LISTA DE SECUENCIAS

<110> APPLIED MOLECULAR TRANSPOT INC.

<120> VEHÍCULOS DERIVADOS DE CHOLIX PARA SUMINISTRO ORAL DE CARGA ÚTIL HETERÓLOGA

<130> 40566-722.601

<140> PCT/US2019/050708
<141> 2019-09-11

<150> 62/888,400
<151> 2019-08-16

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<151> 2019-03-08

<150> 62/816,022
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<151> 2018-11-07

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Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile Pro
20 25 30

Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr Ile
35 40 45

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Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser Ile
    50                  55                  60

Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr Val
65                  70                  75                  80

Asn Gln Asp Ala Pro Phe Gly Val Ile His Leu Asp Ile Thr Thr Glu
                85                  90                  95

Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe Ala
            100                 105                 110

Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile Lys
        115                 120                 125

Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val Pro
    130                 135                 140

Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp Lys
145                 150                 155                 160

Thr Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His Asn Ile
                165                 170                 175

Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys Glu Gly
            180                 185                 190

Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala Leu Cys
        195                 200                 205

Trp Leu Val Pro Met Asp Ala Ile Tyr Asn Tyr Ile Thr Gln Gln Asn
    210                 215                 220

Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr Val Ala
225                 230                 235                 240

Gly Thr Pro Lys Val Ile Thr Val Lys Gln Gly Ile Glu Gln Lys Pro
                245                 250                 255
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Val Glu Gln Arg Ile His Phe Ser Lys Gly Asn Ala Met Ser Ala Leu
            260                 265                 270

Ala Ala His Arg Val Cys Gly Val Pro Leu Glu Thr Leu Ala Arg Ser
        275                 280                 285

Arg Lys Pro Arg Asp Leu Thr Asp Asp Leu Ser Cys Ala Tyr Gln Ala
    290                 295                 300

Gln Asn Ile Val Ser Leu Phe Val Ala Thr Arg Ile Leu Phe Ser His
305                 310                 315                 320

Leu Asp Ser Val Phe Thr Leu Asn Leu Asp Glu Gln Glu Pro Glu Val
                325                 330                 335

Ala Glu Arg Leu Ser Asp Leu Arg Arg Ile Asn Glu Asn Asn Pro Gly
            340                 345                 350

Met Val Thr Gln Val Leu Thr Val Ala Arg Gln Ile Tyr Asn Asp Tyr
        355                 360                 365

Val Thr His His Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala Gly Ala
    370                 375                 380

Gln Ala Ala Asp Ile Leu Ser Leu Phe Cys Pro Asp Ala Asp Lys Ser
385                 390                 395                 400

Cys Val Ala Ser Asn Asn Asp Gln Ala Asn Ile Asn Ile Glu Ser Arg
                405                 410                 415

Ser Gly Arg Ser Tyr Leu Pro Glu Asn Arg Ala Val Ile Thr Pro Gln
            420                 425                 430

Gly Val Thr Asn Trp Thr Tyr Gln Glu Leu Glu Ala Thr His Gln Ala
        435                 440                 445

Leu Thr Arg Glu Gly Tyr Val Phe Val Gly Tyr His Gly Thr Asn His
    450                 455                 460

Val Ala Ala Gln Thr Ile Val Asn Arg Ile Ala Pro Val Pro Arg Gly
465                 470                 475                 480
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Asn Asn Thr Glu Asn Glu Glu Lys Trp Gly Gly Leu Tyr Val Ala Thr
485 490 495

His Ala Glu Val Ala His Gly Tyr Ala Arg Ile Lys Glu Gly Thr Gly
500 505 510

Glu Tyr Gly Leu Pro Thr Arg Ala Glu Arg Asp Ala Arg Gly Val Met
515 520 525

Leu Arg Val Tyr Ile Pro Arg Ala Ser Leu Glu Arg Phe Tyr Arg Thr
530 535 540

Asn Thr Pro Leu Glu Asn Ala Glu Glu His Ile Thr Gln Val Ile Gly
545 550 555 560

His Ser Leu Pro Leu Arg Asn Glu Ala Phe Thr Gly Pro Glu Ser Ala
565 570 575

Gly Gly Glu Asp Glu Thr Val Ile Gly Trp Asp Met Ala Ile His Ala
580 585 590

Val Ala Ile Pro Ser Thr Ile Pro Gly Asn Ala Tyr Glu Glu Leu Ala
595 600 605

Ile Asp Glu Glu Ala Val Ala Lys Glu Gln Ser Ile Ser Thr Lys Pro
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Pro Tyr Lys Glu Arg Lys Asp Glu Leu Lys
625 630

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polipéptido sintético

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Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr Ile
        35                  40                  45

Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser Ile
    50                  55                  60

Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr Val
65                  70                  75                  80

Asn Gln Asp Ala Pro Phe Gly Val Ile His Leu Asp Ile Thr Thr Glu
                85                  90                  95

Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe Ala
            100                 105                 110

Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile Lys
        115                 120                 125

Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val Pro
    130                 135                 140

Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp Lys
145                 150                 155                 160

Thr Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His Asn Ile
                165                 170                 175

Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys Glu Gly
            180                 185                 190

Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala Leu Cys
        195                 200                 205

Trp Leu Val Pro Met Asp Ala Ile Tyr Asn Tyr Ile Thr Gln Gln Asn
    210                 215                 220
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Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr Val Ala
225                 230                 235                 240

Gly Thr Pro Lys Val Ile Thr Val Lys Gln Gly Ile Glu Gln Lys Pro
                245                 250                 255

Val Glu Gln Arg Ile His Phe Ser Lys Gly Asn Ala Met Ser Ala Leu
            260                 265                 270

Ala Ala His Arg Val Cys Gly Val Pro Leu Glu Thr Leu Ala Arg Ser
        275                 280                 285

Arg Lys Pro Arg Asp Leu Thr Asp Asp Leu Ser Cys Ala Tyr Gln Ala
    290                 295                 300

Gln Asn Ile Val Ser Leu Phe Val Ala Thr Arg Ile Leu Phe Ser His
305                 310                 315                 320

Leu Asp Ser Val Phe Thr Leu Asn Leu Asp Glu Gln Glu Pro Glu Val
                325                 330                 335

Ala Glu Arg Leu Ser Asp Leu Arg Arg Ile Asn Glu Asn Asn Pro Gly
            340                 345                 350

Met Val Thr Gln Val Leu Thr Val Ala Arg Gln Ile Tyr Asn Asp Tyr
        355                 360                 365

Val Thr His His Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala Gly Ala
    370                 375                 380

Gln Ala Ala Asp Ile Leu Ser Leu Phe Cys Pro Asp Ala Asp Lys Ser
385                 390                 395                 400

Cys Val Ala Ser Asn Asn Asp Gln Ala Asn Ile Asn Ile Glu Ser Arg
                405                 410                 415

Ser Gly Arg Ser Tyr Leu Pro Glu Asn Arg Ala Val Ile Thr Pro Gln
            420                 425                 430

Gly Val Thr Asn Trp Thr Tyr Gln Glu Leu Glu Ala Thr His Gln Ala
        435                 440                 445
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Leu Thr Arg Glu Gly Tyr Val Phe Val Gly Tyr His Gly Thr Asn His
    450                 455                 460

Val Ala Ala Gln Thr Ile Val Asn Arg Ile Ala Pro Val Pro Arg Gly
465                 470                 475                 480

Asn Asn Thr Glu Asn Glu Glu Lys Trp Gly Gly Leu Tyr Val Ala Thr
                485                 490                 495

His Ala Glu Val Ala His Gly Tyr Ala Arg Ile Lys Glu Gly Thr Gly
            500                 505                 510

Glu Tyr Gly Leu Pro Thr Arg Ala Glu Arg Asp Ala Arg Gly Val Met
        515                 520                 525

Leu Arg Val Tyr Ile Pro Arg Ala Ser Leu Glu Arg Phe Tyr Arg Thr
    530                 535                 540

Asn Thr Pro Leu Glu Asn Ala Glu Glu His Ile Thr Gln Val Ile Gly
545                 550                 555                 560

His Ser Leu Pro Leu Arg Asn Glu Ala Phe Thr Gly Pro Glu Ser Ala
                565                 570                 575

Gly Gly Glu Asp Glu Thr Val Ile Gly Trp Asp Met Ala Ile His Ala
            580                 585                 590

Val Ala Ile Pro Ser Thr Ile Pro Gly Asn Ala Tyr Glu Glu Leu Ala
        595                 600                 605

Ile Asp Glu Glu Ala Val Ala Lys Glu Gln Ser Ile Ser Thr Lys Pro
    610                 615                 620

Pro Tyr Lys Glu Arg Lys Asp Glu Leu Lys
625                 630
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Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile Pro
            20                  25                  30

Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr Ile
        35                  40                  45

Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser Ile
    50                  55                  60

Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr Val
65                  70                  75                  80

Asn Gln Asp Ala Pro Phe Gly Val Ile His Leu Asp Ile Thr Thr Glu
                85                  90                  95

Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe Ala
            100                 105                 110

Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile Lys
        115                 120                 125

Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val Pro
    130                 135                 140

Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp Lys
145                 150                 155                 160

Thr Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His Asn Ile
                165                 170                 175

Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys Glu Gly
            180                 185                 190

Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala Leu Cys
        195                 200                 205
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Trp Leu Val Pro Met Asp Ala Ile Tyr Asn Tyr Ile Thr Gln Gln Asn
    210                 215                 220

Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr Val Ala
225                 230                 235                 240

Gly Thr Pro Lys Val Ile Thr Val Lys Gln Gly Ile Glu Gln Lys Pro
                245                 250                 255

Val Glu Gln Arg Ile His Phe Ser Lys Gly Asn Ala Met Ser Ala Leu
            260                 265                 270

Ala Ala His Arg Val Cys Gly Val Pro Leu Glu Thr Leu Ala Arg Ser
        275                 280                 285

Arg Lys Pro Arg Asp Leu Thr Asp Asp Leu Ser Cys Ala Tyr Gln Ala
    290                 295                 300

Gln Asn Ile Val Ser Leu Phe Val Ala Thr Arg Ile Leu Phe Ser His
305                 310                 315                 320

Leu Asp Ser Val Phe Thr Leu Asn Leu Asp Glu Gln Glu Pro Glu Val
                325                 330                 335

Ala Glu Arg Leu Ser Asp Leu Arg Arg Ile Asn Glu Asn Asn Pro Gly
            340                 345                 350

Met Val Thr Gln Val Leu Thr Val Ala Arg Gln Ile Tyr Asn Asp Tyr
        355                 360                 365

Val Thr His His Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala Gly Ala
    370                 375                 380

Gln Ala Ala Asp Ile Leu Ser Leu Phe Cys Pro Asp Ala Asp Lys Ser
385                 390                 395                 400

Cys Val Ala Ser Asn Asn Asp Gln Ala Asn Ile Asn Ile Glu Ser Arg
                405                 410                 415

Ser Gly Arg Ser Tyr Leu Pro Glu Asn Arg Ala Val Ile Thr Pro Gln
            420                 425                 430
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Gly Val Thr Asn Trp Thr Tyr Gln Glu Leu Glu Ala Thr His Gln Ala
        435                 440                 445

Leu Thr Arg Glu Gly Tyr Val Phe Val Gly Tyr His Gly Thr Asn His
    450                 455                 460

Val Ala Ala Gln Thr Ile Val Asn Arg Ile Ala Pro Val Pro Arg Gly
465                 470                 475                 480

Asn Asn Thr Glu Asn Glu Glu Lys Trp Gly Gly Leu Tyr Val Ala Thr
                485                 490                 495

His Ala Glu Val Ala His Gly Tyr Ala Arg Ile Lys Glu Gly Thr Gly
            500                 505                 510

Glu Tyr Gly Leu Pro Thr Arg Ala Glu Arg Asp Ala Arg Gly Val Met
        515                 520                 525

Leu Arg Val Tyr Ile Pro Arg Ala Ser Leu Glu Arg Phe Tyr Arg Thr
    530                 535                 540

Asn Thr Pro Leu Glu Asn Ala Glu Glu His Ile Thr Gln Val Ile Gly
545                 550                 555                 560

His Ser Leu Pro Leu Arg Asn Glu Ala Phe Thr Gly Pro Glu Ser Ala
                565                 570                 575

Gly Gly Glu Asp Glu Thr Val Ile Gly Trp Asp Met Ala Ile His Ala
            580                 585                 590

Val Ala Ile Pro Ser Thr Ile Pro Gly Asn Ala Tyr Glu Glu Leu Ala
        595                 600                 605

Ile Asp Glu Glu Ala Val Ala Lys Glu Gln Ser Ile Ser Thr Lys Pro
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Pro Tyr Lys Glu Arg Lys Asp Glu Leu Lys
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Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr Ile
        35   40   45

Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser Ile
    50   55   60

Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr Val
65   70   75   80

Asn Gln Asp Ala Pro Phe Gly Val Ile Asn Leu Asp Ile Thr Thr Glu
                85   90   95

Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe Ala
            100   105   110

Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile Lys
        115   120   125

Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val Pro
    130   135   140

Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp Glu
145   150   155   160

Asn Gln Gly Asn Val Ser Phe Ala Val Thr Arg Pro Glu Gln Ser Ile
                165   170   175

Ala Lys Gln Ser Ile Ala Lys Gln Ser Ile Ala Ile Ser Trp Pro Ser
            180   185   190

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Val Ser Tyr Lys Ala Ala Gln Lys Glu Gly Ser Arg His Lys Arg Trp
        195                 200                 205

Ala His Trp His Thr Gly Leu Ala Leu Cys Trp Leu Val Pro Ile Asp
    210                 215                 220

Ala Ile Tyr Asn Tyr Ile Thr Gln Gln Asn Cys Thr Leu Gly Asp Asn
225                 230                 235                 240

Trp Phe Gly Gly Ser Tyr Glu Thr Val Ala Gly Thr Pro Lys Ala Ile
                245                 250                 255

Thr Val Lys Gln Gly Ile Glu Gln Lys Pro Val Glu Gln Arg Ile His
            260                 265                 270

Phe Ser Lys Lys Asn Ala Met Glu Ala Leu Ala Ala His Arg Val Cys
        275                 280                 285

Gly Val Pro Leu Glu Thr Leu Ala Arg Ser Arg Lys Pro Arg Asp Leu
    290                 295                 300

Pro Asp Asp Leu Ser Cys Ala Tyr Gln Ala Gln Asn Ile Val Ser Leu
305                 310                 315                 320

Phe Val Ala Thr Arg Ile Leu Phe Ser His Leu Asp Ser Val Phe Thr
                325                 330                 335

Leu Asn Leu Asp Glu Gln Glu Pro Glu Val Ala Glu Arg Leu Ser Ala
            340                 345                 350

Leu Arg Gln Ile Asn Glu Asn Asn Pro Gly Met Val Thr Gln Val Leu
        355                 360                 365

Thr Val Ala Arg Gln Ile Tyr Asn Asp Tyr Val Thr His His Pro Gly
    370                 375                 380

Leu Thr Pro Glu Gln Thr Ser Ala Gly Ala Gln Ala Ala Asp Ile Leu
385                 390                 395                 400

Ser Leu Phe Cys Pro Asp Ala Asp Lys Pro Cys Val Ala Ser Asn Asn
                405                 410                 415
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Asp Gln Ala Asn Ile Asn Val Glu Ser Arg Ser Gly Arg Ser Tyr Leu
            420                 425                 430

Pro Glu Asn Arg Ala Val Ile Thr Pro Gln Gly Val Thr Asn Trp Thr
        435                 440                 445

Tyr Gln Glu Leu Glu Ala Thr His Gln Ala Leu Thr Arg Glu Gly Tyr
    450                 455                 460

Val Phe Val Gly Tyr His Gly Thr Asn His Val Ala Ala Gln Thr Ile
465                 470                 475                 480

Val Asn Arg Ile Ala Pro Val Pro Arg Gly Asn Asn Thr Glu Asn Glu
                485                 490                 495

Glu Lys Trp Gly Gly Leu Tyr Val Ala Thr His Ala Glu Val Ala His
            500                 505                 510

Gly Tyr Ala Arg Ile Lys Glu Gly Thr Gly Glu Tyr Gly Leu Pro Thr
        515                 520                 525

Arg Ala Glu Arg Glu Ala Arg Gly Val Met Leu Arg Val Tyr Ile Pro
    530                 535                 540

Arg Ala Ser Leu Glu Arg Phe Tyr Arg Thr Asn Thr Pro Leu Glu Asn
545                 550                 555                 560

Ala Glu Arg His Ile Thr Gln Val Ile Gly His Ser Leu Pro Leu Arg
                565                 570                 575

Asn Glu Ala Phe Thr Gly Pro Glu Ser Ala Gly Gly Glu Asp Glu Thr
            580                 585                 590

Val Ile Gly Trp Asp Met Ala Ile His Ala Val Ala Ile Pro Ser Thr
        595                 600                 605

Ile Pro Gly Asn Ala Tyr Glu Glu Leu Ala Ile Asp Glu Glu Ala Val
    610                 615                 620
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Ala Lys Glu Gln Ser Ile Ser Ala Lys Pro Pro Tyr Lys Glu Gln Lys
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Asp Glu Leu Lys
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Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile Pro
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Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr Ile
        35                  40                  45


Asn Asp Glu Gln Asn Asp Ile Met Asp Glu Gly Lys Gly Glu Ser Ile
    50                  55                  60


Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr Val
65                  70                  75                  80


Asn Gln Asp Ala Pro Phe Gly Val Ile Asn Leu Asp Ile Thr Thr Glu
                85                  90                  95


Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe Ala
            100                 105                 110


Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile Lys
        115                 120                 125


Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val Pro
    130                 135                 140


Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp Glu
145                 150                 155                 160
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Asn Gln Gly Asn Val Ser Phe Ala Val Thr Arg Pro Glu Gln Ser Ile
                165                 170                 175

Ala Lys Gln Ser Ile Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala
            180                 185                 190

Ala Gln Lys Glu Gly Ser Arg His Lys Arg Trp Ala His Trp His Thr
        195                 200                 205

Gly Leu Ala Leu Cys Trp Leu Val Pro Ile Asp Ala Ile Tyr Asn Tyr
    210                 215                 220

Ile Thr Gln Gln Asn Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser
225                 230                 235                 240

Tyr Glu Thr Val Ala Gly Thr Pro Lys Ala Ile Thr Val Lys Gln Gly
                245                 250                 255

Ile Glu Gln Lys Pro Val Glu Gln Arg Ile His Phe Ser Lys Lys Asn
            260                 265                 270

Ala Met Glu Ala Leu Ala Ala His Arg Val Cys Gly Val Pro Leu Glu
        275                 280                 285

Thr Leu Ala Arg Ser Arg Lys Pro Arg Asp Leu Thr Asp Asp Leu Ser
    290                 295                 300

Cys Ala Tyr Gln Ala Gln Asn Ile Val Ser Leu Phe Val Ala Thr Arg
305                 310                 315                 320

Ile Leu Phe Ser His Leu Asp Ser Val Phe Thr Leu Asn Leu Asp Glu
                325                 330                 335

Gln Glu Pro Glu Val Ala Glu Arg Leu Ser Ala Leu Arg Gln Ile Asn
            340                 345                 350

Glu Asn Asn Pro Gly Met Val Thr Gln Val Leu Thr Val Ala Arg Gln
        355                 360                 365

Ile Tyr Asn Asp Tyr Val Thr His His Pro Gly Leu Thr Pro Glu Gln
    370                 375                 380
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Thr Ser Ala Gly Ala Gln Ala Ala Asp Ile Leu Ser Leu Phe Cys Pro
385                 390                 395                 400

Asp Ala Asp Lys Ser Cys Val Ala Ser Asn Asn Asp Gln Ala Asn Ile
                405                 410                 415

Asn Ile Glu Ser Arg Ser Gly Arg Ser Tyr Leu Pro Glu Asn Arg Ala
            420                 425                 430

Val Ile Thr Pro Gln Gly Val Thr Asn Trp Thr Tyr Gln Glu Leu Glu
        435                 440                 445

Ala Thr His Gln Ala Leu Thr Arg Glu Gly Tyr Val Phe Val Gly Tyr
    450                 455                 460

His Gly Thr Asn His Val Ala Ala Gln Thr Ile Val Asn Arg Ile Ala
465                 470                 475                 480

Pro Val Pro Arg Gly Asn Asn Thr Glu Asn Glu Glu Lys Trp Gly Gly
                485                 490                 495

Leu Tyr Val Ala Thr His Ala Glu Val Ala His Gly Tyr Ala Arg Ile
            500                 505                 510

Lys Glu Gly Thr Gly Glu Tyr Gly Leu Pro Thr Arg Ala Glu Arg Asp
        515                 520                 525

Ala Arg Gly Val Met Leu Arg Val Tyr Ile Pro Arg Ala Ser Leu Glu
    530                 535                 540

Arg Phe Tyr Arg Thr Asn Thr Pro Leu Glu Asn Ala Glu Glu His Ile
545                 550                 555                 560

Thr Gln Val Ile Gly His Ser Leu Pro Leu Arg Asn Glu Ala Phe Thr
                565                 570                 575

Gly Pro Glu Ser Ala Gly Gly Glu Asp Glu Thr Val Ile Gly Trp Asp
            580                 585                 590
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Met Ala Ile His Ala Val Ala Ile Pro Ser Thr Ile Pro Gly Asn Ala
595 600 605

Tyr Glu Glu Leu Ala Ile Asp Glu Glu Ala Val Ala Lys Glu Gln Ser
610 615 620

Ile Ser Thr Lys Pro Pro Tyr Lys Glu Arg Lys Asp Glu Leu Lys
625 630 635

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Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile Pro
20 25 30

Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr Ile
35 40 45

Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser Ile
50 55 60

Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr Val
65 70 75 80

Asn Gln Asp Ala Pro Phe Gly Val Ile His Leu Asp Ile Thr Thr Glu
85 90 95

Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe Ala
100 105 110

Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile Lys
115 120 125

Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val Pro
130 135 140

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Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp Glu
145                 150                 155                 160

Asn Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His Asn Ile
                165                 170                 175

Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys Glu Gly
            180                 185                 190

Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala Leu Cys
        195                 200                 205

Trp Leu Val Pro Ile Asp Ala Ile Tyr Asn Tyr Ile Thr Gln Gln Asn
    210                 215                 220

Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr Val Ala
225                 230                 235                 240

Gly Thr Pro Lys Ala Ile Thr Val Lys Gln Gly Ile Glu Gln Lys Pro
                245                 250                 255

Val Glu Gln Arg Ile His Phe Ser Lys Lys Asn Ala Met Glu Ala Leu
            260                 265                 270

Ala Ala His Arg Val Cys Gly Val Pro Leu Glu Thr Leu Ala Arg Ser
        275                 280                 285

Arg Lys Pro Arg Asp Leu Thr Asp Asp Leu Ser Cys Ala Tyr Gln Ala
    290                 295                 300

Gln Asn Ile Val Ser Leu Phe Val Ala Thr Arg Ile Leu Phe Ser His
305                 310                 315                 320

Leu Asp Ser Val Phe Thr Leu Asn Leu Asp Glu Gln Glu Pro Glu Val
                325                 330                 335

Ala Glu Arg Leu Ser Ala Leu Arg Gln Ile Asn Glu Asn Asn Pro Gly
            340                 345                 350

Met Val Thr Gln Val Leu Thr Val Ala Arg Gln Ile Tyr Asn Asp Tyr
        355                 360                 365
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Val Thr His His Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala Gly Ala
    370                 375                 380

Gln Ala Ala Asp Ile Leu Ser Leu Phe Cys Pro Asp Ala Asp Lys Pro
385                 390                 395                 400

Cys Val Ala Ser Asn Asn Asp Gln Ala Asn Ile Asn Ile Glu Ser Arg
                405                 410                 415

Ser Gly Arg Ser Tyr Leu Pro Glu Asn Arg Ala Val Ile Thr Pro Gln
            420                 425                 430

Gly Val Thr Asn Trp Thr Tyr Gln Glu Leu Glu Ala Thr His Gln Ala
        435                 440                 445

Leu Thr Arg Glu Gly Tyr Val Phe Val Gly Tyr His Gly Thr Asn His
    450                 455                 460

Val Ala Ala Gln Thr Ile Val Asn Arg Ile Ala Pro Val Pro Arg Gly
465                 470                 475                 480

Asn Asn Thr Glu Asn Glu Glu Lys Trp Gly Gly Leu Tyr Val Ala Thr
                485                 490                 495

His Ala Glu Val Ala His Gly Tyr Ala Arg Ile Lys Glu Gly Thr Gly
            500                 505                 510

Glu Tyr Gly Leu Pro Thr Arg Ala Glu Arg Asp Ala Arg Gly Val Met
        515                 520                 525

Leu Arg Val Tyr Ile Pro Arg Ala Ser Leu Glu Arg Phe Tyr Arg Thr
    530                 535                 540

Asn Thr Pro Leu Glu Asn Ala Glu Glu His Ile Thr Gln Val Ile Gly
545                 550                 555                 560

His Ser Leu Pro Leu Arg Asn Glu Ala Phe Thr Gly Pro Glu Ser Ala
                565                 570                 575
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Gly Gly Glu Asp Glu Thr Val Ile Gly Trp Asp Met Ala Ile His Ala
            580                 585                 590

Val Ala Ile Pro Ser Thr Ile Pro Gly Asn Ala Tyr Glu Arg Leu Thr
        595                 600                 605

Pro Ala Glu Glu Ala Val Val Lys Glu Ala Ile Ala Lys Glu Gln Ser
    610                 615                 620

Ile Ser Ala Lys Pro Pro Tyr Lys Glu Gln Lys Asp Glu Leu Lys
625                 630                 635
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Val Glu Asp Glu Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys Ser
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Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile Pro
            20                  25                  30

Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr Ile
        35                  40                  45

Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser Ile
    50                  55                  60

Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr Val
65                  70                  75                  80

Asn Gln Asp Ala Pro Phe Gly Val Ile His Leu Asp Ile Thr Thr Glu
                85                  90                  95

Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe Ala
            100                 105                 110

Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile Lys
        115                 120                 125
```

```
Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val Pro
    130                 135                 140

Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp Glu
145                 150                 155                 160

Asn Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His Asn Ile
                165                 170                 175

Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys Glu Gly
            180                 185                 190

Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala Leu Cys
        195                 200                 205

Trp Leu Val Pro Ile Asp Ala Ile Tyr Asn Tyr Ile Thr Gln Gln Asn
    210                 215                 220

Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr Val Ala
225                 230                 235                 240

Gly Thr Pro Lys Ala Ile Thr Val Lys Gln Gly Ile Glu Gln Lys Pro
                245                 250                 255

Val Glu Gln Arg Ile His Phe Ser Lys Lys Asn Ala Met Glu Ala Leu
            260                 265                 270

Ala Ala His Arg Val Cys Gly Val Pro Leu Glu Thr Leu Ala Arg Ser
        275                 280                 285

Arg Lys Pro Arg Asp Leu Pro Asp Asp Leu Ser Cys Ala Tyr Gln Ala
    290                 295                 300

Gln Asn Ile Val Ser Leu Phe Val Ala Thr Arg Ile Leu Phe Ser His
305                 310                 315                 320

Leu Asp Ser Val Phe Thr Leu Asn Leu Asp Glu Gln Glu Pro Glu Val
                325                 330                 335

Ala Glu Arg Leu Ser Ala Leu Arg Gln Ile Asn Glu Asn Asn Pro Gly
            340                 345                 350
```

```
Met Val Thr Gln Val Leu Thr Val Ala Arg Gln Ile Tyr Asn Asp Tyr
        355                 360                 365

Val Thr His His Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala Gly Ala
    370                 375                 380

Gln Ala Ala Asp Ile Leu Ser Leu Phe Cys Pro Asp Ala Asp Lys Pro
385                 390                 395                 400

Cys Val Ala Ser Asn Asn Asp Gln Ala Asn Ile Asn Ile Glu Ser Arg
                405                 410                 415

Ser Gly Arg Ser Tyr Leu Pro Glu Asn Arg Ala Val Ile Thr Pro Gln
            420                 425                 430

Gly Val Thr Asn Trp Thr Tyr Gln Glu Leu Glu Ala Thr His Gln Ala
        435                 440                 445

Leu Thr Arg Glu Gly Tyr Val Phe Val Gly Tyr His Gly Thr Asn His
    450                 455                 460

Val Ala Ala Gln Thr Ile Val Asn Arg Ile Ala Pro Val Pro Arg Gly
465                 470                 475                 480

Asn Asn Thr Glu Asn Glu Glu Lys Trp Gly Gly Leu Tyr Val Ala Thr
                485                 490                 495

His Ala Glu Val Ala His Gly Tyr Ala Arg Ile Lys Glu Gly Thr Gly
            500                 505                 510

Glu Tyr Gly Leu Pro Thr Arg Ala Glu Arg Asp Ala Arg Gly Val Met
        515                 520                 525

Leu Arg Val Tyr Ile Pro Arg Ala Ser Leu Glu Arg Phe Tyr Arg Thr
    530                 535                 540

Asn Thr Pro Leu Glu Asn Ala Glu Glu His Ile Thr Gln Val Ile Gly
545                 550                 555                 560
```

```
His Ser Leu Pro Leu Arg Asn Glu Ala Phe Thr Gly Pro Glu Ser Ala
                565                 570                 575

Gly Gly Glu Asp Glu Thr Val Ile Gly Trp Asp Met Ala Ile His Ala
            580                 585                 590

Val Ala Ile Pro Ser Thr Ile Pro Gly Asn Ala Tyr Glu Arg Leu Thr
        595                 600                 605

Pro Ala Glu Glu Ala Val Val Lys Glu Ala Ile Ala Lys Glu Gln Ser
    610                 615                 620

Ile Ser Ala Lys Pro Pro Tyr Lys Glu Gln Lys Asp Glu Leu Lys
625                 630                 635
```

<210> 8
<211> 634
<212> PRT
<213> Vibrio cholerae

<400> 8

```
Val Glu Asp Glu Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys Ser
1               5                   10                  15

Leu Thr Pro Glu Pro Gly Lys Gln Ile Gln Ser Lys Leu Ser Ile Pro
            20                  25                  30

Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr Ile
        35                  40                  45

Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser Ile
    50                  55                  60

Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr Val
65                  70                  75                  80

Asn Gln Asp Ala Pro Phe Gly Val Ile Asn Leu Asp Ile Thr Thr Glu
                85                  90                  95

Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe Ala
            100                 105                 110
```

```
Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile Lys
        115                 120                 125

Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val Pro
    130                 135                 140

Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp Lys
145                 150                 155                 160

Thr Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His Asn Ile
                165                 170                 175

Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys Glu Gly
            180                 185                 190

Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala Leu Cys
        195                 200                 205

Trp Leu Val Pro Ile Asp Ala Ile Tyr Asn Tyr Ile Thr Gln Gln Asn
    210                 215                 220

Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr Val Ala
225                 230                 235                 240

Gly Thr Pro Lys Ala Ile Thr Val Lys Gln Gly Ile Glu Gln Lys Pro
                245                 250                 255

Val Glu Gln Arg Ile His Phe Ser Lys Lys Asn Ala Met Glu Ala Leu
            260                 265                 270

Ala Ala His Arg Val Cys Gly Val Pro Leu Glu Thr Leu Ala Arg Ser
        275                 280                 285

Arg Lys Pro Arg Asp Leu Thr Asp Asp Leu Ser Cys Val Tyr Gln Ala
    290                 295                 300

Gln Asn Ile Val Ser Leu Phe Val Ala Thr Arg Ile Leu Phe Ser His
305                 310                 315                 320

Leu Asp Ser Val Phe Thr Leu Asn Leu Asp Glu Gln Glu Pro Glu Val
                325                 330                 335
```

```
Ala Glu Arg Leu Ser Ala Leu Arg Gln Ile Asn Glu Asn Asn Pro Gly
            340                 345                 350

Met Val Thr Gln Val Leu Thr Val Ala Arg Gln Ile Tyr Asn Asp Tyr
        355                 360                 365

Val Thr His His Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala Gly Ala
    370                 375                 380

Gln Ala Ala Asp Ile Leu Ser Leu Phe Cys Pro Asp Ala Asp Lys Ser
385                 390                 395                 400

Cys Val Ala Ser Asn Asn Asp Gln Ala Asn Ile Asn Ile Glu Ser Arg
                405                 410                 415

Ser Gly Arg Ser Tyr Leu Pro Glu Asn Arg Ala Val Ile Thr Pro Gln
            420                 425                 430

Gly Val Thr Asn Trp Thr Tyr Gln Glu Leu Glu Ala Thr His Gln Ala
        435                 440                 445

Leu Thr Arg Glu Gly Tyr Val Phe Val Gly Tyr His Gly Thr Asn His
    450                 455                 460

Val Ala Ala Gln Thr Ile Val Asn Arg Ile Ala Pro Val Pro Arg Gly
465                 470                 475                 480

Asn Asn Thr Glu Asn Glu Lys Lys Trp Gly Gly Leu Tyr Val Ala Thr
                485                 490                 495

His Ala Glu Val Ala His Gly Tyr Ala Arg Ile Lys Glu Gly Thr Gly
            500                 505                 510

Glu Tyr Gly Leu Pro Thr Arg Ala Glu Arg Asp Ala Arg Gly Val Met
        515                 520                 525

Leu Arg Val Tyr Ile Pro Arg Ala Ser Leu Glu Arg Phe Tyr Arg Thr
    530                 535                 540
```

```
Asn Thr Pro Leu Glu Asn Ala Glu Glu His Ile Thr Gln Val Ile Gly
545                 550                 555                 560

His Ser Leu Pro Leu Arg Asn Glu Ala Phe Thr Gly Pro Glu Ser Ala
                565                 570                 575

Gly Gly Glu Asp Glu Thr Val Ile Gly Trp Asp Met Ala Ile His Ala
            580                 585                 590

Val Ala Ile Pro Ser Thr Ile Pro Gly Asn Ala Tyr Glu Glu Leu Ala
        595                 600                 605

Ile Asp Glu Glu Ala Val Ala Lys Glu Gln Ser Ile Ser Thr Lys Pro
    610                 615                 620

Pro Tyr Lys Glu Arg Lys Asp Glu Leu Lys
625                 630
```

<210> 9
<211> 634
<212> PRT
<213> Vibrio cholerae

<400> 9

```
Val Glu Asp Glu Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys Ser
1               5                   10                  15

Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile Pro
            20                  25                  30

Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr Ile
        35                  40                  45

Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser Ile
    50                  55                  60

Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr Val
65                  70                  75                  80

Asn Gln Asp Ala Pro Phe Gly Val Ile Asn Leu Asp Ile Thr Thr Glu
                85                  90                  95
```

```
Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe Ala
            100                 105                 110

Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile Lys
        115                 120                 125

Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val Pro
    130                 135                 140

Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp Lys
145                 150                 155                 160

Thr Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His Asn Ile
                165                 170                 175

Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys Glu Gly
            180                 185                 190

Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala Leu Cys
        195                 200                 205

Trp Leu Val Pro Met Asp Ala Ile Tyr Asn Tyr Ile Thr Gln Gln Asn
    210                 215                 220

Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr Val Ala
225                 230                 235                 240

Gly Thr Pro Lys Val Ile Thr Val Lys Gln Gly Ile Glu Gln Lys Pro
                245                 250                 255

Val Glu Gln Arg Ile His Phe Ser Lys Gly Asn Ala Met Ser Ala Leu
            260                 265                 270

Ala Ala His Arg Val Cys Gly Val Pro Leu Glu Thr Leu Ala Arg Ser
        275                 280                 285

Arg Lys Pro Arg Asp Leu Thr Asp Asp Leu Ser Cys Ala Tyr Gln Ala
    290                 295                 300

Gln Asn Ile Val Ser Leu Phe Val Ala Thr Arg Ile Leu Phe Ser His
305                 310                 315                 320
```

```
Leu Asp Ser Val Phe Thr Leu Asn Leu Asp Glu Gln Glu Pro Glu Val
                325                 330                 335

Ala Glu Arg Leu Ser Asp Leu Arg Arg Ile Asn Glu Asn Asn Pro Gly
            340                 345                 350

Met Val Thr Gln Val Leu Thr Val Ala Arg Gln Ile Tyr Asn Asp Tyr
        355                 360                 365

Val Thr His His Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala Gly Ala
    370                 375                 380

Gln Ala Ala Asp Ile Leu Ser Leu Phe Cys Pro Asp Ala Asp Lys Ser
385                 390                 395                 400

Cys Val Ala Ser Asn Asn Asp Gln Ala Asn Ile Asn Ile Glu Ser Arg
                405                 410                 415

Ser Gly Arg Ser Tyr Leu Pro Glu Asn Arg Ala Val Ile Thr Pro Gln
            420                 425                 430

Gly Val Thr Asn Trp Thr Tyr Gln Glu Leu Glu Ala Thr His Gln Ala
        435                 440                 445

Leu Thr Arg Glu Gly Tyr Val Phe Val Gly Tyr His Gly Thr Asn His
    450                 455                 460

Val Ala Ala Gln Thr Ile Val Asn Arg Ile Ala Pro Val Pro Arg Gly
465                 470                 475                 480

Asn Asn Thr Glu Asn Glu Glu Lys Trp Gly Gly Leu Tyr Val Ala Thr
                485                 490                 495

His Ala Glu Val Ala His Gly Tyr Ala Arg Ile Lys Glu Gly Thr Gly
            500                 505                 510

Glu Tyr Gly Leu Pro Thr Arg Ala Glu Arg Asp Ala Arg Gly Val Met
        515                 520                 525
```

Leu Arg Val Tyr Ile Pro Arg Ala Ser Leu Glu Arg Phe Tyr Arg Thr
530 535 540

Asn Thr Pro Leu Glu Asn Ala Glu Glu His Ile Thr Gln Val Ile Gly
545 550 555 560

His Ser Leu Pro Leu Arg Asn Glu Ala Phe Thr Gly Pro Glu Ser Ala
565 570 575

Gly Gly Glu Asp Glu Thr Val Ile Gly Trp Asp Met Ala Ile His Ala
580 585 590

Val Ala Ile Pro Ser Thr Ile Pro Gly Asn Ala Tyr Glu Glu Leu Ala
595 600 605

Ile Asp Glu Glu Ala Val Ala Lys Glu Gln Ser Ile Ser Ala Lys Pro
610 615 620

Pro Tyr Lys Glu Arg Lys Asp Glu Leu Lys
625 630

<210> 10
<211> 634
<212> PRT
<213> Vibrio cholerae

<400> 10
Val Glu Asp Glu Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys Ser
1 5 10 15

Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile Pro
20 25 30

Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr Ile
35 40 45

Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser Ile
50 55 60

Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr Val
65 70 75 80

```
Asn Gln Asp Ala Pro Phe Gly Val Ile Asn Leu Asp Ile Thr Thr Glu
                85                  90                  95

Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe Ala
            100                 105                 110

Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile Lys
        115                 120                 125

Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val Pro
    130                 135                 140

Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp Lys
145                 150                 155                 160

Thr Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His Asn Ile
                165                 170                 175

Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys Glu Gly
            180                 185                 190

Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala Leu Cys
        195                 200                 205

Trp Leu Val Pro Met Asp Ala Ile Tyr Asn Tyr Ile Thr Gln Gln Asn
    210                 215                 220

Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr Val Ala
225                 230                 235                 240

Gly Thr Pro Lys Val Ile Thr Val Lys Gln Gly Ile Glu Gln Lys Pro
                245                 250                 255

Val Glu Gln Arg Ile His Phe Ser Lys Gly Asn Ala Met Ser Ala Leu
            260                 265                 270

Ala Ala His Arg Val Cys Gly Val Pro Leu Glu Thr Leu Ala Arg Ser
        275                 280                 285

Arg Lys Pro Arg Asp Leu Thr Asp Asp Leu Ser Cys Ala Tyr Gln Ala
    290                 295                 300
```

```
Gln Asn Ile Val Ser Leu Phe Val Ala Thr Arg Ile Leu Phe Ser His
305                 310                 315                 320

Leu Asp Ser Val Phe Thr Leu Asn Leu Asp Glu Gln Glu Pro Glu Val
                325                 330                 335

Ala Glu Arg Leu Ser Asp Leu Arg Arg Ile Asn Glu Asn Asn Pro Gly
            340                 345                 350

Met Val Thr Gln Val Leu Thr Val Ala Arg Gln Ile Tyr Asn Asp Tyr
        355                 360                 365

Val Thr His His Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala Gly Ala
    370                 375                 380

Gln Ala Ala Asp Ile Leu Ser Leu Phe Cys Pro Asp Ala Asp Lys Ser
385                 390                 395                 400

Cys Val Ala Ser Asn Asn Asp Gln Ala Asn Ile Asn Ile Glu Ser Arg
                405                 410                 415

Ser Gly Arg Ser Tyr Leu Pro Glu Asn Arg Ala Val Ile Thr Pro Gln
            420                 425                 430

Gly Val Thr Asn Trp Thr Tyr Gln Glu Leu Glu Ala Thr His Gln Ala
        435                 440                 445

Leu Thr Arg Glu Gly Tyr Val Phe Val Gly Tyr His Gly Thr Asn His
    450                 455                 460

Val Ala Ala Gln Thr Ile Val Asn Arg Ile Ala Pro Val Pro Arg Gly
465                 470                 475                 480

Asn Asn Thr Glu Asn Glu Glu Lys Trp Gly Gly Leu Tyr Val Ser Thr
                485                 490                 495

His Ala Glu Val Ala His Gly Tyr Ala Arg Ile Lys Glu Gly Thr Gly
            500                 505                 510
```

```
Glu Tyr Gly Leu Pro Thr Arg Ala Glu Arg Asp Ala Arg Gly Val Met
        515                 520                 525

Leu Arg Val Tyr Ile Pro Arg Ala Ser Leu Glu Arg Phe Tyr Arg Thr
    530                 535                 540

Asn Thr Pro Leu Glu Asn Ala Glu Glu His Ile Thr Gln Val Ile Gly
545                 550                 555                 560

His Ser Leu Pro Leu Arg Asn Glu Ala Phe Thr Gly Pro Glu Ser Ala
                565                 570                 575

Gly Gly Glu Asp Glu Thr Val Ile Gly Trp Asp Met Ala Ile His Ala
            580                 585                 590

Val Ala Ile Pro Ser Thr Ile Pro Gly Asn Ala Tyr Glu Glu Leu Ala
        595                 600                 605

Ile Asp Glu Glu Ala Val Ala Lys Glu Gln Ser Ile Ser Thr Lys Pro
    610                 615                 620

Pro Tyr Lys Glu Arg Lys Asp Glu Leu Lys
625                 630
```

<210> 11
<211> 634
<212> PRT
<213> Vibrio cholerae

<400> 11

```
Val Glu Asp Glu Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys Ser
1               5                   10                  15

Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile Pro
            20                  25                  30

Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr Ile
        35                  40                  45

Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser Ile
    50                  55                  60
```

```
Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr Val
65                  70                  75                  80

Asn Gln Asp Ala Pro Phe Gly Val Ile Asn Leu Asp Ile Thr Thr Glu
                85                  90                  95

Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe Ala
            100                 105                 110

Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile Lys
        115                 120                 125

Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val Pro
    130                 135                 140

Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp Lys
145                 150                 155                 160

Thr Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His Asn Ile
                165                 170                 175

Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys Glu Gly
            180                 185                 190

Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala Leu Cys
        195                 200                 205

Trp Leu Val Pro Ile Asp Ala Ile Tyr Asn Tyr Ile Thr Gln Gln Asn
    210                 215                 220

Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr Val Ala
225                 230                 235                 240

Gly Thr Pro Lys Ala Ile Thr Val Lys Gln Gly Ile Glu Gln Lys Pro
                245                 250                 255

Val Glu Gln Arg Ile His Phe Ser Lys Lys Asn Ala Met Glu Ala Leu
            260                 265                 270

Ala Ala His Arg Val Cys Gly Val Pro Leu Glu Thr Leu Ala Arg Ser
        275                 280                 285
```

```
Arg Lys Pro Arg Asp Leu Thr Asp Asp Leu Ser Cys Val Tyr Gln Ala
    290                 295                 300

Gln Asn Ile Val Ser Leu Phe Val Ala Thr Arg Ile Leu Phe Ser His
305                 310                 315                 320

Leu Asp Ser Val Phe Thr Leu Asn Leu Asp Glu Gln Glu Pro Glu Val
                325                 330                 335

Ala Glu Arg Leu Ser Ala Leu Arg Gln Ile Asn Glu Asn Asn Pro Gly
            340                 345                 350

Met Val Thr Gln Val Leu Thr Val Ala Arg Gln Ile Tyr Asn Asp Tyr
        355                 360                 365

Val Thr His His Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala Gly Ala
    370                 375                 380

Gln Ala Ala Asp Ile Leu Ser Leu Phe Cys Pro Asp Ala Asp Lys Ser
385                 390                 395                 400

Cys Val Ala Ser Asn Asn Asp Gln Ala Asn Ile Asn Ile Glu Ser Arg
                405                 410                 415

Ser Gly Arg Ser Tyr Leu Pro Glu Asn Arg Ala Val Ile Thr Pro Gln
            420                 425                 430

Gly Val Thr Asn Trp Thr Tyr Gln Glu Leu Glu Ala Thr His Gln Ala
        435                 440                 445

Leu Thr Arg Glu Gly Tyr Val Phe Val Gly Tyr His Gly Thr Asn His
    450                 455                 460

Val Ala Ala Gln Thr Ile Val Asn Arg Ile Ala Pro Val Pro Arg Gly
465                 470                 475                 480

Asn Asn Thr Glu Asn Glu Lys Lys Trp Gly Gly Leu Tyr Val Ala Thr
                485                 490                 495
```

```
His Ala Glu Val Ala His Gly Tyr Ala Arg Ile Lys Glu Gly Thr Gly
            500                 505                 510

Glu Tyr Gly Leu Pro Thr Arg Ala Glu Arg Asp Ala Arg Gly Val Met
        515                 520                 525

Leu Arg Val Tyr Ile Pro Arg Ala Ser Leu Glu Arg Phe Tyr Arg Thr
    530                 535                 540

Asn Thr Pro Leu Glu Asn Ala Glu Glu His Ile Thr Gln Val Ile Gly
545                 550                 555                 560

His Ser Leu Pro Leu Arg Asn Glu Ala Phe Thr Gly Pro Glu Ser Ala
                565                 570                 575

Gly Gly Glu Asp Glu Thr Val Ile Gly Trp Asp Met Ala Ile His Ala
            580                 585                 590

Val Ala Ile Pro Ser Thr Ile Pro Gly Asn Ala Tyr Glu Glu Leu Ala
        595                 600                 605

Ile Asp Glu Glu Ala Val Ala Lys Glu Gln Ser Ile Ser Thr Lys Pro
    610                 615                 620

Pro Tyr Lys Glu Arg Lys Asp Glu Leu Lys
625                 630
```

<210> 12
<211> 634
<212> PRT
<213> Vibrio cholerae

<400> 12

```
Val Glu Asp Glu Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys Ser
1               5                   10                  15

Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile Pro
            20                  25                  30

Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr Ile
        35                  40                  45
```

```
Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser Ile
    50                  55                  60

Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr Val
65                  70                  75                  80

Asn Gln Asp Ala Pro Phe Gly Val Ile Asn Leu Asp Ile Thr Thr Glu
                85                  90                  95

Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe Ala
            100                 105                 110

Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile Lys
        115                 120                 125

Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val Pro
    130                 135                 140

Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp Lys
145                 150                 155                 160

Thr Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His Asn Ile
                165                 170                 175

Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys Glu Gly
            180                 185                 190

Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala Leu Cys
        195                 200                 205

Trp Leu Val Pro Ile Asp Ala Ile Tyr Asn Tyr Ile Thr Gln Gln Asn
    210                 215                 220

Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr Val Ala
225                 230                 235                 240

Gly Thr Pro Lys Ala Ile Thr Val Lys Gln Gly Ile Glu Gln Lys Pro
                245                 250                 255

Val Glu Gln Arg Ile His Phe Ser Lys Lys Asn Ala Met Glu Ala Leu
            260                 265                 270
```

```
Ala Ala His Arg Val Cys Gly Val Pro Leu Glu Thr Leu Ala Arg Ser
        275                 280                 285

Arg Lys Pro Arg Asp Leu Pro Asp Asp Leu Ser Cys Ala Tyr Gln Ala
    290                 295                 300

Gln Asn Ile Val Ser Leu Phe Val Ala Thr Arg Ile Leu Phe Ser His
305                 310                 315                 320

Leu Asp Ser Val Phe Thr Leu Asn Leu Asp Glu Gln Glu Pro Glu Val
                325                 330                 335

Ala Glu Arg Leu Ser Ala Leu Arg Gln Ile Asn Glu Asn Asn Pro Gly
            340                 345                 350

Met Val Thr Gln Val Leu Thr Val Ala Arg Gln Ile Tyr Asn Asp Tyr
        355                 360                 365

Val Thr His His Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala Gly Ala
    370                 375                 380

Gln Ala Ala Asp Ile Leu Ser Leu Phe Cys Pro Asp Ala Asp Lys Pro
385                 390                 395                 400

Cys Val Ala Ser Asn Asn Asp Gln Ala Asn Ile Asn Ile Glu Ser Arg
                405                 410                 415

Ser Gly Arg Ser Tyr Leu Pro Glu Asn Arg Ala Val Ile Thr Pro Gln
            420                 425                 430

Gly Val Thr Asn Trp Thr Tyr Gln Glu Leu Glu Ala Thr His Gln Ala
        435                 440                 445

Leu Thr Arg Glu Gly Tyr Val Phe Val Gly Tyr His Gly Thr Asn His
    450                 455                 460

Val Ala Ala Gln Thr Ile Val Asn Arg Ile Ala Pro Val Pro Arg Gly
465                 470                 475                 480
```

```
Asn Asn Thr Glu Asn Glu Glu Lys Trp Gly Gly Leu Tyr Val Ala Thr
                485                 490                 495

His Ala Glu Val Ala His Gly Tyr Ala Arg Ile Lys Glu Gly Thr Gly
            500                 505                 510

Glu Tyr Gly Leu Pro Thr Arg Ala Glu Arg Asp Ala Arg Gly Val Met
        515                 520                 525

Leu Arg Val Tyr Ile His Arg Ala Ser Leu Glu Arg Phe Tyr Arg Thr
    530                 535                 540

Asn Thr Pro Leu Glu Asn Ala Glu Glu His Ile Thr Gln Val Ile Gly
545                 550                 555                 560

His Ser Leu Pro Leu Arg Asn Glu Ala Phe Thr Gly Pro Glu Ser Ala
                565                 570                 575

Gly Gly Glu Asp Glu Thr Val Ile Gly Trp Asp Met Ala Ile His Ala
            580                 585                 590

Val Ala Ile Pro Ser Thr Ile Pro Gly Asn Ala Tyr Glu Glu Leu Ala
        595                 600                 605

Ile Asp Glu Glu Ala Val Ala Lys Glu Gln Ser Ile Ser Thr Lys Pro
    610                 615                 620

Pro Tyr Lys Glu Arg Lys Asp Glu Leu Lys
625                 630
```

<210> 13
<211> 634
<212> PRT
<213> Vibrio cholerae

<400> 13

```
Val Glu Asp Glu Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys Ser
1               5                   10                  15

Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile Pro
            20                  25                  30
```

```
Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr Ile
        35                  40                  45

Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser Ile
    50                  55                  60

Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr Val
65                  70                  75                  80

Asn Gln Asp Ala Pro Phe Gly Val Ile Asn Leu Asp Ile Thr Thr Glu
                85                  90                  95

Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe Ala
            100                 105                 110

Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile Lys
        115                 120                 125

Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val Pro
    130                 135                 140

Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp Lys
145                 150                 155                 160

Thr Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His Asn Ile
                165                 170                 175

Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys Glu Gly
            180                 185                 190

Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala Leu Cys
        195                 200                 205

Trp Leu Val Pro Ile Asp Ala Ile Tyr Asn Tyr Ile Thr Gln Gln Asn
    210                 215                 220

Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr Val Ala
225                 230                 235                 240

Gly Thr Pro Lys Ala Ile Thr Val Lys Gln Gly Ile Glu Gln Lys Pro
                245                 250                 255
```

```
Val Glu Gln Arg Ile His Phe Ser Lys Lys Asn Ala Met Glu Ala Leu
            260                 265                 270

Ala Ala His Arg Val Cys Gly Val Pro Leu Glu Thr Leu Ala Arg Ser
        275                 280                 285

Arg Lys Pro Arg Asp Leu Pro Asp Asp Leu Ser Cys Ala Tyr Gln Ala
    290                 295                 300

Gln Asn Ile Val Ser Leu Phe Val Ala Thr Arg Ile Leu Phe Ser His
305                 310                 315                 320

Leu Asp Ser Val Phe Thr Leu Asn Leu Asp Glu Gln Glu Pro Ala Val
                325                 330                 335

Ala Glu Arg Leu Ser Ala Leu Arg Gln Ile Asn Glu Asn Asn Pro Gly
            340                 345                 350

Met Val Thr Gln Val Leu Thr Val Ala Arg Gln Ile Tyr Asn Asp Tyr
        355                 360                 365

Val Thr His His Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala Gly Ala
    370                 375                 380

Gln Ala Ala Asp Ile Leu Ser Leu Phe Cys Pro Asp Ala Asp Lys Ser
385                 390                 395                 400

Cys Val Ala Ser Asp Asn Asp Gln Ala Asn Ile Asn Ile Glu Ser Arg
                405                 410                 415

Ser Gly Arg Ser Tyr Leu Pro Glu Asn Arg Ala Val Ile Thr Pro Gln
            420                 425                 430

Gly Val Thr Asn Trp Thr Tyr Gln Glu Leu Glu Ala Thr His Gln Ala
        435                 440                 445

Leu Thr Arg Glu Gly Tyr Val Phe Val Gly Tyr His Gly Thr Asn His
    450                 455                 460
```

```
Val Ala Ala Gln Thr Ile Val Asn Arg Ile Ala Pro Val Pro Arg Gly
465                 470                 475                 480

Asn Asn Thr Glu Asn Glu Glu Lys Trp Gly Gly Leu Tyr Val Ala Thr
                485                 490                 495

His Ala Glu Val Ala His Gly Tyr Ala Arg Ile Lys Glu Gly Thr Gly
            500                 505                 510

Glu Tyr Gly Leu Pro Thr Arg Ala Glu Arg Asp Ala Arg Gly Val Met
        515                 520                 525

Leu Arg Val Tyr Ile Pro Arg Ala Ser Leu Glu Arg Phe Tyr Arg Thr
    530                 535                 540

Asn Thr Pro Leu Glu Asn Ala Glu Glu His Ile Thr Gln Val Ile Gly
545                 550                 555                 560

His Ser Leu Pro Leu Arg Asn Glu Ala Phe Thr Gly Pro Glu Ser Ala
                565                 570                 575

Gly Gly Glu Asp Glu Thr Val Ile Gly Trp Asp Met Ala Ile His Ala
            580                 585                 590

Val Ala Ile Pro Ser Thr Ile Pro Gly Asn Ala Tyr Glu Glu Leu Ala
        595                 600                 605

Ile Asp Glu Glu Ala Val Ala Lys Glu Gln Ser Ile Ser Thr Lys Pro
    610                 615                 620

Pro Tyr Lys Glu Arg Lys Asp Glu Leu Lys
625                 630
```

<210> 14
<211> 634
<212> PRT
<213> Vibrio cholerae

<400> 14

```
Val Glu Asp Glu Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys Ser
1               5                   10                  15
```

```
Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile Pro
            20                  25                  30

Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr Ile
        35                  40                  45

Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser Ile
    50                  55                  60

Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr Val
65                  70                  75                  80

Asn Gln Asp Ala Pro Phe Gly Val Ile Asn Leu Asp Ile Thr Thr Glu
                85                  90                  95

Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe Ala
            100                 105                 110

Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile Lys
        115                 120                 125

Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val Pro
    130                 135                 140

Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp Lys
145                 150                 155                 160

Thr Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His Asn Ile
                165                 170                 175

Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys Glu Gly
            180                 185                 190

Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala Leu Cys
        195                 200                 205

Trp Leu Val Pro Ile Asp Ala Ile Tyr Asn Tyr Ile Thr Gln Gln Asn
    210                 215                 220

Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr Val Ala
225                 230                 235                 240
```

```
Gly Thr Pro Lys Ala Ile Thr Val Lys Gln Gly Ile Glu Gln Lys Pro
                245                 250                 255

Val Glu Gln Arg Ile His Phe Ser Lys Lys Asn Ala Met Glu Ala Leu
            260                 265                 270

Ala Ala His Arg Val Cys Gly Val Pro Leu Glu Thr Leu Ala Arg Ser
        275                 280                 285

Arg Lys Pro Arg Asp Leu Pro Asp Asp Leu Ser Cys Ala Tyr Gln Ala
    290                 295                 300

Gln Asn Ile Val Ser Leu Phe Val Ala Thr Arg Ile Leu Phe Ser His
305                 310                 315                 320

Leu Asp Ser Val Phe Thr Leu Asn Leu Asp Glu Gln Glu Pro Glu Val
                325                 330                 335

Ala Glu Arg Leu Ser Ala Leu Arg Gln Ile Asn Glu Asn Asn Pro Gly
            340                 345                 350

Met Val Thr Gln Val Leu Thr Val Ala Arg Gln Ile Tyr Asn Asp Tyr
        355                 360                 365

Val Thr His His Pro Gly Leu Ile Pro Glu Gln Thr Ser Ala Gly Ala
    370                 375                 380

Gln Ala Ala Asp Ile Leu Ser Leu Phe Cys Pro Asp Ala Asp Lys Pro
385                 390                 395                 400

Cys Val Ala Ser Asn Asn Asp Gln Ala Asn Ile Asn Ile Glu Ser Arg
                405                 410                 415

Ser Gly Arg Ser Tyr Leu Pro Glu Asn Arg Ala Val Ile Thr Pro Gln
            420                 425                 430

Gly Val Thr Asn Trp Thr Tyr Gln Glu Leu Glu Ala Thr His Gln Ala
        435                 440                 445
```

```
Leu Thr Arg Glu Gly Tyr Val Phe Val Gly Tyr His Gly Thr Asn His
    450                 455                 460

Val Ala Ala Gln Thr Ile Val Asn Arg Ile Ala Pro Val Pro Arg Gly
465                 470                 475                 480

Asn Asn Thr Glu Asn Glu Glu Lys Trp Gly Gly Leu Tyr Val Ala Thr
                485                 490                 495

His Ala Glu Val Ala His Gly Tyr Ala Arg Ile Lys Glu Gly Thr Gly
            500                 505                 510

Glu Tyr Gly Leu Pro Thr Arg Ala Glu Arg Glu Ala Arg Gly Val Met
        515                 520                 525

Leu Arg Val Tyr Ile Pro Arg Ala Ser Leu Glu Arg Phe Tyr Arg Thr
    530                 535                 540

Asn Thr Pro Leu Glu Asn Ala Glu Arg His Ile Thr Gln Val Ile Gly
545                 550                 555                 560

His Ser Leu Pro Leu Arg Asn Glu Ala Phe Thr Gly Pro Glu Ser Ala
                565                 570                 575

Gly Gly Glu Asp Glu Thr Val Ile Gly Trp Asp Met Ala Ile His Ala
            580                 585                 590

Val Ala Ile Pro Ser Thr Ile Pro Gly Asn Ala Tyr Glu Glu Leu Ala
        595                 600                 605

Ile Asp Glu Glu Ala Val Ala Lys Glu Gln Ser Ile Ser Ala Lys Pro
    610                 615                 620

Pro Tyr Lys Glu Arg Lys Asp Glu Leu Lys
625                 630
```

<210> 15
<211> 634
<212> PRT
<213> Vibrio cholerae

<400> 15

```
Val Glu Asp Glu Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys Ser
1               5                  10                  15

Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile Pro
            20                  25                  30

Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr Ile
        35                  40                  45

Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser Ile
    50                  55                  60

Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr Val
65                  70                  75                  80

Asn Gln Asp Ala Pro Phe Gly Val Ile Asn Leu Asp Ile Thr Thr Glu
                85                  90                  95

Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe Ala
            100                 105                 110

Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile Lys
        115                 120                 125

Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val Pro
    130                 135                 140

Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp Lys
145                 150                 155                 160

Thr Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His Asn Ile
                165                 170                 175

Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys Glu Gly
            180                 185                 190

Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala Leu Cys
        195                 200                 205

Trp Leu Val Pro Ile Asp Ala Ile Tyr Asn Tyr Ile Thr Gln Gln Asn
    210                 215                 220
```

```
Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr Val Ala
225                 230                 235                 240

Gly Thr Pro Lys Ala Ile Thr Val Lys Gln Gly Ile Glu Gln Lys Pro
                245                 250                 255

Val Glu Gln Arg Ile His Phe Ser Lys Lys Asn Ala Met Glu Ala Leu
            260                 265                 270

Ala Ala His Arg Val Cys Gly Val Pro Leu Glu Thr Leu Ala Arg Ser
        275                 280                 285

Arg Lys Pro Arg Asp Leu Pro Asp Asp Leu Ser Cys Ala Tyr Gln Ala
    290                 295                 300

Gln Asn Ile Val Ser Leu Phe Val Ala Thr Arg Ile Leu Phe Ser His
305                 310                 315                 320

Leu Asp Ser Val Phe Thr Leu Asn Leu Asp Glu Gln Glu Pro Glu Val
                325                 330                 335

Ala Glu Arg Leu Ser Ala Leu Arg Gln Ile Asn Glu Asn Asn Pro Gly
            340                 345                 350

Met Val Thr Gln Val Leu Thr Val Ala Arg Gln Ile Tyr Asn Asp Tyr
        355                 360                 365

Val Thr His His Pro Gly Leu Ile Pro Glu Gln Thr Ser Ala Gly Ala
    370                 375                 380

Gln Ala Ala Asp Ile Leu Ser Leu Phe Cys Pro Asp Ala Asp Lys Pro
385                 390                 395                 400

Cys Val Ala Ser Asn Asn Asp Gln Ala Asn Ile Asn Ile Glu Ser Arg
                405                 410                 415

Ser Gly Arg Ser Tyr Leu Pro Glu Asn Arg Ala Val Ile Thr Pro Gln
            420                 425                 430
```

```
Gly Val Thr Asn Trp Thr Tyr Gln Glu Leu Glu Ala Thr His Gln Ala
        435                 440                 445

Leu Thr Arg Glu Gly Tyr Val Phe Val Gly Tyr His Gly Thr Asn His
    450                 455                 460

Val Ala Ala Gln Thr Ile Val Asn Arg Ile Ala Pro Val Pro Arg Gly
465                 470                 475                 480

Asn Asn Thr Glu Asn Glu Glu Lys Trp Gly Gly Leu Tyr Val Ala Thr
                485                 490                 495

His Ala Glu Val Ala His Gly Tyr Ala Arg Ile Lys Glu Gly Thr Gly
            500                 505                 510

Glu Tyr Gly Leu Pro Thr Arg Ala Glu Arg Glu Ala Arg Gly Val Met
        515                 520                 525

Leu Arg Val Tyr Ile Pro Arg Ala Ser Leu Glu Arg Phe Tyr Arg Thr
    530                 535                 540

Asn Thr Pro Leu Glu Asn Ala Glu Arg His Ile Thr Gln Val Ile Gly
545                 550                 555                 560

His Ser Leu Pro Leu Arg Asn Glu Ala Phe Thr Gly Pro Glu Ser Ala
                565                 570                 575

Gly Gly Glu Asp Glu Thr Val Ile Gly Trp Asp Met Ala Ile His Ala
            580                 585                 590

Val Ala Ile Pro Ser Thr Ile Pro Gly Asn Ala Tyr Glu Glu Leu Ala
        595                 600                 605

Ile Asp Glu Glu Ala Val Ala Lys Glu Gln Ser Ile Ser Ala Lys Pro
    610                 615                 620

Pro Tyr Lys Glu Gln Lys Asp Glu Leu Lys
625                 630
```

<210> 16
<211> 634

<212> PRT
<213> Vibrio cholerae

<400> 16
Val Glu Asp Glu Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys Ser
1 5 10 15

Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile Pro
20 25 30

Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr Ile
35 40 45

Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser Ile
50 55 60

Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr Val
65 70 75 80

Asn Gln Asp Ala Pro Phe Gly Val Ile Asn Leu Asp Ile Thr Thr Glu
85 90 95

Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe Ala
100 105 110

Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile Lys
115 120 125

Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val Pro
130 135 140

Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp Lys
145 150 155 160

Thr Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His Asn Ile
165 170 175

Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys Glu Gly
180 185 190

Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala Leu Cys
195 200 205

```
Trp Leu Val Pro Ile Asp Ala Ile Tyr Asn Tyr Ile Thr Gln Gln Asn
    210                 215                 220

Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr Val Ala
225                 230                 235                 240

Gly Thr Pro Lys Ala Ile Thr Val Lys Gln Gly Ile Glu Gln Lys Pro
                245                 250                 255

Val Glu Gln Arg Ile His Phe Ser Lys Lys Asn Ala Met Glu Ala Leu
            260                 265                 270

Ala Ala His Arg Val Cys Gly Val Pro Leu Glu Thr Leu Ala Arg Ser
        275                 280                 285

Arg Lys Pro Arg Asp Leu Pro Asp Asp Leu Ser Cys Ala Tyr Gln Ala
    290                 295                 300

Gln Asn Ile Val Ser Leu Phe Val Ala Thr Arg Met Leu Phe Ser His
305                 310                 315                 320

Leu Asp Ser Val Phe Thr Leu Asn Leu Asp Glu Gln Glu Pro Glu Val
                325                 330                 335

Ala Glu Arg Leu Ser Ala Leu Arg Gln Ile Asn Glu Asn Asn Pro Gly
            340                 345                 350

Met Val Thr Gln Val Leu Thr Val Ala Arg Gln Ile Tyr Asn Asp Tyr
        355                 360                 365

Val Thr His His Pro Gly Leu Ile Pro Glu Gln Thr Ser Ala Gly Ala
    370                 375                 380

Gln Ala Ala Asp Ile Leu Ser Leu Phe Cys Pro Asp Ala Asp Lys Pro
385                 390                 395                 400

Cys Val Ala Ser Asn Asn Asp Gln Ala Asn Ile Asn Ile Glu Ser Arg
                405                 410                 415
```

```
Ser Gly Arg Ser Tyr Leu Pro Glu Asn Arg Ala Val Ile Thr Pro Gln
            420                 425                 430

Gly Val Thr Asn Trp Thr Tyr Gln Glu Leu Glu Ala Thr His Gln Ala
        435                 440                 445

Leu Thr Arg Glu Gly Tyr Val Phe Val Gly Tyr His Gly Thr Asn His
    450                 455                 460

Val Ala Ala Gln Thr Ile Val Asn Arg Ile Ala Pro Val Pro Arg Gly
465                 470                 475                 480

Asn Asn Thr Glu Asn Glu Glu Lys Trp Gly Gly Leu Tyr Val Ala Thr
                485                 490                 495

His Ala Glu Val Ala His Gly Tyr Ala Arg Ile Lys Glu Gly Thr Gly
            500                 505                 510

Glu Tyr Gly Leu Pro Thr Arg Ala Glu Arg Glu Ala Arg Gly Val Met
        515                 520                 525

Leu Arg Val Tyr Ile Pro Arg Ala Ser Leu Glu Arg Phe Tyr Arg Thr
    530                 535                 540

Asn Thr Pro Leu Glu Asn Ala Glu Arg His Ile Thr Gln Val Ile Gly
545                 550                 555                 560

His Ser Leu Pro Leu Arg Asn Glu Ala Phe Thr Gly Pro Glu Ser Ala
                565                 570                 575

Gly Gly Glu Asp Glu Thr Val Ile Gly Trp Asp Met Ala Ile His Ala
            580                 585                 590

Val Ala Ile Pro Ser Thr Ile Pro Gly Asn Ala Tyr Glu Glu Leu Ala
        595                 600                 605

Ile Asp Glu Glu Ala Val Ala Lys Glu Gln Ser Ile Ser Ala Lys Pro
    610                 615                 620

Pro Tyr Lys Glu Gln Lys Asp Glu Leu Lys
625                 630
```

<210> 17
<211> 634
<212> PRT
<213> Vibrio cholerae

<400> 17
Val Glu Asp Glu Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys Ser
1   5   10   15

Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile Pro
            20   25   30

Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr Ile
        35   40   45

Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser Ile
    50   55   60

Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr Val
65   70   75   80

Asn Gln Asp Ala Pro Phe Gly Val Ile Asn Leu Asp Ile Thr Thr Glu
                85   90   95

Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe Ala
            100   105   110

Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile Lys
        115   120   125

Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val Pro
    130   135   140

Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp Lys
145   150   155   160

Thr Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His Asn Ile
                165   170   175

Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys Glu Gly
            180   185   190

```
Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala Leu Cys
        195                 200                 205

Trp Leu Val Pro Ile Asp Ala Ile Tyr Asn Tyr Ile Thr Gln Gln Asn
    210                 215                 220

Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr Val Ala
225                 230                 235                 240

Gly Thr Pro Lys Ala Ile Thr Val Lys Gln Gly Ile Glu Gln Lys Pro
                245                 250                 255

Val Glu Gln Arg Ile His Phe Ser Lys Lys Asn Ala Met Glu Ala Leu
            260                 265                 270

Ala Ala His Arg Val Cys Gly Val Pro Leu Glu Thr Leu Ala Arg Ser
        275                 280                 285

Arg Lys Pro Arg Asp Leu Pro Asp Asp Leu Ser Cys Ala Tyr Gln Ala
    290                 295                 300

Gln Asn Ile Val Ser Leu Phe Val Ala Thr Arg Ile Leu Phe Ser His
305                 310                 315                 320

Leu Asp Ser Val Phe Thr Leu Asn Leu Asp Glu Gln Glu Pro Glu Val
                325                 330                 335

Ala Glu Arg Leu Ser Ala Leu Arg Gln Ile Asn Glu Asn Asn Pro Gly
            340                 345                 350

Met Val Thr Gln Val Leu Thr Val Ala Arg Gln Ile Tyr Asn Asp Tyr
        355                 360                 365

Val Thr His His Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala Gly Ala
    370                 375                 380

Gln Ala Ala Asp Ile Leu Ser Leu Phe Cys Pro Asp Ala Asp Lys Ser
385                 390                 395                 400
```

```
Cys Val Ala Ser Asn Asn Asp Gln Ala Asn Ile Asn Ile Glu Ser Arg
                405                 410                 415

Ser Gly Arg Ser Tyr Leu Pro Glu Asn Arg Ala Val Ile Thr Pro Gln
            420                 425                 430

Gly Val Thr Asn Trp Thr Tyr Gln Glu Leu Glu Ala Thr His Gln Ala
        435                 440                 445

Leu Thr Arg Glu Gly Tyr Val Phe Val Gly Tyr His Gly Thr Asn His
    450                 455                 460

Val Ala Ala Gln Thr Ile Val Asn Arg Ile Ala Pro Val Pro Arg Gly
465                 470                 475                 480

Asn Asn Thr Glu Asn Glu Glu Lys Trp Gly Gly Leu Tyr Val Ala Thr
                485                 490                 495

His Ala Glu Val Ala His Gly Tyr Ala Arg Leu Lys Lys Gly Thr Gly
            500                 505                 510

Asn Ala Glu Leu Pro Thr Arg Ala Glu Arg Asp Ala Arg Gly Val Met
        515                 520                 525

Leu Arg Val Tyr Ile Pro Arg Ala Ser Leu Glu Arg Phe Tyr Arg Thr
    530                 535                 540

Asn Thr Pro Leu Glu Asn Ala Glu Glu His Ile Thr His Val Ile Gly
545                 550                 555                 560

His Ser Leu Pro Leu Arg Asn Glu Ala Phe Thr Gly Pro Glu Arg Val
                565                 570                 575

Asp Gly Glu Asp Glu Thr Val Ile Gly Trp Asp Met Ala Ile His Ala
            580                 585                 590

Val Ala Ile Pro Ser Thr Ile Pro Gly Asn Ala Tyr Glu Val Leu Ala
        595                 600                 605

Ile Asp Glu Glu Ala Val Ala Glu Glu Gln Ser Ile Ser Ala Lys Pro
    610                 615                 620
```

Pro Tyr Lys Glu Arg Lys Asp Glu Leu Lys
625 630

<210> 18
<211> 634
<212> PRT
<213> Vibrio cholerae

<400> 18
Val Glu Asp Glu Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys Ser
1 5 10 15

Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile Pro
20 25 30

Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr Ile
35 40 45

Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser Ile
50 55 60

Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr Val
65 70 75 80

Asn Gln Asp Ala Pro Phe Gly Val Ile Asn Leu Asp Ile Thr Thr Glu
85 90 95

Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe Ala
100 105 110

Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile Lys
115 120 125

Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val Pro
130 135 140

Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp Lys
145 150 155 160

Thr Gln Gly Asn Val Phe Phe Ser Val Thr Arg Pro Glu His Asn Ile
165 170 175

```
Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys Glu Gly
            180                 185                 190

Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala Leu Cys
        195                 200                 205

Trp Leu Val Pro Ile Asp Ala Ile Tyr Asn Tyr Ile Thr Gln Gln Asn
    210                 215                 220

Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr Val Ala
225                 230                 235                 240

Gly Thr Pro Lys Ala Ile Thr Val Lys Gln Gly Ile Glu Gln Lys Pro
                245                 250                 255

Val Glu Gln Arg Ile His Phe Ser Lys Lys Asn Ala Met Glu Ala Leu
            260                 265                 270

Ala Ala His Arg Val Cys Gly Val Pro Leu Glu Thr Leu Ala Arg Ser
        275                 280                 285

Arg Lys Pro Arg Asp Leu Pro Asp Asp Leu Ser Cys Ala Tyr Gln Ala
    290                 295                 300

Gln Asn Ile Val Ser Leu Phe Val Ala Thr Arg Ile Leu Phe Ser His
305                 310                 315                 320

Leu Asp Ser Val Phe Thr Leu Asn Leu Asp Glu Gln Glu Pro Glu Val
                325                 330                 335

Thr Glu Arg Leu Ser Ala Leu Arg Gln Ile Asn Glu Asn Asn Pro Gly
            340                 345                 350

Met Val Thr Gln Val Leu Thr Val Ala Arg Gln Ile Tyr Asn Asp Tyr
        355                 360                 365

Val Thr His His Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala Gly Ala
    370                 375                 380
```

```
Gln Ala Ala Asp Ile Leu Ser Leu Phe Cys Pro Asp Ala Asp Lys Pro
385                 390                 395                 400

Cys Val Ala Ser Asn Asn Asp Gln Ala Asn Ile Asn Ile Glu Ser Arg
                405                 410                 415

Ser Gly Arg Ser Tyr Leu Pro Glu Asn Arg Ala Val Ile Thr Pro Gln
            420                 425                 430

Gly Val Thr Asn Trp Thr Tyr Gln Glu Leu Glu Ala Thr His Gln Ala
        435                 440                 445

Leu Thr Arg Glu Gly Tyr Val Phe Val Gly Tyr His Gly Thr Asn His
    450                 455                 460

Val Ala Ala Gln Thr Ile Val Asn Arg Ile Ala Pro Val Pro Arg Gly
465                 470                 475                 480

Asn Asn Thr Glu Asn Glu Glu Lys Trp Gly Gly Leu Tyr Val Ala Thr
                485                 490                 495

His Ala Glu Val Ala His Gly Tyr Ala Arg Ile Lys Glu Gly Thr Gly
            500                 505                 510

Glu Tyr Gly Leu Pro Thr Arg Ala Glu Arg Asp Ala Arg Gly Val Met
        515                 520                 525

Leu Arg Val Tyr Ile His Arg Ala Ser Leu Glu Arg Phe Tyr Arg Thr
    530                 535                 540

Asn Thr Pro Leu Glu Asn Ala Glu Glu His Ile Thr Gln Val Ile Gly
545                 550                 555                 560

His Ser Leu Pro Leu Arg Asn Glu Ala Phe Thr Gly Pro Glu Ser Ala
                565                 570                 575

Gly Gly Glu Asp Glu Thr Val Ile Gly Trp Asp Met Ala Ile His Ala
            580                 585                 590

Val Ala Ile Pro Ser Thr Ile Pro Gly Asn Ala Tyr Glu Glu Leu Ala
        595                 600                 605
```

```
Ile Asp Glu Glu Ala Val Ala Lys Glu Gln Ser Ile Ser Thr Lys Pro
    610                 615                 620

Pro Tyr Lys Glu Arg Lys Asp Glu Leu Lys
625                 630
```

<210> 19
<211> 634
<212> PRT
<213> Vibrio cholerae

<400> 19

```
Val Glu Asp Glu Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys Ser
1               5                   10                  15

Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile Pro
            20                  25                  30

Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr Ile
        35                  40                  45

Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser Ile
    50                  55                  60

Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr Val
65                  70                  75                  80

Asn Gln Asp Ala Pro Phe Gly Val Ile Asn Leu Asp Ile Thr Thr Glu
                85                  90                  95

Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe Ala
            100                 105                 110

Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile Lys
        115                 120                 125

Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val Pro
    130                 135                 140

Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp Glu
145                 150                 155                 160
```

```
Asn Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His Asn Ile
                165                 170                 175

Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys Glu Gly
            180                 185                 190

Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala Leu Cys
        195                 200                 205

Trp Leu Val Pro Ile Asp Ala Ile Tyr Asn Tyr Ile Thr Gln Gln Asn
    210                 215                 220

Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr Val Ala
225                 230                 235                 240

Gly Thr Pro Lys Ala Ile Thr Val Lys Gln Gly Ile Glu Gln Lys Pro
                245                 250                 255

Val Glu Gln Arg Ile His Phe Ser Lys Lys Asn Ala Met Glu Ala Leu
            260                 265                 270

Ala Ala His Arg Val Cys Gly Val Pro Leu Glu Thr Leu Ala Arg Ser
        275                 280                 285

Arg Lys Pro Arg Asp Leu Pro Asp Asp Leu Ser Cys Ala Tyr Gln Ala
    290                 295                 300

Gln Asn Ile Val Ser Leu Phe Val Ala Thr Arg Ile Leu Phe Ser His
305                 310                 315                 320

Leu Asp Ser Val Phe Thr Leu Asn Leu Asp Glu Gln Glu Pro Ala Val
                325                 330                 335

Ala Glu Arg Leu Ser Ala Leu Arg Gln Ile Asn Glu Asn Asn Pro Gly
            340                 345                 350

Met Val Thr Gln Val Leu Thr Val Ala Arg Gln Ile Tyr Asn Asp Tyr
        355                 360                 365
```

```
Val Thr His His Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala Gly Ala
    370                 375                 380

Gln Ala Ala Asp Ile Leu Ser Leu Phe Cys Pro Asp Ala Asp Lys Ser
385                 390                 395                 400

Cys Val Ala Ser Asn Asn Asp Gln Ala Asn Ile Asn Ile Glu Ser Arg
                405                 410                 415

Ser Gly Arg Ser Tyr Leu Pro Glu Asn Arg Ala Val Ile Thr Pro Gln
            420                 425                 430

Gly Val Thr Asn Trp Thr Tyr Gln Glu Leu Glu Ala Thr His Gln Ala
        435                 440                 445

Leu Thr Arg Glu Gly Tyr Val Phe Val Gly Tyr His Gly Thr Asn His
    450                 455                 460

Val Ala Ala Gln Thr Ile Val Asn Arg Ile Ala Pro Val Pro Arg Gly
465                 470                 475                 480

Asn Asn Thr Glu Asn Glu Glu Lys Trp Gly Gly Leu Tyr Val Ala Thr
                485                 490                 495

His Ala Glu Val Ala His Gly Tyr Ala Arg Ile Lys Glu Gly Thr Gly
            500                 505                 510

Glu Tyr Gly Leu Pro Thr Arg Ala Glu Arg Asp Ala Arg Gly Val Met
        515                 520                 525

Leu Arg Val Tyr Ile Pro Arg Ala Ser Leu Glu Arg Phe Tyr Arg Thr
    530                 535                 540

Asn Thr Pro Leu Glu Asn Ala Glu Glu His Ile Thr Gln Val Ile Gly
545                 550                 555                 560

His Ser Leu Pro Leu Arg Asn Glu Ala Phe Thr Gly Pro Glu Ser Ala
                565                 570                 575

Gly Gly Glu Asp Glu Thr Val Ile Gly Trp Asp Met Ala Ile His Ala
            580                 585                 590
```

Val Ala Ile Pro Ser Thr Ile Pro Gly Asn Ala Tyr Glu Glu Leu Ala
595 600 605

Ile Asp Glu Glu Ala Val Ala Lys Glu Gln Ser Ile Ser Ala Lys Pro
610 615 620

Pro Tyr Lys Glu Arg Lys Asp Glu Leu Lys
625 630

<210> 20
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<212> PRT
<213> Vibrio cholerae

<400> 20
Val Glu Asp Glu Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys Ser
1 5 10 15

Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile Pro
20 25 30

Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr Ile
35 40 45

Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser Ile
50 55 60

Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr Val
65 70 75 80

Asn Gln Asp Ala Pro Phe Gly Val Ile Asn Leu Asp Ile Thr Thr Glu
85 90 95

Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe Ala
100 105 110

Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile Lys
115 120 125

Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val Pro
130 135 140

```
Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp Glu
145                 150                 155                 160

Asn Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His Asn Ile
                165                 170                 175

Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys Glu Gly
            180                 185                 190

Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala Leu Cys
        195                 200                 205

Trp Leu Val Pro Ile Asp Ala Ile Tyr Asn Tyr Ile Thr Gln Gln Asn
    210                 215                 220

Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr Val Ala
225                 230                 235                 240

Gly Thr Pro Lys Ala Ile Thr Val Lys Gln Gly Ile Glu Gln Lys Pro
                245                 250                 255

Val Glu Gln Arg Ile His Phe Ser Lys Lys Asn Ala Met Glu Ala Leu
            260                 265                 270

Ala Ala His Arg Val Cys Gly Val Pro Leu Glu Thr Leu Ala Arg Ser
        275                 280                 285

Arg Lys Pro Arg Asp Leu Pro Asp Asp Leu Ser Cys Ala Tyr Gln Ala
    290                 295                 300

Gln Asn Ile Val Ser Leu Phe Val Ala Thr Arg Ile Leu Phe Ser His
305                 310                 315                 320

Leu Asp Ser Val Phe Thr Leu Asn Leu Asp Glu Gln Glu Pro Ala Val
                325                 330                 335

Ala Glu Arg Leu Ser Ala Leu Arg Gln Ile Asn Glu Asn Asn Pro Gly
            340                 345                 350
```

```
Met Val Thr Gln Val Leu Thr Val Ala Arg Gln Ile Tyr Asn Asp Tyr
        355                 360                 365

Val Thr His His Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala Gly Ala
    370                 375                 380

Gln Ala Ala Asp Ile Leu Ser Leu Phe Cys Pro Asp Ala Asp Lys Ser
385                 390                 395                 400

Cys Val Ala Leu Asn Asn Asp Gln Ala Asn Ile Asn Ile Glu Ser Arg
                405                 410                 415

Ser Gly Arg Ser Tyr Leu Pro Glu Asn Arg Ala Val Ile Thr Pro Gln
            420                 425                 430

Gly Val Thr Asn Trp Thr Tyr Gln Glu Leu Glu Ala Thr His Gln Ala
        435                 440                 445

Leu Thr Arg Glu Gly Tyr Val Phe Val Gly Tyr His Gly Thr Asn His
    450                 455                 460

Val Ala Ala Gln Thr Ile Val Asn Arg Ile Ala Pro Val Pro Arg Gly
465                 470                 475                 480

Asn Asn Thr Glu Asn Glu Glu Lys Trp Gly Gly Leu Tyr Val Ala Thr
                485                 490                 495

His Ala Glu Val Ala His Gly Tyr Ala Arg Ile Lys Glu Gly Thr Gly
            500                 505                 510

Glu Tyr Gly Leu Pro Thr Arg Ala Glu Arg Asp Ala Arg Gly Val Met
        515                 520                 525

Leu Arg Val Tyr Ile Pro Arg Ala Ser Leu Glu Arg Phe Tyr Arg Thr
    530                 535                 540

Asn Thr Pro Leu Glu Asn Ala Glu Glu His Ile Thr Gln Val Ile Gly
545                 550                 555                 560

His Ser Leu Pro Leu Arg Asn Glu Ala Phe Thr Gly Pro Glu Ser Ala
                565                 570                 575
```

```
Gly Gly Glu Asp Glu Thr Val Ile Gly Trp Asp Met Ala Ile His Ala
            580                 585                 590

Val Ala Ile Pro Ser Thr Ile Pro Gly Asn Ala Tyr Glu Glu Leu Ala
        595                 600                 605

Ile Asp Glu Glu Ala Val Ala Lys Glu Gln Ser Ile Ser Ala Lys Pro
    610                 615                 620

Pro Tyr Lys Glu Arg Lys Asp Glu Leu Lys
625                 630
```

<210> 21
<211> 634
<212> PRT
<213> Vibrio cholerae

<400> 21

```
Val Glu Asp Glu Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys Ser
1               5                   10                  15

Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile Pro
            20                  25                  30

Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr Ile
        35                  40                  45

Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser Ile
    50                  55                  60

Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr Val
65                  70                  75                  80

Asn Gln Asp Ala Pro Phe Gly Val Ile Asn Leu Asp Ile Thr Thr Glu
                85                  90                  95

Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe Ala
            100                 105                 110

Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile Lys
        115                 120                 125
```

```
Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val Pro
    130                 135                 140

Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp Glu
145                 150                 155                 160

Asn Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His Asn Ile
                165                 170                 175

Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys Glu Gly
            180                 185                 190

Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala Leu Cys
        195                 200                 205

Trp Leu Val Pro Ile Asp Ala Ile Tyr Asn Tyr Ile Thr Gln Gln Asn
    210                 215                 220

Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr Val Ala
225                 230                 235                 240

Gly Thr Pro Lys Ala Ile Thr Val Lys Gln Gly Ile Glu Gln Lys Pro
                245                 250                 255

Val Glu Gln Arg Ile His Phe Ser Lys Lys Asn Ala Met Glu Ala Leu
            260                 265                 270

Ala Ala His Arg Val Cys Gly Val Pro Leu Glu Thr Leu Ala Arg Ser
        275                 280                 285

Arg Lys Pro Arg Asp Leu Thr Asp Asp Leu Ser Cys Ala Tyr Gln Ala
    290                 295                 300

Gln Asn Ile Val Ser Leu Phe Val Ala Thr Arg Ile Leu Phe Ser His
305                 310                 315                 320

Leu Asp Ser Val Phe Thr Leu Asn Leu Asp Glu Gln Ala Pro Glu Val
                325                 330                 335
```

```
Ala Glu Arg Leu Ser Ala Leu Arg Gln Ile Asn Glu Asn Asn Pro Gly
            340                 345                 350

Val Val Thr Gln Val Leu Thr Val Ala Arg Gln Ile Tyr Asn Asp Tyr
        355                 360                 365

Val Thr His His Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala Gly Ala
    370                 375                 380

Gln Ala Ala Asp Ile Leu Ser Leu Phe Cys Pro Asp Ala Asp Lys Ser
385                 390                 395                 400

Cys Val Ala Ser Asn Asn Asp Gln Ala Asn Ile Asn Ile Glu Ser Arg
                405                 410                 415

Ser Gly Arg Ser Tyr Leu Pro Glu Asn Arg Ala Val Ile Thr Pro Gln
            420                 425                 430

Gly Val Thr Asn Trp Thr Tyr Gln Glu Leu Glu Ala Thr His Gln Ala
        435                 440                 445

Leu Thr Arg Glu Gly Tyr Val Phe Val Gly Tyr His Gly Thr Asn His
    450                 455                 460

Val Ala Ala Gln Thr Ile Val Asn Arg Ile Ala Pro Val Pro Arg Gly
465                 470                 475                 480

Asn Asn Thr Glu Asn Glu Glu Lys Trp Gly Gly Leu Tyr Val Ala Thr
                485                 490                 495

His Ala Glu Val Ala His Gly Tyr Ala Arg Ile Lys Glu Gly Thr Gly
            500                 505                 510

Asn Gly Gly Leu Pro Thr Arg Ala Glu Arg Glu Thr Arg Gly Val Met
        515                 520                 525

Leu Arg Val Tyr Ile Pro Arg Ala Ser Leu Glu Arg Phe Tyr Arg Thr
    530                 535                 540

Asn Thr Pro Leu Glu Asn Ala Glu Glu His Ile Thr Gln Val Ile Gly
545                 550                 555                 560
```

```
His Ser Leu Pro Leu Arg Asn Glu Ala Phe Thr Gly Pro Glu Ser Ala
                565                 570                 575

Gly Gly Glu Asp Glu Thr Val Ile Gly Trp Asp Met Ala Ile His Ala
            580                 585                 590

Val Ala Ile Pro Ser Thr Ile Pro Gly Asn Ala Tyr Glu Glu Leu Ala
        595                 600                 605

Ile Asp Glu Glu Ala Val Ala Lys Glu Gln Ser Ile Ser Ala Lys Pro
    610                 615                 620

Pro Tyr Lys Glu Gln Lys Asp Glu Leu Lys
625                 630
```

<210> 22
<211> 634
<212> PRT
<213> Vibrio cholerae

<400> 22

```
Val Glu Asp Glu Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys Ser
1               5                   10                  15

Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile Pro
            20                  25                  30

Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr Ile
        35                  40                  45

Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser Ile
    50                  55                  60

Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr Val
65                  70                  75                  80

Asn Gln Asp Ala Pro Phe Gly Val Ile Asn Leu Asp Ile Thr Thr Glu
                85                  90                  95

Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe Ala
            100                 105                 110
```

```
Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile Lys
        115                 120                 125

Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val Pro
    130                 135                 140

Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp Glu
145                 150                 155                 160

Asn Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His Asn Ile
                165                 170                 175

Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys Glu Gly
            180                 185                 190

Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala Leu Cys
        195                 200                 205

Trp Leu Val Pro Ile Asp Ala Ile Tyr Asn Tyr Ile Thr Gln Gln Asn
    210                 215                 220

Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr Val Ala
225                 230                 235                 240

Gly Thr Pro Lys Ala Ile Thr Val Lys Gln Gly Ile Glu Gln Lys Thr
                245                 250                 255

Val Glu Gln Arg Ile His Phe Ser Lys Lys Asn Ala Met Glu Ala Leu
            260                 265                 270

Ala Ala His Arg Val Cys Gly Val Pro Leu Glu Thr Leu Ala Arg Ser
        275                 280                 285

Arg Lys Pro Arg Asp Leu Thr Asp Asp Leu Ser Cys Val Tyr Gln Ala
    290                 295                 300

Gln Asn Ile Val Ser Leu Phe Val Ala Thr Arg Ile Leu Phe Ser His
305                 310                 315                 320
```

```
Leu Asp Ser Val Phe Thr Leu Asn Leu Glu Glu Gln Glu Pro Glu Val
                325                 330                 335

Ala Glu Arg Leu Ser Ala Leu Arg Gln Ile Asn Glu Asn Asn Pro Gly
            340                 345                 350

Met Val Thr Gln Val Leu Thr Val Ala Arg Gln Ile Tyr Asn Asp Tyr
        355                 360                 365

Val Thr His His Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala Gly Ala
    370                 375                 380

Gln Ala Ala Asp Ile Leu Ser Leu Phe Cys Pro Asp Ala Asp Lys Ser
385                 390                 395                 400

Cys Val Ala Ser Asn Asn Asp Gln Ala Asn Ile Asn Ile Glu Ser Arg
                405                 410                 415

Ser Gly Arg Ser Tyr Leu Pro Glu Asn Arg Ala Val Ile Thr Pro Gln
            420                 425                 430

Gly Val Thr Asn Trp Thr Tyr Gln Glu Leu Glu Ala Thr His Gln Ala
        435                 440                 445

Leu Thr Arg Glu Gly Tyr Val Phe Val Gly Tyr His Gly Thr Asn His
    450                 455                 460

Val Ala Ala Gln Thr Ile Val Asn Arg Ile Ala Pro Val Pro Arg Gly
465                 470                 475                 480

Asn Asn Thr Glu Asn Glu Glu Lys Trp Gly Gly Leu Tyr Val Ala Thr
                485                 490                 495

His Ala Glu Val Ala His Gly Tyr Ala Arg Ile Lys Glu Gly Thr Gly
            500                 505                 510

Asn Gly Gly Leu Pro Thr Arg Ala Glu Arg Glu Thr Arg Gly Val Met
        515                 520                 525

Leu Arg Val Tyr Ile Pro Arg Ala Ser Leu Glu Arg Phe Tyr Arg Thr
    530                 535                 540
```

Asn Thr Pro Leu Glu Asn Ala Glu Glu His Ile Thr Asp Val Ile Gly
545 550 555 560

His Ser Leu Pro Leu Arg Asn Glu Ala Phe Thr Gly Pro Glu Ser Ala
565 570 575

Gly Gly Glu Asp Glu Thr Val Ile Gly Trp Asp Met Ala Ile His Ala
580 585 590

Val Ala Ile Pro Ser Thr Ile Pro Gly Asn Ala Tyr Glu Glu Leu Ala
595 600 605

Ile Asp Glu Glu Ala Val Ala Lys Glu Gln Ser Ile Ser Ala Lys Pro
610 615 620

Pro Tyr Lys Glu Gln Lys Asp Glu Leu Lys
625 630

<210> 23
<211> 634
<212> PRT
<213> Vibrio cholerae

<400> 23
Val Glu Asp Glu Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys Ser
1 5 10 15

Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile Pro
20 25 30

Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr Ile
35 40 45

Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser Ile
50 55 60

Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr Val
65 70 75 80

Asn Gln Asp Ala Pro Phe Gly Val Ile Asn Leu Asp Ile Thr Thr Glu
85 90 95

```
Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe Ala
            100                 105                 110

Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile Lys
        115                 120                 125

Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val Pro
    130                 135                 140

Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp Glu
145                 150                 155                 160

Asn Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His Asn Ile
                165                 170                 175

Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys Glu Gly
            180                 185                 190

Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala Leu Cys
        195                 200                 205

Trp Leu Val Pro Ile Asp Ala Ile Tyr Asn Tyr Ile Thr Gln Gln Asn
    210                 215                 220

Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr Val Ala
225                 230                 235                 240

Gly Thr Pro Lys Ala Ile Met Val Lys Gln Gly Ile Glu Gln Lys Pro
                245                 250                 255

Val Glu Gln Arg Ile His Phe Ser Lys Lys Asn Ala Met Glu Ala Leu
            260                 265                 270

Ala Ala His Arg Val Cys Gly Val Pro Leu Glu Thr Leu Ala Arg Ser
        275                 280                 285

Arg Lys Pro Arg Tyr Leu Pro Asp Asp Leu Ser Cys Ala Tyr Gln Ala
    290                 295                 300
```

```
Gln Asn Ile Val Ser Leu Phe Val Ala Thr Arg Ile Leu Phe Ser His
305                 310                 315                 320

Leu Asp Ser Val Phe Thr Leu Asn Leu Asp Glu Gln Glu Pro Glu Val
                325                 330                 335

Ala Glu Arg Leu Ser Ala Leu Arg Gln Ile Asn Glu Asn Asn Pro Gly
            340                 345                 350

Met Val Thr Gln Val Leu Thr Val Ala Arg Gln Ile Tyr Asn Asp Tyr
        355                 360                 365

Val Thr His His Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala Gly Ala
    370                 375                 380

Gln Ala Ala Asp Ile Leu Ser Leu Phe Cys Pro Asp Ala Asp Lys Ser
385                 390                 395                 400

Cys Val Ala Ser Asn Asn Asp Gln Ala Asn Ile Asn Ile Glu Ser Arg
                405                 410                 415

Ser Gly Arg Ser Tyr Leu Pro Glu Asn Arg Ala Val Ile Thr Pro Gln
            420                 425                 430

Gly Val Thr Asn Trp Thr Tyr Gln Glu Leu Glu Ala Thr His Gln Ala
        435                 440                 445

Leu Thr Arg Glu Gly Tyr Val Phe Val Gly Tyr His Gly Thr Asn His
    450                 455                 460

Val Ala Ala Gln Thr Ile Val Asn Arg Ile Ala Pro Val Pro Arg Gly
465                 470                 475                 480

Asn Asn Thr Glu Asn Glu Glu Lys Trp Gly Gly Leu Tyr Val Ala Thr
                485                 490                 495

His Ala Glu Val Ala His Gly Tyr Ala Arg Ile Lys Glu Gly Thr Gly
            500                 505                 510

Glu Tyr Gly Leu Pro Thr Arg Ala Glu Arg Asp Ala Arg Gly Val Met
        515                 520                 525
```

Leu Arg Val Tyr Ile Pro Arg Ala Ser Leu Glu Arg Phe Tyr Arg Thr
530 535 540

Asn Thr Pro Leu Glu Asn Ala Glu Glu His Ile Thr Gln Val Ile Gly
545 550 555 560

His Ser Leu Pro Leu Arg Asn Glu Ala Phe Thr Gly Pro Glu Arg Val
565 570 575

Asp Gly Glu Asp Glu Thr Val Ile Gly Trp Asp Met Ala Ile His Ala
580 585 590

Val Ala Ile Pro Ser Thr Ile Pro Gly Asn Ala Tyr Glu Glu Leu Ala
595 600 605

Ile Asp Glu Glu Ala Val Ala Lys Glu Gln Ser Ile Ser Pro Lys Pro
610 615 620

Pro Tyr Lys Glu Arg Lys Asp Glu Leu Lys
625 630

<210> 24
<211> 634
<212> PRT
<213> Vibrio cholerae

<400> 24
Val Glu Asp Glu Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys Ser
1 5 10 15

Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile Pro
20 25 30

Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr Ile
35 40 45

Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser Ile
50 55 60

Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr Val
65 70 75 80

```
Asn Gln Asp Ala Pro Phe Gly Val Ile Asn Leu Asp Ile Thr Thr Glu
                85                  90                  95

Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Asp Gly Glu Phe Ala
            100                 105                 110

Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile Lys
        115                 120                 125

Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val Pro
    130                 135                 140

Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp Lys
145                 150                 155                 160

Thr Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His Asn Ile
                165                 170                 175

Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys Glu Gly
            180                 185                 190

Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala Leu Cys
        195                 200                 205

Trp Leu Val Pro Ile Asp Ala Ile Tyr Asn Tyr Ile Thr Gln Gln Asn
    210                 215                 220

Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr Val Ala
225                 230                 235                 240

Gly Thr Pro Lys Ala Ile Thr Val Lys Gln Gly Ile Glu Gln Lys Pro
                245                 250                 255

Val Glu Gln Arg Ile His Phe Ser Lys Lys Asn Ala Met Glu Ala Leu
            260                 265                 270

Ala Ala His Arg Val Cys Gly Val Pro Leu Glu Thr Leu Ala Arg Ser
        275                 280                 285
```

```
Arg Lys Pro Arg Asp Leu Pro Asp Asp Leu Ser Cys Ala Tyr Gln Ala
    290                 295                 300

Gln Asn Ile Val Ser Leu Phe Val Ala Thr Arg Ile Leu Phe Ser His
305                 310                 315                 320

Leu Asp Ser Val Phe Thr Leu Asn Leu Asp Glu Gln Glu Pro Ala Val
                325                 330                 335

Ala Glu Arg Leu Ser Ala Ile Arg Gln Ile Asn Glu Asn Asn Pro Gly
            340                 345                 350

Met Val Thr Gln Val Leu Thr Val Ala Arg Gln Ile Tyr Asn Asp Tyr
        355                 360                 365

Val Thr His His Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala Gly Ala
    370                 375                 380

Gln Ala Ala Asp Ile Leu Ser Leu Phe Cys Pro Asp Ala Asp Lys Ser
385                 390                 395                 400

Cys Val Ala Ser Asp Asn Asp Gln Ala Asn Ile Asn Ile Glu Ser Arg
                405                 410                 415

Ser Gly Arg Ser Tyr Leu Pro Glu Asn Arg Ala Val Ile Thr Pro Gln
            420                 425                 430

Gly Val Thr Asn Trp Thr Tyr Gln Glu Leu Glu Ala Thr His Gln Ala
        435                 440                 445

Leu Thr Arg Glu Gly Tyr Val Phe Val Gly Tyr His Gly Thr Asn His
    450                 455                 460

Val Ala Ala Gln Thr Ile Val Asn Arg Ile Ala Pro Val Pro Arg Gly
465                 470                 475                 480

Asn Asn Thr Glu Asn Glu Glu Lys Trp Gly Gly Leu Tyr Val Ala Thr
                485                 490                 495

His Ala Glu Val Ala His Gly Tyr Ala Arg Ile Lys Glu Gly Thr Gly
            500                 505                 510
```

```
Glu Tyr Gly Leu Pro Thr Arg Ala Glu Arg Asp Ala Arg Gly Val Met
        515                 520                 525

Leu Arg Val Tyr Ile Pro Arg Ala Ser Leu Glu Arg Phe Tyr Arg Thr
    530                 535                 540

Asn Thr Pro Leu Glu Asn Ala Glu Glu His Ile Thr Gln Val Ile Gly
545                 550                 555                 560

His Ser Leu Pro Leu Arg Asn Glu Ala Phe Thr Gly Pro Glu Ser Ala
                565                 570                 575

Gly Gly Glu Asp Glu Thr Val Ile Gly Trp Asp Met Ala Ile His Ala
            580                 585                 590

Val Ala Ile Pro Ser Thr Ile Pro Gly Asn Ala Tyr Glu Glu Leu Ala
        595                 600                 605

Ile Asp Glu Glu Ala Val Ala Lys Glu Gln Ser Ile Ser Thr Lys Pro
    610                 615                 620

Pro Tyr Lys Glu Arg Lys Asp Glu Leu Lys
625                 630


<210> 25
<211> 634
<212> PRT
<213> Vibrio cholerae

<400> 25
Val Glu Asp Glu Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys Ser
1               5                   10                  15

Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile Pro
            20                  25                  30

Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr Ile
        35                  40                  45

Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser Ile
    50                  55                  60
```

```
Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr Val
65                  70                  75                  80

Asn Gln Asp Ala Pro Phe Gly Val Ile Asn Leu Asp Ile Thr Thr Glu
                85                  90                  95

Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Asp Gly Glu Phe Ala
            100                 105                 110

Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile Lys
        115                 120                 125

Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val Pro
    130                 135                 140

Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp Lys
145                 150                 155                 160

Thr Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His Asn Ile
                165                 170                 175

Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys Glu Gly
            180                 185                 190

Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala Leu Cys
        195                 200                 205

Trp Leu Val Pro Ile Asp Ala Ile Tyr Asn Tyr Ile Thr Gln Gln Asn
    210                 215                 220

Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr Val Ala
225                 230                 235                 240

Gly Thr Pro Lys Ala Ile Thr Val Lys Gln Gly Ile Glu Gln Lys Pro
                245                 250                 255

Val Glu Gln Arg Ile His Phe Ser Lys Lys Asn Ala Met Glu Ala Leu
            260                 265                 270
```

```
Ala Ala His Arg Val Cys Gly Val Pro Leu Glu Thr Leu Ala Arg Ser
        275                 280                 285

Arg Lys Pro Arg Asp Leu Pro Asp Asp Leu Ser Cys Ala Tyr Gln Ala
    290                 295                 300

Gln Asn Ile Val Ser Leu Phe Val Ala Thr Arg Ile Leu Phe Ser His
305                 310                 315                 320

Leu Asp Ser Val Phe Thr Leu Asn Leu Asp Glu Gln Glu Pro Glu Val
                325                 330                 335

Ala Glu Arg Leu Ser Ala Leu Arg Gln Ile Asn Glu Asn Asn Pro Gly
            340                 345                 350

Met Val Thr Gln Val Leu Thr Val Ala Arg Gln Ile Tyr Asn Asp Tyr
        355                 360                 365

Val Thr His His Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala Gly Ala
    370                 375                 380

Gln Ala Ala Asp Ile Leu Ser Leu Phe Cys Pro Asp Ala Asp Lys His
385                 390                 395                 400

Cys Val Ala Ser Asn Asn Asp Gln Ala Asn Ile Asn Val Glu Ser Arg
                405                 410                 415

Ser Gly Arg Ser Tyr Leu Pro Glu Asn Arg Ala Val Ile Thr Pro Gln
            420                 425                 430

Gly Val Thr Asn Trp Thr Tyr Gln Glu Leu Glu Ala Thr His Gln Ala
        435                 440                 445

Leu Thr Arg Glu Gly Tyr Val Phe Val Gly Tyr His Gly Thr Asn His
    450                 455                 460

Val Ala Ala Gln Thr Ile Val Asn Arg Ile Ala Pro Val Pro Arg Gly
465                 470                 475                 480

Asn Asn Thr Glu Asn Glu Glu Lys Trp Gly Gly Leu Tyr Val Ala Thr
                485                 490                 495
```

```
His Ala Glu Val Ala His Gly Tyr Ala Arg Ile Lys Glu Gly Thr Gly
            500                 505                 510

Glu Tyr Gly Leu Pro Thr Arg Ala Glu Arg Asp Ala Arg Gly Val Met
        515                 520                 525

Leu Arg Val Tyr Ile Pro Arg Ala Ser Leu Glu Arg Phe Tyr Arg Thr
    530                 535                 540

Asn Thr Pro Leu Glu Asn Ala Glu Arg His Ile Thr Gln Val Ile Gly
545                 550                 555                 560

His Ser Leu Pro Leu Arg Asn Glu Ala Phe Thr Gly Pro Glu Ser Ala
                565                 570                 575

Gly Gly Glu Asp Glu Thr Val Ile Gly Trp Asp Met Ala Ile His Ala
            580                 585                 590

Val Ala Ile Pro Ser Thr Ile Pro Gly Asn Ala Tyr Glu Glu Leu Ala
        595                 600                 605

Ile Asp Glu Glu Ala Val Ala Lys Glu Gln Ser Ile Ser Ala Lys Pro
    610                 615                 620

Pro Tyr Lys Glu Arg Lys Asp Glu Leu Lys
625                 630
```

<210> 26
<211> 634
<212> PRT
<213> Vibrio cholerae

<400> 26

```
Val Glu Asp Glu Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys Ser
1               5                   10                  15

Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile Pro
            20                  25                  30

Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr Ile
        35                  40                  45
```

```
Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser Ile
    50                  55                  60

Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr Val
65                  70                  75                  80

Asn Gln Asp Ala Pro Phe Gly Val Ile His Leu Asp Ile Thr Thr Glu
                85                  90                  95

Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe Ala
            100                 105                 110

Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile Lys
        115                 120                 125

Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val Pro
    130                 135                 140

Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp Lys
145                 150                 155                 160

Thr Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His Asn Ile
                165                 170                 175

Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys Glu Gly
            180                 185                 190

Ser Arg His Lys Arg Trp Ala His Trp Arg Thr Gly Leu Ala Leu Cys
        195                 200                 205

Trp Leu Val Pro Met Asp Ala Ile Tyr Asn Tyr Ile Thr Gln Gln Asn
    210                 215                 220

Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr Val Ala
225                 230                 235                 240

Gly Thr Pro Lys Val Ile Thr Val Lys Gln Gly Ile Glu Gln Lys Pro
                245                 250                 255
```

```
Val Glu Gln Arg Ile His Phe Ser Lys Gly Asn Ala Met Ser Ala Leu
            260                 265                 270

Ala Ala His Arg Val Cys Gly Val Pro Leu Glu Thr Leu Ala Arg Ser
        275                 280                 285

Arg Lys Pro Arg Asp Leu Thr Asp Asp Leu Ser Cys Ala Tyr Gln Ala
    290                 295                 300

Gln Asn Ile Val Ser Leu Phe Val Ala Thr Arg Ile Leu Phe Ser His
305                 310                 315                 320

Leu Asp Ser Val Phe Thr Leu Asn Leu Glu Glu Gln Glu Pro Glu Val
                325                 330                 335

Ala Glu Arg Leu Ser Ala Leu Arg Gln Ile Asn Glu Asn Asn Pro Gly
            340                 345                 350

Met Val Thr Gln Val Leu Thr Val Ala Arg Gln Ile Tyr Asn Asp Tyr
        355                 360                 365

Val Thr His His Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala Gly Ala
    370                 375                 380

Gln Ala Ala Asp Ile Leu Ser Leu Phe Cys Pro Asp Ala Asp Lys Ser
385                 390                 395                 400

Cys Val Ala Ser Asn Asn Asp Gln Ala Asn Ile Asn Ile Glu Ser Arg
                405                 410                 415

Ser Gly Arg Ser Tyr Leu Pro Glu Asn Arg Ala Val Ile Thr Pro Gln
            420                 425                 430

Gly Val Thr Asn Trp Thr Tyr Gln Glu Leu Glu Ala Thr His Gln Ala
        435                 440                 445

Leu Thr Arg Glu Gly Tyr Val Phe Val Gly Tyr His Gly Thr Asn His
    450                 455                 460

Val Ala Ala Gln Thr Ile Val Asn Arg Ile Ala Pro Val Pro Arg Gly
465                 470                 475                 480
```

```
Asn Asn Thr Glu Asn Glu Glu Lys Trp Gly Gly Leu Tyr Val Ala Thr
                485                 490                 495

His Ala Glu Val Ala His Gly Tyr Ala Arg Ile Lys Glu Gly Thr Gly
            500                 505                 510

Glu Tyr Gly Leu Pro Thr Arg Ala Glu Arg Asp Ala Arg Gly Val Met
        515                 520                 525

Leu Arg Val Tyr Ile Pro Arg Ala Ser Leu Glu Arg Phe Tyr Arg Thr
    530                 535                 540

Asn Thr Pro Leu Glu Asn Ala Glu Glu His Ile Thr Gln Val Ile Gly
545                 550                 555                 560

His Ser Leu Pro Leu Arg Asn Glu Ala Phe Thr Gly Pro Glu Ser Ala
                565                 570                 575

Gly Gly Glu Asp Glu Thr Val Ile Gly Trp Asp Met Ala Ile His Ala
            580                 585                 590

Val Ala Ile Pro Ser Thr Ile Pro Gly Asn Ala Tyr Glu Glu Leu Ala
        595                 600                 605

Ile Asp Glu Glu Ala Val Ala Lys Glu Gln Ser Ile Ser Thr Lys Pro
    610                 615                 620

Pro Tyr Lys Glu Arg Lys Asp Glu Leu Lys
625                 630
```

<210> 27
<211> 634
<212> PRT
<213> Vibrio cholerae

<400> 27

```
Val Glu Asp Glu Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys Ser
1               5                   10                  15

Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile Pro
            20                  25                  30
```

```
Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr Ile
        35                  40                  45

Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser Ile
    50                  55                  60

Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr Val
65                  70                  75                  80

Asn Gln Asp Ala Pro Phe Gly Val Ile His Leu Asp Ile Thr Thr Glu
                85                  90                  95

Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe Ala
            100                 105                 110

Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile Lys
        115                 120                 125

Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val Pro
    130                 135                 140

Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp Lys
145                 150                 155                 160

Thr Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His Asn Ile
                165                 170                 175

Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys Glu Gly
            180                 185                 190

Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala Leu Cys
        195                 200                 205

Trp Leu Val Pro Met Asp Ala Ile Tyr Asn Tyr Ile Thr Gln Gln Asn
    210                 215                 220

Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr Val Ala
225                 230                 235                 240
```

```
Gly Thr Pro Lys Val Ile Thr Val Lys Gln Gly Ile Glu Gln Lys Pro
                245                 250                 255

Val Glu Gln Arg Ile His Phe Ser Asn Gly Asn Ala Met Ser Ala Leu
            260                 265                 270

Ala Ala His Arg Val Cys Gly Val Pro Leu Glu Thr Leu Ala Arg Ser
        275                 280                 285

Arg Lys Pro Arg Asp Leu Thr Asp Asp Leu Ser Cys Ala Tyr Gln Ala
    290                 295                 300

Gln Asn Ile Val Ser Leu Phe Val Ala Thr Arg Ile Leu Phe Ser His
305                 310                 315                 320

Leu Asp Ser Val Phe Thr Leu Asn Leu Asp Glu Gln Glu Pro Glu Val
                325                 330                 335

Ala Glu Arg Leu Ser Asp Leu Arg Arg Ile Asn Glu Asn Asn Pro Gly
            340                 345                 350

Met Val Thr Gln Val Leu Thr Val Ala Arg Gln Ile Tyr Asn Asp Tyr
        355                 360                 365

Val Thr His His Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala Gly Ala
    370                 375                 380

Gln Ala Ala Asp Ile Leu Ser Leu Phe Cys Pro Asp Ala Asp Lys Ser
385                 390                 395                 400

Cys Val Ala Ser Asn Asn Asp Gln Ala Asn Ile Asn Ile Glu Ser Arg
                405                 410                 415

Ser Gly Arg Ser Tyr Leu Pro Glu Asn Arg Ala Val Ile Thr Pro Gln
            420                 425                 430

Gly Val Thr Asn Trp Thr Tyr Gln Glu Leu Glu Ala Thr His Gln Ala
        435                 440                 445

Leu Thr Arg Glu Gly Tyr Val Phe Val Gly Tyr His Gly Thr Asn His
    450                 455                 460
```

```
Val Ala Ala Gln Thr Ile Val Asn Arg Ile Ala Pro Val Pro Arg Gly
465                 470                 475                 480

Asn Asn Thr Glu Asn Glu Glu Lys Trp Gly Gly Leu Tyr Val Ala Thr
                485                 490                 495

His Ala Glu Val Ala His Gly Tyr Ala Arg Ile Lys Glu Gly Thr Gly
            500                 505                 510

Glu Tyr Gly Leu Pro Thr Arg Ala Glu Arg Asp Ala Arg Gly Val Met
        515                 520                 525

Leu Arg Val Tyr Ile Pro Arg Ala Ser Leu Glu Arg Phe Tyr Arg Thr
    530                 535                 540

Asn Thr Pro Leu Glu Asn Ala Glu Glu His Ile Thr Gln Val Ile Gly
545                 550                 555                 560

His Ser Leu Pro Leu Arg Asn Glu Ala Phe Thr Gly Pro Glu Ser Ala
                565                 570                 575

Gly Gly Glu Asp Glu Thr Val Ile Gly Trp Asp Met Ala Ile His Ala
            580                 585                 590

Val Ala Ile Pro Ser Thr Ile Pro Gly Asn Ala Tyr Glu Glu Leu Ala
        595                 600                 605

Ile Asp Glu Glu Ala Val Ala Lys Glu Gln Ser Ile Ser Thr Lys Pro
    610                 615                 620

Pro Tyr Lys Glu Arg Lys Asp Glu Leu Lys
625                 630
```

<210> 28
<211> 634
<212> PRT
<213> Vibrio cholerae

<400> 28

```
Val Glu Asp Glu Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys Ser
1               5                   10                  15
```

```
Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile Pro
            20                  25                  30

Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr Ile
        35                  40                  45

Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser Ile
    50                  55                  60

Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr Val
65                  70                  75                  80

Asn Gln Asp Ala Pro Phe Gly Val Ile His Leu Asp Ile Thr Thr Glu
                85                  90                  95

Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe Ala
            100                 105                 110

Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile Lys
        115                 120                 125

Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val Pro
    130                 135                 140

Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp Lys
145                 150                 155                 160

Thr Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His Asn Ile
                165                 170                 175

Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys Glu Gly
            180                 185                 190

Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala Leu Cys
        195                 200                 205

Trp Leu Val Pro Met Asp Ala Ile Tyr Asn Tyr Ile Thr Gln Gln Asn
    210                 215                 220
```

```
Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr Val Ala
225                 230                 235                 240

Gly Thr Pro Lys Val Ile Thr Val Lys Gln Gly Ile Glu Gln Lys Pro
                245                 250                 255

Val Glu Gln Arg Ile His Phe Ser Lys Gly Asn Ala Met Ser Ala Leu
            260                 265                 270

Ala Ala His Arg Val Cys Gly Val Pro Leu Glu Thr Leu Ala Arg Ser
        275                 280                 285

Arg Lys Pro Arg Asp Leu Thr Asp Asp Leu Ser Cys Ala Tyr Gln Ala
    290                 295                 300

Gln Asn Ile Val Ser Leu Phe Val Ala Thr Arg Ile Leu Phe Ser His
305                 310                 315                 320

Leu Asp Ser Val Phe Thr Leu Asn Leu Asp Glu Gln Glu Pro Glu Val
                325                 330                 335

Ala Glu Arg Leu Ser Asp Leu Arg Arg Ile Asn Glu Asn Asn Pro Gly
            340                 345                 350

Met Val Thr Gln Val Leu Thr Val Ala Arg Gln Ile Tyr Asn Asp Tyr
        355                 360                 365

Val Thr His His Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala Gly Ala
    370                 375                 380

Gln Ala Ala Asp Ile Leu Ser Leu Phe Cys Pro Asp Ala Asp Lys Ser
385                 390                 395                 400

Cys Val Ala Ser Asn Asn Asp Gln Ala Asn Ile Asn Ile Glu Ser Arg
                405                 410                 415

Ser Gly Arg Ser Tyr Leu Leu Glu Asn Arg Ala Val Ile Thr Pro Gln
            420                 425                 430

Gly Val Thr Asn Trp Thr Tyr Gln Glu Leu Glu Ala Thr His Gln Ala
        435                 440                 445
```

```
Leu Thr Arg Glu Gly Tyr Val Phe Val Gly Tyr His Gly Thr Asn His
    450                 455                 460

Val Ala Ala Gln Thr Ile Val Asn Arg Ile Ala Pro Val Pro Arg Gly
465                 470                 475                 480

Asn Asn Thr Glu Asn Glu Glu Lys Trp Gly Gly Leu Tyr Val Ala Thr
                485                 490                 495

His Ala Glu Val Ala His Gly Tyr Ala Arg Ile Lys Glu Gly Thr Gly
            500                 505                 510

Glu Tyr Gly Leu Pro Thr Arg Ala Glu Arg Asp Ala Arg Gly Val Met
        515                 520                 525

Leu Arg Val Tyr Ile Pro Arg Ala Ser Leu Glu Arg Phe Tyr Arg Thr
    530                 535                 540

Asn Thr Pro Leu Glu Asn Ala Glu Glu His Ile Thr Gln Val Ile Gly
545                 550                 555                 560

His Ser Leu Pro Leu Arg Asn Glu Ala Phe Thr Gly Pro Glu Ser Ala
                565                 570                 575

Gly Gly Glu Asp Glu Thr Val Ile Gly Trp Asp Met Ala Ile His Ala
            580                 585                 590

Val Ala Ile Pro Ser Thr Ile Pro Gly Asn Ala Tyr Glu Glu Leu Ala
        595                 600                 605

Ile Asp Glu Glu Ala Val Ala Lys Glu Gln Ser Ile Ser Thr Lys Pro
    610                 615                 620

Pro Tyr Lys Glu Arg Lys Asp Glu Leu Lys
625                 630
```

<210> 29
<211> 634
<212> PRT
<213> Vibrio cholerae

<400> 29

```
Val Glu Asp Glu Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys Ser
1               5                  10                  15

Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile Pro
            20                  25                  30

Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr Ile
        35                  40                  45

Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser Ile
    50                  55                  60

Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr Val
65                  70                  75                  80

Asn Gln Asp Ala Pro Phe Gly Val Ile His Leu Asp Ile Thr Thr Glu
                85                  90                  95

Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe Ala
            100                 105                 110

Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile Lys
        115                 120                 125

Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val Pro
    130                 135                 140

Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp Lys
145                 150                 155                 160

Thr Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His Asn Ile
                165                 170                 175

Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys Glu Gly
            180                 185                 190

Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala Leu Cys
        195                 200                 205
```

```
Trp Leu Val Pro Met Asp Ala Ile Tyr Asn Tyr Ile Thr Gln Lys Asn
    210                 215                 220

Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr Val Ala
225                 230                 235                 240

Gly Thr Pro Lys Val Ile Thr Val Lys Gln Gly Ile Glu Gln Lys Pro
                245                 250                 255

Val Glu Gln Arg Ile His Phe Ser Lys Gly Asn Ala Met Ser Ala Leu
            260                 265                 270

Ala Ala His Arg Val Cys Gly Val Pro Leu Glu Thr Leu Ala Arg Ser
        275                 280                 285

Arg Lys Pro Arg Asp Leu Pro Asp Asp Leu Ser Cys Ala Tyr Gln Ala
    290                 295                 300

Gln Asn Ile Val Ser Leu Phe Val Ala Thr Arg Ile Leu Phe Ser His
305                 310                 315                 320

Leu Asp Ser Val Phe Thr Leu Asn Leu Asp Glu Gln Glu Pro Glu Val
                325                 330                 335

Ala Glu Arg Leu Ser Asp Leu Arg Arg Ile Asn Glu Asn Asn Pro Gly
            340                 345                 350

Met Val Thr Gln Val Leu Thr Val Ala Arg Gln Ile Tyr Asn Asp Tyr
        355                 360                 365

Val Thr His His Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala Gly Ala
    370                 375                 380

Gln Ala Ala Asp Ile Leu Ser Leu Phe Cys Pro Asp Ala Asp Lys Ser
385                 390                 395                 400

Cys Val Ala Ser Asn Asn Asp Gln Ala Asn Ile Asn Ile Glu Ser Arg
                405                 410                 415

Ser Gly Arg Ser Tyr Leu Pro Glu Asn Arg Ala Val Ile Thr Pro Gln
            420                 425                 430
```

```
Gly Val Thr Asn Trp Thr Tyr Gln Glu Leu Glu Ala Thr His Gln Ala
        435                 440                 445

Leu Thr Arg Glu Gly Tyr Val Phe Val Gly Tyr His Gly Thr Asn His
    450                 455                 460

Val Ala Ala Gln Thr Ile Val Asn Arg Ile Ala Pro Val Pro Arg Gly
465                 470                 475                 480

Asn Asn Thr Glu Asn Glu Glu Lys Trp Gly Gly Leu Tyr Val Ala Thr
                485                 490                 495

His Ala Glu Val Ala His Gly Tyr Ala Arg Ile Lys Glu Gly Thr Gly
            500                 505                 510

Glu Tyr Gly Leu Pro Thr Arg Ala Glu Arg Asp Ala Arg Gly Val Met
        515                 520                 525

Leu Arg Val Tyr Ile Pro Arg Ala Ser Leu Glu Arg Phe Tyr Arg Thr
    530                 535                 540

Asn Thr Pro Leu Glu Asn Ala Glu Glu His Ile Thr Gln Val Ile Gly
545                 550                 555                 560

His Ser Leu Pro Leu Arg Asn Glu Ala Phe Thr Gly Pro Glu Ser Ala
                565                 570                 575

Gly Gly Glu Asp Glu Thr Val Ile Gly Trp Asp Met Ala Ile His Ala
            580                 585                 590

Val Ala Ile Pro Ser Thr Ile Pro Gly Asn Ala Tyr Glu Glu Leu Ala
        595                 600                 605

Ile Asp Glu Glu Ala Val Ala Lys Glu Gln Ser Ile Ser Ala Lys Pro
    610                 615                 620

Pro Tyr Lys Glu Gln Lys Asp Glu Leu Lys
625                 630
```

<210> 30
<211> 634
<212> PRT
<213> Vibrio cholerae

<400> 30
Val Glu Asp Glu Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys Ser
1 5 10 15

Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile Pro
20 25 30

Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr Ile
35 40 45

Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser Ile
50 55 60

Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr Val
65 70 75 80

Asn Gln Asp Ala Pro Phe Gly Val Ile His Leu Asp Ile Thr Thr Glu
85 90 95

Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe Ala
100 105 110

Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile Lys
115 120 125

Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val Pro
130 135 140

Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp Lys
145 150 155 160

Thr Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His Asn Ile
165 170 175

Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys Glu Gly
180 185 190

```
Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala Leu Cys
        195                 200                 205

Trp Leu Val Pro Ile Asp Ala Ile Tyr Asn Tyr Ile Thr Gln Gln Asn
    210                 215                 220

Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr Val Ala
225                 230                 235                 240

Gly Thr Pro Lys Ala Ile Thr Val Lys Gln Gly Ile Glu Gln Lys Pro
                245                 250                 255

Val Glu Gln Arg Ile His Phe Ser Lys Lys Asn Ala Met Glu Ala Leu
            260                 265                 270

Ala Ala His Arg Val Cys Gly Val Pro Leu Glu Thr Leu Ala Arg Ser
        275                 280                 285

Arg Lys Pro Arg Asp Leu Pro Asp Asp Leu Ser Cys Ala Tyr Gln Ala
    290                 295                 300

Gln Asn Ile Val Ser Leu Phe Val Ala Thr Arg Ile Leu Phe Ser His
305                 310                 315                 320

Leu Asp Ser Val Phe Thr Leu Asn Leu Asp Glu Gln Glu Pro Glu Val
                325                 330                 335

Ala Glu Arg Leu Ser Ala Leu Arg Gln Ile Asn Glu Asn Asn Pro Gly
            340                 345                 350

Met Val Thr Gln Val Leu Thr Val Ala Arg Gln Ile Tyr Asn Asp Tyr
        355                 360                 365

Val Thr His His Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala Gly Ala
    370                 375                 380

Gln Ala Ala Asp Ile Leu Ser Leu Phe Cys Pro Asp Ala Asp Lys Ser
385                 390                 395                 400

Cys Val Ala Ser Asn Asn Asp Gln Ala Asn Ile Asn Ile Glu Ser Arg
                405                 410                 415
```

```
Ser Gly Arg Ser Tyr Leu Pro Glu Asn Arg Ala Val Ile Thr Pro Gln
            420                 425                 430

Gly Val Thr Asn Trp Thr Tyr Gln Glu Leu Glu Ala Thr His Gln Ala
        435                 440                 445

Leu Thr Arg Glu Gly Tyr Val Phe Val Gly Tyr His Gly Thr Asn His
    450                 455                 460

Val Ala Ala Gln Thr Ile Val Asn Arg Ile Ala Pro Val Pro Arg Gly
465                 470                 475                 480

Asn Asn Thr Glu Asn Glu Glu Lys Trp Gly Gly Leu Tyr Val Ala Thr
                485                 490                 495

His Ala Glu Val Ala His Gly Tyr Ala Arg Ile Lys Glu Gly Thr Gly
            500                 505                 510

Glu Tyr Gly Leu Pro Thr Arg Ala Glu Arg Asp Ala Arg Gly Val Met
        515                 520                 525

Leu Arg Val Tyr Ile Pro Arg Ala Ser Leu Glu Arg Phe Tyr Arg Thr
    530                 535                 540

Asn Thr Pro Leu Glu Asn Ala Glu Glu His Ile Thr Gln Val Ile Gly
545                 550                 555                 560

His Ser Leu Pro Leu Arg Asn Glu Ala Phe Thr Gly Pro Glu Ser Ala
                565                 570                 575

Gly Gly Glu Asp Glu Thr Val Ile Gly Trp Asp Met Ala Ile Tyr Ala
            580                 585                 590

Val Ala Ile Pro Ser Thr Ile Pro Gly Asn Ala Tyr Glu Glu Leu Ala
        595                 600                 605

Ile Asp Glu Glu Ala Val Ala Lys Glu Gln Ser Ile Ser Ala Lys Pro
    610                 615                 620
```

```
Pro Tyr Lys Glu Gln Lys Asp Glu Leu Lys
625                 630
```

<210> 31
<211> 634
<212> PRT
<213> Vibrio cholerae

<400> 31

```
Val Glu Asp Glu Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys Ser
1               5                   10                  15

Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile Pro
            20                  25                  30

Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr Ile
        35                  40                  45

Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser Ile
    50                  55                  60

Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr Val
65                  70                  75                  80

Asn Gln Asp Ala Pro Phe Gly Val Ile His Leu Asp Ile Thr Thr Glu
                85                  90                  95

Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe Ala
            100                 105                 110

Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile Lys
        115                 120                 125

Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val Pro
    130                 135                 140

Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp Lys
145                 150                 155                 160

Thr Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His Asn Ile
                165                 170                 175
```

```
Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys Glu Gly
            180                 185                 190

Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala Leu Cys
        195                 200                 205

Trp Leu Val Pro Ile Asp Ala Ile Tyr Asn Tyr Ile Thr Gln Gln Asn
    210                 215                 220

Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr Val Ala
225                 230                 235                 240

Gly Thr Pro Lys Ala Ile Thr Val Lys Gln Gly Ile Glu Gln Lys Pro
                245                 250                 255

Val Glu Gln Arg Ile His Phe Ser Lys Lys Asn Ala Met Glu Ala Leu
            260                 265                 270

Ala Ala His Arg Val Cys Gly Val Pro Leu Glu Thr Leu Ala Arg Ser
        275                 280                 285

Arg Lys Pro Arg Asp Leu Pro Asp Asp Leu Ser Cys Ala Tyr Gln Ala
    290                 295                 300

Gln Asn Ile Val Ser Leu Phe Val Ala Thr Arg Ile Leu Phe Ser His
305                 310                 315                 320

Leu Asp Ser Val Phe Thr Leu Asn Leu Asp Glu Gln Glu Pro Ala Val
                325                 330                 335

Ala Glu Arg Leu Ser Ala Leu Arg Gln Ile Asn Glu Asn Asn Pro Gly
            340                 345                 350

Met Val Thr Gln Val Leu Thr Val Ala Arg Gln Ile Tyr Asn Asp Tyr
        355                 360                 365

Val Thr His His Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala Gly Ala
    370                 375                 380

Gln Ala Ala Asp Ile Leu Ser Leu Phe Cys Pro Asp Ala Asp Lys Pro
385                 390                 395                 400
```

```
Cys Val Ala Ser Asn Asn Asp Gln Ala Asn Ile Asn Val Glu Ser Arg
                405                 410                 415

Ser Gly Arg Ser Tyr Leu Pro Glu Asn Arg Ala Val Ile Thr Pro Gln
            420                 425                 430

Gly Val Thr Asn Trp Thr Tyr Gln Glu Leu Glu Ala Thr His Gln Ala
        435                 440                 445

Leu Thr Arg Glu Gly Tyr Val Phe Val Gly Tyr His Gly Thr Asn His
    450                 455                 460

Val Ala Ala Gln Thr Ile Val Asn Arg Ile Ala Pro Val Pro Arg Gly
465                 470                 475                 480

Asn Asn Thr Glu Asn Glu Glu Lys Trp Gly Gly Leu Tyr Val Ala Thr
                485                 490                 495

His Ala Glu Val Ala His Gly Tyr Ala Arg Ile Lys Glu Gly Thr Gly
            500                 505                 510

Glu Tyr Gly Leu Pro Thr Arg Ala Glu Arg Glu Ala Arg Gly Val Met
        515                 520                 525

Leu Arg Val Tyr Ile Pro Arg Ala Ser Leu Glu Arg Phe Tyr Arg Thr
    530                 535                 540

Asn Thr Pro Leu Glu Asn Ala Glu Arg His Ile Thr Gln Val Ile Gly
545                 550                 555                 560

His Ser Leu Pro Leu Arg Asn Glu Ala Phe Thr Gly Pro Glu Ser Ala
                565                 570                 575

Gly Gly Glu Asp Glu Thr Val Ile Gly Trp Asp Met Ala Ile His Ala
            580                 585                 590

Val Ala Ile Pro Ser Thr Ile Pro Gly Asn Ala Tyr Glu Glu Leu Ala
        595                 600                 605
```

```
Ile Asp Glu Glu Ala Val Ala Lys Glu Gln Ser Ile Ser Ala Lys Pro
    610                 615                 620

Pro Tyr Lys Glu Gln Lys Asp Glu Leu Lys
625                 630
```

<210> 32
<211> 634
<212> PRT
<213> Vibrio cholerae

<400> 32

```
Val Glu Asp Glu Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys Ser
1               5                   10                  15

Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile Pro
            20                  25                  30

Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr Ile
        35                  40                  45

Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser Ile
    50                  55                  60

Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr Val
65                  70                  75                  80

Asn Gln Asp Ala Pro Phe Gly Val Ile His Leu Asp Ile Thr Thr Glu
                85                  90                  95

Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe Ala
            100                 105                 110

Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile Lys
        115                 120                 125

Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val Pro
    130                 135                 140

Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp Glu
145                 150                 155                 160
```

```
Asn Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His Asn Ile
                165                 170                 175

Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys Glu Gly
            180                 185                 190

Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala Leu Cys
        195                 200                 205

Trp Leu Val Pro Met Asp Ala Ile Tyr Asn Tyr Ile Thr Gln Gln Asn
    210                 215                 220

Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr Val Ala
225                 230                 235                 240

Gly Thr Pro Lys Val Ile Thr Val Lys Gln Gly Ile Glu Gln Lys Pro
                245                 250                 255

Val Glu Gln Arg Ile His Phe Ser Lys Gly Asn Ala Met Ser Ala Leu
            260                 265                 270

Ala Ala His Arg Val Cys Gly Val Pro Leu Glu Thr Leu Ala Arg Ser
        275                 280                 285

Arg Lys Pro Arg Asp Leu Thr Asp Asp Leu Ser Cys Ala Tyr Gln Ala
    290                 295                 300

Gln Asn Ile Val Ser Leu Phe Val Ala Thr Arg Ile Leu Phe Ser His
305                 310                 315                 320

Leu Asp Ser Val Phe Thr Leu Asn Leu Asp Glu Gln Glu Pro Glu Val
                325                 330                 335

Ala Glu Arg Leu Ser Asp Leu Arg Arg Ile Asn Glu Asn Asn Pro Gly
            340                 345                 350

Met Val Thr Gln Val Leu Thr Val Ala Arg Gln Ile Tyr Asn Asp Tyr
        355                 360                 365

Val Thr His His Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala Gly Ala
    370                 375                 380
```

```
Gln Ala Ala Asp Ile Leu Ser Leu Phe Cys Pro Asp Ala Asp Lys Ser
385                 390                 395                 400

Cys Val Ala Ser Asn Asn Asp Gln Ala Asn Ile Asn Ile Glu Ser Arg
                405                 410                 415

Ser Gly Arg Ser Tyr Leu Pro Glu Asn Arg Ala Val Ile Thr Pro Gln
            420                 425                 430

Gly Val Thr Asn Trp Thr Tyr Gln Glu Leu Glu Ala Thr His Gln Ala
        435                 440                 445

Leu Thr Arg Glu Gly Tyr Val Phe Val Gly Tyr His Gly Thr Asn His
    450                 455                 460

Val Ala Ala Gln Thr Ile Val Asn Arg Ile Ala Pro Val Pro Arg Gly
465                 470                 475                 480

Asn Asn Thr Glu Asn Glu Glu Lys Trp Gly Gly Leu Tyr Val Ala Thr
                485                 490                 495

His Ala Glu Val Ala His Gly Tyr Ala Arg Ile Lys Glu Gly Thr Gly
            500                 505                 510

Glu Tyr Gly Leu Pro Thr Arg Ala Glu Arg Asp Ala Arg Gly Val Met
        515                 520                 525

Leu Arg Val Tyr Ile Pro Arg Ala Ser Leu Glu Arg Phe Tyr Arg Thr
    530                 535                 540

Asn Thr Pro Leu Glu Asn Ala Glu Glu His Ile Thr Gln Val Ile Gly
545                 550                 555                 560

His Ser Leu Pro Leu Arg Asn Glu Ala Phe Thr Gly Pro Glu Ser Ala
                565                 570                 575

Gly Gly Glu Asp Glu Thr Val Ile Gly Trp Asp Met Ala Ile Tyr Ala
            580                 585                 590
```

Val Ala Ile Pro Ser Thr Ile Pro Gly Asn Ala Tyr Glu Glu Leu Ala
595 600 605

Ile Asp Glu Glu Ala Val Ala Lys Glu Gln Ser Ile Ser Ala Lys Pro
610 615 620

Pro Tyr Lys Glu Gln Lys Asp Glu Leu Lys
625 630

<210> 33
<211> 634
<212> PRT
<213> Vibrio cholerae

<400> 33
Val Glu Asp Glu Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys Ser
1 5 10 15

Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile Pro
20 25 30

Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr Ile
35 40 45

Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser Ile
50 55 60

Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr Val
65 70 75 80

Asn Gln Asp Ala Pro Phe Gly Val Ile His Leu Asp Ile Thr Thr Glu
85 90 95

Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe Ala
100 105 110

Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile Lys
115 120 125

Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val Pro
130 135 140

```
Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp Glu
145                 150                 155                 160

Asn Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His Asn Ile
                165                 170                 175

Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys Glu Gly
            180                 185                 190

Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala Leu Cys
        195                 200                 205

Trp Leu Val Pro Met Asp Ala Ile Tyr Asn Tyr Ile Thr Gln Lys Asn
    210                 215                 220

Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr Val Ala
225                 230                 235                 240

Gly Thr Pro Lys Val Ile Thr Val Lys Gln Gly Ile Glu Gln Lys Pro
                245                 250                 255

Val Glu Gln Arg Ile His Phe Ser Lys Gly Asn Ala Met Ser Ala Leu
            260                 265                 270

Ala Ala His Arg Val Cys Gly Val Pro Leu Glu Thr Leu Ala Arg Ser
        275                 280                 285

Arg Lys Pro Arg Asp Leu Thr Asp Asp Leu Ser Cys Ala Tyr Gln Ala
    290                 295                 300

Gln Asn Ile Val Ser Leu Phe Val Ala Thr Arg Ile Leu Phe Ser His
305                 310                 315                 320

Leu Asp Ser Val Phe Thr Leu Asn Leu Asp Glu Gln Glu Pro Glu Val
                325                 330                 335

Ala Glu Arg Leu Ser Asp Leu Arg Arg Ile Asn Glu Asn Asn Pro Gly
            340                 345                 350

Met Val Thr Gln Val Leu Thr Val Ala Arg Gln Ile Tyr Asn Asp Tyr
        355                 360                 365
```

```
Val Thr His His Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala Gly Ala
    370                 375                 380

Gln Ala Ala Asp Ile Leu Ser Leu Phe Cys Pro Asp Ala Asp Lys Ser
385                 390                 395                 400

Cys Val Ala Ser Asn Asn Asp Gln Ala Asn Ile Asn Ile Glu Ser Arg
                405                 410                 415

Ser Gly Arg Ser Tyr Leu Pro Glu Asn Arg Ala Val Ile Thr Pro Gln
            420                 425                 430

Gly Val Thr Asn Trp Thr Tyr Gln Glu Leu Glu Ala Thr His Gln Ala
        435                 440                 445

Leu Thr Arg Glu Gly Tyr Val Phe Val Gly Tyr His Gly Thr Asn His
    450                 455                 460

Val Ala Ala Gln Thr Ile Val Asn Arg Ile Ala Pro Val Pro Arg Gly
465                 470                 475                 480

Asn Asn Thr Glu Asn Glu Glu Lys Trp Gly Gly Leu Tyr Val Ala Thr
                485                 490                 495

His Ala Glu Val Ala His Gly Tyr Ala Arg Ile Lys Glu Gly Thr Gly
            500                 505                 510

Glu Tyr Gly Leu Pro Thr Arg Ala Glu Arg Asp Ala Arg Gly Val Met
        515                 520                 525

Leu Arg Val Tyr Ile Pro Arg Ala Ser Leu Glu Arg Phe Tyr Arg Thr
    530                 535                 540

Asn Thr Pro Leu Glu Asn Ala Glu Glu His Ile Thr Gln Val Ile Gly
545                 550                 555                 560

His Ser Leu Pro Leu Arg Asn Glu Ala Phe Thr Gly Pro Glu Ser Ala
                565                 570                 575
```

```
Gly Gly Glu Asp Glu Thr Val Ile Gly Trp Asp Met Ala Ile His Ala
            580                 585                 590

Val Ala Ile Pro Ser Thr Ile Pro Gly Asn Ala Tyr Glu Glu Leu Ala
        595                 600                 605

Ile Asp Glu Glu Ala Val Ala Lys Glu Gln Ser Ile Ser Thr Lys Pro
    610                 615                 620

Pro Tyr Lys Glu Arg Lys Asp Glu Leu Lys
625                 630
```

<210> 34
<211> 634
<212> PRT
<213> Vibrio cholerae

<400> 34

```
Val Glu Asp Glu Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys Ser
1               5                   10                  15

Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile Pro
            20                  25                  30

Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr Ile
        35                  40                  45

Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser Ile
    50                  55                  60

Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr Val
65                  70                  75                  80

Asn Gln Asp Ala Pro Phe Gly Val Ile His Leu Asp Ile Thr Thr Glu
                85                  90                  95

Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe Ala
            100                 105                 110

Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile Lys
        115                 120                 125
```

```
Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val Pro
    130                 135                 140

Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp Glu
145                 150                 155                 160

Asn Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His Asn Ile
                165                 170                 175

Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys Glu Gly
            180                 185                 190

Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala Leu Cys
        195                 200                 205

Trp Leu Val Pro Ile Asp Ala Ile Tyr Asn Tyr Ile Thr Gln Gln Asn
    210                 215                 220

Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr Val Ala
225                 230                 235                 240

Gly Thr Pro Lys Ala Ile Thr Val Lys Gln Gly Ile Glu Gln Lys Thr
                245                 250                 255

Val Glu Gln Arg Ile His Phe Ser Lys Lys Asn Ala Met Glu Ala Leu
            260                 265                 270

Ala Ala His Arg Val Cys Gly Val Pro Leu Glu Thr Leu Ala Arg Ser
        275                 280                 285

Arg Lys Pro Arg Asp Leu Thr Asp Asp Leu Ser Cys Val Tyr Gln Ala
    290                 295                 300

Gln Asn Ile Val Ser Leu Phe Val Ala Thr Arg Ile Leu Phe Ser His
305                 310                 315                 320

Leu Asp Ser Val Phe Thr Leu Asn Leu Glu Glu Gln Glu Pro Glu Val
                325                 330                 335

Ala Glu Arg Leu Ser Ala Leu Arg Gln Ile Asn Glu Asn Asn Pro Gly
            340                 345                 350
```

```
Met Val Thr Gln Val Leu Thr Val Ala Arg Gln Ile Tyr Asn Asp Tyr
        355                 360                 365

Val Thr His His Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala Gly Ala
    370                 375                 380

Gln Ala Ala Asp Ile Leu Ser Leu Phe Cys Pro Asp Ala Asp Lys Ser
385                 390                 395                 400

Cys Val Ala Ser Asn Asn Asp Gln Ala Asn Ile Asn Ile Glu Ser Arg
                405                 410                 415

Ser Gly Arg Ser Tyr Leu Pro Glu Asn Arg Ala Val Ile Thr Pro Gln
            420                 425                 430

Gly Val Thr Asn Trp Thr Tyr Gln Glu Leu Glu Ala Thr His Gln Ala
        435                 440                 445

Leu Thr Arg Glu Gly Tyr Val Phe Val Gly Tyr His Gly Thr Asn His
    450                 455                 460

Val Ala Ala Gln Thr Ile Val Asn Arg Ile Ala Pro Val Pro Arg Gly
465                 470                 475                 480

Asn Asn Thr Glu Asn Glu Glu Lys Trp Gly Gly Leu Tyr Val Ala Thr
                485                 490                 495

His Ala Glu Val Ala His Gly Tyr Ala Arg Ile Lys Glu Gly Thr Gly
            500                 505                 510

Glu Tyr Gly Leu Pro Thr Arg Ala Glu Arg Asp Ala Arg Gly Val Met
        515                 520                 525

Leu Arg Val Tyr Ile Pro Arg Ala Ser Leu Glu Arg Phe Tyr Arg Thr
    530                 535                 540

Asn Thr Pro Leu Glu Asn Ala Glu Glu His Ile Thr Gln Val Ile Gly
545                 550                 555                 560
```

```
His Ser Leu Pro Leu Arg Asn Glu Ala Phe Thr Gly Pro Glu Arg Val
                565                 570                 575

Asp Gly Glu Asp Glu Thr Val Ile Gly Trp Asp Met Ala Ile His Ala
            580                 585                 590

Val Ala Ile Pro Ser Thr Ile Pro Gly Asn Ala Tyr Glu Glu Leu Ala
        595                 600                 605

Ile Asp Glu Glu Ala Val Ala Lys Glu Gln Ser Ile Ser Thr Lys Pro
    610                 615                 620

Pro Tyr Lys Glu Arg Lys Asp Glu Leu Lys
625                 630
```

<210> 35
<211> 634
<212> PRT
<213> Vibrio cholerae

<400> 35

```
Val Glu Asp Glu Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys Ser
1               5                   10                  15

Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile Pro
            20                  25                  30

Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr Ile
        35                  40                  45

Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser Ile
    50                  55                  60

Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr Val
65                  70                  75                  80

Asn Gln Asp Ala Pro Phe Gly Val Ile His Leu Asp Ile Thr Thr Glu
                85                  90                  95

Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe Ala
            100                 105                 110
```

```
Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile Lys
        115                 120                 125

Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val Pro
    130                 135                 140

Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp Glu
145                 150                 155                 160

Asn Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His Asn Ile
                165                 170                 175

Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys Glu Gly
            180                 185                 190

Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala Leu Cys
        195                 200                 205

Trp Leu Val Pro Ile Asp Ala Ile Tyr Asn Tyr Ile Thr Gln Gln Asn
    210                 215                 220

Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr Val Ala
225                 230                 235                 240

Gly Thr Pro Lys Ala Ile Thr Val Lys Gln Gly Ile Glu Gln Lys Pro
                245                 250                 255

Val Glu Gln Arg Ile His Phe Ser Lys Lys Asn Ala Met Glu Ala Leu
            260                 265                 270

Ala Ala His Arg Val Cys Gly Val Pro Leu Glu Thr Leu Ala Arg Ser
        275                 280                 285

Arg Lys Pro Arg Asp Leu Pro Asp Asp Leu Ser Cys Ala Tyr Gln Ala
    290                 295                 300

Gln Asn Ile Val Ser Leu Phe Val Ala Thr Arg Ile Leu Phe Ser His
305                 310                 315                 320

Leu Asp Ser Val Phe Thr Leu Asn Leu Asp Glu Gln Glu Pro Glu Val
                325                 330                 335
```

```
Ala Glu Arg Leu Ser Ala Leu Arg Gln Ile Asn Glu Asn Asn Pro Gly
            340                 345                 350

Met Val Thr Gln Val Leu Thr Val Ala Arg Gln Ile Tyr Asn Asp Tyr
        355                 360                 365

Val Thr His His Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala Gly Ala
    370                 375                 380

Gln Ala Ala Asp Ile Leu Ser Leu Phe Cys Pro Asp Ala Asp Lys Pro
385                 390                 395                 400

Cys Val Ala Ser Asn Asn Asp Gln Ala Asn Ile Asn Ile Glu Ser Arg
                405                 410                 415

Ser Gly Arg Ser Tyr Leu Pro Glu Asn Arg Ala Val Ile Thr Pro Gln
            420                 425                 430

Gly Val Thr Asn Trp Thr Tyr Gln Glu Leu Glu Ala Thr His Gln Ala
        435                 440                 445

Leu Thr Arg Glu Gly Tyr Val Phe Val Gly Tyr His Gly Thr Asn His
    450                 455                 460

Val Ala Ala Gln Thr Ile Val Asn Arg Ile Ala Pro Val Pro Arg Gly
465                 470                 475                 480

Asn Asn Thr Glu Asn Glu Glu Lys Trp Gly Gly Leu Tyr Val Ala Thr
                485                 490                 495

His Ala Glu Val Ala His Gly Tyr Ala Arg Ile Lys Glu Gly Thr Gly
            500                 505                 510

Asn Gly Gly Leu Pro Thr Arg Ala Glu Arg Glu Thr Arg Gly Val Met
        515                 520                 525

Leu Arg Val Tyr Ile Pro Arg Ala Ser Leu Glu Arg Phe Tyr Arg Thr
    530                 535                 540
```

```
Asn Thr Pro Leu Glu Asn Ala Glu Glu His Ile Thr Asp Val Ile Gly
545                 550                 555                 560

His Ser Leu Pro Leu Arg Asn Glu Ala Phe Thr Gly Pro Glu Ser Ala
                565                 570                 575

Gly Gly Glu Asp Glu Thr Val Ile Gly Trp Asp Met Ala Ile His Ala
            580                 585                 590

Val Ala Ile Pro Ser Thr Ile Pro Gly Asn Ala Tyr Glu Glu Leu Ala
        595                 600                 605

Ile Asp Glu Glu Ala Val Ala Lys Glu Gln Ser Ile Ser Ala Lys Pro
    610                 615                 620

Pro Tyr Lys Glu Gln Lys Asp Glu Leu Lys
625                 630
```

<210> 36
<211> 634
<212> PRT
<213> Vibrio cholerae

<400> 36

```
Val Glu Asp Glu Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys Ser
1               5                   10                  15

Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile Pro
            20                  25                  30

Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr Ile
        35                  40                  45

Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser Ile
    50                  55                  60

Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr Val
65                  70                  75                  80

Asn Gln Asp Ala Pro Phe Gly Val Ile His Leu Asp Ile Thr Thr Glu
                85                  90                  95
```

```
Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe Ala
            100                 105                 110

Ile His Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile Lys
        115                 120                 125

Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val Pro
    130                 135                 140

Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp Glu
145                 150                 155                 160

Asn Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His Asn Ile
                165                 170                 175

Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys Glu Gly
            180                 185                 190

Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala Leu Cys
        195                 200                 205

Trp Leu Val Pro Ile Asp Ala Ile Tyr Asn Tyr Ile Thr Gln Gln Asn
    210                 215                 220

Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr Val Ala
225                 230                 235                 240

Gly Thr Pro Lys Ala Ile Thr Val Lys Gln Gly Ile Glu Gln Lys Thr
                245                 250                 255

Val Glu Gln Arg Ile His Phe Ser Lys Lys Asn Ala Met Glu Ala Leu
            260                 265                 270

Ala Ala His Arg Val Cys Gly Val Pro Leu Glu Thr Leu Ala Arg Ser
        275                 280                 285

Arg Lys Pro Arg Asp Leu Thr Asp Asp Leu Ser Cys Val Tyr Gln Ala
    290                 295                 300

Gln Asn Ile Val Ser Leu Phe Val Ala Thr Arg Ile Leu Phe Ser His
305                 310                 315                 320
```

```
Leu Asp Ser Val Phe Thr Leu Asn Leu Glu Glu Gln Glu Pro Glu Val
                325                 330                 335

Ala Glu Arg Leu Ser Ala Leu Arg Gln Ile Asn Glu Asn Asn Pro Gly
            340                 345                 350

Met Val Thr Gln Val Leu Thr Val Ala Arg Gln Ile Tyr Asn Asp Tyr
        355                 360                 365

Val Thr His His Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala Gly Ala
    370                 375                 380

Gln Ala Ala Asp Ile Leu Ser Leu Phe Cys Pro Asp Ala Asp Lys Ser
385                 390                 395                 400

Cys Val Ala Ser Asn Asn Asp Gln Ala Asn Ile Asn Ile Glu Ser Arg
                405                 410                 415

Ser Gly Arg Ser Tyr Leu Pro Glu Asn Arg Ala Val Ile Thr Pro Gln
            420                 425                 430

Gly Val Thr Asn Trp Thr Tyr Gln Glu Leu Glu Ala Thr His Gln Ala
        435                 440                 445

Leu Thr Arg Glu Gly Tyr Val Phe Val Gly Tyr His Gly Thr Asn His
    450                 455                 460

Val Ala Ala Gln Thr Ile Val Asn Arg Ile Ala Pro Val Pro Arg Gly
465                 470                 475                 480

Asn Asn Thr Glu Asn Glu Glu Lys Trp Gly Gly Leu Tyr Val Ala Thr
                485                 490                 495

His Ala Glu Val Ala His Gly Tyr Ala Arg Ile Lys Glu Gly Thr Gly
            500                 505                 510

Glu Tyr Gly Leu Pro Thr Arg Ala Glu Arg Asp Ala Arg Gly Val Met
        515                 520                 525
```

Leu Arg Val Tyr Ile Pro Arg Ala Ser Leu Glu Arg Phe Tyr Arg Thr
530 535 540

Asn Thr Pro Leu Glu Asn Ala Glu Glu His Ile Thr Gln Val Ile Gly
545 550 555 560

His Ser Leu Pro Leu Arg Asn Glu Ala Phe Thr Gly Pro Glu Ser Ala
565 570 575

Gly Gly Glu Asp Glu Thr Val Ile Gly Trp Asp Met Ala Ile His Ala
580 585 590

Val Ala Ile Pro Ser Thr Ile Pro Gly Asn Ala Tyr Glu Glu Leu Ala
595 600 605

Ile Asp Glu Glu Ala Val Ala Lys Glu Gln Ser Ile Ser Thr Lys Pro
610 615 620

Pro Tyr Lys Glu Arg Lys Asp Glu Leu Lys
625 630

<210> 37
<211> 634
<212> PRT
<213> Vibrio cholerae

<400> 37
Val Glu Asp Glu Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys Ser
1 5 10 15

Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile Pro
20 25 30

Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr Ile
35 40 45

Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser Ile
50 55 60

Ile Thr Ile Gly Glu Phe Ala Thr Ile Arg Ala Thr Arg His Tyr Val
65 70 75 80

```
Asn Gln Asp Ala Pro Phe Gly Val Ile Asn Leu Asp Ile Thr Thr Glu
                85                  90                  95

Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe Ala
            100                 105                 110

Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile Lys
        115                 120                 125

Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val Pro
    130                 135                 140

Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp Lys
145                 150                 155                 160

Thr Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His Asn Ile
                165                 170                 175

Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys Glu Gly
            180                 185                 190

Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala Leu Cys
        195                 200                 205

Trp Leu Val Pro Met Asp Ala Ile Tyr Asn Tyr Ile Thr Gln Gln Asn
    210                 215                 220

Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr Val Ala
225                 230                 235                 240

Gly Thr Pro Lys Val Ile Thr Val Lys Gln Gly Ile Glu Gln Lys Pro
                245                 250                 255

Val Glu Gln Arg Ile His Phe Ser Lys Gly Asn Ala Met Ser Ala Leu
            260                 265                 270

Ala Ala His Arg Val Cys Gly Val Pro Leu Glu Thr Leu Ala Arg Ser
        275                 280                 285

Arg Lys Pro Arg Asp Leu Thr Asp Asp Leu Ser Cys Ala Tyr Gln Ala
    290                 295                 300
```

```
Gln Asn Ile Val Ser Leu Phe Val Ala Thr Arg Ile Leu Phe Ser His
305                 310                 315                 320

Leu Asp Ser Val Phe Thr Leu Asn Leu Asp Glu Gln Glu Pro Glu Val
                325                 330                 335

Ala Glu Arg Leu Ser Asp Leu Arg Arg Ile Asn Glu Asn Asn Pro Gly
            340                 345                 350

Met Val Thr Gln Val Leu Thr Val Ala Arg Gln Ile Tyr Asn Asp Tyr
        355                 360                 365

Val Thr His His Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala Gly Ala
    370                 375                 380

Gln Ala Ala Asp Ile Leu Ser Leu Phe Cys Pro Asp Ala Asp Lys Ser
385                 390                 395                 400

Cys Val Ala Ser Asn Asn Asp Gln Ala Asn Ile Asn Ile Glu Ser Arg
                405                 410                 415

Ser Gly Arg Ser Tyr Leu Pro Glu Asn Arg Ala Val Ile Thr Pro Gln
            420                 425                 430

Gly Val Thr Asn Trp Thr Tyr Gln Glu Leu Glu Ala Thr His Gln Ala
        435                 440                 445

Leu Thr Arg Glu Gly Tyr Val Phe Val Gly Tyr His Gly Thr Asn His
    450                 455                 460

Val Ala Ala Gln Thr Ile Val Asn Arg Ile Ala Pro Val Pro Arg Gly
465                 470                 475                 480

Asn Asn Thr Glu Asn Glu Glu Lys Trp Gly Gly Leu Tyr Val Ala Thr
                485                 490                 495

His Ala Glu Val Ala His Gly Tyr Ala Arg Ile Lys Glu Gly Thr Gly
            500                 505                 510
```

Glu Tyr Gly Leu Pro Thr Arg Ala Glu Arg Asp Ala Arg Gly Val Met
515 520 525

Leu Arg Val Tyr Ile Pro Arg Ala Ser Leu Glu Arg Phe Tyr Arg Thr
530 535 540

Asn Thr Pro Leu Glu Asn Ala Glu Arg His Ile Thr Gln Val Ile Gly
545 550 555 560

His Ser Leu Pro Leu Arg Asn Glu Ala Phe Thr Gly Pro Glu Ser Ala
565 570 575

Gly Gly Glu Asp Glu Thr Val Ile Gly Trp Asp Met Ala Ile His Ala
580 585 590

Val Ala Ile Pro Ser Thr Ile Pro Gly Asn Ala Tyr Glu Glu Leu Ala
595 600 605

Ile Asp Glu Glu Ala Val Ala Lys Glu Gln Ser Ile Ser Ala Lys Pro
610 615 620

Pro Tyr Lys Glu Gln Lys Asp Glu Leu Lys
625 630

<210> 38
<211> 634
<212> PRT
<213> Vibrio cholerae

<400> 38
Val Glu Asp Glu Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys Ser
1 5 10 15

Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile Pro
20 25 30

Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr Ile
35 40 45

Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser Ile
50 55 60

```
Ile Thr Phe Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr Val
65                  70                  75                  80

Asn Gln Asp Ala Pro Phe Gly Val Ile Asn Leu Asp Ile Thr Thr Glu
                85                  90                  95

Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe Ala
            100                 105                 110

Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile Lys
        115                 120                 125

Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val Pro
    130                 135                 140

Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp Lys
145                 150                 155                 160

Thr Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His Asn Ile
                165                 170                 175

Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys Glu Gly
            180                 185                 190

Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala Leu Cys
        195                 200                 205

Trp Leu Val Pro Met Asp Ala Ile Tyr Asn Tyr Ile Thr Gln Gln Asn
    210                 215                 220

Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr Val Ala
225                 230                 235                 240

Gly Thr Pro Lys Val Ile Thr Val Lys Gln Gly Ile Glu Gln Lys Pro
                245                 250                 255

Val Glu Gln Arg Ile His Phe Ser Lys Gly Asn Ala Met Ser Ala Leu
            260                 265                 270

Ala Ala His Arg Val Cys Gly Val Pro Leu Glu Thr Leu Ala Arg Ser
        275                 280                 285
```

```
Arg Lys Pro Arg Asp Leu Thr Asp Asp Leu Ser Cys Ala Tyr Gln Ala
    290                 295                 300

Gln Asn Ile Val Ser Leu Phe Val Ala Thr Arg Ile Leu Phe Ser His
305                 310                 315                 320

Leu Asp Ser Val Phe Thr Leu Asn Leu Asp Glu Gln Glu Pro Glu Val
                325                 330                 335

Ala Glu Arg Leu Ser Asp Leu Arg Arg Ile Asn Glu Asn Asn Pro Gly
            340                 345                 350

Met Val Thr Gln Val Leu Thr Val Ala Arg Gln Ile Tyr Asn Asp Tyr
        355                 360                 365

Val Thr His His Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala Gly Ala
    370                 375                 380

Gln Ala Ala Asp Ile Leu Ser Leu Phe Cys Pro Asp Ala Asp Lys Ser
385                 390                 395                 400

Cys Val Ala Ser Asn Asn Asp Gln Ala Asn Ile Asn Ile Glu Ser Arg
                405                 410                 415

Ser Gly Arg Ser Tyr Leu Pro Glu Asn Arg Ala Val Ile Thr Pro Gln
            420                 425                 430

Gly Val Thr Asn Trp Thr Tyr Gln Glu Leu Glu Ala Thr His Gln Ala
        435                 440                 445

Leu Thr Arg Glu Gly Tyr Val Phe Val Gly Tyr His Gly Thr Asn His
    450                 455                 460

Val Ala Ala Gln Thr Ile Val Asn Arg Ile Ala Pro Val Pro Arg Gly
465                 470                 475                 480

Asn Asn Thr Glu Asn Glu Glu Lys Trp Gly Gly Leu Tyr Val Ala Thr
                485                 490                 495
```

```
His Ala Glu Val Ala His Gly Tyr Ala Arg Ile Lys Glu Gly Thr Gly
            500                 505                 510

Glu Tyr Gly Leu Pro Thr Arg Ala Glu Arg Asp Ala Arg Gly Val Met
        515                 520                 525

Leu Arg Val Tyr Ile Pro Arg Ala Ser Leu Glu Arg Phe Tyr Arg Thr
    530                 535                 540

Asn Thr Pro Leu Glu Asn Ala Glu Glu His Ile Thr Gln Val Ile Gly
545                 550                 555                 560

His Ser Leu Pro Leu Arg Asn Glu Ala Phe Thr Gly Pro Glu Ser Ala
                565                 570                 575

Gly Gly Glu Asp Glu Thr Val Ile Gly Trp Asp Met Ala Ile His Ala
            580                 585                 590

Val Ala Ile Pro Ser Thr Ile Pro Gly Asn Ala Tyr Glu Glu Leu Ala
        595                 600                 605

Ile Asp Glu Glu Ala Val Ala Lys Glu Gln Ser Ile Ser Thr Lys Pro
    610                 615                 620

Pro Tyr Lys Glu Arg Lys Asp Glu Leu Lys
625                 630
```

<210> 39
<211> 634
<212> PRT
<213> Vibrio cholerae

<400> 39

```
Val Glu Asp Glu Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys Ser
1               5                   10                  15

Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile Pro
            20                  25                  30

Gly Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr Ile
        35                  40                  45
```

```
Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser Ile
    50                  55                  60

Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr Val
65                  70                  75                  80

Ser Gln Asp Ala Pro Phe Gly Val Ile Asn Leu Asp Ile Thr Thr Glu
                85                  90                  95

Asn Gly Thr Lys Thr Tyr Ser Phe Asn Arg Lys Glu Ser Glu Phe Ala
            100                 105                 110

Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile Lys
        115                 120                 125

Ile Ser Ile Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val Pro
    130                 135                 140

Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp Lys
145                 150                 155                 160

Thr Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His Asn Ile
                165                 170                 175

Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys Glu Gly
            180                 185                 190

Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala Leu Cys
        195                 200                 205

Trp Leu Val Pro Ile Asp Ala Ile Tyr Asn Tyr Ile Thr Gln Gln Asn
    210                 215                 220

Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr Val Ala
225                 230                 235                 240

Gly Thr Pro Lys Ala Ile Thr Val Lys Gln Gly Ile Glu Gln Lys Pro
                245                 250                 255

Val Glu Gln Arg Ile His Phe Ser Lys Lys Asn Ala Met Glu Ala Leu
            260                 265                 270
```

```
Ala Ala His Arg Val Cys Gly Val Pro Leu Glu Thr Leu Ala Arg Ser
        275                 280                 285

Arg Lys Pro Arg Asp Leu Pro Asp Asp Leu Ser Cys Ala Tyr Asn Ala
    290                 295                 300

Gln Gln Ile Val Ser Leu Phe Leu Ala Thr Arg Ile Leu Phe Thr His
305                 310                 315                 320

Ile Asp Ser Ile Phe Thr Leu Asn Leu Asp Gly Gln Glu Pro Glu Val
                325                 330                 335

Ala Glu Arg Leu Asp Asp Leu Arg Arg Ile Asn Glu Asn Asn Pro Gly
            340                 345                 350

Met Val Ile Gln Val Leu Thr Val Ala Arg Gln Ile Tyr Asn Asp Tyr
        355                 360                 365

Val Thr His His Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala Gly Ala
    370                 375                 380

Gln Ala Ala Asp Ile Leu Ser Leu Phe Cys Pro Asp Ala Asp Lys Ser
385                 390                 395                 400

Cys Val Ala Ser Asn Ser Asp Gln Ala Asn Ile Asn Ile Glu Ser Arg
                405                 410                 415

Ser Gly Arg Ser Tyr Leu Pro Glu Asn Arg Ala Val Ile Thr Gln Gln
            420                 425                 430

Gly Val Thr Asn Trp Thr Tyr Gln Glu Leu Glu Ala Thr His Gln Ala
        435                 440                 445

Leu Thr Gln Glu Gly Tyr Val Phe Val Gly Tyr His Gly Thr Asn His
    450                 455                 460

Val Ala Ala Gln Ser Ile Val Asn Arg Ile Ser Pro Val Pro Arg Gly
465                 470                 475                 480
```

```
Ser Asp Thr Glu Ser Glu Arg Ala Trp Gly Gly Leu Tyr Val Ser Thr
                485                 490                 495

Asp Ala Ser Val Ala Tyr Gly Tyr Ala Arg Ile Gln Glu Gly Thr Ala
            500                 505                 510

Asp Gly Gly Gly Leu Thr Pro Ala Glu Arg Lys Ala Arg Gly Val Met
        515                 520                 525

Leu Arg Val Tyr Leu Pro Gln Ala Ser Leu Glu Arg Phe Tyr Arg Ile
    530                 535                 540

Asn Ala Asp Leu Glu Lys Glu Arg Asn Leu Val Glu Arg Val Ile Gly
545                 550                 555                 560

His Pro Leu Pro Leu Arg Asn Glu Ala Phe Thr Gly Thr Asp Ala Glu
                565                 570                 575

Glu Gly Ser Asp Glu Thr Ala Ile Gly Trp Asp Met Ala Ile His Gly
            580                 585                 590

Val Ala Ile Pro Ser Thr Ile Pro Gly Asn Ser Tyr Ala Gln Leu Pro
        595                 600                 605

Ile Asp Glu Glu Ala Val Ala Lys Glu Gln Ser Ile Ser Ala Lys Pro
    610                 615                 620

Pro Tyr Lys Glu Gln Lys Asp Glu Leu Lys
625                 630
```

<210> 40
<211> 634
<212> PRT
<213> Vibrio cholerae

<400> 40

```
Val Glu Asp Glu Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys Ser
1               5                   10                  15

Leu Thr Pro Glu Leu Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile Pro
            20                  25                  30
```

```
Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr Ile
        35                  40                  45

Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser Ile
    50                  55                  60

Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr Val
65                  70                  75                  80

Asn Gln Asp Ala Pro Phe Gly Val Ile Asn Leu Asp Ile Thr Thr Glu
                85                  90                  95

Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe Ala
            100                 105                 110

Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile Lys
        115                 120                 125

Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val Pro
    130                 135                 140

Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp Lys
145                 150                 155                 160

Thr Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His Asn Ile
                165                 170                 175

Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys Glu Gly
            180                 185                 190

Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala Leu Cys
        195                 200                 205

Trp Leu Val Pro Ile Asp Ala Ile Tyr Asn Tyr Ile Thr Gln Gln Asn
    210                 215                 220

Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr Val Ala
225                 230                 235                 240

Gly Thr Pro Lys Ala Ile Thr Val Lys Gln Gly Ile Glu Gln Lys Pro
                245                 250                 255
```

```
Val Glu Gln Arg Ile His Phe Ser Lys Lys Asn Ala Met Glu Ala Leu
            260                 265                 270

Ala Ala His Arg Val Cys Gly Val Pro Leu Glu Thr Leu Ala Arg Ser
        275                 280                 285

Arg Lys Pro Arg Asp Leu Pro Asp Asp Leu Ser Cys Ala Tyr Gln Ala
    290                 295                 300

Gln Asn Ile Val Ser Leu Phe Val Ala Thr Arg Ile Leu Phe Ser His
305                 310                 315                 320

Leu Asp Ser Val Phe Thr Leu Asn Leu Asp Glu Gln Glu Pro Glu Val
                325                 330                 335

Ala Glu Arg Leu Ser Ala Leu Arg Gln Ile Asn Glu Asn Asn Pro Gly
            340                 345                 350

Met Val Thr Gln Val Leu Thr Val Ala Arg Gln Ile Tyr Asn Asp Tyr
        355                 360                 365

Val Thr His His Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala Gly Ala
    370                 375                 380

Gln Ala Ala Asp Ile Leu Ser Leu Phe Cys Pro Asp Ala Asp Lys Pro
385                 390                 395                 400

Cys Val Ala Ser Asn Asn Asp Gln Ala Asn Ile Asn Ile Glu Ser Arg
                405                 410                 415

Ser Gly Arg Ser Tyr Leu Pro Glu Asn Arg Ala Val Ile Thr Pro Gln
            420                 425                 430

Gly Val Thr Asn Trp Thr Tyr Gln Glu Leu Glu Ala Thr His Gln Ala
        435                 440                 445

Leu Thr Arg Glu Gly Tyr Val Phe Val Gly Tyr His Gly Thr Asn His
    450                 455                 460
```

```
Val Ala Ala Gln Thr Ile Val Asn Arg Ile Ala Pro Val Pro Arg Gly
465                 470                 475                 480

Asn Asn Thr Glu Asn Glu Glu Lys Trp Gly Gly Leu Tyr Val Ala Thr
                485                 490                 495

His Ala Glu Val Ala His Gly Tyr Ala Arg Ile Lys Glu Gly Thr Gly
            500                 505                 510

Glu Tyr Gly Leu Pro Thr Arg Ala Glu Arg Asp Ala Arg Gly Val Met
        515                 520                 525

Leu Arg Val Tyr Ile Pro Arg Ala Ser Leu Glu Arg Phe Tyr Arg Thr
    530                 535                 540

Asn Thr Pro Leu Glu Asn Ala Glu Glu His Ile Thr Gln Val Ile Gly
545                 550                 555                 560

His Ser Leu Pro Leu Arg Asn Glu Ala Phe Thr Gly Pro Glu Ser Ala
                565                 570                 575

Gly Gly Glu Asp Glu Thr Val Ile Gly Trp Asp Met Ala Ile His Ala
            580                 585                 590

Val Ala Ile Pro Ser Thr Ile Pro Gly Asn Ala Tyr Glu Glu Leu Ala
        595                 600                 605

Ile Asp Glu Glu Ala Val Ala Lys Glu Gln Ser Ile Ser Thr Lys Pro
    610                 615                 620

Pro Tyr Lys Glu Arg Lys Asp Glu Leu Lys
625                 630
```

<210> 41
<211> 634
<212> PRT
<213> Vibrio cholerae

<400> 41

```
Val Glu Asp Glu Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys Ser
1               5                  10                  15
```

```
Leu Thr Pro Glu Leu Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile Pro
            20                  25                  30

Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr Ile
        35                  40                  45

Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser Ile
    50                  55                  60

Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr Val
65                  70                  75                  80

Asn Gln Asp Ala Pro Phe Gly Val Ile Asn Leu Asp Ile Thr Thr Glu
                85                  90                  95

Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe Ala
            100                 105                 110

Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile Lys
        115                 120                 125

Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val Pro
    130                 135                 140

Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp Lys
145                 150                 155                 160

Thr Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His Asn Ile
                165                 170                 175

Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys Glu Gly
            180                 185                 190

Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala Leu Cys
        195                 200                 205

Trp Leu Val Pro Ile Asp Ala Ile Tyr Asn Tyr Ile Thr Gln Gln Asn
    210                 215                 220

Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr Val Ala
225                 230                 235                 240
```

```
Gly Thr Pro Lys Ala Ile Thr Val Lys Gln Gly Ile Glu Gln Lys Pro
                245                 250                 255

Val Glu Gln Arg Ile His Phe Ser Lys Lys Asn Ala Met Glu Ala Leu
            260                 265                 270

Ala Ala His Arg Val Cys Gly Val Pro Leu Glu Thr Leu Ala Arg Ser
        275                 280                 285

Arg Lys Pro Arg Asp Leu Pro Asp Asp Leu Ser Cys Ala Tyr Gln Ala
    290                 295                 300

Gln Asn Ile Val Ser Leu Phe Val Ala Thr Arg Ile Leu Phe Ser His
305                 310                 315                 320

Leu Asp Ser Val Phe Thr Leu Asn Leu Asp Glu Gln Glu Pro Ala Val
                325                 330                 335

Ala Glu Arg Leu Ser Ala Leu Arg Gln Ile Asn Glu Asn Asn Pro Gly
            340                 345                 350

Met Val Thr Gln Val Leu Thr Val Ala Arg Gln Ile Tyr Asn Asp Tyr
        355                 360                 365

Val Thr His His Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala Gly Ala
    370                 375                 380

Gln Ala Ala Asp Ile Leu Ser Leu Phe Cys Pro Asp Ala Asp Lys Ser
385                 390                 395                 400

Cys Val Ala Ser Asp Asn Asp Gln Ala Asn Ile Asn Ile Glu Ser Arg
                405                 410                 415

Ser Gly Arg Ser Tyr Leu Pro Glu Asn Arg Ala Val Ile Thr Pro Gln
            420                 425                 430

Gly Val Thr Asn Trp Thr Tyr Gln Glu Leu Glu Ala Thr His Gln Ala
        435                 440                 445
```

```
Leu Thr Arg Glu Gly Tyr Val Phe Val Gly Tyr His Gly Thr Asn His
    450                 455                 460

Val Ala Ala Gln Thr Ile Val Asn Arg Ile Ala Pro Val Pro Arg Gly
465                 470                 475                 480

Asn Asn Thr Glu Asn Glu Glu Lys Trp Gly Gly Leu Tyr Val Ala Thr
                485                 490                 495

His Ala Glu Val Ala His Gly Tyr Ala Arg Ile Lys Glu Gly Thr Gly
            500                 505                 510

Glu Tyr Gly Leu Pro Thr Arg Ala Glu Arg Asp Ala Arg Gly Val Met
        515                 520                 525

Leu Arg Val Tyr Ile Pro Arg Ala Ser Leu Glu Arg Phe Tyr Arg Thr
    530                 535                 540

Asn Thr Pro Leu Glu Asn Ala Glu Glu His Ile Thr Gln Val Ile Gly
545                 550                 555                 560

His Ser Leu Pro Leu Arg Asn Glu Ala Phe Thr Gly Pro Glu Ser Ala
                565                 570                 575

Gly Gly Glu Asp Glu Thr Val Ile Gly Trp Asp Met Ala Ile His Ala
            580                 585                 590

Val Ala Ile Pro Ser Thr Ile Pro Gly Asn Ala Tyr Glu Glu Leu Ala
        595                 600                 605

Ile Asp Glu Glu Ala Val Ala Lys Glu Gln Ser Ile Ser Thr Lys Pro
    610                 615                 620

Pro Tyr Lys Glu Arg Lys Asp Glu Leu Lys
625                 630
```

<210> 42
<211> 634
<212> PRT
<213> Vibrio cholerae

<400> 42

```
Val Glu Asp Glu Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys Ser
1               5                  10                  15

Leu Thr Pro Glu Leu Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile Pro
            20                  25                  30

Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr Ile
        35                  40                  45

Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser Ile
    50                  55                  60

Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr Val
65                  70                  75                  80

Asn Gln Asp Ala Pro Phe Gly Val Ile Asn Leu Asp Ile Thr Thr Glu
                85                  90                  95

Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe Ala
            100                 105                 110

Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile Lys
        115                 120                 125

Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val Pro
    130                 135                 140

Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp Lys
145                 150                 155                 160

Thr Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His Asn Ile
                165                 170                 175

Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys Glu Gly
            180                 185                 190

Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala Leu Cys
        195                 200                 205

Trp Leu Val Pro Ile Asp Ala Ile Tyr Asn Tyr Ile Thr Gln Gln Asn
    210                 215                 220
```

```
Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr Val Ala
225                 230                 235                 240

Gly Thr Pro Lys Ala Ile Thr Val Lys Gln Gly Ile Glu Gln Lys Pro
                245                 250                 255

Val Glu Gln Arg Ile His Phe Ser Lys Lys Asn Ala Met Glu Ala Leu
            260                 265                 270

Ala Ala His Arg Val Cys Gly Val Pro Leu Glu Thr Leu Ala Arg Ser
        275                 280                 285

Arg Lys Pro Arg Asp Leu Pro Asp Asp Leu Ser Cys Ala Tyr Gln Ala
    290                 295                 300

Gln Asn Ile Val Ser Leu Phe Val Ala Thr Arg Ile Leu Phe Ser His
305                 310                 315                 320

Leu Asp Ser Val Phe Thr Leu Asn Leu Asp Glu Gln Glu Pro Glu Val
                325                 330                 335

Ala Glu Arg Leu Ser Ala Leu Arg Gln Ile Asn Glu Asn Asn Pro Gly
            340                 345                 350

Met Val Thr Gln Val Leu Thr Val Ala Arg Gln Ile Tyr Asn Asp Tyr
        355                 360                 365

Val Thr His His Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala Gly Ala
    370                 375                 380

Gln Ala Ala Asp Ile Leu Ser Leu Phe Cys Pro Asp Ala Asp Lys Pro
385                 390                 395                 400

Cys Val Ala Ser Asn Asn Asp Gln Ala Asn Ile Asn Ile Glu Ser Arg
                405                 410                 415

Ser Gly Arg Ser Tyr Leu Pro Glu Asn Arg Ala Val Ile Thr Pro Gln
            420                 425                 430
```

```
Gly Val Thr Asn Trp Thr Tyr Gln Glu Leu Glu Ala Thr His Gln Ala
        435                 440                 445

Leu Thr Arg Glu Gly Tyr Val Phe Val Gly Tyr His Gly Thr Asn His
    450                 455                 460

Val Ala Ala Gln Asn Ile Val Asn Arg Ile Ala Pro Val Pro Arg Gly
465                 470                 475                 480

Asn Asn Thr Glu Asn Glu Glu Lys Trp Gly Gly Leu Tyr Val Ala Thr
                485                 490                 495

His Ala Glu Val Ala His Gly Tyr Ala Arg Ile Lys Glu Gly Thr Gly
            500                 505                 510

Glu Tyr Gly Leu Pro Thr Arg Ala Glu Arg Asp Ala Arg Gly Val Met
        515                 520                 525

Leu Arg Val Tyr Ile Pro Arg Ala Ser Leu Glu Arg Phe Tyr Arg Thr
    530                 535                 540

Asn Thr Pro Leu Glu Asn Ala Glu Glu His Ile Thr Gln Val Ile Gly
545                 550                 555                 560

His Ser Leu Pro Leu Arg Asn Glu Ala Phe Thr Gly Pro Glu Ser Ala
                565                 570                 575

Gly Gly Glu Asp Glu Thr Val Ile Gly Trp Asp Met Ala Ile His Ala
            580                 585                 590

Val Ala Ile Pro Ser Thr Ile Pro Gly Asn Ala Tyr Glu Glu Leu Ala
        595                 600                 605

Ile Asp Glu Glu Ala Val Ala Lys Glu Gln Ser Ile Ser Thr Lys Pro
    610                 615                 620

Pro Tyr Lys Glu Arg Lys Asp Glu Leu Lys
625                 630
```

<210> 43
<211> 634

<212> PRT
<213> Vibrio cholerae

<400> 43
Val Glu Asp Glu Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys Ser
1 5 10 15

Leu Thr Pro Glu Leu Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile Pro
20 25 30

Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr Ile
35 40 45

Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser Ile
50 55 60

Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr Val
65 70 75 80

Asn Gln Asp Ala Pro Phe Gly Val Ile Asn Leu Asp Ile Thr Thr Glu
85 90 95

Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe Ala
100 105 110

Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile Lys
115 120 125

Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val Pro
130 135 140

Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp Lys
145 150 155 160

Thr Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His Asn Ile
165 170 175

Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys Glu Gly
180 185 190

Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala Leu Cys
195 200 205

```
Trp Leu Val Pro Ile Asp Ala Ile Tyr Asn Tyr Ile Thr Gln Gln Asn
    210                 215                 220

Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr Val Ala
225                 230                 235                 240

Gly Thr Pro Lys Ala Ile Thr Val Lys Gln Gly Ile Glu Gln Lys Pro
                245                 250                 255

Val Glu Gln Arg Ile His Phe Ser Lys Lys Asn Ala Met Glu Ala Leu
            260                 265                 270

Ala Ala His Arg Val Cys Gly Val Pro Leu Glu Thr Leu Ala Arg Ser
        275                 280                 285

Arg Lys Pro Arg Asp Leu Pro Asp Asp Leu Ser Cys Ala Tyr Gln Ala
    290                 295                 300

Gln Asn Ile Val Ser Leu Phe Val Ala Thr Arg Ile Leu Phe Ser His
305                 310                 315                 320

Leu Asp Ser Val Phe Thr Leu Asn Leu Asp Glu Gln Glu Pro Glu Val
                325                 330                 335

Ala Glu Arg Leu Ser Ala Leu Arg Gln Ile Asn Glu Asn Asn Pro Gly
            340                 345                 350

Met Val Thr Gln Val Leu Thr Val Ala Arg Gln Ile Tyr Asn Asp Tyr
        355                 360                 365

Val Thr His His Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala Gly Ala
    370                 375                 380

Gln Ala Ala Asp Ile Leu Ser Leu Phe Cys Pro Asp Ala Asp Lys Pro
385                 390                 395                 400

Cys Val Ala Ser Asn Asn Asp Gln Ala Asn Ile Asn Ile Glu Ser Arg
                405                 410                 415
```

```
Ser Gly Arg Ser Tyr Leu Pro Glu Asn Arg Ala Val Ile Thr Pro Gln
            420                 425                 430

Gly Val Thr Asn Trp Thr Tyr Gln Glu Leu Glu Ala Thr His Gln Ala
        435                 440                 445

Leu Thr Arg Glu Gly Tyr Val Phe Val Gly Tyr His Gly Thr Asn His
    450                 455                 460

Val Ala Ala Gln Thr Ile Val Asn Arg Ile Ala Pro Val Pro Arg Gly
465                 470                 475                 480

Asn Asn Thr Glu Asn Glu Glu Lys Trp Gly Gly Leu Tyr Val Ala Thr
                485                 490                 495

His Ala Glu Val Ala His Gly Tyr Ala Arg Ile Lys Glu Gly Thr Gly
            500                 505                 510

Glu Tyr Gly Leu Pro Thr Arg Ala Glu Arg Asp Ala Arg Gly Val Met
        515                 520                 525

Leu Arg Val Tyr Ile Pro Arg Ala Ser Leu Glu Arg Phe Tyr Arg Thr
    530                 535                 540

Asn Thr Pro Leu Glu Asn Ala Glu Glu His Ile Thr Gln Val Ile Gly
545                 550                 555                 560

His Ser Leu Pro Leu Arg Asn Glu Ala Phe Thr Gly Pro Glu Ser Ala
                565                 570                 575

Gly Gly Glu Asp Glu Thr Val Ile Gly Trp Asp Ile Ala Ile His Ala
            580                 585                 590

Val Ala Ile Pro Ser Thr Ile Pro Gly Asn Ala Tyr Glu Glu Leu Ala
        595                 600                 605

Ile Asp Glu Glu Ala Val Ala Lys Glu Gln Ser Ile Ser Thr Lys Pro
    610                 615                 620

Pro Tyr Lys Glu Arg Lys Asp Glu Leu Lys
625                 630
```

<210> 44
<211> 634
<212> PRT
<213> Vibrio cholerae

<400> 44
Val Glu Asp Glu Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys Ser
1   5   10   15

Leu Thr Pro Glu Leu Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile Pro
            20   25   30

Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr Ile
        35   40   45

Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser Ile
    50   55   60

Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr Val
65   70   75   80

Asn Gln Asp Ala Pro Phe Gly Val Ile Asn Leu Asp Ile Thr Thr Glu
                85   90   95

Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe Ala
            100   105   110

Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile Lys
        115   120   125

Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val Pro
    130   135   140

Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp Lys
145   150   155   160

Thr Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His Asn Ile
                165   170   175

Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys Glu Gly
            180   185   190

```
Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala Leu Cys
        195                 200                 205

Trp Leu Val Pro Ile Asp Ala Ile Tyr Asn Tyr Ile Thr Gln Gln Asn
    210                 215                 220

Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr Val Ala
225                 230                 235                 240

Gly Thr Pro Lys Ala Ile Thr Val Lys Gln Gly Ile Glu Gln Lys Pro
                245                 250                 255

Val Glu Gln Arg Ile His Phe Ser Lys Lys Asn Ala Met Glu Ala Leu
            260                 265                 270

Ala Ala His Arg Val Cys Gly Val Pro Leu Glu Thr Leu Ala Arg Ser
        275                 280                 285

Arg Lys Pro Arg Asp Leu Pro Asp Asp Leu Ser Cys Ala Tyr Gln Ala
    290                 295                 300

Gln Asn Ile Val Ser Leu Phe Val Ala Thr Arg Ile Leu Phe Ser His
305                 310                 315                 320

Leu Asp Ser Val Phe Thr Leu Asn Leu Asp Glu Gln Glu Pro Glu Val
                325                 330                 335

Ala Glu Arg Leu Ser Ala Leu Arg Gln Ile Asn Glu Asn Asn Pro Gly
            340                 345                 350

Met Val Thr Gln Val Leu Thr Val Ala Arg Gln Ile Tyr Asn Asp Tyr
        355                 360                 365

Val Thr His His Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala Gly Ala
    370                 375                 380

Gln Ala Ala Asp Ile Leu Ser Leu Phe Cys Pro Asp Ala Asp Lys Pro
385                 390                 395                 400
```

```
Cys Val Ala Ser Asn Asn Asp Gln Ala Asn Ile Asn Val Glu Ser Arg
                405                 410                 415

Ser Gly Arg Ser Tyr Leu Pro Glu Asn Arg Ala Val Ile Thr Pro Gln
            420                 425                 430

Gly Val Thr Asn Trp Thr Tyr Gln Glu Leu Glu Ala Thr His Gln Ala
        435                 440                 445

Leu Thr Arg Glu Gly Tyr Val Phe Val Gly Tyr His Gly Thr Asn His
    450                 455                 460

Val Ala Ala Gln Thr Ile Val Asn Arg Ile Ala Pro Val Pro Arg Gly
465                 470                 475                 480

Asn Asn Thr Glu Asn Glu Glu Lys Trp Gly Gly Leu Tyr Val Ala Thr
                485                 490                 495

His Ala Glu Val Ala His Gly Tyr Ala Arg Ile Lys Glu Gly Thr Gly
            500                 505                 510

Glu Tyr Gly Leu Pro Thr Arg Ala Glu Arg Glu Ala Arg Gly Val Met
        515                 520                 525

Leu Arg Val Tyr Ile Pro Arg Ala Ser Leu Glu Arg Phe Tyr Arg Thr
    530                 535                 540

Asn Thr Pro Leu Glu Asn Ala Glu Arg His Ile Thr Gln Val Ile Gly
545                 550                 555                 560

His Ser Leu Pro Leu Arg Asn Glu Ala Phe Thr Gly Pro Glu Ser Ala
                565                 570                 575

Gly Gly Glu Asp Glu Thr Val Ile Gly Trp Asp Met Ala Ile His Ala
            580                 585                 590

Val Ala Ile Pro Ser Thr Ile Pro Gly Asn Ala Tyr Glu Glu Leu Ala
        595                 600                 605

Ile Asp Glu Glu Ala Val Ala Lys Glu Gln Ser Ile Ser Ala Lys Pro
    610                 615                 620
```

Pro Tyr Lys Glu Arg Lys Asp Glu Leu Lys
625 630

<210> 45
<211> 634
<212> PRT
<213> Vibrio cholerae

<400> 45
Val Glu Asp Glu Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys Ser
1 5 10 15

Leu Thr Pro Glu Leu Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile Pro
20 25 30

Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr Ile
35 40 45

Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser Ile
50 55 60

Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr Val
65 70 75 80

Asn Gln Asp Ala Pro Phe Gly Val Ile Asn Leu Asp Ile Thr Thr Glu
85 90 95

Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe Ala
100 105 110

Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile Lys
115 120 125

Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val Pro
130 135 140

Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp Lys
145 150 155 160

Thr Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His Asn Ile
165 170 175

```
Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys Glu Gly
            180                 185                 190

Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala Leu Cys
        195                 200                 205

Trp Leu Val Pro Ile Asp Ala Ile Tyr Asn Tyr Ile Thr Gln Gln Asn
    210                 215                 220

Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr Val Ala
225                 230                 235                 240

Gly Thr Pro Lys Ala Ile Thr Val Lys Gln Gly Ile Glu Gln Lys Pro
                245                 250                 255

Val Glu Gln Arg Ile His Phe Ser Lys Lys Asn Ala Met Glu Thr Leu
            260                 265                 270

Ala Ala His Arg Val Cys Gly Val Pro Leu Glu Thr Leu Ala Arg Ser
        275                 280                 285

Arg Lys Pro Arg Asp Leu Pro Asp Asp Leu Ser Cys Ala Tyr Gln Ala
    290                 295                 300

Gln Asn Ile Val Ser Leu Phe Val Ala Thr Arg Ile Leu Phe Ser His
305                 310                 315                 320

Leu Asp Ser Val Phe Thr Leu Asn Leu Asp Glu Gln Glu Pro Glu Val
                325                 330                 335

Ala Glu Arg Leu Ser Ala Leu Arg Gln Ile Asn Glu Asn Asn Pro Gly
            340                 345                 350

Met Val Thr Gln Val Leu Thr Val Ala Arg Gln Ile Tyr Asn Asp Tyr
        355                 360                 365

Val Thr His His Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala Gly Ala
    370                 375                 380
```

```
Gln Ala Ala Asp Ile Leu Ser Leu Phe Cys Pro Asp Ala Asp Lys Pro
385                 390                 395                 400

Cys Val Ala Ser Asn Asn Asp Gln Ala Asn Ile Asn Val Glu Ser Arg
                405                 410                 415

Ser Gly Arg Ser Tyr Leu Pro Glu Asn Arg Ala Val Ile Thr Pro Gln
            420                 425                 430

Gly Val Thr Asn Trp Thr Tyr Gln Glu Leu Glu Ala Thr His Gln Ala
        435                 440                 445

Leu Thr Arg Glu Gly Tyr Val Phe Val Gly Tyr His Gly Thr Asn His
    450                 455                 460

Val Ala Ala Gln Thr Ile Val Asn Arg Ile Ala Pro Val Pro Arg Gly
465                 470                 475                 480

Asn Asn Thr Glu Asn Glu Glu Lys Trp Gly Gly Leu Tyr Val Ala Thr
                485                 490                 495

His Ala Glu Val Ala His Gly Tyr Ala Arg Ile Lys Glu Gly Thr Gly
            500                 505                 510

Glu Tyr Gly Leu Pro Thr Arg Ala Glu Arg Glu Ala Arg Gly Val Met
        515                 520                 525

Leu Arg Val Tyr Ile Pro Arg Ala Ser Leu Glu Arg Phe Tyr Arg Thr
    530                 535                 540

Asn Thr Pro Leu Glu Asn Ala Glu Arg His Ile Thr Gln Val Ile Gly
545                 550                 555                 560

His Ser Leu Pro Leu Arg Asn Glu Ala Phe Thr Gly Pro Glu Ser Ala
                565                 570                 575

Gly Gly Glu Asp Glu Thr Val Ile Gly Trp Asp Met Ala Ile His Ala
            580                 585                 590

Val Ala Ile Pro Ser Thr Ile Pro Gly Asn Ala Tyr Glu Glu Leu Ala
        595                 600                 605
```

```
Ile Asp Glu Glu Ala Val Ala Lys Glu Gln Ser Ile Ser Ala Lys Pro
    610                 615                 620

Pro Tyr Lys Glu Arg Lys Asp Glu Leu Lys
625                 630
```

<210> 46
<211> 634
<212> PRT
<213> Vibrio cholerae

<400> 46

```
Val Glu Asp Glu Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys Ser
1               5                   10                  15

Leu Thr Pro Glu Leu Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile Pro
            20                  25                  30

Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr Ile
        35                  40                  45

Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser Ile
    50                  55                  60

Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr Val
65                  70                  75                  80

Asn Gln Asp Ala Pro Phe Gly Val Ile Asn Leu Asp Ile Thr Thr Glu
                85                  90                  95

Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe Ala
            100                 105                 110

Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile Lys
        115                 120                 125

Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val Pro
    130                 135                 140

Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp Lys
145                 150                 155                 160
```

```
Thr Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His Asn Ile
                165                 170                 175

Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys Glu Gly
            180                 185                 190

Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala Leu Cys
        195                 200                 205

Trp Leu Val Pro Ile Asp Ala Ile Tyr Asn Tyr Ile Thr Gln Gln Asn
    210                 215                 220

Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr Val Ala
225                 230                 235                 240

Gly Thr Pro Lys Ala Ile Thr Val Lys Gln Gly Ile Glu Gln Lys Pro
                245                 250                 255

Val Glu Gln Arg Ile His Phe Ser Lys Lys Asn Ala Met Glu Ala Leu
            260                 265                 270

Ala Ala His Arg Val Cys Gly Val Pro Leu Glu Thr Leu Ala Arg Ser
        275                 280                 285

Arg Lys Pro Arg Asp Leu Pro Asp Asp Leu Ser Cys Ala Tyr Gln Ala
    290                 295                 300

Gln Asn Ile Val Ser Leu Phe Val Ala Thr Arg Ile Leu Phe Ser His
305                 310                 315                 320

Leu Asp Ser Val Phe Thr Leu Asn Leu Asp Glu Gln Glu Pro Glu Val
                325                 330                 335

Ala Glu Arg Leu Ser Ala Leu Arg Gln Ile Asn Glu Asn Asn Pro Gly
            340                 345                 350

Met Val Thr Gln Val Leu Thr Val Ala Arg Gln Ile Tyr Asn Asp Tyr
        355                 360                 365
```

```
Val Thr His His Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala Gly Ala
    370                 375                 380

Gln Ala Ala Asp Ile Leu Ser Leu Phe Cys Pro Asp Ala Asp Lys Pro
385                 390                 395                 400

Cys Val Ala Ser Asn Asn Asp Gln Ala Asn Ile Asn Val Glu Ser Arg
                405                 410                 415

Ser Gly Arg Ser Tyr Leu Pro Glu Asn Arg Ala Val Ile Thr Pro Gln
            420                 425                 430

Gly Val Thr Asn Trp Thr Tyr Gln Glu Leu Glu Ala Thr His Gln Ala
        435                 440                 445

Leu Thr Arg Glu Gly Tyr Val Phe Val Gly Tyr His Gly Thr Asn His
    450                 455                 460

Val Ala Ala Gln Thr Ile Val Asn Arg Ile Ala Pro Val Pro Arg Gly
465                 470                 475                 480

Asn Asn Thr Glu Asn Glu Glu Lys Trp Gly Gly Leu Tyr Val Ala Thr
                485                 490                 495

His Ala Glu Val Ala His Gly Tyr Ala Arg Ile Lys Glu Gly Thr Gly
            500                 505                 510

Glu Tyr Gly Leu Pro Thr Arg Ala Glu Arg Glu Ala Arg Gly Val Met
        515                 520                 525

Leu Arg Val Tyr Ile Pro Arg Ala Ser Leu Glu Arg Phe Tyr Arg Thr
    530                 535                 540

Asn Thr Pro Leu Glu Asn Ala Glu Arg His Ile Thr Gln Val Ile Gly
545                 550                 555                 560

His Ser Leu Pro Leu Arg Asn Glu Ala Phe Thr Gly Pro Glu Ser Ala
                565                 570                 575

Gly Gly Glu Asp Glu Thr Val Ile Gly Trp Asp Met Ala Ile His Ala
            580                 585                 590
```

Val Ala Ile Pro Ser Thr Ile Pro Gly Asn Ala Tyr Glu Glu Leu Ala
595 600 605

Ile Asp Glu Glu Ala Val Ala Lys Glu Gln Ser Ile Ser Ala Lys Pro
610 615 620

Pro Tyr Lys Glu Gln Lys Asp Glu Leu Lys
625 630

<210> 47
<211> 634
<212> PRT
<213> Vibrio cholerae

<400> 47
Val Glu Asp Glu Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys Ser
1 5 10 15

Leu Thr Pro Glu Leu Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile Pro
20 25 30

Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr Ile
35 40 45

Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser Ile
50 55 60

Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr Val
65 70 75 80

Asn Gln Asp Ala Pro Phe Gly Val Ile Asn Leu Asp Ile Thr Thr Glu
85 90 95

Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe Ala
100 105 110

Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile Lys
115 120 125

Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val Pro
130 135 140

```
Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp Lys
145                 150                 155                 160

Thr Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His Asn Ile
                165                 170                 175

Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys Glu Gly
            180                 185                 190

Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala Leu Cys
        195                 200                 205

Trp Leu Val Pro Ile Asp Ala Ile Tyr Asn Tyr Ile Thr Gln Gln Asn
    210                 215                 220

Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr Val Ala
225                 230                 235                 240

Gly Thr Pro Lys Ala Ile Thr Val Lys Gln Gly Ile Glu Gln Lys Pro
                245                 250                 255

Val Glu Gln Arg Ile His Phe Ser Lys Lys Asn Ala Met Glu Thr Leu
            260                 265                 270

Ala Ala His Arg Val Cys Gly Val Pro Leu Glu Thr Leu Ala Arg Ser
        275                 280                 285

Arg Lys Pro Arg Asp Leu Pro Asp Asp Leu Ser Cys Ala Tyr Gln Ala
    290                 295                 300

Gln Asn Ile Val Ser Leu Phe Val Ala Thr Arg Ile Leu Phe Ser His
305                 310                 315                 320

Leu Asp Ser Val Phe Thr Leu Asn Leu Asp Glu Gln Glu Pro Glu Val
                325                 330                 335

Ala Glu Arg Leu Ser Ala Leu Arg Gln Ile Asn Glu Asn Asn Pro Gly
            340                 345                 350
```

```
Met Val Thr Gln Val Leu Thr Val Ala Arg Gln Ile Tyr Asn Asp Tyr
        355                 360                 365

Val Thr His His Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala Gly Ala
    370                 375                 380

Gln Ala Ala Asp Ile Leu Ser Leu Phe Cys Pro Asp Ala Asp Lys Pro
385                 390                 395                 400

Cys Val Ala Ser Asn Asn Asp Gln Ala Asn Ile Asn Val Glu Ser Arg
                405                 410                 415

Ser Gly Arg Ser Tyr Leu Pro Glu Asn Arg Ala Val Ile Thr Pro Gln
            420                 425                 430

Gly Val Thr Asn Trp Thr Tyr Gln Glu Leu Glu Ala Thr His Gln Ala
        435                 440                 445

Leu Thr Arg Glu Gly Tyr Val Phe Val Gly Tyr His Gly Thr Asn His
    450                 455                 460

Val Ala Ala Gln Thr Ile Val Asn Arg Ile Ala Pro Val Pro Arg Gly
465                 470                 475                 480

Asn Asn Thr Glu Asn Glu Glu Lys Trp Gly Gly Leu Tyr Val Ala Thr
                485                 490                 495

His Ala Glu Val Ala His Gly Tyr Ala Arg Ile Lys Glu Gly Thr Gly
            500                 505                 510

Glu Tyr Gly Leu Pro Thr Arg Ala Glu Arg Glu Ala Arg Gly Val Met
        515                 520                 525

Leu Arg Val Tyr Ile Pro Arg Ala Ser Leu Glu Arg Phe Tyr Arg Thr
    530                 535                 540

Asn Thr Pro Leu Glu Asn Ala Glu Arg His Ile Thr Gln Val Ile Gly
545                 550                 555                 560

His Ser Leu Pro Leu Arg Asn Glu Ala Phe Thr Gly Pro Glu Ser Ala
                565                 570                 575
```

```
Gly Gly Glu Asp Glu Thr Val Ile Gly Trp Asp Met Ala Ile His Ala
            580                 585                 590

Val Ala Ile Pro Ser Thr Ile Pro Gly Asn Ala Tyr Glu Glu Leu Ala
        595                 600                 605

Ile Asp Glu Glu Ala Val Ala Lys Glu Gln Ser Ile Ser Ala Lys Pro
    610                 615                 620

Pro Tyr Lys Glu Gln Lys Asp Glu Leu Lys
625                 630
```

<210> 48
<211> 634
<212> PRT
<213> Vibrio cholerae

<400> 48

```
Val Glu Asp Glu Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys Leu
1               5                   10                  15

Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile Pro
            20                  25                  30

Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr Ile
        35                  40                  45

Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser Ile
    50                  55                  60

Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr Val
65                  70                  75                  80

Asn Gln Asp Ala Pro Phe Gly Val Ile Asn Leu Asp Ile Thr Thr Glu
                85                  90                  95

Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe Ala
            100                 105                 110

Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile Lys
        115                 120                 125
```

```
Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val Pro
    130                 135                 140

Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp Glu
145                 150                 155                 160

Asn Gln Gly Asn Val Ser Phe Ala Val Thr Arg Pro Glu Gln Ser Ile
                165                 170                 175

Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala His Lys Asn Gly
            180                 185                 190

Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala Leu Cys
        195                 200                 205

Trp Leu Val Pro Ile Asp Ala Ile Tyr Asn Tyr Ile Thr Gln Gln Asn
    210                 215                 220

Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr Val Ala
225                 230                 235                 240

Gly Thr Pro Lys Ala Ile Thr Val Lys Gln Gly Ile Glu Gln Lys Pro
                245                 250                 255

Val Glu Gln Arg Ile His Phe Ser Lys Lys Asn Ala Met Glu Ala Leu
            260                 265                 270

Ala Ala His Arg Val Cys Gly Val Pro Leu Glu Thr Leu Ala Arg Ser
        275                 280                 285

Arg Lys Pro Arg Asp Leu Pro Asp Asp Leu Ser Cys Ala Tyr Gln Ala
    290                 295                 300

Gln Asn Ile Val Ser Leu Phe Val Ala Thr Arg Ile Leu Phe Ser His
305                 310                 315                 320

Leu Asp Ser Val Phe Thr Leu Asn Leu Asp Glu Gln Glu Pro Glu Val
                325                 330                 335
```

```
Ala Glu Arg Leu Ser Ala Leu Arg Gln Ile Asn Glu Asn Asn Pro Gly
            340                 345                 350

Met Val Thr Gln Val Leu Thr Val Ala Arg Gln Ile Tyr Asn Asp Tyr
        355                 360                 365

Val Thr His His Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala Gly Ala
    370                 375                 380

Gln Ala Ala Asp Ile Leu Ser Leu Phe Cys Pro Asp Ala Asp Lys Pro
385                 390                 395                 400

Cys Val Ala Ser Asn Asn Asp Gln Ala Asn Ile Asn Val Glu Ser Arg
                405                 410                 415

Ser Gly Arg Ser Tyr Leu Pro Glu Asn Arg Ala Val Ile Thr Pro Gln
            420                 425                 430

Gly Val Thr Asn Trp Thr Tyr Gln Glu Leu Glu Ala Thr His Gln Ala
        435                 440                 445

Leu Thr Arg Glu Gly Tyr Val Phe Val Gly Tyr His Gly Thr Asn His
    450                 455                 460

Val Ala Ala Gln Thr Ile Val Asn Arg Ile Ala Pro Val Pro Arg Gly
465                 470                 475                 480

Asn Asn Thr Glu Asn Glu Glu Lys Trp Gly Gly Leu Tyr Val Ala Thr
                485                 490                 495

His Ala Glu Val Ala His Gly Tyr Ala Arg Ile Lys Glu Gly Thr Gly
            500                 505                 510

Glu Tyr Gly Leu Pro Thr Arg Ala Glu Arg Glu Ala Arg Gly Val Met
        515                 520                 525

Leu Arg Val Tyr Ile Pro Arg Ala Ser Leu Glu Arg Phe Tyr Arg Thr
    530                 535                 540

Asn Thr Pro Leu Glu Asn Ala Glu Arg His Ile Thr Gln Val Ile Gly
545                 550                 555                 560
```

```
His Ser Leu Pro Leu Arg Asn Glu Ala Phe Thr Gly Pro Glu Ser Ala
                565                 570                 575

Gly Gly Glu Asp Glu Thr Val Ile Gly Trp Asp Met Ala Ile His Ala
            580                 585                 590

Val Ala Ile Pro Ser Thr Ile Pro Gly Asn Ala Tyr Glu Glu Leu Ala
        595                 600                 605

Ile Asp Glu Glu Ala Val Ala Lys Glu Gln Ser Ile Ser Ala Lys Pro
    610                 615                 620

Pro Tyr Lys Glu Gln Lys Asp Glu Leu Lys
625                 630
```

<210> 49
<211> 634
<212> PRT
<213> Vibrio cholerae

<400> 49

```
Val Glu Asp Glu Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys Ser
1               5                   10                  15

Leu Thr Pro Glu Leu Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile Pro
            20                  25                  30

Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr Ile
        35                  40                  45

Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser Ile
    50                  55                  60

Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr Val
65                  70                  75                  80

Asn Gln Asp Ala Pro Phe Gly Val Ile Asn Leu Asp Ile Thr Thr Glu
                85                  90                  95

Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe Ala
            100                 105                 110
```

```
Ile Asn Trp Leu Val Ile Pro Gly Glu Asp Ser Pro Ala Ser Ile Lys
        115                 120                 125

Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val Pro
    130                 135                 140

Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp Lys
145                 150                 155                 160

Thr Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His Asn Ile
                165                 170                 175

Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys Glu Gly
            180                 185                 190

Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala Leu Cys
        195                 200                 205

Trp Leu Val Pro Ile Asp Ala Ile Tyr Asn Tyr Ile Thr Gln Gln Asn
    210                 215                 220

Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr Val Ala
225                 230                 235                 240

Gly Thr Pro Lys Ala Ile Thr Val Lys Gln Gly Ile Glu Gln Lys Pro
                245                 250                 255

Val Glu Gln Arg Ile His Phe Ser Lys Lys Asn Ala Met Glu Thr Leu
            260                 265                 270

Ala Ala His Arg Val Cys Gly Val Pro Leu Glu Thr Leu Ala Arg Ser
        275                 280                 285

Arg Lys Pro Arg Asp Leu Pro Asp Asp Leu Ser Cys Ala Tyr Gln Ala
    290                 295                 300

Gln Asn Ile Val Ser Leu Phe Val Ala Thr Arg Ile Leu Phe Ser His
305                 310                 315                 320
```

```
Leu Asp Ser Val Phe Thr Leu Asn Leu Asp Glu Gln Glu Pro Glu Val
                325                 330                 335

Ala Glu Arg Leu Ser Ala Leu Arg Gln Ile Asn Glu Asn Asn Pro Gly
            340                 345                 350

Met Val Thr Gln Val Leu Thr Val Ala Arg Gln Ile Tyr Asn Asp Tyr
        355                 360                 365

Val Thr His His Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala Gly Ala
    370                 375                 380

Gln Ala Ala Asp Ile Leu Ser Leu Phe Cys Pro Asp Ala Asp Lys Pro
385                 390                 395                 400

Cys Val Ala Ser Asn Asn Asp Gln Ala Asn Ile Asn Val Glu Ser Arg
                405                 410                 415

Ser Gly Arg Ser Tyr Leu Pro Glu Asn Arg Ala Val Ile Thr Pro Gln
            420                 425                 430

Gly Val Thr Asn Trp Thr Tyr Gln Glu Leu Glu Ala Thr His Gln Ala
        435                 440                 445

Leu Thr Arg Glu Gly Tyr Val Phe Val Gly Tyr His Gly Thr Asn His
    450                 455                 460

Val Ala Ala Gln Thr Ile Val Asn Arg Ile Ala Pro Val Pro Arg Gly
465                 470                 475                 480

Asn Asn Thr Glu Asn Glu Glu Lys Trp Gly Gly Leu Tyr Val Ala Thr
                485                 490                 495

His Ala Glu Val Ala His Gly Tyr Ala Arg Ile Lys Glu Gly Thr Gly
            500                 505                 510

Glu Tyr Gly Leu Pro Thr Arg Ala Glu Arg Glu Ala Arg Gly Val Met
        515                 520                 525

Leu Arg Val Tyr Ile Pro Arg Ala Ser Leu Glu Arg Phe Tyr Arg Thr
    530                 535                 540
```

Asn Thr Pro Leu Glu Asn Ala Glu Arg His Ile Thr Gln Val Ile Gly
545 550 555 560

His Ser Leu Pro Leu Arg Asn Glu Ala Phe Thr Gly Pro Glu Ser Ala
565 570 575

Gly Gly Glu Asp Glu Thr Val Ile Gly Trp Asp Met Ala Ile His Ala
580 585 590

Val Ala Ile Pro Ser Thr Ile Pro Gly Asn Ala Tyr Glu Glu Leu Ala
595 600 605

Ile Asp Glu Glu Ala Val Ala Lys Glu Gln Ser Ile Ser Ala Lys Pro
610 615 620

Pro Tyr Lys Glu Arg Lys Asp Glu Leu Lys
625 630

<210> 50
<211> 633
<212> PRT
<213> Vibrio cholerae

<400> 50
Val Glu Asp Glu Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys Ser
1 5 10 15

Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile Pro
20 25 30

Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr Ile
35 40 45

Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser Ile
50 55 60

Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr Val
65 70 75 80

Ser Gln Asp Ala Pro Phe Gly Val Ile Asn Leu Asp Ile Thr Thr Glu
85 90 95

```
Asn Gly Thr Lys Thr Tyr Ser Phe Asn Arg Lys Glu Ser Glu Phe Ala
            100                 105                 110

Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile Lys
        115                 120                 125

Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val Pro
    130                 135                 140

Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp Glu
145                 150                 155                 160

Thr Gln Gly Asn Val Ser Phe Ala Val Thr Arg Pro Glu Gln Ser Ile
                165                 170                 175

Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala His Lys Asn Gly
            180                 185                 190

Ser Arg His Lys Arg Trp Ala Asn Trp Phe Thr Thr Ser Pro Lys Val
        195                 200                 205

Thr Leu Cys Phe Tyr Glu Asp Pro Ala Gln Cys Thr Tyr Gly Asp Asp
    210                 215                 220

Trp His Gly Gly Ala Tyr Lys Thr Val Ala Gly Thr Pro Lys Ala Ile
225                 230                 235                 240

Thr Val Lys Gln Gly Ile Glu Gln Lys Thr Val Glu Gln Arg Ile His
                245                 250                 255

Phe Ser Lys Lys Asn Ala Met Glu Ala Leu Ala Ala His Arg Val Cys
            260                 265                 270

Gly Val Pro Leu Glu Thr Leu Ala Arg Ser Arg Lys Pro Arg Asp Leu
        275                 280                 285

Pro Asp Asp Leu Ser Cys Ala Tyr Gln Ala Gln Asn Ile Val Ser Leu
    290                 295                 300
```

```
Phe Val Ala Thr Arg Ile Leu Phe Ser His Leu Asp Ser Val Phe Thr
305                 310                 315                 320

Leu Asn Leu Asp Glu Gln Glu Pro Glu Val Ala Glu Arg Leu Ser Ala
                325                 330                 335

Leu Arg Gln Ile Asn Glu Asn Asn Pro Gly Met Val Thr Gln Val Leu
            340                 345                 350

Thr Val Ala Arg Gln Ile Tyr Asn Asp Tyr Val Thr His His Pro Gly
        355                 360                 365

Leu Thr Pro Glu Gln Thr Ser Ala Gly Ala Gln Ala Ala Asp Ile Leu
    370                 375                 380

Ser Leu Phe Cys Pro Asp Ala Asp Lys Ser Cys Val Ala Ser Asn Asn
385                 390                 395                 400

Asp Gln Ala Asn Ile Asn Ile Glu Ser Arg Ser Gly Arg Ser Tyr Leu
                405                 410                 415

Pro Glu Asn Arg Ala Val Ile Thr Pro Gln Gly Val Thr Asn Trp Thr
            420                 425                 430

Tyr Gln Glu Leu Glu Ala Thr His Gln Ala Leu Thr Arg Glu Asp Tyr
        435                 440                 445

Val Phe Val Gly Tyr His Gly Thr Asn His Val Ala Ala Gln Thr Ile
    450                 455                 460

Val Asn Arg Ile Ala Pro Val Pro Arg Gly Asn Asn Thr Glu Asn Glu
465                 470                 475                 480

Glu Lys Trp Gly Gly Leu Tyr Val Ala Thr His Ala Glu Val Ala His
                485                 490                 495

Gly Tyr Ala Arg Ile Lys Glu Gly Thr Gly Glu Tyr Gly Leu Pro Thr
            500                 505                 510

Arg Ala Glu Gln Glu Thr Arg Gly Val Met Leu Arg Val Tyr Ile Pro
        515                 520                 525
```

```
Arg Ala Ser Leu Glu Arg Phe Tyr Arg Thr Asn Thr Pro Leu Glu Asn
    530                 535                 540

Ala Glu Glu His Ile Thr Gln Val Ile Gly His Ser Leu Pro Leu Arg
545                 550                 555                 560

Asn Glu Ala Phe Thr Gly Pro Glu Ser Ala Gly Gly Glu Asp Glu Thr
                565                 570                 575

Val Ile Gly Trp Asp Met Ala Ile His Ala Val Ala Ile Pro Ser Thr
            580                 585                 590

Ile Pro Gly Asn Ala Tyr Glu Gly Leu Thr Thr Asp Glu Glu Ala Val
        595                 600                 605

Val Lys Glu Ala Ile Ala Lys Glu Gln Ser Ile Ser Ala Lys Pro Pro
    610                 615                 620

Tyr Lys Glu Arg Lys Asp Glu Leu Lys
625                 630
```

<210> 51
<211> 633
<212> PRT
<213> Vibrio cholerae

<400> 51

```
Val Glu Asp Glu Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys Ser
1               5                   10                  15

Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile Pro
            20                  25                  30

Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr Ile
        35                  40                  45

Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser Ile
    50                  55                  60

Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr Val
65                  70                  75                  80
```

```
Asn Gln Asp Ala Pro Phe Gly Val Ile Asn Leu Asp Ile Thr Thr Glu
                85                  90                  95

Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe Ala
            100                 105                 110

Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile Lys
        115                 120                 125

Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val Pro
    130                 135                 140

Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp Glu
145                 150                 155                 160

Asn Gln Gly Asn Val Ser Phe Ala Val Thr Arg Pro Glu Gln Ser Ile
                165                 170                 175

Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala His Lys Asn Gly
            180                 185                 190

Ser Arg His Lys Arg Trp Ala Asn Trp Phe Thr Thr Ser Pro Lys Val
        195                 200                 205

Thr Leu Cys Phe Tyr Glu Asp Pro Ala Gln Cys Thr Tyr Gly Asp Asp
    210                 215                 220

Trp His Gly Gly Ala Tyr Lys Thr Val Ala Gly Thr Pro Lys Ala Ile
225                 230                 235                 240

Thr Val Lys Gln Gly Ile Glu Gln Lys Thr Val Glu Gln Arg Ile His
                245                 250                 255

Phe Ser Gln Lys Asn Ala Met Glu Ala Leu Ala Ala His Arg Val Cys
            260                 265                 270

Gly Val Pro Leu Glu Thr Leu Ala Arg Ser Arg Lys Pro Arg Asp Leu
        275                 280                 285
```

```
Pro Asp Asp Leu Ser Cys Ala Tyr Gln Ala Gln Asn Ile Val Ser Leu
    290                 295                 300

Phe Val Ala Thr Arg Ile Leu Phe Ser His Leu Asp Ser Val Phe Thr
305                 310                 315                 320

Leu Asn Leu Asp Glu Gln Glu Pro Glu Val Ala Glu Arg Leu Ser Ala
                325                 330                 335

Leu Arg Gln Ile Asn Glu Asn Asn Pro Gly Met Val Thr Gln Val Leu
            340                 345                 350

Thr Val Ala Arg Gln Ile Tyr Asn Asp Tyr Val Thr His His Pro Gly
        355                 360                 365

Leu Thr Pro Glu Gln Thr Ser Ala Gly Ala Gln Ala Ala Asp Ile Leu
    370                 375                 380

Ser Leu Phe Cys Pro Asp Ala Asp Lys Ser Cys Val Ala Ser Asn Asn
385                 390                 395                 400

Asp Gln Ala Asn Ile Asn Ile Glu Ser Arg Ser Gly Arg Ser Tyr Leu
                405                 410                 415

Pro Glu Asn Arg Ala Val Ile Thr Pro Gln Gly Val Thr Asn Trp Thr
            420                 425                 430

Tyr Gln Glu Leu Glu Ala Thr His Gln Ala Leu Thr Arg Glu Asp Tyr
        435                 440                 445

Val Phe Val Gly Tyr His Gly Thr Asn His Val Ala Ala Gln Thr Ile
    450                 455                 460

Val Asn Arg Ile Ala Pro Val Pro Arg Gly Asn Asn Thr Glu Asn Glu
465                 470                 475                 480

Glu Lys Trp Gly Gly Leu Tyr Val Ala Thr His Ala Glu Val Ala His
                485                 490                 495

Gly Tyr Ala Arg Ile Lys Glu Gly Thr Gly Glu Tyr Gly Leu Pro Thr
            500                 505                 510
```

```
Arg Ala Glu Gln Glu Thr Arg Gly Val Met Leu Arg Val Tyr Ile Pro
        515                 520                 525

Arg Ala Ser Leu Glu Arg Phe Tyr Arg Thr Asn Thr Pro Leu Glu Asn
    530                 535                 540

Ala Glu Glu His Ile Thr Gln Val Ile Gly His Ser Leu Pro Leu Arg
545                 550                 555                 560

Asn Glu Ala Phe Thr Gly Pro Glu Ser Ala Gly Gly Glu Asp Glu Thr
                565                 570                 575

Val Ile Gly Trp Asp Met Ala Ile His Ala Val Ala Ile Pro Ser Thr
            580                 585                 590

Ile Pro Gly Asn Ala Tyr Glu Gly Leu Thr Thr Asp Glu Glu Ala Val
        595                 600                 605

Val Lys Glu Ala Ile Ala Lys Glu Gln Ser Ile Ser Ala Lys Pro Pro
    610                 615                 620

Tyr Lys Glu Gln Lys Asp Glu Leu Lys
625                 630
```

<210> 52
<211> 633
<212> PRT
<213> Vibrio cholerae

<400> 52

```
Val Glu Asp Glu Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys Ser
1               5                   10                  15

Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile Pro
            20                  25                  30

Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr Ile
        35                  40                  45

Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser Ile
    50                  55                  60
```

```
Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr Val
65                  70                  75                  80

Asn Gln Asp Ala Pro Phe Gly Val Ile Asn Leu Asp Ile Thr Thr Glu
                85                  90                  95

Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe Ala
            100                 105                 110

Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile Lys
        115                 120                 125

Ile Ser Val Asp Glu Ile Asp Gln Gln Arg Asn Ile Ile Glu Val Pro
    130                 135                 140

Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp Glu
145                 150                 155                 160

Asn Gln Gly Asn Val Ser Phe Ala Val Thr Arg Pro Glu Gln Ser Ile
                165                 170                 175

Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala His Lys Asn Gly
            180                 185                 190

Ser Arg His Lys Arg Trp Ala Asn Trp Phe Thr Thr Ser Pro Lys Val
        195                 200                 205

Thr Leu Cys Phe Tyr Glu Asp Pro Ala Gln Cys Thr Tyr Gly Asp Asp
    210                 215                 220

Trp His Gly Gly Ala Tyr Lys Thr Val Ala Gly Thr Pro Lys Ala Ile
225                 230                 235                 240

Thr Val Lys Gln Gly Ile Glu Gln Lys Thr Val Glu Gln Arg Ile His
                245                 250                 255

Phe Ser Lys Lys Asn Ala Met Glu Ala Leu Ala Ala His Arg Val Cys
            260                 265                 270
```

```
Gly Val Pro Leu Glu Thr Leu Ala Arg Ser Arg Lys Pro Arg Asp Leu
        275                 280                 285

Pro Asp Asp Leu Ser Cys Ala Tyr Gln Ala Gln Asn Ile Val Ser Leu
    290                 295                 300

Phe Val Ala Thr Arg Ile Leu Phe Ser His Leu Asp Ser Val Phe Thr
305                 310                 315                 320

Leu Asn Leu Asp Glu Gln Glu Pro Glu Val Ala Glu Arg Leu Ser Ala
                325                 330                 335

Leu Arg Gln Ile Asn Glu Asn Asn Pro Gly Met Val Thr Gln Val Leu
            340                 345                 350

Thr Val Ala Arg Gln Ile Tyr Asn Asp Tyr Val Thr His His Pro Gly
        355                 360                 365

Leu Thr Pro Glu Gln Thr Ser Ala Gly Ala Gln Ala Ala Asp Ile Leu
    370                 375                 380

Ser Leu Phe Cys Pro Asp Ala Asp Lys Ser Cys Val Ala Ser Asn Asn
385                 390                 395                 400

Asp Gln Ala Asn Ile Asn Ile Glu Ser Arg Ser Gly Arg Ser Tyr Leu
                405                 410                 415

Pro Glu Asn Arg Ala Val Ile Thr Pro Gln Gly Val Thr Asn Trp Thr
            420                 425                 430

Tyr Gln Glu Leu Glu Ala Thr His Gln Ala Leu Thr Arg Glu Asp Tyr
        435                 440                 445

Val Phe Val Gly Tyr His Gly Thr Asn His Val Ala Ala Gln Thr Ile
    450                 455                 460

Val Asn Arg Ile Ala Pro Val Pro Arg Gly Asn Asn Thr Glu Asn Glu
465                 470                 475                 480

Glu Lys Trp Gly Gly Leu Tyr Val Ala Thr His Ala Glu Val Ala His
                485                 490                 495
```

```
Gly Tyr Ala Arg Ile Lys Glu Gly Thr Gly Glu Tyr Gly Leu Pro Thr
            500                 505                 510

Arg Ala Glu Gln Glu Thr Arg Gly Val Met Leu Arg Val Tyr Ile Pro
        515                 520                 525

Arg Ala Ser Leu Glu Arg Phe Tyr Arg Thr Asn Thr Pro Leu Glu Asn
    530                 535                 540

Ala Glu Glu His Ile Thr Gln Val Ile Gly His Ser Leu Pro Leu Arg
545                 550                 555                 560

Asn Glu Ala Phe Thr Gly Pro Glu Ser Ala Gly Gly Glu Asp Glu Thr
                565                 570                 575

Val Ile Gly Trp Asp Met Ala Ile His Ala Val Ala Ile Pro Ser Thr
            580                 585                 590

Ile Pro Gly Asn Ala Tyr Glu Gly Leu Thr Thr Asp Glu Glu Ala Val
        595                 600                 605

Val Lys Glu Ala Ile Ala Lys Glu Gln Ser Ile Ser Ala Lys Pro Pro
    610                 615                 620

Tyr Lys Glu Arg Lys Asp Glu Leu Lys
625                 630
```

<210> 53
<211> 633
<212> PRT
<213> Vibrio cholerae

<400> 53

```
Val Glu Asp Glu Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys Ser
1               5                   10                  15

Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile Pro
            20                  25                  30

Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr Ile
        35                  40                  45
```

```
Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser Ile
    50                  55                  60

Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr Val
65                  70                  75                  80

Asn Gln Asp Ala Pro Phe Gly Val Ile Asn Leu Asp Ile Thr Thr Glu
                85                  90                  95

Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe Ala
            100                 105                 110

Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile Lys
        115                 120                 125

Ile Ser Val Asp Glu Ile Asp Gln Gln Arg Asn Ile Ile Glu Val Pro
    130                 135                 140

Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp Glu
145                 150                 155                 160

Asn Gln Gly Asn Val Ser Phe Ala Val Thr Arg Pro Glu Gln Ser Ile
                165                 170                 175

Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala His Lys Asn Gly
            180                 185                 190

Ser Arg His Lys Arg Trp Ala Asn Trp Phe Thr Thr Ser Pro Lys Val
        195                 200                 205

Thr Leu Cys Phe Tyr Glu Asp Pro Ala Gln Cys Thr Tyr Gly Asp Asp
    210                 215                 220

Trp His Gly Gly Ala Tyr Lys Thr Val Ala Gly Thr Pro Lys Ala Ile
225                 230                 235                 240

Thr Val Lys Gln Gly Ile Glu Gln Lys Thr Val Glu Gln Arg Ile His
                245                 250                 255
```

```
Phe Ser Lys Lys Asn Ala Met Glu Ala Leu Ala Ala His Arg Val Cys
            260                 265                 270

Gly Val Pro Leu Glu Thr Leu Ala Arg Ser Arg Lys Pro Arg Asp Leu
        275                 280                 285

Pro Asp Asp Leu Ser Cys Ala Tyr Gln Ala Gln Asn Ile Val Ser Leu
    290                 295                 300

Phe Val Ala Thr Arg Ile Leu Phe Ser His Leu Asp Ser Val Phe Thr
305                 310                 315                 320

Leu Asn Leu Asp Glu Gln Glu Pro Glu Val Ala Glu Arg Leu Ser Ala
                325                 330                 335

Leu Arg Gln Ile Asn Glu Asn Asn Pro Gly Met Val Thr Gln Val Leu
            340                 345                 350

Thr Val Ala Arg Gln Ile Tyr Asn Asp Tyr Val Thr His His Pro Gly
        355                 360                 365

Leu Thr Pro Glu Gln Thr Ser Ala Gly Ala Gln Ala Ala Asp Ile Leu
    370                 375                 380

Ser Leu Phe Cys Pro Asp Ala Asp Lys Ser Cys Val Ala Ser Asn Asn
385                 390                 395                 400

Asp Gln Ala Asn Ile Asn Ile Glu Ser Arg Ser Gly Arg Ser Tyr Leu
                405                 410                 415

Pro Glu Asn Arg Ala Val Ile Thr Pro Gln Gly Val Thr Asn Trp Thr
            420                 425                 430

Tyr Gln Glu Leu Glu Ala Thr His Gln Ala Leu Thr Arg Glu Gly Tyr
        435                 440                 445

Val Phe Val Gly Tyr His Gly Thr Asn His Val Ala Ala Gln Thr Ile
    450                 455                 460

Val Asn Arg Ile Ala Pro Val Pro Arg Gly Asn Asn Thr Glu Asn Glu
465                 470                 475                 480
```

```
Glu Lys Trp Gly Gly Leu Tyr Val Ala Thr His Ala Glu Val Ala His
                485                 490                 495


Gly Tyr Ala Arg Ile Lys Glu Gly Thr Gly Glu Tyr Gly Leu Pro Thr
            500                 505                 510


Arg Ala Glu Gln Glu Thr Arg Gly Val Met Leu Arg Val Tyr Ile Pro
        515                 520                 525


Arg Ala Ser Leu Glu Arg Phe Tyr Arg Thr Asn Thr Pro Leu Glu Asn
    530                 535                 540


Ala Glu Glu His Ile Thr Gln Val Ile Gly His Ser Leu Pro Leu Arg
545                 550                 555                 560


Asn Glu Ala Phe Thr Gly Pro Glu Ser Ala Gly Gly Glu Asp Glu Thr
                565                 570                 575


Val Ile Gly Trp Asp Met Ala Ile His Ala Val Ala Ile Pro Ser Thr
            580                 585                 590


Ile Pro Gly Asn Ala Tyr Glu Gly Leu Thr Thr Asp Glu Glu Ala Val
        595                 600                 605


Val Lys Glu Ala Ile Ala Lys Glu Gln Ser Ile Ser Ala Lys Pro Pro
    610                 615                 620


Tyr Lys Glu Gln Lys Asp Glu Leu Lys
625                 630


<210> 54
<211> 633
<212> PRT
<213> Vibrio cholerae

<400> 54
Val Glu Asp Glu Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys Ser
1               5                   10                  15


Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile Pro
            20                  25                  30
```

```
Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr Ile
        35                  40                  45

Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser Ile
    50                  55                  60

Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr Val
65                  70                  75                  80

Asn Gln Asp Ala Pro Phe Gly Val Ile Asn Leu Asp Ile Thr Thr Glu
                85                  90                  95

Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe Ala
            100                 105                 110

Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile Lys
        115                 120                 125

Ile Ser Val Asp Glu Ile Asp Gln Gln Arg Asn Ile Ile Glu Val Pro
    130                 135                 140

Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp Glu
145                 150                 155                 160

Asn Gln Gly Asn Val Ser Phe Ala Val Thr Arg Pro Glu Gln Ser Ile
                165                 170                 175

Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala His Lys Asn Gly
            180                 185                 190

Ser Arg His Lys Arg Trp Ala Asn Trp Phe Thr Thr Ser Pro Lys Val
        195                 200                 205

Thr Leu Cys Phe Tyr Glu Asp Pro Ala Gln Cys Thr Tyr Gly Asp Asp
    210                 215                 220

Trp His Gly Gly Ala Tyr Lys Thr Val Ala Gly Thr Pro Lys Ala Ile
225                 230                 235                 240
```

```
Thr Val Lys Gln Gly Ile Glu Gln Lys Thr Val Glu Gln Arg Ile His
                245                 250                 255

Phe Ser Lys Lys Asn Ala Met Glu Ala Leu Ala Ala His Arg Val Cys
            260                 265                 270

Gly Val Pro Leu Glu Thr Leu Ala Arg Ser Arg Lys Pro Arg Asp Leu
        275                 280                 285

Pro Asp Asp Leu Ser Cys Ala Tyr Gln Ala Gln Asn Ile Val Ser Leu
    290                 295                 300

Phe Val Ala Thr Arg Ile Leu Phe Ser His Leu Asp Ser Val Phe Thr
305                 310                 315                 320

Leu Asn Leu Asp Glu Gln Glu Pro Glu Val Ala Glu Arg Leu Ser Ala
                325                 330                 335

Leu Arg Gln Ile Asn Glu Asn Asn Pro Gly Met Val Thr Gln Val Leu
            340                 345                 350

Thr Val Ala Arg Gln Ile Tyr Asn Asp Tyr Val Thr His His Pro Gly
        355                 360                 365

Leu Thr Pro Glu Gln Thr Ser Ala Gly Ala Gln Ala Ala Asp Ile Leu
    370                 375                 380

Ser Leu Phe Cys Pro Asp Ala Asp Lys Ser Cys Val Ala Ser Asn Asn
385                 390                 395                 400

Asp Gln Ala Asn Ile Asn Ile Glu Ser Arg Ser Gly Arg Ser Tyr Leu
                405                 410                 415

Pro Glu Asn Arg Ala Val Ile Thr Pro Gln Gly Val Thr Asn Trp Thr
            420                 425                 430

Tyr Gln Glu Leu Glu Ala Thr His Gln Ala Leu Thr Arg Glu Asp Tyr
        435                 440                 445

Val Phe Val Gly Tyr His Gly Thr Asn His Val Ala Ala Gln Thr Ile
    450                 455                 460
```

```
Val Asn Arg Ile Ala Pro Val Pro Arg Gly Asn Asn Thr Glu Asn Glu
465                 470                 475                 480

Glu Lys Trp Gly Gly Leu Tyr Val Ala Thr His Ala Glu Val Ala His
                485                 490                 495

Gly Tyr Ala Arg Ile Lys Glu Gly Thr Gly Glu Tyr Gly Leu Pro Thr
            500                 505                 510

Arg Ala Glu Gln Glu Thr Arg Gly Val Met Leu Arg Val Tyr Ile Pro
        515                 520                 525

Arg Ala Ser Leu Glu Arg Phe Tyr Arg Thr Asn Thr Pro Leu Glu Asn
    530                 535                 540

Ala Glu Glu His Ile Thr Gln Val Ile Gly His Ser Leu Pro Leu Arg
545                 550                 555                 560

Asn Glu Ala Phe Thr Gly Pro Glu Ser Ala Gly Gly Glu Asp Glu Thr
                565                 570                 575

Val Ile Gly Trp Asp Met Ala Ile His Ala Val Ala Ile Pro Ser Thr
            580                 585                 590

Ile Pro Gly Asn Ala Tyr Glu Gly Leu Thr Thr Asp Glu Glu Ala Val
        595                 600                 605

Val Lys Glu Ala Ile Ala Lys Glu Gln Ser Ile Ser Ala Lys Pro Pro
    610                 615                 620

Tyr Lys Glu Gln Lys Asp Glu Leu Lys
625                 630
```

<210> 55
<211> 633
<212> PRT
<213> Vibrio cholerae

<400> 55

```
Val Glu Asp Glu Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys Ser
1               5                   10                  15
```

```
Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile Pro
            20                  25                  30

Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr Ile
        35                  40                  45

Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser Ile
    50                  55                  60

Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr Val
65                  70                  75                  80

Asn Gln Asp Ala Pro Phe Gly Val Ile Asn Leu Asp Ile Thr Thr Glu
                85                  90                  95

Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe Ala
            100                 105                 110

Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile Lys
        115                 120                 125

Ile Ser Val Asp Glu Ile Asp Gln Gln Arg Asn Ile Ile Glu Val Pro
    130                 135                 140

Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp Glu
145                 150                 155                 160

Asn Gln Gly Asn Val Ser Phe Ala Val Thr Arg Pro Glu Gln Ser Ile
                165                 170                 175

Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala His Lys Asn Gly
            180                 185                 190

Ser Arg His Lys Arg Trp Ala Asn Trp Phe Thr Thr Ser Pro Lys Val
        195                 200                 205

Thr Leu Cys Phe Tyr Glu Asp Pro Ala Gln Cys Thr Tyr Gly Asp Asp
    210                 215                 220
```

```
Trp His Gly Gly Ala Tyr Lys Thr Val Ala Gly Ile Pro Lys Ala Ile
225                 230                 235                 240

Thr Val Lys Gln Gly Ile Glu Gln Lys Thr Val Glu Gln Arg Ile His
                245                 250                 255

Phe Ser Lys Lys Asn Ala Met Glu Ala Leu Ala Ala His Arg Val Cys
            260                 265                 270

Gly Val Pro Leu Glu Thr Leu Ala Arg Ser Arg Lys Pro Arg Asp Leu
        275                 280                 285

Pro Asp Asp Leu Ser Cys Ala Tyr Gln Ala Gln Asn Ile Val Ser Leu
    290                 295                 300

Phe Val Ala Thr Arg Ile Leu Phe Ser His Leu Asp Ser Val Phe Thr
305                 310                 315                 320

Leu Asn Leu Asp Glu Gln Glu Pro Glu Val Ala Glu Arg Leu Ser Ala
                325                 330                 335

Leu Arg Gln Ile Asn Glu Asn Asn Pro Gly Met Val Thr Gln Val Leu
            340                 345                 350

Thr Val Ala Arg Gln Ile Tyr Asn Asp Tyr Val Thr His His Pro Gly
        355                 360                 365

Leu Thr Pro Glu Gln Thr Ser Ala Gly Ala Gln Ala Ala Asp Ile Leu
    370                 375                 380

Ser Leu Phe Cys Pro Asp Ala Asp Lys Ser Cys Val Ala Ser Asn Asn
385                 390                 395                 400

Asp Gln Ala Asn Ile Asn Ile Glu Ser Arg Ser Gly Arg Ser Tyr Leu
                405                 410                 415

Pro Glu Asn Arg Ala Val Ile Thr Pro Gln Gly Val Thr Asn Trp Thr
            420                 425                 430

Tyr Gln Glu Leu Glu Ala Thr His Gln Ala Leu Thr Arg Glu Asp Tyr
        435                 440                 445
```

```
Val Phe Val Gly Tyr His Gly Thr Asn His Val Ala Ala Gln Thr Ile
    450                 455                 460

Val Asn Arg Ile Ala Pro Val Pro Arg Gly Asn Asn Thr Glu Asn Glu
465                 470                 475                 480

Glu Lys Trp Gly Gly Leu Tyr Val Ala Thr His Ala Glu Val Ala His
                485                 490                 495

Gly Tyr Ala Arg Ile Lys Glu Gly Thr Gly Glu Tyr Gly Leu Pro Thr
            500                 505                 510

Arg Ala Glu Gln Glu Thr Arg Gly Val Met Leu Arg Val Tyr Ile Pro
        515                 520                 525

Arg Ala Ser Leu Glu Arg Phe Tyr Arg Thr Asn Thr Pro Leu Glu Asn
    530                 535                 540

Ala Glu Glu His Ile Thr Gln Val Ile Gly His Ser Leu Pro Leu Arg
545                 550                 555                 560

Asn Glu Ala Phe Thr Gly Pro Glu Ser Ala Gly Gly Glu Asp Glu Thr
                565                 570                 575

Val Ile Gly Trp Asp Met Ala Ile His Ala Val Ala Ile Pro Ser Thr
            580                 585                 590

Ile Pro Gly Asn Ala Tyr Glu Gly Leu Thr Thr Asp Glu Glu Ala Val
        595                 600                 605

Val Lys Glu Ala Ile Ala Lys Glu Gln Ser Ile Ser Ala Lys Pro Pro
    610                 615                 620

Tyr Lys Glu Arg Lys Asp Glu Leu Lys
625                 630
```

<210> 56
<211> 633
<212> PRT
<213> Vibrio cholerae

<400> 56

```
Val Glu Asp Glu Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys Ser
1               5                  10                  15

Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile Pro
            20                  25                  30

Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr Ile
        35                  40                  45

Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser Ile
    50                  55                  60

Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr Val
65                  70                  75                  80

Asn Gln Asp Ala Pro Phe Gly Val Ile Asn Leu Asp Ile Thr Thr Glu
                85                  90                  95

Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe Ala
            100                 105                 110

Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile Lys
        115                 120                 125

Ile Ser Val Asp Glu Ile Asp Gln Gln Arg Asn Ile Ile Glu Val Pro
    130                 135                 140

Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp Glu
145                 150                 155                 160

Asn Gln Gly Asn Val Ser Phe Ala Val Thr Arg Pro Glu Gln Ser Ile
                165                 170                 175

Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala His Lys Asn Gly
            180                 185                 190

Ser Arg His Lys Arg Trp Ala Asn Trp Phe Thr Thr Ser Pro Lys Val
        195                 200                 205
```

```
Thr Leu Cys Phe Tyr Glu Asp Pro Ala Gln Cys Thr Tyr Gly Asp Asp
    210                 215                 220

Trp His Gly Gly Ala Tyr Lys Thr Val Ala Gly Ile Pro Lys Ala Ile
225                 230                 235                 240

Thr Val Lys Gln Gly Ile Glu Gln Lys Thr Val Glu Gln Arg Ile His
                245                 250                 255

Phe Ser Lys Lys Asn Ala Met Glu Ala Leu Ala Ala His Arg Val Cys
            260                 265                 270

Gly Val Pro Leu Glu Thr Leu Ala Arg Ser Arg Lys Pro Arg Asp Leu
        275                 280                 285

Pro Asp Asp Leu Ser Cys Ala Tyr Gln Ala Gln Asn Ile Val Ser Leu
    290                 295                 300

Phe Val Ala Thr Arg Ile Leu Phe Ser His Leu Asp Ser Val Phe Thr
305                 310                 315                 320

Leu Asn Leu Asp Glu Gln Glu Pro Glu Val Ala Glu Arg Leu Ser Ala
                325                 330                 335

Leu Arg Gln Ile Asn Glu Asn Asn Pro Gly Met Val Thr Gln Val Leu
            340                 345                 350

Thr Val Ala Arg Gln Ile Tyr Asn Asp Tyr Val Thr His His Pro Gly
        355                 360                 365

Leu Thr Pro Glu Gln Thr Ser Ala Gly Ala Gln Ala Ala Asp Ile Leu
    370                 375                 380

Ser Leu Phe Cys Pro Asp Ala Asp Lys Ser Cys Val Ala Ser Asn Asn
385                 390                 395                 400

Asp Gln Ala Asn Ile Asn Ile Glu Ser Arg Ser Gly Arg Ser Tyr Leu
                405                 410                 415

Pro Glu Asn Arg Ala Val Ile Thr Pro Gln Gly Val Thr Asn Trp Thr
            420                 425                 430
```

```
Tyr Gln Glu Leu Glu Ala Thr His Gln Ala Leu Thr Arg Glu Asp Tyr
        435                 440                 445

Val Phe Val Gly Tyr His Gly Thr Asn His Val Ala Ala Gln Thr Ile
    450                 455                 460

Val Asn Arg Ile Ala Pro Val Pro Arg Gly Asn Asn Thr Glu Asn Glu
465                 470                 475                 480

Glu Lys Trp Gly Gly Leu Tyr Val Ala Thr His Ala Glu Val Ala His
                485                 490                 495

Gly Tyr Ala Arg Ile Lys Glu Gly Thr Gly Glu Tyr Gly Leu Pro Thr
            500                 505                 510

Arg Ala Glu Gln Glu Thr Arg Gly Val Met Leu Arg Val Tyr Ile Pro
        515                 520                 525

Arg Ala Ser Leu Glu Arg Phe Tyr Arg Thr Asn Thr Pro Leu Glu Asn
    530                 535                 540

Ala Glu Glu His Ile Thr Gln Val Ile Gly His Ser Leu Pro Leu Arg
545                 550                 555                 560

Asn Glu Ala Phe Thr Gly Pro Glu Ser Ala Gly Gly Glu Asp Glu Thr
                565                 570                 575

Val Ile Gly Trp Asp Met Ala Ile His Ala Val Ala Ile Pro Ser Thr
            580                 585                 590

Ile Pro Gly Asn Ala Tyr Glu Gly Leu Thr Thr Asp Glu Glu Ala Val
        595                 600                 605

Val Lys Glu Ala Ile Ala Lys Glu Gln Ser Ile Ser Ala Lys Pro Pro
    610                 615                 620

Tyr Lys Glu Gln Lys Asp Glu Leu Lys
625                 630
```

<210> 57
<211> 633
<212> PRT
<213> Vibrio cholerae

<400> 57
Val Glu Asp Glu Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys Ser
1   5   10   15

Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile Pro
            20   25   30

Gly Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr Ile
        35   40   45

Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser Ile
    50   55   60

Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr Val
65   70   75   80

Ser Gln Asp Ala Pro Phe Gly Val Ile Asn Leu Asp Ile Thr Thr Glu
                85   90   95

Asn Gly Thr Lys Thr Tyr Ser Phe Asn Arg Lys Glu Ser Glu Phe Ala
            100   105   110

Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile Lys
        115   120   125

Ile Ser Ile Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val Pro
    130   135   140

Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp Glu
145   150   155   160

Asn Gln Gly Asn Val Ser Phe Ala Val Thr Arg Pro Glu Gln Ser Ile
                165   170   175

Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala His Lys Asn Gly
            180   185   190

```
Ser Arg His Lys Arg Trp Ala Asn Trp Leu Thr Thr Leu Pro Glu Val
        195                 200                 205

Val Leu Cys Phe Phe Glu Asp Pro Glu Leu Cys Thr Tyr Gly Asp Asp
    210                 215                 220

Trp His Gly Gly Ala Tyr Lys Thr Val Ala Gly Thr Pro Lys Ala Ile
225                 230                 235                 240

Thr Val Lys Gln Gly Ile Glu Gln Lys Thr Val Glu Gln Arg Ile His
                245                 250                 255

Phe Ser Lys Lys Asn Ala Met Glu Ala Leu Ala Ala His Arg Val Cys
            260                 265                 270

Gly Val Pro Leu Glu Thr Leu Ala Arg Ser Arg Lys Pro Arg Asp Leu
        275                 280                 285

Pro Asp Asp Leu Ser Cys Ala Tyr Asn Ala Gln Gln Ile Val Ser Leu
    290                 295                 300

Phe Leu Ala Thr Arg Ile Leu Phe Thr His Ile Asp Ser Ile Phe Thr
305                 310                 315                 320

Leu Asn Leu Asp Gly Gln Glu Pro Glu Val Ala Glu Arg Leu Asp Asp
                325                 330                 335

Leu Arg Arg Ile Asn Glu Asn Asn Pro Gly Met Val Ile Gln Val Leu
            340                 345                 350

Thr Val Ala Arg Gln Ile Tyr Asn Asp Tyr Val Thr His His Pro Gly
        355                 360                 365

Leu Thr Pro Glu Gln Thr Ser Ala Gly Ala Gln Ala Ala Asp Ile Leu
    370                 375                 380

Ser Leu Phe Cys Pro Asp Ala Asp Lys Ser Cys Val Ala Ser Asn Ser
385                 390                 395                 400

Asp Gln Ala Asn Ile Asn Ile Glu Ser Arg Ser Gly Arg Ser Tyr Leu
                405                 410                 415
```

```
Pro Glu Asn Arg Ala Val Ile Thr Gln Gln Gly Val Thr Asn Trp Thr
            420                 425                 430

Tyr Gln Glu Leu Glu Ala Thr His Gln Ala Leu Thr Gln Glu Gly Tyr
        435                 440                 445

Val Phe Val Gly Tyr His Gly Thr Asn His Val Ala Ala Gln Thr Ile
    450                 455                 460

Val Asn Arg Ile Ala Pro Val Pro Arg Gly Asn Asn Thr Glu Asn Glu
465                 470                 475                 480

Glu Lys Trp Gly Gly Leu Tyr Val Ala Thr His Ala Glu Val Ala His
                485                 490                 495

Gly Tyr Ala Arg Ile Lys Glu Gly Thr Gly Glu Tyr Gly Leu Pro Thr
            500                 505                 510

Arg Ala Glu Gln Glu Thr Arg Gly Val Met Leu Arg Val Tyr Ile Pro
        515                 520                 525

Arg Ala Ser Leu Glu Arg Phe Tyr Arg Thr Asn Thr Pro Leu Glu Asn
    530                 535                 540

Ala Glu Glu His Ile Thr Gln Val Ile Gly His Ser Leu Pro Leu Arg
545                 550                 555                 560

Asn Glu Ala Phe Thr Gly Pro Glu Ser Ala Gly Gly Glu Asp Glu Thr
                565                 570                 575

Val Ile Gly Trp Asp Met Ala Ile His Ala Val Ala Ile Pro Ser Thr
            580                 585                 590

Ile Pro Gly Asn Ala Tyr Glu Gly Leu Thr Thr Asp Glu Glu Ala Val
        595                 600                 605

Val Lys Glu Ala Ile Ala Lys Glu Gln Ser Ile Ser Ala Lys Pro Pro
    610                 615                 620
```

Tyr Lys Glu Gln Lys Asp Glu Leu Lys
625 630

<210> 58
<211> 633
<212> PRT
<213> Vibrio cholerae

<400> 58
Val Glu Asp Glu Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys Ser
1 5 10 15

Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile Pro
20 25 30

Gly Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr Ile
35 40 45

Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser Ile
50 55 60

Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr Val
65 70 75 80

Asn Gln Asp Ala Pro Phe Gly Val Ile His Leu Asp Ile Thr Thr Glu
85 90 95

Asn Gly Thr Lys Thr Tyr Ser Phe Asn Arg Lys Glu Gly Glu Phe Ala
100 105 110

Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile Lys
115 120 125

Ile Ser Ile Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val Pro
130 135 140

Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp Glu
145 150 155 160

Thr Gln Gly Asn Val Ser Phe Ala Val Thr Arg Pro Glu Gln Ser Ile
165 170 175

```
Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys Asp Gly
            180                 185                 190

Ala Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala Leu Cys
        195                 200                 205

Trp Leu Val Pro Leu Asp Ala Ile Tyr Asn Tyr Ile Thr Gln Gln Asn
    210                 215                 220

Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr Val Ala
225                 230                 235                 240

Gly Thr Pro Lys Ala Ile Thr Val Lys Gln Gly Met Glu Gln Lys Pro
                245                 250                 255

Val Glu Gln Arg Ile His Phe Ser Lys Lys Asn Ala Met Glu Ala Leu
            260                 265                 270

Ala Ala His Arg Val Cys Gly Val Pro Leu Glu Thr Leu Ala Arg Gly
        275                 280                 285

Arg Lys Pro Arg Asp Leu Thr Asp Asp Leu Gln Cys Ala Tyr Gln Ala
    290                 295                 300

Gln Asn Ile Val Ser Leu Phe Leu Ala Thr Arg Ile Leu Phe Ser His
305                 310                 315                 320

Leu Asp Ser Val Phe Thr Leu Asn Leu Asp Glu Gln Glu Pro Glu Val
                325                 330                 335

Ala Glu Arg Leu Thr Asp Leu Arg Arg Ile Asn Glu Asn Asn Pro Gly
            340                 345                 350

Met Val Thr Gln Val Leu Thr Ile Ala Arg Gln Ile Tyr Asn Asp Tyr
        355                 360                 365

Val Thr Glu His Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala Gly Ala
    370                 375                 380

Gln Ala Ala Asp Ile Leu Ser Leu Phe Cys Pro Asp Ala Asp Glu Ser
385                 390                 395                 400
```

```
Cys Val Ala Ser Asn Ser Asp Gln Ala Asn Ile Asn Ile Glu Ser Arg
                405                 410                 415

Ser Gly Arg Ser Tyr Leu Pro Glu Asn Arg Ala Val Ile Thr Pro Gln
            420                 425                 430

Gly Val Thr Asn Trp Thr Tyr Gln Glu Leu Glu Ala Lys His Gln Thr
        435                 440                 445

Leu Thr Arg Glu Gly Tyr Val Phe Val Gly Tyr His Gly Thr Asn His
    450                 455                 460

Val Ala Ala Gln Ser Ile Val Asn Arg Ile Thr Pro Val Pro Arg Gly
465                 470                 475                 480

Asn Asn Thr Glu Lys Glu Glu Glu Trp Gly Gly Val Tyr Val Ala Thr
                485                 490                 495

His Ala Glu Leu Ala His Arg Tyr Ala Arg Ile Lys Glu Gly Thr Gly
            500                 505                 510

Glu Asn Gly Leu Pro Thr Thr Glu Glu Lys Lys Ser Arg Gly Val Met
        515                 520                 525

Leu Arg Val Tyr Leu Pro Arg Ala Ser Leu Glu Arg Phe Tyr Arg Thr
    530                 535                 540

Asn Ile Pro Leu Glu Asn Ala Asp Glu His Val Thr Gln Val Ile Gly
545                 550                 555                 560

His Pro Leu Pro Leu Arg Asn Glu Ala Phe Thr Gly Pro Glu Ser Ala
                565                 570                 575

Gly Gly Glu Asp Glu Thr Ala Ile Gly Trp Asp Met Ala Ile His Gly
            580                 585                 590

Val Ala Ile Pro Ser Thr Ile Pro Gly Asn Ser Tyr Ala Gln Leu Pro
        595                 600                 605
```

```
Ile Asp Glu Glu Ala Val Ala Lys Glu Gln Ser Ile Ser Ala Lys Pro
    610                 615                 620

Pro Tyr Lys Glu His Asp Glu Leu Lys
625                 630
```

<210> 59
<211> 633
<212> PRT
<213> Vibrio cholerae

<400> 59

```
Val Glu Asp Glu Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys Ser
1               5                   10                  15

Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile Pro
            20                  25                  30

Gly Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr Ile
        35                  40                  45

Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser Ile
    50                  55                  60

Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr Val
65                  70                  75                  80

Asn Gln Asp Ala Pro Phe Gly Val Ile His Leu Asp Ile Thr Thr Glu
                85                  90                  95

Asn Gly Thr Lys Thr Tyr Ser Phe Asn Arg Lys Glu Gly Glu Phe Ala
            100                 105                 110

Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile Lys
        115                 120                 125

Ile Ser Ile Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val Pro
    130                 135                 140

Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp Glu
145                 150                 155                 160
```

```
Thr Gln Gly Asn Val Ser Phe Ala Val Thr Arg Pro Glu Gln Ser Ile
                165                 170                 175

Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys Asp Gly
            180                 185                 190

Ala Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala Leu Cys
        195                 200                 205

Trp Leu Val Pro Leu Asp Ala Ile Tyr Asn Tyr Ile Thr Gln Gln Asn
    210                 215                 220

Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr Val Ala
225                 230                 235                 240

Gly Thr Pro Lys Ala Ile Thr Val Lys Gln Gly Met Glu Gln Lys Pro
                245                 250                 255

Val Glu Gln Arg Ile His Phe Ser Lys Lys Asn Ala Met Glu Ala Leu
            260                 265                 270

Ala Ala His Arg Val Cys Gly Val Pro Leu Glu Thr Leu Ala Arg Gly
        275                 280                 285

Arg Lys Pro Arg Asp Leu Thr Asp Asp Leu Gln Cys Ala Tyr Gln Ala
    290                 295                 300

Gln Asn Ile Val Ser Leu Phe Leu Ala Thr Arg Ile Leu Phe Ser His
305                 310                 315                 320

Leu Asp Ser Val Phe Thr Leu Asn Leu Asp Glu Gln Glu Pro Glu Val
                325                 330                 335

Ala Glu Arg Leu Thr Asp Leu Arg Arg Ile Asn Glu Asn Asn Pro Gly
            340                 345                 350

Met Val Thr Gln Val Leu Thr Ile Ala Arg Gln Ile Tyr Asn Asp Tyr
        355                 360                 365

Val Thr Glu His Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala Gly Ala
    370                 375                 380
```

```
Gln Ala Ala Asp Ile Leu Ser Leu Phe Cys Pro Asp Ala Asp Glu Ser
385                 390                 395                 400

Cys Val Ala Ser Asn Ser Asp Gln Ala Asn Ile Asn Ile Glu Ser Arg
                405                 410                 415

Ser Gly Arg Ser Tyr Leu Pro Glu Asn Arg Ala Val Ile Thr Pro Gln
            420                 425                 430

Gly Val Thr Asn Trp Thr Tyr Gln Glu Leu Glu Ala Lys His Gln Thr
        435                 440                 445

Leu Thr Arg Glu Gly Tyr Val Phe Val Gly Tyr His Gly Thr Asn His
    450                 455                 460

Val Ala Ala Gln Ser Ile Val Asn Arg Ile Thr Pro Val Pro Arg Gly
465                 470                 475                 480

Asn Asn Thr Glu Lys Glu Glu Glu Trp Gly Gly Val Tyr Val Ala Thr
                485                 490                 495

His Ala Glu Val Asn His Arg Tyr Ala Arg Ile Lys Glu Gly Thr Gly
            500                 505                 510

Glu Asn Gly Leu Pro Thr Thr Glu Glu Lys Lys Ser Arg Gly Val Met
        515                 520                 525

Leu Arg Val Tyr Leu Pro Arg Ala Ser Leu Glu Arg Phe Tyr Arg Thr
    530                 535                 540

Asn Ile Pro Leu Glu Asn Ala Asp Glu His Val Thr Gln Val Ile Gly
545                 550                 555                 560

His Pro Leu Pro Leu Arg Asn Glu Ala Phe Thr Gly Pro Glu Ser Ala
                565                 570                 575

Gly Gly Glu Asp Glu Thr Ala Ile Gly Trp Asp Met Ala Ile His Gly
            580                 585                 590
```

Val Ala Ile Pro Ser Thr Ile Pro Gly Asn Ser Tyr Ala Gln Leu Pro
595 600 605

Ile Asp Glu Glu Ala Val Ala Lys Glu Gln Ser Ile Ser Ala Lys Pro
610 615 620

Pro Tyr Lys Glu His Asp Glu Leu Lys
625 630

<210> 60
<211> 633
<212> PRT
<213> Vibrio cholerae

<400> 60
Val Glu Asp Glu Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys Ser
1 5 10 15

Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile Pro
20 25 30

Gly Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr Ile
35 40 45

Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser Ile
50 55 60

Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr Val
65 70 75 80

Asn Gln Asp Ala Pro Phe Gly Val Ile His Leu Asp Ile Thr Thr Glu
85 90 95

Asn Gly Thr Lys Thr Tyr Ser Phe Asn Arg Lys Glu Gly Glu Phe Ala
100 105 110

Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile Lys
115 120 125

Ile Ser Ile Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val Pro
130 135 140

```
Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp Glu
145                 150                 155                 160

Thr Gln Gly Asn Val Ser Phe Ala Val Thr Arg Pro Glu Gln Ser Ile
                165                 170                 175

Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys Asp Gly
            180                 185                 190

Ala Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala Leu Cys
        195                 200                 205

Trp Leu Val Pro Leu Asp Ala Ile Tyr Asn Tyr Ile Thr Gln Gln Asn
    210                 215                 220

Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr Val Ala
225                 230                 235                 240

Gly Thr Pro Lys Ala Ile Thr Val Lys Gln Gly Met Glu Gln Lys Pro
                245                 250                 255

Val Glu Gln Arg Ile His Phe Ser Lys Lys Asn Ala Met Glu Ala Leu
            260                 265                 270

Ala Ala His Arg Val Cys Gly Val Pro Leu Glu Thr Leu Ala Arg Gly
        275                 280                 285

Arg Lys Pro Arg Asp Leu Thr Asp Asp Leu Gln Cys Ala Tyr Gln Ala
    290                 295                 300

Gln Asn Ile Val Ser Leu Phe Leu Ala Thr Arg Ile Leu Phe Ser His
305                 310                 315                 320

Leu Asp Ser Val Phe Thr Leu Asn Leu Asp Glu Gln Glu Pro Glu Val
                325                 330                 335

Ala Glu Arg Leu Thr Asp Leu Arg Arg Ile Asn Glu Asn Asn Pro Gly
            340                 345                 350

Met Val Thr Gln Val Leu Thr Ile Ala Arg Gln Ile Tyr Asn Asp Tyr
        355                 360                 365
```

```
Val Thr Glu His Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala Gly Ala
    370                 375                 380

Gln Ala Ala Asp Ile Leu Ser Leu Phe Cys Pro Asp Ala Asp Glu Ser
385                 390                 395                 400

Cys Val Ala Ser Asn Ser Asp Gln Ala Asn Ile Asn Ile Glu Ser Arg
                405                 410                 415

Ser Gly Arg Ser Tyr Leu Pro Glu Asn Arg Ala Val Ile Thr Pro Gln
            420                 425                 430

Gly Val Thr Asn Trp Thr Tyr Gln Glu Leu Glu Ala Lys His Gln Thr
        435                 440                 445

Leu Thr Arg Glu Gly Tyr Val Phe Val Gly Tyr His Gly Thr Asn His
    450                 455                 460

Val Ala Ala Gln Ser Ile Val Asn Arg Ile Thr Pro Val Pro Arg Gly
465                 470                 475                 480

Asn Asn Thr Glu Lys Glu Glu Glu Trp Gly Gly Val Tyr Val Ala Thr
                485                 490                 495

His Ala Glu Leu Ala His Arg Tyr Ala Arg Ile Lys Glu Gly Thr Gly
            500                 505                 510

Glu Asn Gly Leu Pro Thr Thr Glu Lys Lys Lys Ser Arg Gly Val Met
        515                 520                 525

Leu Lys Val Tyr Leu Pro Arg Ala Ser Leu Glu Arg Phe Tyr Arg Thr
    530                 535                 540

Asn Ile Pro Leu Glu Asn Ala Asp Glu His Val Thr Gln Val Ile Gly
545                 550                 555                 560

His Pro Leu Pro Leu Arg Asn Glu Ala Phe Thr Gly Pro Glu Ser Ala
                565                 570                 575
```

Gly Gly Glu Asn Glu Thr Ala Ile Gly Trp Asp Met Ala Ile His Gly
580 585 590

Val Ala Ile Pro Ser Thr Ile Pro Gly Asn Ser Tyr Ala Gln Leu Pro
595 600 605

Ile Asp Glu Glu Ala Val Ala Lys Glu Gln Ser Ile Ser Ala Lys Pro
610 615 620

Pro Tyr Lys Glu His Asp Glu Leu Lys
625 630

<210> 61
<211> 633
<212> PRT
<213> Vibrio cholerae

<400> 61
Val Glu Asp Glu Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys Ser
1 5 10 15

Leu Thr Pro Glu Leu Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile Pro
20 25 30

Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr Ile
35 40 45

Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser Ile
50 55 60

Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr Val
65 70 75 80

Asn Gln Asp Ala Pro Phe Gly Val Ile Asn Leu Asp Ile Thr Thr Glu
85 90 95

Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe Ala
100 105 110

Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile Lys
115 120 125

```
Ile Ser Val Asp Glu Ile Asp Gln Gln Arg Asn Ile Ile Glu Val Pro
    130                 135                 140

Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp Glu
145                 150                 155                 160

Asn Gln Gly Asn Val Ser Phe Ala Val Thr Arg Pro Glu Gln Ser Ile
                165                 170                 175

Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala His Lys Asn Gly
            180                 185                 190

Ser Arg His Lys Arg Trp Ala Asn Trp Phe Thr Thr Ser Pro Lys Val
        195                 200                 205

Thr Leu Cys Phe Tyr Glu Asp Pro Ala Gln Cys Thr Tyr Gly Asp Asp
    210                 215                 220

Trp His Gly Gly Ala Tyr Lys Thr Val Ala Gly Thr Pro Lys Ala Ile
225                 230                 235                 240

Thr Val Lys Gln Gly Ile Glu Gln Lys Thr Val Glu Gln Arg Ile His
                245                 250                 255

Phe Ser Lys Lys Asn Ala Met Glu Ala Leu Ala Ala His Arg Val Cys
            260                 265                 270

Gly Val Pro Leu Glu Thr Leu Ala Arg Ser Arg Lys Pro Arg Asp Leu
        275                 280                 285

Pro Asp Asp Leu Ser Cys Ala Tyr Gln Ala Gln Asn Ile Val Ser Leu
    290                 295                 300

Phe Val Ala Thr Arg Ile Leu Phe Ser His Leu Asp Ser Val Phe Thr
305                 310                 315                 320

Leu Asn Leu Asp Glu Gln Glu Pro Glu Val Ala Glu Arg Leu Ser Ala
                325                 330                 335

Leu Arg Gln Ile Asn Glu Asn Asn Pro Gly Met Val Thr Gln Val Leu
            340                 345                 350
```

```
Thr Val Ala Arg Gln Ile Tyr Asn Asp Tyr Val Thr His His Pro Gly
        355                 360                 365

Leu Thr Pro Glu Gln Thr Ser Ala Gly Ala Gln Ala Ala Asp Ile Leu
    370                 375                 380

Ser Leu Phe Cys Pro Asp Ala Asp Lys Ser Cys Val Ala Ser Asn Asn
385                 390                 395                 400

Asp Gln Ala Asn Ile Asn Ile Glu Ser Arg Ser Gly Arg Ser Tyr Leu
                405                 410                 415

Pro Glu Asn Arg Ala Val Ile Thr Pro Gln Gly Val Thr Asn Trp Thr
            420                 425                 430

Tyr Gln Glu Leu Glu Ala Thr His Gln Ala Leu Thr Arg Glu Asp Tyr
        435                 440                 445

Val Phe Val Gly Tyr His Gly Thr Asn His Val Ala Ala Gln Thr Ile
    450                 455                 460

Val Asn Arg Ile Ala Pro Val Pro Arg Gly Asn Asn Thr Glu Asn Glu
465                 470                 475                 480

Glu Lys Trp Gly Gly Leu Tyr Val Ala Thr His Ala Glu Val Ala His
                485                 490                 495

Gly Tyr Ala Arg Ile Lys Glu Gly Thr Gly Glu Tyr Gly Leu Pro Thr
            500                 505                 510

Arg Ala Glu Gln Glu Thr Arg Gly Val Met Leu Arg Val Tyr Ile Pro
        515                 520                 525

Arg Ala Ser Leu Glu Arg Phe Tyr Arg Thr Asn Thr Pro Leu Glu Asn
    530                 535                 540

Ala Glu Glu His Ile Thr Gln Val Ile Gly His Ser Leu Pro Leu Arg
545                 550                 555                 560
```

Asn Glu Ala Phe Thr Gly Pro Glu Ser Ala Gly Gly Glu Asp Glu Thr
565 570 575

Val Ile Gly Trp Asp Met Ala Ile His Ala Val Ala Ile Pro Ser Thr
580 585 590

Ile Pro Gly Asn Ala Tyr Glu Gly Leu Thr Thr Asp Glu Glu Ala Val
595 600 605

Val Lys Glu Ala Ile Ala Lys Glu Gln Ser Ile Ser Ala Lys Pro Pro
610 615 620

Tyr Lys Glu Gln Lys Asp Glu Leu Lys
625 630

<210> 62
<211> 633
<212> PRT
<213> Vibrio cholerae

<400> 62
Val Glu Asp Glu Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys Ser
1 5 10 15

Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile Pro
20 25 30

Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr Ile
35 40 45

Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser Ile
50 55 60

Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr Val
65 70 75 80

Asn Gln Asp Ala Pro Phe Gly Val Ile Asn Leu Asp Ile Thr Thr Glu
85 90 95

Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe Ala
100 105 110

```
Ile Asn Trp Leu Val Ile Pro Gly Glu Asp Ser Pro Ala Ser Ile Lys
        115                 120                 125

Ile Ser Val Asp Glu Ile Asp Gln Gln Arg Asn Ile Ile Glu Val Pro
    130                 135                 140

Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp Glu
145                 150                 155                 160

Asn Gln Gly Asn Val Ser Phe Ala Val Thr Arg Pro Glu Gln Ser Ile
                165                 170                 175

Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala His Lys Asn Gly
            180                 185                 190

Ser Arg His Lys Arg Trp Ala Asn Trp Phe Thr Thr Ser Pro Lys Val
        195                 200                 205

Thr Leu Cys Phe Tyr Glu Asp Pro Ala Gln Cys Thr Tyr Gly Asp Asp
    210                 215                 220

Trp His Gly Gly Ala Tyr Lys Thr Val Ala Gly Thr Pro Lys Ala Ile
225                 230                 235                 240

Thr Val Lys Gln Gly Ile Glu Gln Lys Thr Val Glu Gln Arg Ile His
                245                 250                 255

Phe Ser Lys Lys Asn Ala Met Glu Ala Leu Ala Ala His Arg Val Cys
            260                 265                 270

Gly Val Pro Leu Glu Thr Leu Ala Arg Ser Arg Lys Pro Arg Asp Leu
        275                 280                 285

Pro Asp Asp Leu Ser Cys Ala Tyr Gln Ala Gln Asn Ile Val Ser Leu
    290                 295                 300

Phe Val Ala Thr Arg Ile Leu Phe Ser His Leu Asp Ser Val Phe Thr
305                 310                 315                 320

Leu Asn Leu Asp Glu Gln Glu Pro Glu Val Ala Glu Arg Leu Ser Ala
                325                 330                 335
```

```
Leu Arg Gln Ile Asn Glu Asn Asn Pro Gly Met Val Thr Gln Val Leu
            340                 345                 350

Thr Val Ala Arg Gln Ile Tyr Asn Asp Tyr Val Thr His His Pro Gly
        355                 360                 365

Leu Thr Pro Glu Gln Thr Ser Ala Gly Ala Gln Ala Ala Asp Ile Leu
    370                 375                 380

Ser Leu Phe Cys Pro Asp Ala Asp Lys Ser Cys Val Ala Ser Asn Asn
385                 390                 395                 400

Asp Gln Ala Asn Ile Asn Ile Glu Ser Arg Ser Gly Arg Ser Tyr Leu
                405                 410                 415

Pro Glu Asn Arg Ala Val Ile Thr Pro Gln Gly Val Thr Asn Trp Thr
            420                 425                 430

Tyr Gln Glu Leu Glu Ala Thr His Gln Ala Leu Thr Arg Glu Asp Tyr
        435                 440                 445

Val Phe Val Gly Tyr His Gly Thr Asn His Val Ala Ala Gln Thr Ile
    450                 455                 460

Val Asn Arg Ile Ala Pro Val Pro Arg Gly Asn Asn Thr Glu Asn Glu
465                 470                 475                 480

Glu Lys Trp Gly Gly Leu Tyr Val Ala Thr His Ala Glu Val Ala His
                485                 490                 495

Gly Tyr Ala Arg Ile Lys Glu Gly Thr Gly Glu Tyr Gly Leu Pro Thr
            500                 505                 510

Arg Ala Glu Gln Glu Thr Arg Gly Val Met Leu Arg Val Tyr Ile Pro
        515                 520                 525

Arg Ala Ser Leu Glu Arg Phe Tyr Arg Thr Asn Thr Pro Leu Glu Asn
    530                 535                 540
```

```
Ala Glu Glu His Ile Thr Gln Val Ile Gly His Ser Leu Pro Leu Arg
545                 550                 555                 560

Asn Glu Ala Phe Thr Gly Pro Glu Ser Ala Gly Gly Glu Asp Glu Thr
                565                 570                 575

Val Ile Gly Trp Asp Met Ala Ile His Ala Val Ala Ile Pro Ser Thr
            580                 585                 590

Ile Pro Gly Asn Ala Tyr Glu Gly Leu Thr Thr Asp Glu Glu Ala Val
        595                 600                 605

Val Lys Glu Ala Ile Ala Lys Glu Gln Ser Ile Ser Ala Lys Pro Pro
    610                 615                 620

Tyr Lys Glu Arg Lys Asp Glu Leu Lys
625                 630
```

<210> 63
<211> 633
<212> PRT
<213> Vibrio cholerae

<400> 63

```
Val Glu Asp Glu Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys Ser
1               5                   10                  15

Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile Pro
            20                  25                  30

Gly Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr Ile
        35                  40                  45

Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser Ile
    50                  55                  60

Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr Val
65                  70                  75                  80

Asn Gln Asp Ala Pro Phe Gly Val Ile His Leu Asp Ile Thr Thr Glu
                85                  90                  95
```

```
Asn Gly Thr Lys Thr Tyr Ser Phe Asn Arg Lys Glu Gly Glu Phe Ala
            100                 105                 110

Ile Asn Trp Leu Val Ile Pro Gly Glu Asp Ser Pro Ala Ser Ile Lys
        115                 120                 125

Ile Ser Ile Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val Pro
    130                 135                 140

Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp Glu
145                 150                 155                 160

Thr Gln Gly Asn Val Ser Phe Ala Val Thr Arg Pro Glu Gln Ser Ile
                165                 170                 175

Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys Asp Gly
            180                 185                 190

Ala Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala Leu Cys
        195                 200                 205

Trp Leu Val Pro Leu Asp Ala Ile Tyr Asn Tyr Ile Thr Gln Gln Asn
    210                 215                 220

Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr Val Ala
225                 230                 235                 240

Gly Thr Pro Lys Ala Ile Thr Val Lys Gln Gly Met Glu Gln Lys Pro
                245                 250                 255

Val Glu Gln Arg Ile His Phe Ser Lys Lys Asn Ala Met Glu Ala Leu
            260                 265                 270

Ala Ala His Arg Val Cys Gly Val Pro Leu Glu Thr Leu Ala Arg Gly
        275                 280                 285

Arg Lys Pro Arg Asp Leu Thr Asp Asp Leu Gln Cys Ala Tyr Gln Ala
    290                 295                 300

Gln Asn Ile Val Ser Leu Phe Leu Ala Thr Arg Ile Leu Phe Ser His
305                 310                 315                 320
```

```
Leu Asp Ser Val Phe Thr Leu Asn Leu Asp Glu Gln Glu Pro Glu Val
                325                 330                 335

Ala Glu Arg Leu Thr Asp Leu Arg Arg Ile Asn Glu Asn Asn Pro Gly
            340                 345                 350

Met Val Thr Gln Val Leu Thr Ile Ala Arg Gln Ile Tyr Asn Asp Tyr
        355                 360                 365

Val Thr Glu His Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala Gly Ala
    370                 375                 380

Gln Ala Ala Asp Ile Leu Ser Leu Phe Cys Pro Asp Ala Asp Glu Ser
385                 390                 395                 400

Cys Val Ala Ser Asn Ser Asp Gln Ala Asn Ile Asn Ile Glu Ser Arg
                405                 410                 415

Ser Gly Arg Ser Tyr Leu Pro Glu Asn Arg Ala Val Ile Thr Pro Gln
            420                 425                 430

Gly Val Thr Asn Trp Thr Tyr Gln Glu Leu Glu Ala Lys His Gln Thr
        435                 440                 445

Leu Thr Arg Glu Gly Tyr Val Phe Val Gly Tyr His Gly Thr Asn His
    450                 455                 460

Val Ala Ala Gln Ser Ile Val Asn Arg Ile Thr Pro Val Pro Arg Gly
465                 470                 475                 480

Asn Asn Thr Glu Lys Glu Glu Glu Trp Gly Gly Val Tyr Val Ala Thr
                485                 490                 495

His Ala Glu Leu Ala His Arg Tyr Ala Arg Ile Lys Glu Gly Thr Gly
            500                 505                 510

Glu Asn Gly Leu Pro Thr Thr Glu Glu Lys Lys Ser Arg Gly Val Met
        515                 520                 525
```

Leu Arg Val Tyr Leu Pro Arg Ala Ser Leu Glu Arg Phe Tyr Arg Thr
530 535 540

Asn Ile Pro Leu Glu Asn Ala Asp Glu His Val Thr Gln Val Ile Gly
545 550 555 560

His Pro Leu Pro Leu Arg Asn Glu Ala Phe Thr Gly Pro Glu Ser Ala
565 570 575

Gly Gly Glu Asp Glu Thr Ala Ile Gly Trp Asp Met Ala Ile His Gly
580 585 590

Val Ala Ile Pro Ser Thr Ile Pro Gly Asn Ser Tyr Ala Gln Leu Pro
595 600 605

Ile Asp Glu Glu Ala Val Ala Lys Glu Gln Ser Ile Ser Ala Lys Pro
610 615 620

Pro Tyr Lys Glu His Asp Glu Leu Lys
625 630

<210> 64
<211> 628
<212> PRT
<213> Vibrio cholerae

<400> 64
Val Glu Asp Glu Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys Ser
1 5 10 15

Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile Pro
20 25 30

Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr Ile
35 40 45

Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser Ile
50 55 60

Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr Val
65 70 75 80

```
Ser Gln Asp Ala Pro Phe Gly Val Ile Asn Leu Asp Ile Thr Thr Glu
                85                  90                  95

Asn Gly Thr Lys Thr Tyr Ser Phe Asn Arg Lys Glu Ser Glu Phe Ala
            100                 105                 110

Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile Lys
        115                 120                 125

Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val Pro
    130                 135                 140

Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp Glu
145                 150                 155                 160

Thr Gln Gly Asn Val Ser Phe Ala Val Thr Arg Pro Glu Gln Ser Ile
                165                 170                 175

Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala His Lys Asn Gly
            180                 185                 190

Ser Arg His Lys Arg Trp Ala Asn Trp Phe Thr Thr Ser Pro Lys Val
        195                 200                 205

Thr Leu Cys Phe Tyr Glu Asp Pro Ala Gln Cys Thr Tyr Gly Asp Asp
    210                 215                 220

Trp His Gly Gly Ala Tyr Lys Thr Val Ala Gly Thr Pro Lys Ala Ile
225                 230                 235                 240

Thr Val Lys Gln Gly Ile Glu Gln Lys Thr Val Glu Gln Arg Ile His
                245                 250                 255

Phe Ser Lys Lys Asn Ala Met Glu Ala Leu Ala Ala His Arg Val Cys
            260                 265                 270

Gly Val Pro Leu Glu Thr Leu Ala Arg Ser Arg Lys Pro Arg Asp Leu
        275                 280                 285

Pro Asp Asp Leu Ser Cys Ala Tyr Gln Ala Gln Asn Ile Val Ser Leu
    290                 295                 300
```

```
Phe Val Ala Thr Arg Ile Leu Phe Ser His Leu Asp Ser Val Phe Thr
305                 310                 315                 320

Leu Asn Leu Asp Glu Gln Glu Pro Glu Val Ala Glu Arg Leu Ser Ala
                325                 330                 335

Leu Arg Gln Ile Asn Glu Asn Asn Pro Gly Met Val Thr Gln Val Leu
            340                 345                 350

Thr Val Ala Arg Gln Ile Tyr Asn Asp Tyr Val Thr His His Pro Gly
        355                 360                 365

Leu Thr Pro Glu Gln Thr Ser Ala Gly Ala Gln Ala Ala Asp Ile Leu
    370                 375                 380

Ser Leu Phe Cys Pro Asp Ala Asp Lys Ser Cys Val Ala Ser Asn Asn
385                 390                 395                 400

Asp Gln Ala Asn Ile Asn Ile Glu Ser Arg Ser Gly Arg Ser Tyr Leu
                405                 410                 415

Pro Glu Asn Arg Ala Val Ile Thr Pro Gln Gly Val Thr Asn Trp Thr
            420                 425                 430

Tyr Gln Glu Leu Glu Ala Thr His Gln Ala Leu Thr Arg Glu Gly Tyr
        435                 440                 445

Val Phe Val Gly Tyr His Gly Thr Asn His Val Ala Ala Gln Thr Ile
    450                 455                 460

Val Asn Arg Ile Ala Pro Val Pro Arg Gly Asn Asn Thr Glu Asn Glu
465                 470                 475                 480

Glu Lys Trp Gly Gly Leu Tyr Val Ala Thr His Ala Glu Val Ala His
                485                 490                 495

Gly Tyr Ala Arg Ile Lys Glu Gly Thr Gly Glu Tyr Gly Leu Pro Thr
            500                 505                 510
```

```
Arg Ala Glu Arg Asp Ala Arg Gly Val Met Leu Arg Val Tyr Ile Pro
        515                 520                 525

Arg Ala Ser Leu Glu Arg Phe Tyr Arg Thr Asn Thr Pro Leu Glu Asn
    530                 535                 540

Ala Glu Glu His Ile Thr Gln Val Ile Gly His Ser Leu Pro Leu Arg
545                 550                 555                 560

Asn Glu Ala Phe Thr Gly Pro Glu Ser Ala Gly Gly Glu Asp Glu Thr
                565                 570                 575

Val Ile Gly Trp Asp Met Ala Ile His Ala Val Ala Ile Pro Ser Thr
            580                 585                 590

Ile Pro Gly Asn Ala Tyr Glu Glu Leu Ala Ile Asp Glu Glu Ala Val
        595                 600                 605

Ala Lys Glu Gln Ser Ile Ser Thr Lys Pro Pro Tyr Lys Glu Arg Lys
    610                 615                 620

Asp Glu Leu Lys
625
```

<210> 65
<211> 628
<212> PRT
<213> Vibrio cholerae

<400> 65

```
Val Glu Asp Glu Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys Ser
1               5                   10                  15

Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile Pro
            20                  25                  30

Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr Ile
        35                  40                  45

Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser Ile
    50                  55                  60
```

```
Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr Val
65                  70                  75                  80

Ser Gln Asp Ala Pro Phe Gly Val Ile Asn Leu Asp Ile Thr Thr Glu
                85                  90                  95

Asn Gly Thr Lys Thr Tyr Ser Phe Asn Arg Lys Glu Ser Glu Phe Ala
            100                 105                 110

Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile Lys
        115                 120                 125

Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val Pro
    130                 135                 140

Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp Glu
145                 150                 155                 160

Thr Gln Gly Asn Val Ser Phe Ala Val Thr Arg Pro Glu Gln Ser Ile
                165                 170                 175

Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala His Lys Asn Gly
            180                 185                 190

Ser Arg His Lys Arg Trp Ala Asn Trp Phe Thr Thr Ser Pro Lys Val
        195                 200                 205

Thr Leu Cys Phe Tyr Glu Asp Pro Ala Gln Cys Thr Tyr Gly Asp Asp
    210                 215                 220

Trp His Gly Gly Ala Tyr Lys Thr Val Ala Gly Thr Pro Lys Ala Ile
225                 230                 235                 240

Thr Val Lys Gln Gly Ile Glu Gln Lys Thr Val Glu Gln Arg Ile His
                245                 250                 255

Phe Ser Lys Lys Asn Ala Met Glu Ala Leu Ala Ala His Arg Val Cys
            260                 265                 270

Gly Val Pro Leu Glu Thr Leu Ala Arg Ser Arg Lys Pro Arg Asp Leu
        275                 280                 285
```

```
Pro Asp Asp Leu Ser Cys Ala Tyr Gln Ala Gln Asn Ile Val Ser Leu
    290                 295                 300

Phe Val Ala Thr Arg Ile Leu Phe Ser His Leu Asp Ser Val Phe Thr
305                 310                 315                 320

Leu Asn Leu Asp Glu Gln Glu Pro Glu Val Ala Glu Arg Leu Ser Ala
                325                 330                 335

Leu Arg Gln Ile Asn Glu Asn Asn Pro Gly Met Val Thr Gln Val Leu
            340                 345                 350

Thr Val Ala Arg Gln Ile Tyr Asn Asp Tyr Val Thr His His Pro Gly
        355                 360                 365

Leu Thr Pro Glu Gln Thr Ser Ala Gly Ala Gln Ala Ala Asp Ile Leu
    370                 375                 380

Ser Leu Phe Cys Pro Asp Ala Asp Lys Ser Cys Val Ala Ser Asn Asn
385                 390                 395                 400

Asp Gln Ala Asn Ile Asn Ile Glu Ser Arg Ser Gly Arg Ser Tyr Leu
                405                 410                 415

Pro Glu Asn Arg Ala Val Ile Thr Pro Gln Gly Val Thr Asn Trp Thr
            420                 425                 430

Tyr Gln Glu Leu Glu Ala Thr His Gln Ala Leu Thr Arg Glu Asp Tyr
        435                 440                 445

Val Phe Val Gly Tyr His Gly Thr Asn His Val Ala Ala Gln Thr Ile
    450                 455                 460

Val Asn Arg Ile Ala Pro Val Pro Arg Gly Asn Asn Thr Glu Asn Glu
465                 470                 475                 480

Glu Lys Trp Gly Gly Leu Tyr Val Ala Thr His Ala Glu Val Ala His
                485                 490                 495
```

```
Gly Tyr Ala Arg Ile Lys Glu Gly Thr Gly Glu Tyr Gly Leu Pro Thr
            500                 505                 510

Arg Ala Glu Arg Asp Ala Arg Gly Val Met Leu Arg Val Tyr Ile Pro
        515                 520                 525

Arg Ala Ser Leu Glu Arg Phe Tyr Arg Thr Asn Thr Pro Leu Glu Asn
    530                 535                 540

Ala Glu Glu His Ile Thr Gln Val Ile Gly His Ser Leu Pro Leu Arg
545                 550                 555                 560

Asn Glu Ala Phe Thr Gly Pro Glu Ser Ala Gly Gly Glu Asp Glu Thr
                565                 570                 575

Val Ile Gly Trp Asp Met Ala Ile His Ala Val Ala Ile Pro Ser Thr
            580                 585                 590

Ile Pro Gly Asn Ala Tyr Glu Glu Leu Ala Ile Asp Glu Glu Ala Val
        595                 600                 605

Ala Lys Glu Gln Ser Ile Ser Thr Lys Pro Pro Tyr Lys Glu Arg Lys
    610                 615                 620

Asp Glu Leu Lys
625
```

<210> 66
<211> 628
<212> PRT
<213> Vibrio cholerae

<400> 66

```
Val Glu Asp Glu Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys Ser
1               5                   10                  15

Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile Pro
            20                  25                  30

Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr Ile
        35                  40                  45
```

```
Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser Ile
    50                  55                  60

Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr Val
65                  70                  75                  80

Asn Gln Asp Ala Pro Phe Gly Val Ile Asn Leu Asp Ile Thr Thr Glu
                85                  90                  95

Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe Ala
            100                 105                 110

Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile Lys
        115                 120                 125

Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val Pro
    130                 135                 140

Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp Lys
145                 150                 155                 160

Thr Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu Gln Ser Ile
                165                 170                 175

Ala Ile Ser Trp Pro Ser Val Ser Tyr Asn Ala Ala His Lys Asn Gly
            180                 185                 190

Ser Arg His Lys Arg Trp Ala Asn Trp Phe Thr Thr Ser Pro Lys Val
        195                 200                 205

Thr Leu Cys Phe Tyr Glu Asp Pro Ala Gln Cys Thr Tyr Gly Asp Asp
    210                 215                 220

Trp His Gly Gly Ala Tyr Lys Thr Val Ala Gly Thr Pro Lys Ala Ile
225                 230                 235                 240

Thr Val Lys Gln Gly Ile Glu Gln Lys Thr Val Glu Gln Arg Ile His
                245                 250                 255

Phe Ser Lys Lys Asn Ala Met Glu Ala Leu Ala Ala His Arg Val Cys
            260                 265                 270
```

```
Gly Val Pro Leu Glu Thr Leu Ala Arg Ser Arg Lys Pro Arg Asp Leu
        275                 280                 285

Pro Asp Asp Leu Ser Cys Ala Tyr Gln Ala Gln Asn Ile Val Ser Leu
    290                 295                 300

Phe Val Ala Thr Arg Ile Leu Phe Ser His Leu Asp Ser Val Phe Thr
305                 310                 315                 320

Leu Asn Leu Asp Glu Gln Glu Pro Glu Val Ala Glu Arg Leu Ser Ala
                325                 330                 335

Leu Arg Gln Ile Asn Glu Asn Asn Pro Gly Met Val Thr Gln Val Leu
            340                 345                 350

Thr Val Ala Arg Gln Ile Tyr Asn Asp Tyr Val Thr His His Pro Gly
        355                 360                 365

Leu Thr Pro Glu Gln Thr Ser Ala Gly Ala Gln Ala Ala Asp Ile Leu
    370                 375                 380

Ser Leu Phe Cys Pro Asp Ala Asp Lys Ser Cys Val Ala Ser Asn Asn
385                 390                 395                 400

Asp Gln Ala Asn Ile Asn Val Glu Ser Arg Ser Gly Arg Ser Tyr Leu
                405                 410                 415

Pro Glu Asn Arg Ala Val Ile Thr Pro Gln Gly Val Thr Asn Trp Thr
            420                 425                 430

Tyr Gln Glu Leu Glu Ala Thr His Gln Ala Leu Thr Arg Glu Gly Tyr
        435                 440                 445

Val Phe Val Gly Tyr His Gly Thr Asn His Val Ala Ala Gln Thr Ile
    450                 455                 460

Val Asn Arg Ile Ala Pro Val Pro Arg Gly Asn Asn Thr Glu Asn Glu
465                 470                 475                 480
```

```
Glu Lys Trp Gly Gly Leu Tyr Val Ala Thr His Ala Glu Val Ala His
                485                 490                 495

Gly Tyr Ala Arg Ile Lys Glu Gly Thr Gly Glu Tyr Gly Leu Pro Thr
            500                 505                 510

Arg Ala Glu Arg Asp Ala Arg Gly Val Met Leu Arg Val Tyr Ile Pro
        515                 520                 525

Arg Ala Ser Leu Glu Arg Phe Tyr Arg Thr Asn Thr Pro Leu Glu Asn
    530                 535                 540

Ala Glu Glu His Ile Thr Gln Val Ile Gly His Ser Leu Pro Leu Arg
545                 550                 555                 560

Asn Glu Ala Phe Thr Gly Pro Glu Ser Ala Gly Gly Glu Asp Glu Thr
                565                 570                 575

Val Ile Gly Trp Asp Met Ala Ile His Ala Val Ala Ile Pro Ser Thr
            580                 585                 590

Ile Pro Gly Asn Ala Tyr Glu Glu Leu Ala Ile Asp Glu Glu Ala Val
        595                 600                 605

Ala Lys Glu Gln Ser Ile Ser Thr Lys Pro Pro Tyr Lys Glu Arg Lys
    610                 615                 620

Asp Glu Leu Lys
625
```

<210> 67
<211> 628
<212> PRT
<213> Vibrio cholerae

<400> 67

```
Val Glu Asp Glu Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys Ser
1               5                   10                  15

Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile Pro
            20                  25                  30
```

```
Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr Ile
        35                  40                  45

Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser Ile
    50                  55                  60

Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr Val
65                  70                  75                  80

Asn Gln Asp Ala Pro Phe Gly Val Ile Asn Leu Asp Ile Thr Thr Glu
                85                  90                  95

Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe Ala
            100                 105                 110

Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile Lys
        115                 120                 125

Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val Pro
    130                 135                 140

Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp Glu
145                 150                 155                 160

Asn Gln Gly Asn Val Ser Phe Ala Val Thr Arg Pro Glu Gln Ser Ile
                165                 170                 175

Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala His Lys Asn Gly
            180                 185                 190

Ser Arg His Lys Arg Trp Ala Asn Trp Leu Thr Thr Leu Pro Lys Val
        195                 200                 205

Val Leu Cys Phe Tyr Glu Asp Pro Glu Leu Cys Thr Tyr Gly Asp Asp
    210                 215                 220

Trp His Gly Gly Ala Tyr Lys Thr Val Ala Gly Thr Pro Lys Ala Ile
225                 230                 235                 240

Thr Val Lys Gln Gly Ile Glu Gln Lys Thr Val Glu Gln Arg Ile His
                245                 250                 255
```

```
Phe Ser Lys Lys Asn Ala Met Glu Ala Leu Ala Ala His Arg Val Cys
            260                 265                 270

Gly Val Pro Leu Glu Thr Leu Ala Arg Ser Arg Lys Pro Arg Asp Leu
        275                 280                 285

Pro Asp Asp Leu Ser Cys Ala Tyr Gln Ala Gln Asn Ile Val Ser Leu
    290                 295                 300

Phe Val Ala Thr Arg Ile Leu Phe Ser His Leu Asp Ser Val Phe Thr
305                 310                 315                 320

Leu Asn Leu Asp Glu Gln Glu Pro Glu Val Ala Glu Arg Leu Ser Ala
                325                 330                 335

Leu Arg Gln Ile Asn Glu Asn Asn Pro Gly Met Val Thr Gln Val Leu
            340                 345                 350

Thr Val Ala Arg Gln Ile Tyr Asn Asp Tyr Val Thr His His Pro Gly
        355                 360                 365

Leu Thr Pro Glu Gln Thr Ser Ala Gly Ala Gln Ala Ala Asp Ile Leu
    370                 375                 380

Ser Leu Phe Cys Pro Asp Ala Asp Lys Ser Cys Val Ala Ser Asn Asn
385                 390                 395                 400

Asp Gln Ala Asn Ile Asn Ile Glu Ser Arg Ser Gly Arg Ser Tyr Leu
                405                 410                 415

Pro Glu Asn Arg Ala Val Ile Thr Pro Gln Gly Val Thr Asn Trp Thr
            420                 425                 430

Tyr Gln Glu Leu Glu Ala Thr His Gln Ala Leu Thr Arg Glu Gly Tyr
        435                 440                 445

Val Phe Val Gly Tyr His Gly Thr Asn His Val Ala Ala Gln Thr Ile
    450                 455                 460
```

```
Val Asn Arg Ile Ala Pro Val Pro Arg Gly Asn Asn Thr Glu Asn Glu
465                 470                 475                 480

Glu Lys Trp Gly Gly Leu Tyr Val Ala Thr His Ala Glu Val Ala His
                485                 490                 495

Gly Tyr Ala Arg Ile Lys Glu Gly Thr Gly Asn Gly Gly Leu Pro Thr
            500                 505                 510

Arg Ala Glu Arg Asp Ala Arg Gly Val Met Leu Arg Val Tyr Ile Pro
        515                 520                 525

Arg Ala Ser Leu Glu Arg Phe Tyr Arg Thr Asn Thr Pro Leu Glu Asn
    530                 535                 540

Ala Glu Glu His Ile Thr Gln Val Ile Gly His Ser Leu Pro Leu Arg
545                 550                 555                 560

Asn Glu Ala Phe Thr Gly Pro Glu Ser Ala Gly Gly Glu Asp Glu Thr
                565                 570                 575

Val Ile Gly Trp Asp Met Ala Ile His Ala Val Ala Ile Pro Ser Thr
            580                 585                 590

Ile Pro Gly Asn Ala Tyr Glu Glu Leu Ala Ile Asp Glu Glu Ala Val
        595                 600                 605

Ala Lys Glu Gln Ser Ile Ser Ala Lys Pro Pro Tyr Lys Glu Gln Lys
    610                 615                 620

Asp Glu Leu Lys
625


<210> 68
<211> 628
<212> PRT
<213> Vibrio cholerae

<400> 68
Val Glu Asp Glu Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys Ser
1               5                   10                  15
```

```
Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile Pro
            20                  25                  30

Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr Ile
        35                  40                  45

Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser Ile
    50                  55                  60

Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr Val
65                  70                  75                  80

Asn Gln Asp Ala Pro Phe Gly Val Ile Asn Leu Asp Ile Thr Thr Glu
                85                  90                  95

Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe Ala
            100                 105                 110

Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile Lys
        115                 120                 125

Ile Ser Val Asp Glu Ile Asp Gln Gln Arg Asn Ile Ile Glu Val Pro
    130                 135                 140

Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp Glu
145                 150                 155                 160

Asn Gln Gly Asn Val Ser Phe Ala Val Thr Arg Pro Glu Gln Ser Ile
                165                 170                 175

Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala His Lys Asn Gly
            180                 185                 190

Ser Arg His Lys Arg Trp Ala Asn Trp Phe Thr Thr Ser Pro Lys Val
        195                 200                 205

Thr Leu Cys Phe Tyr Glu Asp Pro Ala Gln Cys Thr Tyr Gly Asp Asp
    210                 215                 220

Trp His Gly Gly Ala Tyr Lys Thr Val Ala Gly Thr Pro Lys Ala Ile
225                 230                 235                 240
```

```
Thr Val Lys Gln Gly Ile Glu Gln Lys Thr Val Glu Gln Arg Ile His
                245                 250                 255

Phe Ser Lys Lys Asn Ala Met Glu Ala Leu Ala Ala His Arg Val Cys
            260                 265                 270

Gly Val Pro Leu Glu Thr Leu Ala Arg Ser Arg Lys Pro Arg Asp Leu
        275                 280                 285

Pro Asp Asp Leu Ser Cys Ala Tyr Gln Ala Gln Asn Ile Val Ser Leu
    290                 295                 300

Phe Val Ala Thr Arg Ile Leu Phe Ser His Leu Asp Ser Val Phe Thr
305                 310                 315                 320

Leu Asn Leu Asp Glu Gln Glu Pro Glu Val Ala Glu Arg Leu Ser Ala
                325                 330                 335

Leu Arg Gln Ile Asn Glu Asn Asn Pro Gly Met Val Thr Gln Val Leu
            340                 345                 350

Thr Val Ala Arg Gln Ile Tyr Asn Asp Tyr Val Thr His His Pro Gly
        355                 360                 365

Leu Thr Pro Glu Gln Thr Ser Ala Gly Ala Gln Ala Ala Asp Ile Leu
    370                 375                 380

Ser Leu Phe Cys Pro Asp Ala Asp Lys Ser Cys Val Ala Ser Asn Asn
385                 390                 395                 400

Asp Gln Ala Asn Ile Asn Ile Glu Ser Arg Ser Gly Arg Ser Tyr Leu
                405                 410                 415

Pro Glu Asn Arg Ala Val Ile Thr Pro Gln Gly Val Thr Asn Trp Thr
            420                 425                 430

Tyr Gln Glu Leu Glu Ala Thr His Gln Ala Leu Thr Arg Glu Gly Tyr
        435                 440                 445
```

```
Val Phe Val Gly Tyr His Gly Thr Asn His Val Ala Ala Gln Thr Ile
    450                 455                 460

Val Asn Arg Ile Ala Pro Val Pro Arg Gly Asn Asn Thr Glu Asn Glu
465                 470                 475                 480

Glu Lys Trp Gly Gly Leu Tyr Val Ala Thr His Ala Glu Val Ala His
                485                 490                 495

Gly Tyr Ala Arg Ile Lys Glu Gly Thr Gly Glu Tyr Gly Leu Pro Thr
            500                 505                 510

Arg Ala Glu Arg Asp Ala Arg Gly Val Met Leu Arg Val Tyr Ile Pro
        515                 520                 525

Arg Ala Ser Leu Glu Arg Phe Tyr Arg Thr Asn Thr Pro Leu Glu Asn
    530                 535                 540

Ala Glu Glu His Ile Thr Gln Val Ile Gly His Ser Leu Pro Leu Arg
545                 550                 555                 560

Asn Glu Ala Phe Thr Gly Pro Glu Arg Val Asp Gly Glu Asp Glu Thr
                565                 570                 575

Val Ile Gly Trp Asp Met Ala Ile His Ala Val Ala Ile Pro Ser Thr
            580                 585                 590

Ile Pro Gly Asn Ala Tyr Glu Glu Leu Ala Ile Asp Glu Glu Ala Val
        595                 600                 605

Ala Lys Glu Gln Ser Ile Ser Thr Lys Pro Pro Tyr Lys Glu Arg Lys
    610                 615                 620

Asp Glu Leu Lys
625
```

<210> 69
<211> 628
<212> PRT
<213> Vibrio cholerae

<400> 69

```
Val Glu Asp Glu Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys Ser
1               5                  10                  15

Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile Pro
            20                  25                  30

Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr Ile
        35                  40                  45

Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser Ile
    50                  55                  60

Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr Val
65                  70                  75                  80

Asn Gln Asp Ala Pro Phe Gly Val Ile Asn Leu Asp Ile Thr Thr Glu
                85                  90                  95

Asn Gly Thr Lys Met Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe Ala
            100                 105                 110

Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile Lys
        115                 120                 125

Ile Ser Val Asp Glu Ile Asp Gln Gln Arg Asn Ile Ile Glu Val Pro
    130                 135                 140

Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp Glu
145                 150                 155                 160

Asn Gln Gly Asn Val Ser Phe Ala Val Thr Arg Pro Glu Gln Ser Ile
                165                 170                 175

Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala His Lys Asn Gly
            180                 185                 190

Ser Arg His Lys Arg Trp Ala Asn Trp Phe Thr Thr Ser Pro Lys Val
        195                 200                 205

Thr Leu Cys Phe Tyr Glu Asp Pro Ala Gln Cys Thr Tyr Gly Asp Asp
    210                 215                 220
```

```
Trp His Gly Gly Ala Tyr Lys Thr Val Ala Gly Thr Pro Lys Ala Ile
225                 230                 235                 240

Thr Val Lys Gln Gly Ile Glu Gln Lys Thr Val Glu Gln Arg Ile His
                245                 250                 255

Phe Ser Lys Lys Asn Ala Met Glu Ala Leu Ala Ala His Arg Val Cys
            260                 265                 270

Gly Val Pro Leu Glu Thr Leu Ala Arg Ser Arg Lys Pro Arg Asp Leu
        275                 280                 285

Pro Asp Asp Leu Ser Cys Ala Tyr Gln Ala Gln Asn Ile Val Ser Leu
    290                 295                 300

Phe Val Ala Thr Arg Ile Leu Phe Ser His Leu Asp Ser Val Phe Thr
305                 310                 315                 320

Leu Asn Leu Asp Glu Gln Glu Pro Glu Val Ala Glu Arg Leu Ser Ala
                325                 330                 335

Leu Arg Gln Ile Asn Glu Asn Asn Pro Gly Met Val Thr Gln Val Leu
            340                 345                 350

Thr Val Ala Arg Gln Ile Tyr Asn Asp Tyr Val Thr His His Pro Gly
        355                 360                 365

Leu Thr Pro Glu Gln Thr Ser Ala Gly Ala Gln Ala Ala Asp Ile Leu
    370                 375                 380

Ser Leu Phe Cys Pro Asp Ala Asp Lys Ser Cys Val Ala Ser Asn Asn
385                 390                 395                 400

Asp Gln Ala Asn Ile Asn Ile Glu Ser Arg Ser Gly Arg Ser Tyr Leu
                405                 410                 415

Pro Glu Asn Arg Ala Val Ile Thr Pro Gln Gly Val Thr Asn Trp Thr
            420                 425                 430
```

```
Tyr Gln Glu Leu Glu Ala Thr His Gln Ala Leu Thr Arg Glu Gly Tyr
        435                 440                 445

Val Phe Val Gly Tyr His Gly Thr Asn His Val Ala Ala Gln Thr Ile
    450                 455                 460

Val Asn Arg Ile Ala Pro Val Pro Arg Gly Asn Asn Thr Glu Asn Glu
465                 470                 475                 480

Glu Lys Trp Gly Gly Leu Tyr Val Ala Thr His Ala Glu Val Ala His
                485                 490                 495

Gly Tyr Ala Arg Ile Lys Glu Gly Thr Gly Glu Tyr Gly Leu Pro Thr
            500                 505                 510

Arg Ala Glu Arg Asp Ala Arg Gly Val Met Leu Arg Val Tyr Ile Pro
        515                 520                 525

Arg Ala Ser Leu Glu Arg Phe Tyr Arg Thr Asn Thr Pro Leu Glu Asn
    530                 535                 540

Ala Glu Glu His Ile Thr Gln Val Ile Gly His Ser Leu Pro Leu Arg
545                 550                 555                 560

Asn Glu Ala Phe Thr Gly Pro Glu Arg Val Asp Gly Glu Asp Glu Thr
                565                 570                 575

Val Ile Gly Trp Asp Met Ala Ile His Ala Val Ala Ile Pro Ser Thr
            580                 585                 590

Ile Pro Gly Asn Ala Tyr Glu Glu Leu Ala Ile Asp Glu Glu Ala Val
        595                 600                 605

Ala Lys Glu Gln Ser Ile Ser Thr Lys Pro Pro Tyr Lys Glu Arg Lys
    610                 615                 620

Asp Glu Leu Lys
625
```

<210> 70
<211> 628

<212> PRT
<213> Vibrio cholerae

<400> 70
Val Glu Asp Glu Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys Ser
1 5 10 15

Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile Pro
20 25 30

Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr Ile
35 40 45

Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser Ile
50 55 60

Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr Val
65 70 75 80

Asn Gln Asp Ala Pro Phe Gly Val Ile His Leu Asp Ile Thr Thr Glu
85 90 95

Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe Ala
100 105 110

Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile Lys
115 120 125

Ile Ser Val Asp Glu Leu Asp Gln Lys Arg Asn Ile Ile Glu Val Pro
130 135 140

Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp Glu
145 150 155 160

Asn Gln Gly Asn Val Ser Phe Ala Val Thr Arg Pro Glu Gln Ser Ile
165 170 175

Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala His Lys Asn Gly
180 185 190

Ser Arg His Lys Arg Trp Ala Asn Trp Leu Thr Thr Leu Pro Lys Val
195 200 205

```
Val Leu Cys Phe Tyr Glu Glu Pro Glu Leu Cys Thr Tyr Gly Glu Asp
    210                 215                 220

Trp His Gly Gly Ala Tyr Lys Thr Val Ala Gly Thr Pro Glu Ala Ile
225                 230                 235                 240

Thr Val Lys Gln Gly Ile Glu Gln Lys Thr Val Glu Gln Arg Ile His
                245                 250                 255

Phe Ser Lys Lys Asn Ala Met Glu Ala Leu Ala Ala His Arg Val Cys
            260                 265                 270

Gly Val Pro Leu Glu Thr Leu Ala Arg Ser Arg Lys Pro Arg Asp Leu
        275                 280                 285

Gln Asp Asp Leu Ser Cys Ala Tyr Gln Ala Gln Asn Ile Val Ser Leu
    290                 295                 300

Phe Val Ala Thr Arg Ile Leu Phe Ser His Leu Asp Ser Val Phe Thr
305                 310                 315                 320

Leu Asn Leu Asp Glu Gln Glu Pro Ala Val Ala Glu Arg Leu Ser Ala
                325                 330                 335

Leu Arg Gln Ile Asn Glu Asn Asn Pro Gly Met Val Thr Gln Val Leu
            340                 345                 350

Thr Val Ala Arg Gln Ile Tyr Asn Asp Tyr Val Thr His His Pro Gly
        355                 360                 365

Leu Thr Pro Glu Gln Thr Ser Ala Gly Ala Gln Ala Ala Asp Ile Leu
    370                 375                 380

Ser Leu Phe Cys Pro Asp Ala Asp Lys Ser Cys Val Ala Ser Asn Asn
385                 390                 395                 400

Asp Gln Ala Asn Ile Asn Ile Glu Ser Arg Ser Gly Arg Ser Tyr Leu
                405                 410                 415
```

```
Pro Glu Asn Arg Ala Val Ile Thr Pro Gln Gly Val Thr Asn Trp Thr
            420                 425                 430

Tyr Gln Glu Leu Glu Ala Thr His Gln Ala Leu Thr Arg Glu Gly Tyr
        435                 440                 445

Val Phe Val Gly Tyr His Gly Thr Asn His Val Ala Ala Gln Thr Ile
    450                 455                 460

Val Asn Arg Ile Ala Pro Val Pro Arg Gly Asn Asn Thr Glu Asn Glu
465                 470                 475                 480

Glu Lys Trp Gly Gly Leu Tyr Val Ala Thr His Ala Glu Val Ala His
                485                 490                 495

Gly Tyr Ala Arg Ile Lys Glu Gly Thr Gly Glu Tyr Gly Leu Pro Thr
            500                 505                 510

Arg Ala Glu Arg Asp Ala Arg Gly Val Met Leu Arg Val Tyr Ile Pro
        515                 520                 525

Arg Ala Ser Leu Glu Arg Phe Tyr Arg Thr Asn Thr Pro Leu Glu Asn
    530                 535                 540

Ala Glu Glu His Ile Thr Gln Val Ile Gly His Ser Leu Pro Leu Arg
545                 550                 555                 560

Asn Glu Ala Phe Thr Gly Pro Glu Ser Ala Gly Gly Glu Asp Glu Thr
                565                 570                 575

Val Ile Gly Trp Asp Met Ala Ile His Ala Val Ala Ile Pro Ser Thr
            580                 585                 590

Ile Pro Gly Asn Ala Tyr Glu Glu Leu Ala Ile Asp Glu Glu Ala Val
        595                 600                 605

Ala Lys Glu Gln Ser Ile Ser Ala Lys Pro Pro Tyr Lys Glu Gln Lys
    610                 615                 620

Asp Glu Leu Lys
625
```

<210> 71
<211> 628
<212> PRT
<213> Vibrio cholerae

<400> 71
Val Glu Asp Glu Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys Ser
1   5   10   15

Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile Pro
            20   25   30

Gly Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr Ile
        35   40   45

Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser Ile
    50   55   60

Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr Val
65   70   75   80

Ser Gln Asp Ala Pro Phe Gly Val Ile Asn Leu Asp Ile Thr Thr Glu
                85   90   95

Asn Gly Thr Lys Thr Tyr Ser Phe Asn Arg Lys Glu Ser Glu Phe Ala
            100   105   110

Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile Lys
        115   120   125

Ile Ser Ile Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val Pro
    130   135   140

Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp Glu
145   150   155   160

Asn Gln Gly Asn Val Ser Phe Ala Val Thr Arg Pro Glu Gln Ser Ile
                165   170   175

Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala His Lys Asn Gly
            180   185   190

```
Ser Arg His Lys Arg Trp Ala Asn Trp Leu Thr Thr Leu Pro Glu Val
        195                 200                 205

Val Leu Cys Phe Phe Glu Asp Pro Glu Leu Cys Thr Tyr Gly Asp Asp
    210                 215                 220

Trp His Gly Gly Ala Tyr Lys Thr Val Ala Gly Thr Pro Lys Ala Ile
225                 230                 235                 240

Thr Val Lys Gln Gly Ile Glu Gln Lys Thr Val Glu Gln Arg Ile His
                245                 250                 255

Phe Ser Lys Lys Asn Ala Met Glu Ala Leu Ala Ala His Arg Val Cys
            260                 265                 270

Gly Val Pro Leu Glu Thr Leu Ala Arg Ser Arg Lys Pro Arg Asp Leu
        275                 280                 285

Pro Asp Asp Leu Ser Cys Ala Tyr Asn Ala Gln Gln Ile Val Ser Leu
    290                 295                 300

Phe Leu Ala Thr Arg Ile Leu Phe Thr His Ile Asp Ser Ile Phe Thr
305                 310                 315                 320

Leu Asn Leu Asp Gly Gln Glu Pro Glu Val Ala Glu Arg Leu Asp Asp
                325                 330                 335

Leu Arg Arg Ile Asn Glu Asn Asn Pro Gly Met Val Ile Gln Val Leu
            340                 345                 350

Thr Val Ala Arg Gln Ile Tyr Asn Asp Tyr Val Thr His His Pro Gly
        355                 360                 365

Leu Thr Pro Glu Gln Thr Ser Ala Gly Ala Gln Ala Ala Asp Ile Leu
    370                 375                 380

Ser Leu Phe Cys Pro Asp Ala Asp Lys Ser Cys Val Ala Ser Asn Ser
385                 390                 395                 400
```

```
Asp Gln Ala Asn Ile Asn Ile Glu Ser Arg Ser Gly Arg Ser Tyr Leu
                405                 410                 415

Pro Glu Asn Arg Ala Val Ile Thr Gln Gln Gly Val Thr Asn Trp Thr
            420                 425                 430

Tyr Gln Glu Leu Glu Ala Thr His Gln Ala Leu Thr Gln Glu Gly Tyr
        435                 440                 445

Val Phe Val Gly Tyr His Gly Thr Asn His Val Ala Ala Gln Ser Ile
    450                 455                 460

Val Asn Arg Ile Ser Pro Val Pro Arg Gly Ser Asp Thr Glu Ser Glu
465                 470                 475                 480

Arg Ala Trp Gly Gly Leu Tyr Val Ser Thr Asp Ala Ser Val Ala Tyr
                485                 490                 495

Gly Tyr Ala Arg Ile Gln Glu Gly Thr Ala Asp Gly Gly Gly Leu Thr
            500                 505                 510

Pro Ala Glu Arg Lys Ala Arg Gly Val Met Leu Arg Val Tyr Leu Pro
        515                 520                 525

Gln Ala Ser Leu Glu Arg Phe Tyr Arg Ile Asn Ala Asp Leu Glu Lys
    530                 535                 540

Glu Arg Asn Leu Val Glu Arg Val Ile Gly His Pro Leu Pro Leu Arg
545                 550                 555                 560

Asn Glu Ala Phe Thr Gly Thr Asp Ala Glu Glu Gly Ser Asp Glu Thr
                565                 570                 575

Ala Ile Gly Trp Asp Met Ala Ile His Gly Val Ala Ile Pro Ser Thr
            580                 585                 590

Ile Pro Gly Asn Ser Tyr Ala Gln Leu Pro Ile Asp Glu Glu Ala Val
        595                 600                 605

Ala Lys Glu Gln Ser Ile Ser Ala Lys Pro Pro Tyr Lys Glu Gln Lys
    610                 615                 620
```

Asp Glu Leu Lys
625

<210> 72
<211> 628
<212> PRT
<213> Vibrio cholerae

<400> 72
Val Glu Asp Glu Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys Ser
1 5 10 15

Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile Pro
20 25 30

Gly Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr Ile
35 40 45

Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser Ile
50 55 60

Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr Val
65 70 75 80

Ser Gln Asp Ala Pro Phe Gly Val Ile Asn Leu Asp Ile Thr Thr Glu
85 90 95

Asn Gly Thr Lys Thr Tyr Ser Phe Asn Arg Lys Glu Ser Glu Phe Ala
100 105 110

Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile Lys
115 120 125

Ile Ser Ile Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val Pro
130 135 140

Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp Glu
145 150 155 160

Asn Gln Gly Asn Val Ser Phe Ala Val Thr Arg Pro Glu Gln Ser Ile
165 170 175

```
Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala His Lys Asn Gly
            180                 185                 190

Ser Arg His Lys Arg Trp Ala Asn Trp Leu Thr Thr Leu Pro Glu Val
        195                 200                 205

Val Leu Cys Phe Phe Glu Asp Pro Glu Leu Cys Thr Tyr Gly Asp Asp
    210                 215                 220

Trp His Gly Gly Ala Tyr Lys Thr Val Ala Gly Thr Pro Lys Ala Ile
225                 230                 235                 240

Thr Val Lys Gln Gly Ile Glu Gln Lys Thr Val Glu Gln Arg Ile His
                245                 250                 255

Phe Ser Lys Lys Asn Ala Met Glu Ala Leu Ala Ala His Arg Val Cys
            260                 265                 270

Gly Val Pro Leu Glu Thr Leu Ala Arg Ser Arg Lys Pro Arg Asp Leu
        275                 280                 285

Pro Asp Asp Leu Ser Cys Ala Tyr Asn Ala Gln Gln Ile Val Ser Leu
    290                 295                 300

Phe Leu Ala Thr Arg Ile Leu Phe Thr His Ile Asp Ser Ile Phe Thr
305                 310                 315                 320

Leu Asn Leu Asp Gly Gln Glu Pro Glu Val Ala Glu Arg Leu Asp Asp
                325                 330                 335

Leu Arg Arg Ile Asn Glu Asn Asn Pro Gly Met Val Ile Gln Val Leu
            340                 345                 350

Thr Val Ala Arg Gln Ile Tyr Asn Asp Tyr Val Thr His His Pro Leu
        355                 360                 365

Leu Thr Pro Glu Gln Thr Ser Ala Gly Ala Gln Ala Ala Asp Ile Leu
    370                 375                 380
```

```
Ser Leu Phe Cys Pro Asp Ala Asp Lys Ser Cys Val Ala Ser Asn Ser
385                 390                 395                 400

Asp Gln Ala Asn Ile Asn Ile Glu Ser Arg Ser Gly Arg Ser Tyr Leu
                405                 410                 415

Pro Glu Asn Arg Ala Val Ile Thr Gln Gln Gly Val Thr Asn Trp Thr
            420                 425                 430

Tyr Gln Glu Leu Glu Ala Thr His Gln Ala Leu Thr Gln Glu Gly Tyr
        435                 440                 445

Val Phe Val Gly Tyr His Gly Thr Asn His Val Ala Ala Gln Ser Ile
    450                 455                 460

Val Asn Arg Ile Ser Pro Val Pro Arg Gly Ser Asp Thr Glu Ser Glu
465                 470                 475                 480

Arg Ala Trp Gly Gly Leu Tyr Val Ser Thr Asp Ala Ser Val Ala Tyr
                485                 490                 495

Gly Tyr Ala Arg Ile Gln Glu Gly Thr Ala Asp Gly Gly Gly Leu Thr
            500                 505                 510

Pro Ala Glu Arg Lys Ala Arg Gly Val Met Leu Arg Val Tyr Leu Pro
        515                 520                 525

Gln Ala Ser Leu Glu Arg Phe Tyr Arg Ile Asn Ala Asp Leu Glu Lys
    530                 535                 540

Glu Arg Asn Leu Val Glu Arg Val Ile Gly His Pro Leu Pro Leu Arg
545                 550                 555                 560

Asn Glu Ala Phe Thr Gly Thr Asp Ala Glu Glu Gly Ser Asp Glu Thr
                565                 570                 575

Ala Ile Gly Trp Asp Met Ala Ile His Gly Val Ala Ile Pro Ser Thr
            580                 585                 590

Ile Pro Gly Asn Ser Tyr Ala Gln Leu Pro Ile Asp Glu Glu Ala Val
        595                 600                 605
```

Ala Lys Glu Gln Ser Ile Ser Ala Lys Pro Pro Tyr Lys Glu Gln Lys
610 615 620

Asp Glu Leu Lys
625

<210> 73
<211> 628
<212> PRT
<213> Vibrio cholerae

<400> 73
Val Glu Asp Glu Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys Ser
1 5 10 15

Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile Pro
20 25 30

Gly Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr Ile
35 40 45

Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser Ile
50 55 60

Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr Val
65 70 75 80

Asn Gln Asp Ala Pro Phe Gly Val Ile Asn Leu Asp Ile Thr Thr Glu
85 90 95

Asn Gly Thr Lys Thr Tyr Ser Phe Asn Arg Lys Glu Ser Glu Phe Ala
100 105 110

Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile Lys
115 120 125

Ile Ser Ile Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val Pro
130 135 140

Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp Glu
145 150 155 160

```
Asn Gln Gly Asn Val Ser Phe Ala Val Thr Arg Pro Glu Gln Ser Ile
                165                 170                 175

Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala His Lys Asn Gly
            180                 185                 190

Ser Arg His Lys Arg Trp Ala Asn Trp Leu Thr Thr Leu Pro Glu Val
        195                 200                 205

Val Leu Cys Phe Phe Glu Asp Pro Glu Leu Cys Thr Tyr Gly Asp Asp
    210                 215                 220

Trp His Gly Gly Ala Tyr Lys Thr Val Ala Gly Thr Pro Lys Ala Ile
225                 230                 235                 240

Thr Val Lys Gln Gly Ile Glu Gln Lys Thr Val Glu Gln Arg Ile His
                245                 250                 255

Phe Ser Lys Lys Asn Ala Met Glu Ala Leu Ala Ala His Arg Val Cys
            260                 265                 270

Gly Val Pro Leu Glu Thr Leu Ala Arg Ser Arg Lys Pro Arg Asp Leu
        275                 280                 285

Pro Asp Asp Leu Ser Cys Ala Tyr Asn Ala Gln Gln Ile Val Ser Leu
    290                 295                 300

Phe Leu Ala Thr Arg Ile Leu Phe Thr His Ile Asp Ser Ile Phe Thr
305                 310                 315                 320

Leu Asn Leu Asp Gly Gln Glu Pro Glu Val Ala Glu Arg Leu Asp Asp
                325                 330                 335

Leu Arg Arg Ile Asn Glu Asn Asn Pro Gly Met Val Ile Gln Val Leu
            340                 345                 350

Thr Val Ala Arg Gln Ile Tyr Asn Asp Tyr Val Thr His His Pro Gly
        355                 360                 365
```

```
Leu Thr Pro Glu Gln Thr Ser Ala Gly Ala Gln Ala Ala Asp Ile Leu
    370                 375                 380

Ser Leu Phe Cys Pro Asp Ala Asp Lys Ser Cys Val Ala Ser Asn Ser
385                 390                 395                 400

Asp Gln Ala Asn Ile Asn Ile Glu Ser Arg Ser Gly Arg Ser Tyr Leu
                405                 410                 415

Pro Glu Asn Arg Ala Val Ile Thr Gln Gln Gly Val Thr Asn Trp Thr
            420                 425                 430

Tyr Gln Glu Leu Glu Ala Thr His Gln Ala Leu Thr Gln Glu Gly Tyr
        435                 440                 445

Val Phe Val Gly Tyr His Gly Thr Asn His Val Ala Ala Gln Ser Ile
    450                 455                 460

Val Asn Arg Ile Ser Pro Val Pro Arg Gly Ser Asp Thr Glu Ser Glu
465                 470                 475                 480

Arg Ala Trp Gly Gly Leu Tyr Val Ser Thr Asp Ala Ser Val Ala Tyr
                485                 490                 495

Gly Tyr Ala Arg Ile Gln Glu Gly Thr Ala Asp Gly Gly Gly Leu Thr
            500                 505                 510

Pro Ala Glu Arg Lys Ala Arg Gly Val Met Leu Arg Val Tyr Leu Pro
        515                 520                 525

Gln Ala Ser Leu Glu Arg Phe Tyr Arg Ile Asn Ala Asp Leu Glu Lys
    530                 535                 540

Glu Arg Asn Leu Val Glu Arg Val Ile Gly His Pro Leu Pro Leu Arg
545                 550                 555                 560

Asn Glu Ala Phe Thr Gly Thr Asp Ala Glu Glu Gly Ser Asp Glu Thr
                565                 570                 575

Ala Ile Gly Trp Asp Met Ala Ile His Gly Val Ala Ile Pro Ser Thr
            580                 585                 590
```

Ile Pro Gly Asn Ser Tyr Ala Gln Leu Pro Ile Asp Glu Glu Ala Val
595 600 605

Ala Lys Glu Gln Ser Ile Ser Ala Lys Pro Pro Tyr Lys Glu Gln Lys
610 615 620

Asp Glu Leu Lys
625

<210> 74
<211> 628
<212> PRT
<213> Vibrio cholerae

<400> 74
Val Glu Asp Glu Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys Ser
1 5 10 15

Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Phe Ile Pro
20 25 30

Gly Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr Ile
35 40 45

Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser Ile
50 55 60

Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr Val
65 70 75 80

Asn Gln Asp Ala Pro Phe Gly Val Ile Asn Leu Asp Ile Thr Thr Glu
85 90 95

Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe Ala
100 105 110

Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile Lys
115 120 125

Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val Pro
130 135 140

```
Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp Glu
145                 150                 155                 160

Asn Gln Gly Asn Val Ser Phe Ala Val Thr Arg Pro Glu Gln Ser Ile
                165                 170                 175

Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala His Lys Asn Gly
            180                 185                 190

Ser Arg His Lys Arg Trp Ala Asn Trp Leu Thr Thr Leu Pro Lys Val
        195                 200                 205

Val Leu Cys Phe Tyr Glu Asp Pro Glu Leu Cys Thr Tyr Gly Asp Asp
    210                 215                 220

Trp His Gly Gly Ala Tyr Lys Thr Val Ala Gly Thr Pro Lys Ala Ile
225                 230                 235                 240

Thr Val Lys Gln Gly Ile Glu Gln Lys Thr Val Glu Gln Arg Ile His
                245                 250                 255

Phe Ser Lys Lys Asn Ala Ile Glu Ala Leu Ala Ala His Arg Val Cys
            260                 265                 270

Gly Val Pro Leu Glu Thr Leu Ala Arg Ser Arg Lys Pro Arg Asp Leu
        275                 280                 285

Pro Asp Asp Leu Ser Cys Ala Tyr Gln Ala Gln Asn Ile Val Ser Leu
    290                 295                 300

Phe Val Ala Thr Arg Ile Leu Phe Ser His Leu Asp Ser Val Phe Thr
305                 310                 315                 320

Leu Asn Leu Asp Glu Gln Glu Pro Ala Val Ala Glu Arg Leu Ser Ala
                325                 330                 335

Leu Arg Gln Ile Asn Glu Asn Asn Pro Gly Met Val Thr Gln Val Leu
            340                 345                 350
```

```
Thr Val Ala Arg Gln Ile Tyr Asn Asp Tyr Val Thr His His Pro Gly
        355                 360                 365

Leu Thr Pro Glu Gln Thr Ser Ala Gly Ala Gln Ala Ala Asp Ile Leu
    370                 375                 380

Ser Leu Phe Cys Pro Asp Ala Asp Lys Ser Cys Val Ala Ser Asn Asn
385                 390                 395                 400

Asp Gln Ala Asn Ile Asn Ile Glu Ser Arg Ser Gly Arg Ser Tyr Leu
                405                 410                 415

Pro Glu Asn Arg Ala Val Ile Thr Pro Gln Gly Val Thr Asn Trp Thr
            420                 425                 430

Tyr Gln Glu Leu Glu Ala Thr His Gln Ala Leu Thr Arg Glu Gly Tyr
        435                 440                 445

Val Phe Val Gly Tyr His Gly Thr Asn His Val Ala Ala Gln Thr Ile
    450                 455                 460

Val Asn Arg Ile Ala Pro Val Pro Arg Gly Asn Asn Thr Glu Asn Glu
465                 470                 475                 480

Glu Lys Trp Gly Gly Leu Tyr Val Ala Thr His Ala Glu Val Ala His
                485                 490                 495

Gly Tyr Ala Arg Ile Lys Glu Gly Thr Gly Glu Tyr Gly Leu Pro Thr
            500                 505                 510

Arg Ala Glu Arg Asp Ala Arg Gly Val Met Leu Arg Val Tyr Ile Pro
        515                 520                 525

Arg Ala Ser Leu Glu Arg Phe Tyr Arg Thr Asn Thr Pro Leu Glu Asn
    530                 535                 540

Ala Glu Glu His Ile Thr Gln Val Ile Gly His Ser Leu Pro Leu Arg
545                 550                 555                 560

Asn Glu Ala Phe Thr Gly Pro Glu Ser Ala Gly Gly Glu Asp Glu Thr
                565                 570                 575
```

Val Ile Gly Trp Asp Met Ala Ile His Ala Val Ala Ile Pro Ser Thr
580 585 590

Ile Pro Gly Asn Ala Tyr Glu Glu Leu Ala Ile Asp Glu Glu Ala Val
595 600 605

Ala Lys Glu Gln Ser Ile Ser Thr Lys Pro Pro Tyr Lys Glu Arg Lys
610 615 620

Asp Glu Leu Lys
625

<210> 75
<211> 628
<212> PRT
<213> Vibrio cholerae

<400> 75
Val Glu Asp Glu Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys Ser
1 5 10 15

Leu Thr Pro Glu Leu Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile Pro
20 25 30

Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr Ile
35 40 45

Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser Ile
50 55 60

Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr Val
65 70 75 80

Asn Gln Asp Ala Pro Phe Gly Val Ile Asn Leu Asp Ile Thr Thr Glu
85 90 95

Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe Ala
100 105 110

Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile Lys
115 120 125

```
Ile Ser Val Asp Glu Ile Asp Gln Gln Arg Asn Ile Ile Glu Val Pro
    130                 135                 140

Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp Glu
145                 150                 155                 160

Asn Gln Gly Asn Val Ser Phe Ala Val Thr Arg Pro Glu Gln Ser Ile
                165                 170                 175

Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala His Lys Asn Gly
            180                 185                 190

Ser Arg His Lys Arg Trp Ala Asn Trp Phe Thr Thr Ser Pro Lys Val
        195                 200                 205

Thr Leu Cys Phe Tyr Glu Asp Pro Ala Gln Cys Thr Tyr Gly Asp Asp
    210                 215                 220

Trp Tyr Gly Gly Ala Tyr Lys Thr Val Ala Gly Thr Pro Lys Ala Ile
225                 230                 235                 240

Thr Val Lys Gln Gly Ile Glu Gln Lys Thr Val Glu Gln Arg Ile His
                245                 250                 255

Phe Ser Lys Lys Asn Ala Met Glu Ala Leu Ala Ala His Arg Val Cys
            260                 265                 270

Gly Val Pro Leu Glu Thr Leu Ala Arg Ser Arg Lys Pro Arg Asp Leu
        275                 280                 285

Pro Asp Asp Leu Ser Cys Ala Tyr Gln Ala Gln Asn Ile Val Ser Leu
    290                 295                 300

Phe Val Ala Thr Arg Ile Leu Phe Ser His Leu Asp Ser Val Phe Thr
305                 310                 315                 320

Leu Asn Leu Asp Glu Gln Glu Pro Glu Val Ala Glu Arg Leu Ser Ala
                325                 330                 335
```

```
Leu Arg Gln Ile Asn Glu Asn Asn Pro Gly Met Val Thr Gln Val Leu
            340                 345                 350

Thr Val Ala Arg Gln Ile Tyr Asn Asp Tyr Val Thr His His Pro Gly
        355                 360                 365

Leu Thr Pro Glu Gln Thr Ser Ala Gly Ala Gln Ala Ala Asp Ile Leu
    370                 375                 380

Ser Leu Phe Cys Pro Asp Thr Asp Lys Ser Cys Val Ala Ser Asn Asn
385                 390                 395                 400

Asp Gln Ala Asn Ile Asn Ile Glu Ser Arg Ser Gly Arg Ser Tyr Leu
                405                 410                 415

Pro Glu Asn Arg Ala Val Ile Thr Pro Gln Gly Val Thr Asn Trp Thr
            420                 425                 430

Tyr Gln Glu Leu Glu Ala Thr His Gln Ala Leu Thr Arg Glu Asp Tyr
        435                 440                 445

Val Phe Val Gly Tyr His Gly Thr Asn His Val Ala Ala Gln Thr Ile
    450                 455                 460

Val Asn Arg Ile Ala Pro Val Pro Arg Gly Asn Asn Thr Glu Asn Glu
465                 470                 475                 480

Glu Lys Trp Gly Gly Leu Tyr Val Ala Thr His Ala Glu Val Ala His
                485                 490                 495

Gly Tyr Ala Arg Ile Lys Glu Gly Thr Gly Glu Tyr Gly Leu Pro Thr
            500                 505                 510

Arg Ala Glu Arg Asp Ala Arg Gly Val Met Leu Arg Val Tyr Ile Pro
        515                 520                 525

Arg Ala Ser Leu Glu Arg Phe Tyr Arg Thr Asn Thr Pro Leu Glu Asn
    530                 535                 540

Ala Glu Glu His Ile Thr Gln Val Ile Gly His Ser Leu Pro Leu Arg
545                 550                 555                 560
```

```
Asn Glu Ala Phe Thr Gly Pro Glu Ser Ala Gly Gly Glu Asp Glu Thr
                565                 570                 575

Val Ile Gly Trp Asp Met Ala Ile His Ala Val Ala Ile Pro Ser Thr
            580                 585                 590

Ile Pro Gly Asn Ala Tyr Glu Glu Leu Ala Ile Asp Glu Glu Ala Val
        595                 600                 605

Ala Lys Glu Gln Ser Ile Ser Thr Lys Pro Pro Tyr Lys Glu Arg Lys
    610                 615                 620

Asp Glu Leu Lys
625
```

<210> 76
<211> 628
<212> PRT
<213> Vibrio cholerae

<400> 76

```
Val Glu Asp Glu Leu Lys Ile Phe Asp Glu Cys Arg Ser Pro Cys Ser
1               5                   10                  15

Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile Pro
            20                  25                  30

Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr Ile
        35                  40                  45

Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser Ile
    50                  55                  60

Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr Val
65                  70                  75                  80

Asn Gln Asp Ala Pro Phe Gly Val Ile Asn Leu Asp Ile Thr Thr Glu
                85                  90                  95

Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe Ala
            100                 105                 110
```

```
Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile Lys
        115                 120                 125

Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val Pro
    130                 135                 140

Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp Glu
145                 150                 155                 160

Asn Gln Gly Asn Val Ser Phe Ala Val Thr Arg Pro Glu Gln Ser Ile
                165                 170                 175

Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala His Lys Asn Gly
            180                 185                 190

Ser Arg His Lys Arg Trp Ala Asn Trp Leu Thr Thr Leu Pro Lys Val
        195                 200                 205

Val Leu Cys Phe Tyr Glu Asp Pro Glu Leu Cys Thr Tyr Gly Asp Asp
    210                 215                 220

Trp His Gly Gly Ala Tyr Lys Thr Val Ala Gly Thr Pro Lys Ala Ile
225                 230                 235                 240

Thr Val Lys Gln Gly Ile Glu Gln Lys Thr Val Glu Gln Arg Ile His
                245                 250                 255

Phe Ser Lys Lys Asn Ala Met Glu Ala Leu Ala Ala His Arg Val Cys
            260                 265                 270

Gly Val Pro Leu Glu Thr Leu Ala Arg Ser Arg Lys Pro Arg Asp Leu
        275                 280                 285

Thr Asp Asp Leu Ser Cys Ala Tyr Gln Ala Gln Asn Ile Val Ser Leu
    290                 295                 300

Phe Val Ala Thr Arg Ile Leu Phe Ser His Leu Asp Ser Val Phe Thr
305                 310                 315                 320
```

```
Leu Asn Leu Asp Glu Gln Glu Pro Glu Val Ala Glu Arg Leu Ser Ala
                325                 330                 335

Leu Arg Gln Ile Asn Glu Asn Asn Pro Gly Met Val Thr Gln Val Leu
            340                 345                 350

Thr Val Ala Arg Gln Ile Tyr Asn Asp Tyr Val Thr His His Pro Gly
        355                 360                 365

Leu Thr Pro Glu Gln Thr Ser Ala Gly Ala Gln Ala Ala Asp Ile Leu
    370                 375                 380

Ser Leu Phe Cys Pro Asp Ala Asp Lys Ser Cys Val Ala Ser Asn Asn
385                 390                 395                 400

Asp Gln Ala Asn Ile Asn Ile Glu Ser Arg Ser Gly Arg Ser Tyr Leu
                405                 410                 415

Pro Glu Asn Arg Ala Val Ile Thr Pro Gln Gly Val Thr Asn Trp Thr
            420                 425                 430

Tyr Gln Glu Leu Glu Ala Thr His Gln Ala Leu Thr Arg Glu Gly Tyr
        435                 440                 445

Val Phe Val Gly Tyr His Gly Thr Asn His Val Ala Ala Gln Thr Ile
    450                 455                 460

Val Asn Arg Ile Ala Pro Val Pro Arg Gly Asn Asn Thr Glu Asn Glu
465                 470                 475                 480

Glu Lys Trp Gly Gly Leu Tyr Val Ala Thr His Ala Glu Val Ala His
                485                 490                 495

Gly Tyr Ala Arg Ile Lys Glu Gly Thr Gly Glu Tyr Gly Leu Pro Thr
            500                 505                 510

Arg Ala Glu Arg Asp Ala Arg Gly Val Met Leu Arg Val Tyr Ile Pro
        515                 520                 525

Arg Ala Ser Leu Glu Arg Phe Tyr Arg Thr Asn Thr Pro Leu Glu Asn
    530                 535                 540
```

```
Ala Glu Glu His Ile Thr Gln Val Ile Gly His Ser Leu Pro Leu Arg
545                 550                 555                 560


Asn Glu Ala Phe Thr Gly Pro Glu Ser Ala Gly Gly Glu Asp Glu Thr
                565                 570                 575


Val Ile Gly Trp Asp Met Ala Ile His Ala Val Ala Ile Pro Ser Thr
            580                 585                 590


Ile Pro Gly Asn Ala Tyr Glu Glu Leu Ala Ile Asp Glu Glu Ala Val
        595                 600                 605


Ala Lys Glu Gln Ser Ile Ser Ala Lys Pro Pro Tyr Lys Glu Gln Lys
    610                 615                 620


Asp Glu Leu Lys
625


<210> 77
<211> 628
<212> PRT
<213> Vibrio cholerae

<400> 77
Val Glu Asp Glu Leu Lys Ile Phe Asp Glu Cys Arg Ser Pro Cys Ser
1               5                   10                  15


Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile Pro
            20                  25                  30


Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr Ile
        35                  40                  45


Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser Ile
    50                  55                  60


Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr Val
65                  70                  75                  80


Asn Gln Asp Ala Pro Phe Gly Val Ile Asn Leu Asp Ile Thr Thr Glu
                85                  90                  95
```

```
Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe Ala
            100                 105                 110

Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile Lys
        115                 120                 125

Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val Pro
    130                 135                 140

Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp Glu
145                 150                 155                 160

Asn Gln Gly Asn Val Ser Phe Ala Val Thr Arg Pro Glu Gln Ser Ile
                165                 170                 175

Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala His Lys Asn Gly
            180                 185                 190

Ser Arg His Lys Arg Trp Ala Asn Trp Leu Thr Thr Leu Pro Lys Val
        195                 200                 205

Val Leu Cys Phe Tyr Glu Asp Pro Glu Leu Cys Thr Tyr Gly Asp Asp
    210                 215                 220

Trp His Gly Gly Ala Tyr Lys Thr Val Ala Gly Thr Pro Lys Ala Ile
225                 230                 235                 240

Thr Val Lys Gln Gly Ile Glu Gln Lys Thr Val Glu Gln Arg Ile His
                245                 250                 255

Phe Ser Lys Lys Asn Ala Met Glu Ala Leu Ala Ala His Arg Val Cys
            260                 265                 270

Gly Val Pro Leu Glu Thr Leu Ala Arg Ser Arg Lys Pro Arg Asp Leu
        275                 280                 285

Pro Asp Asp Leu Ser Cys Ala Tyr Gln Ala Gln Asn Ile Val Ser Leu
    290                 295                 300
```

```
Phe Val Ala Thr Arg Ile Leu Phe Ser His Leu Asp Ser Val Phe Thr
305                 310                 315                 320

Leu Asn Leu Asp Glu Gln Ala Pro Glu Val Ala Glu Arg Leu Ser Asp
                325                 330                 335

Leu Arg Arg Ile Asn Glu Asp Asn Pro Gly Met Val Thr Gln Val Leu
            340                 345                 350

Thr Val Ala Arg Gln Ile Tyr Asn Asp Tyr Val Thr His His Pro Gly
        355                 360                 365

Leu Thr Pro Glu Gln Thr Ser Ala Gly Ala Gln Ala Ala Asp Ile Leu
    370                 375                 380

Ser Leu Phe Cys Pro Asp Ala Asp Lys Ser Cys Val Ala Ser Asn Asn
385                 390                 395                 400

Asp Gln Ala Asn Ile Asn Ile Glu Ser Arg Ser Gly Arg Ser Tyr Leu
                405                 410                 415

Pro Glu Asn Arg Ala Val Ile Thr Pro Gln Gly Val Thr Asn Trp Thr
            420                 425                 430

Tyr Gln Glu Leu Glu Thr Thr His Gln Ala Leu Thr Arg Glu Gly Tyr
        435                 440                 445

Val Phe Val Gly Tyr His Gly Thr Asn His Val Ala Ala Gln Thr Ile
    450                 455                 460

Val Asn Arg Ile Ala Pro Val Pro Arg Gly Asn Asn Thr Glu Asn Glu
465                 470                 475                 480

Glu Lys Trp Gly Gly Leu Tyr Val Ala Thr His Ala Glu Val Ala His
                485                 490                 495

Gly Tyr Ala Arg Ile Lys Glu Gly Thr Gly Glu Tyr Gly Leu Pro Thr
            500                 505                 510

Arg Ala Glu Arg Glu Thr Arg Gly Val Met Leu Arg Val Tyr Ile Pro
        515                 520                 525
```

```
Arg Ala Ser Leu Glu Arg Phe Tyr Arg Thr Asn Thr Pro Leu Glu Asn
    530                 535                 540

Ala Glu Glu His Ile Thr Gln Val Ile Gly His Ser Leu Pro Leu Arg
545                 550                 555                 560

Asn Glu Ala Phe Thr Gly Pro Glu Ser Ala Gly Gly Glu Asp Glu Thr
                565                 570                 575

Val Ile Gly Trp Asp Met Ala Ile His Ala Val Ala Ile Pro Ser Thr
            580                 585                 590

Ile Pro Gly Asn Ala Tyr Glu Glu Leu Ala Ile Asp Glu Glu Ala Val
        595                 600                 605

Ala Lys Glu Gln Ser Ile Ser Ala Lys Pro Pro Tyr Lys Glu Gln Lys
    610                 615                 620

Asp Glu Leu Lys
625
```

<210> 78
<211> 628
<212> PRT
<213> Vibrio cholerae

<400> 78

```
Val Glu Asp Glu Leu Lys Ile Phe Asp Glu Cys Arg Ser Pro Cys Ser
1               5                   10                  15

Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile Pro
            20                  25                  30

Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr Ile
        35                  40                  45

Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser Ile
    50                  55                  60

Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr Val
65                  70                  75                  80
```

```
Asn Gln Asp Ala Pro Phe Gly Val Ile Asn Leu Asp Ile Thr Thr Glu
                85                  90                  95

Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe Ala
            100                 105                 110

Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile Lys
        115                 120                 125

Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val Pro
    130                 135                 140

Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp Glu
145                 150                 155                 160

Asn Gln Gly Asn Val Ser Phe Ala Val Thr Arg Pro Glu Gln Ser Ile
                165                 170                 175

Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala His Lys Asn Gly
            180                 185                 190

Ser Arg His Lys Arg Trp Ala Asn Trp Leu Thr Thr Leu Pro Lys Val
        195                 200                 205

Val Leu Cys Phe Tyr Glu Asp Pro Glu Leu Cys Thr Tyr Gly Asp Asp
    210                 215                 220

Trp His Gly Gly Ala Tyr Lys Thr Val Ala Gly Thr Pro Lys Ala Ile
225                 230                 235                 240

Thr Val Lys Gln Gly Ile Glu Gln Lys Ala Val Glu Gln Arg Ile His
                245                 250                 255

Phe Ser Lys Lys Asn Ala Met Glu Ala Leu Ala Ala His Arg Val Cys
            260                 265                 270

Gly Val Pro Leu Glu Thr Leu Ala Arg Ser Arg Lys Pro Arg Asp Leu
        275                 280                 285
```

```
Pro Asp Asp Leu Ser Cys Ala Tyr Gln Ala Gln Asn Ile Val Ser Leu
    290                 295                 300

Phe Val Ala Thr Arg Ile Leu Phe Ser His Leu Asp Ser Val Phe Thr
305                 310                 315                 320

Leu Asn Leu Asp Glu Gln Glu Pro Glu Val Ala Glu Arg Leu Ser Ala
                325                 330                 335

Leu Arg Gln Ile Asn Glu Asn Asn Pro Gly Met Val Thr Gln Val Leu
            340                 345                 350

Thr Val Ala Arg Gln Ile Tyr Asn Asp Tyr Val Thr His His Pro Gly
        355                 360                 365

Leu Thr Pro Glu Gln Thr Ser Ala Gly Ala Gln Ala Ala Asp Ile Leu
    370                 375                 380

Ser Leu Phe Cys Pro Asp Ala Asp Lys Ser Cys Val Ala Ser Asn Asn
385                 390                 395                 400

Asp Gln Ala Asn Ile Asn Ile Glu Ser Arg Ser Gly Arg Ser Tyr Leu
                405                 410                 415

Pro Glu Asn Arg Ala Val Ile Thr Pro Gln Gly Val Thr Asn Trp Thr
            420                 425                 430

Tyr Gln Glu Leu Glu Ala Thr His Gln Ala Leu Thr Arg Glu Gly Tyr
        435                 440                 445

Val Phe Val Gly Tyr His Gly Thr Asn His Val Ala Ala Gln Thr Ile
    450                 455                 460

Val Asn Arg Ile Ala Pro Val Pro Arg Gly Asn Asn Thr Glu Asn Glu
465                 470                 475                 480

Glu Lys Trp Gly Gly Leu Tyr Val Ala Thr His Ala Glu Val Ala His
                485                 490                 495

Gly Tyr Ala Arg Ile Lys Glu Gly Thr Gly Asn Gly Gly Leu Pro Thr
            500                 505                 510
```

```
Arg Ala Glu Arg Glu Thr Arg Gly Val Met Leu Arg Val Tyr Ile Pro
        515                 520                 525

Arg Ala Ser Leu Glu Arg Phe Tyr Arg Thr Asn Thr Pro Leu Glu Asn
    530                 535                 540

Ala Glu Glu His Ile Thr Gln Val Ile Gly His Ser Leu Pro Leu Arg
545                 550                 555                 560

Asn Glu Ala Phe Thr Gly Pro Glu Ser Ala Gly Gly Glu Asp Glu Thr
                565                 570                 575

Val Ile Gly Trp Asp Met Ala Ile Tyr Ala Val Ala Ile Pro Ser Thr
            580                 585                 590

Ile Pro Gly Asn Ala Tyr Glu Glu Leu Ala Ile Asp Glu Glu Ala Val
        595                 600                 605

Ala Lys Glu Gln Ser Ile Ser Ala Lys Pro Pro Tyr Lys Glu Gln Lys
    610                 615                 620

Asp Glu Leu Lys
625
```

<210> 79
<211> 617
<212> PRT
<213> Vibrio cholerae

<400> 79

```
Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile Pro Gly
1               5                   10                  15

Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr Ile Asn
            20                  25                  30

Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser Ile Ile
        35                  40                  45

Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr Val Ser
    50                  55                  60
```

```
Gln Asp Ala Pro Phe Gly Val Ile Asn Leu Asp Ile Thr Thr Glu Asn
65                  70                  75                  80

Gly Thr Lys Thr Tyr Ser Phe Asn Arg Lys Glu Ser Glu Phe Ala Ile
                85                  90                  95

Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile Lys Ile
            100                 105                 110

Ser Ile Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val Pro Lys
        115                 120                 125

Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp Lys Thr
    130                 135                 140

Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His Asn Ile Ala
145                 150                 155                 160

Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys Glu Gly Ser
                165                 170                 175

Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala Leu Cys Trp
            180                 185                 190

Leu Val Pro Ile Asp Ala Ile Tyr Asn Tyr Ile Thr Gln Gln Asn Cys
        195                 200                 205

Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr Val Ala Gly
    210                 215                 220

Thr Pro Lys Ala Ile Thr Val Lys Gln Gly Ile Glu Gln Lys Pro Val
225                 230                 235                 240

Glu Gln Arg Ile His Phe Ser Lys Lys Asn Ala Met Glu Ala Leu Ala
                245                 250                 255

Ala His Arg Val Cys Gly Val Pro Leu Glu Thr Leu Ala Arg Ser Arg
            260                 265                 270
```

```
Lys Pro Arg Asp Leu Pro Asp Asp Leu Ser Cys Ala Tyr Asn Ala Gln
        275                 280                 285

Gln Ile Val Ser Leu Phe Leu Ala Thr Arg Ile Leu Phe Thr His Ile
    290                 295                 300

Asp Ser Ile Phe Thr Leu Asn Leu Asp Gly Gln Glu Pro Glu Val Ala
305                 310                 315                 320

Glu Arg Leu Asp Asp Leu Arg Arg Ile Asn Glu Asn Asn Pro Gly Met
                325                 330                 335

Val Ile Gln Val Leu Thr Val Ala Arg Gln Ile Tyr Asn Asp Tyr Val
            340                 345                 350

Thr His His Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala Gly Ala Gln
        355                 360                 365

Ala Ala Asp Ile Leu Ser Leu Phe Cys Pro Asp Ala Asp Lys Ser Cys
    370                 375                 380

Val Ala Ser Asn Ser Asp Gln Ala Asn Ile Asn Ile Glu Ser Arg Ser
385                 390                 395                 400

Gly Arg Ser Tyr Leu Pro Glu Asn Arg Ala Val Ile Thr Gln Gln Gly
                405                 410                 415

Val Thr Asn Trp Thr Tyr Gln Glu Leu Glu Ala Thr His Gln Ala Leu
            420                 425                 430

Thr Gln Glu Gly Tyr Val Phe Val Gly Tyr His Gly Thr Asn His Val
        435                 440                 445

Ala Ala Gln Ser Ile Val Asn Arg Ile Ser Pro Val Pro Arg Gly Ser
    450                 455                 460

Asp Thr Glu Ser Glu Arg Ala Trp Gly Gly Leu Tyr Val Ser Thr Asp
465                 470                 475                 480

Ala Ser Val Ala Tyr Gly Tyr Ala Arg Ile Gln Glu Gly Thr Ala Asp
                485                 490                 495
```

```
Gly Gly Gly Leu Thr Pro Ala Glu Arg Lys Ala Arg Gly Val Met Leu
            500                 505                 510

Arg Val Tyr Leu Pro Gln Ala Ser Leu Glu Arg Phe Tyr Arg Ile Asn
        515                 520                 525

Ala Asp Leu Glu Lys Glu Arg Asn Leu Val Glu Arg Val Ile Gly His
    530                 535                 540

Pro Leu Pro Leu Arg Asn Glu Ala Phe Thr Gly Thr Asp Ala Glu Glu
545                 550                 555                 560

Gly Ser Asp Glu Thr Ala Ile Gly Trp Asp Met Ala Ile His Gly Val
                565                 570                 575

Ala Ile Pro Ser Thr Ile Pro Gly Asn Ser Tyr Ala Gln Leu Pro Ile
            580                 585                 590

Asp Glu Glu Ala Val Ala Lys Glu Gln Ser Ile Ser Ala Lys Pro Pro
        595                 600                 605

Tyr Lys Glu Gln Lys Asp Glu Leu Lys
    610                 615
```

<210> 80
<211> 605
<212> PRT
<213> Vibrio cholerae

<400> 80

```
Ser Ile Pro Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser
1               5                   10                  15

Met Thr Ile Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly
            20                  25                  30

Glu Ser Ile Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg
        35                  40                  45

His Tyr Val Asn Gln Asp Ala Pro Phe Gly Val Ile Asn Leu Asp Ile
    50                  55                  60
```

```
Thr Thr Glu Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly
65                  70                  75                  80

Glu Phe Ala Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala
                85                  90                  95

Ser Ile Lys Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile
            100                 105                 110

Glu Val Pro Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu
        115                 120                 125

Gln Trp Lys Thr Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu
    130                 135                 140

His Asn Ile Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln
145                 150                 155                 160

Lys Glu Gly Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu
                165                 170                 175

Ala Leu Cys Trp Leu Val Pro Ile Asp Ala Ile Tyr Asn Tyr Ile Thr
            180                 185                 190

Gln Gln Asn Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu
        195                 200                 205

Thr Val Ala Gly Thr Pro Lys Ala Ile Thr Val Lys Gln Gly Ile Glu
    210                 215                 220

Gln Lys Pro Val Glu Gln Arg Ile His Phe Ser Lys Lys Asn Ala Met
225                 230                 235                 240

Glu Ala Leu Ala Ala His Arg Val Cys Gly Val Pro Leu Glu Thr Leu
                245                 250                 255

Ala Arg Ser Arg Lys Pro Arg Asp Leu Pro Asp Asp Leu Ser Cys Ala
            260                 265                 270
```

```
Tyr Gln Ala Gln Asn Ile Val Ser Leu Phe Val Ala Thr Arg Ile Leu
        275                 280                 285

Phe Ser His Leu Asp Ser Val Phe Thr Leu Asn Leu Asp Glu Gln Glu
    290                 295                 300

Pro Glu Val Ala Glu Arg Leu Ser Ala Leu Arg Gln Ile Asn Glu Asn
305                 310                 315                 320

Asn Pro Gly Met Val Thr Gln Val Leu Thr Val Ala Arg Gln Ile Tyr
                325                 330                 335

Asn Asp Tyr Val Thr His His Pro Gly Leu Thr Pro Glu Gln Thr Ser
            340                 345                 350

Ala Gly Ala Gln Ala Ala Asp Ile Leu Ser Leu Phe Cys Pro Asp Ala
        355                 360                 365

Asp Lys Ser Cys Val Ala Ser Asn Asn Asp Gln Ala Asn Ile Asn Ile
    370                 375                 380

Glu Ser Arg Ser Gly Arg Ser Tyr Leu Pro Glu Asn Arg Ala Val Ile
385                 390                 395                 400

Thr Pro Gln Gly Val Thr Asn Trp Thr Tyr Gln Glu Leu Glu Ala Thr
                405                 410                 415

His Gln Ala Leu Thr Arg Glu Gly Tyr Val Phe Val Gly Tyr His Gly
            420                 425                 430

Thr Asn His Val Ala Ala Gln Thr Ile Val Asn Arg Ile Ala Pro Val
        435                 440                 445

Pro Arg Gly Asn Asn Thr Glu Asn Glu Glu Lys Trp Gly Gly Leu Tyr
    450                 455                 460

Val Ala Thr His Ala Glu Val Ala His Gly Tyr Ala Arg Ile Lys Glu
465                 470                 475                 480

Gly Thr Gly Glu Tyr Gly Leu Pro Thr Arg Ala Glu Arg Asp Ala Arg
                485                 490                 495
```

```
Gly Val Met Leu Arg Val Tyr Ile Pro Arg Ala Ser Leu Glu Arg Phe
            500                 505                 510

Tyr Arg Thr Asn Thr Pro Leu Glu Asn Ala Glu Glu His Ile Thr Gln
        515                 520                 525

Val Ile Gly His Ser Leu Pro Leu Arg Asn Glu Ala Phe Thr Gly Pro
    530                 535                 540

Glu Ser Ala Gly Gly Glu Asp Glu Thr Val Ile Gly Trp Asp Met Ala
545                 550                 555                 560

Ile His Ala Val Ala Ile Pro Ser Thr Ile Pro Gly Asn Ala Tyr Glu
                565                 570                 575

Glu Leu Ala Ile Asp Glu Glu Ala Val Ala Lys Glu Gln Ser Ile Ser
            580                 585                 590

Thr Lys Pro Pro Tyr Lys Glu Arg Lys Asp Glu Leu Lys
        595                 600                 605
```

<210> 81
<211> 594
<212> PRT
<213> Vibrio cholerae

```
<400> 81
Met Thr Ile Asn Asp Glu Gln Asn Asp Ile Met Asp Glu Gly Lys Gly
1               5                   10                  15

Glu Ser Ile Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg
            20                  25                  30

His Tyr Val Asn Gln Asp Ala Pro Phe Gly Val Ile Asn Leu Asp Ile
        35                  40                  45

Thr Thr Glu Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly
    50                  55                  60

Glu Phe Ala Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala
65                  70                  75                  80
```

```
Ser Ile Lys Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile
                85                  90                  95

Glu Val Pro Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu
            100                 105                 110

Gln Trp Glu Asn Gln Gly Asn Val Ser Phe Ala Val Thr Arg Pro Glu
        115                 120                 125

Gln Ser Ile Ala Lys Gln Ser Ile Ala Ile Ser Trp Pro Ser Val Ser
    130                 135                 140

Tyr Lys Ala Ala Gln Lys Glu Gly Ser Arg His Lys Arg Trp Ala His
145                 150                 155                 160

Trp His Thr Gly Leu Ala Leu Cys Trp Leu Val Pro Ile Asp Ala Ile
                165                 170                 175

Tyr Asn Tyr Ile Thr Gln Gln Asn Cys Thr Leu Gly Asp Asn Trp Phe
            180                 185                 190

Gly Gly Ser Tyr Glu Thr Val Ala Gly Thr Pro Lys Ala Ile Thr Val
        195                 200                 205

Lys Gln Gly Ile Glu Gln Lys Pro Val Glu Gln Arg Ile His Phe Ser
    210                 215                 220

Lys Lys Asn Ala Met Glu Ala Leu Ala Ala His Arg Val Cys Gly Val
225                 230                 235                 240

Pro Leu Glu Thr Leu Ala Arg Ser Arg Lys Pro Arg Asp Leu Thr Asp
                245                 250                 255

Asp Leu Ser Cys Ala Tyr Gln Ala Gln Asn Ile Val Ser Leu Phe Val
            260                 265                 270

Ala Thr Arg Ile Leu Phe Ser His Leu Asp Ser Val Phe Thr Leu Asn
        275                 280                 285
```

```
Leu Asp Glu Gln Glu Pro Glu Val Ala Glu Arg Leu Ser Ala Leu Arg
    290                 295                 300

Gln Ile Asn Glu Asn Asn Pro Gly Met Val Thr Gln Val Leu Thr Val
305                 310                 315                 320

Ala Arg Gln Ile Tyr Asn Asp Tyr Val Thr His His Pro Gly Leu Thr
                325                 330                 335

Pro Glu Gln Thr Ser Ala Gly Ala Gln Ala Ala Asp Ile Leu Ser Leu
            340                 345                 350

Phe Cys Pro Asp Ala Asp Lys Ser Cys Val Ala Ser Asn Asn Asp Gln
        355                 360                 365

Ala Asn Ile Asn Ile Glu Ser Arg Ser Gly Arg Ser Tyr Leu Pro Glu
    370                 375                 380

Asn Arg Ala Val Ile Thr Pro Gln Gly Val Thr Asn Trp Thr Tyr Gln
385                 390                 395                 400

Glu Leu Glu Ala Thr His Gln Ala Leu Thr Arg Glu Gly Tyr Val Phe
                405                 410                 415

Val Gly Tyr His Gly Thr Asn His Val Ala Ala Gln Thr Ile Val Asn
            420                 425                 430

Arg Ile Ala Pro Val Pro Arg Gly Asn Asn Thr Glu Asn Glu Glu Lys
        435                 440                 445

Trp Gly Gly Leu Tyr Val Ala Thr His Ala Glu Val Ala His Gly Tyr
    450                 455                 460

Ala Arg Ile Lys Glu Gly Thr Gly Glu Tyr Gly Leu Pro Thr Arg Ala
465                 470                 475                 480

Glu Arg Asp Ala Arg Gly Val Met Leu Arg Val Tyr Ile Pro Arg Ala
                485                 490                 495

Ser Leu Glu Arg Phe Tyr Arg Thr Asn Thr Pro Leu Glu Asn Ala Glu
            500                 505                 510
```

Glu His Ile Thr Gln Val Ile Gly His Ser Leu Pro Leu Arg Asn Glu
515 520 525

Ala Phe Thr Gly Pro Glu Ser Ala Gly Gly Glu Asp Glu Thr Val Ile
530 535 540

Gly Trp Asp Met Ala Ile His Ala Val Ala Ile Pro Ser Thr Ile Pro
545 550 555 560

Gly Asn Ala Tyr Glu Glu Leu Ala Ile Asp Glu Glu Ala Val Ala Lys
565 570 575

Glu Gln Ser Ile Ser Thr Lys Pro Pro Tyr Lys Glu Arg Lys Asp Glu
580 585 590

Leu Lys

<210> 82
<211> 588
<212> PRT
<213> Vibrio cholerae

<400> 82
Cys Ser Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser
1 5 10 15

Ile Pro Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met
20 25 30

Thr Ile Asn Asp Glu Gln Asn Asp Ile Met Asp Glu Gly Lys Gly Glu
35 40 45

Ser Ile Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His
50 55 60

Tyr Val Asn Gln Asp Ala Pro Phe Gly Val Ile Asn Leu Asp Ile Thr
65 70 75 80

Thr Glu Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu
85 90 95

```
Phe Thr Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser
            100                 105                 110

Ile Lys Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu
        115                 120                 125

Val Pro Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln
    130                 135                 140

Trp Glu Asn Gln Gly Asn Val Ser Phe Ala Val Thr Arg Pro Glu Gln
145                 150                 155                 160

Ser Ile Ala Lys Gln Ser Ile Ala Ile Ser Trp Pro Ser Val Ser Tyr
                165                 170                 175

Lys Ala Ala Gln Lys Glu Gly Ser Arg His Lys Arg Trp Ala His Trp
            180                 185                 190

His Thr Gly Leu Ala Leu Cys Trp Leu Val Pro Ile Asp Ala Ile Tyr
        195                 200                 205

Asn Tyr Ile Thr Gln Gln Asn Cys Thr Leu Gly Asp Asn Trp Phe Gly
    210                 215                 220

Gly Ser Tyr Glu Thr Val Ala Gly Thr Pro Lys Ala Ile Thr Val Lys
225                 230                 235                 240

Gln Gly Ile Glu Gln Lys Pro Val Glu Gln Arg Ile His Phe Ser Lys
                245                 250                 255

Lys Asn Ala Met Glu Ala Leu Ala Ala His Arg Val Cys Gly Val Pro
            260                 265                 270

Leu Glu Thr Leu Ala Arg Ser Arg Lys Pro Arg Asp Leu Thr Asp Asp
        275                 280                 285

Leu Ser Cys Ala Tyr Gln Ala Gln Asn Ile Val Ser Leu Phe Val Ala
    290                 295                 300
```

```
Thr Arg Ile Leu Phe Ser His Leu Asp Ser Val Phe Thr Leu Asn Leu
305                 310                 315                 320

Asp Glu Gln Glu Pro Glu Val Ala Glu Arg Leu Ser Asp Leu Arg Arg
                325                 330                 335

Ile Asn Glu Asn Asn Pro Gly Met Val Thr Gln Val Leu Thr Val Ala
            340                 345                 350

Arg Gln Ile Tyr Asn Asp Tyr Val Thr His His Pro Gly Leu Thr Pro
        355                 360                 365

Glu Gln Thr Ser Ala Gly Ala Gln Ala Ala Asp Ile Leu Ser Leu Phe
    370                 375                 380

Cys Pro Asp Ala Asp Lys Ser Cys Val Ala Ser Asn Asn Asp Gln Ala
385                 390                 395                 400

Asn Ile Asn Ile Glu Ser Arg Ser Gly Arg Ser Tyr Leu Pro Glu Asn
                405                 410                 415

Arg Ala Val Ile Thr Pro Gln Gly Val Thr Asn Trp Thr Tyr Gln Glu
            420                 425                 430

Leu Glu Ala Thr His Gln Ala Leu Thr Arg Glu Gly Tyr Val Phe Val
        435                 440                 445

Gly Tyr His Gly Thr Asn His Val Ala Ala Gln Thr Ile Val Asn Arg
    450                 455                 460

Ile Ala Pro Val Pro Arg Gly Asn Asn Thr Glu Asn Glu Glu Lys Trp
465                 470                 475                 480

Gly Gly Leu Tyr Val Ala Thr His Ala Glu Val Ala His Gly Tyr Ala
                485                 490                 495

Arg Ile Lys Glu Gly Thr Gly Glu Tyr Gly Leu Pro Thr Arg Ala Glu
            500                 505                 510

Arg Asp Ala Arg Gly Val Met Leu Arg Val Tyr Ile Pro Arg Ala Ser
        515                 520                 525
```

Leu Glu Arg Phe Tyr Arg Thr Asn Thr Pro Leu Glu Asn Ala Glu Glu
530 535 540

His Ile Thr Gln Val Ile Gly His Ser Leu Pro Leu Arg Asn Glu Ala
545 550 555 560

Phe Thr Gly Pro Glu Ser Ala Gly Gly Glu Asp Glu Thr Ile Ile Gly
565 570 575

Trp Asp Met Ala Ile His Ala Val Ala Ile Pro Ser
580 585

<210> 83
<211> 588
<212> PRT
<213> Vibrio cholerae

<400> 83
Cys Ser Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser
1 5 10 15

Ile Pro Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met
20 25 30

Thr Ile Asn Asp Glu Gln Asn Asp Ile Met Asp Glu Gly Lys Gly Glu
35 40 45

Ser Ile Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His
50 55 60

Tyr Val Asn Gln Asp Ala Pro Phe Gly Val Ile Asn Leu Asp Ile Thr
65 70 75 80

Thr Glu Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu
85 90 95

Phe Ala Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser
100 105 110

Ile Lys Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu
115 120 125

```
Val Pro Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln
    130                 135                 140

Trp Glu Asn Gln Gly Asn Val Ser Phe Ala Val Thr Arg Pro Glu Gln
145                 150                 155                 160

Ser Ile Ala Lys Gln Ser Ile Ala Ile Ser Trp Pro Ser Val Ser Tyr
                165                 170                 175

Lys Ala Ala Gln Lys Glu Gly Ser Arg His Lys Arg Trp Ala His Trp
            180                 185                 190

His Thr Gly Leu Ala Leu Cys Trp Leu Val Pro Met Asp Ala Ile Tyr
        195                 200                 205

Asn Tyr Ile Thr Gln Gln Asn Cys Thr Leu Gly Asp Asn Trp Phe Gly
    210                 215                 220

Gly Ser Tyr Glu Thr Val Ala Gly Thr Pro Lys Ala Ile Thr Val Lys
225                 230                 235                 240

Gln Gly Ile Glu Gln Lys Pro Val Glu Gln Arg Ile His Phe Ser Lys
                245                 250                 255

Lys Asn Ala Met Glu Ala Leu Ala Ala His Arg Val Cys Gly Val Pro
            260                 265                 270

Leu Glu Thr Leu Ala Arg Ser Arg Lys Pro Arg Asp Leu Thr Asp Asp
        275                 280                 285

Leu Ser Cys Ala Tyr Gln Ala Gln Asn Ile Val Ser Leu Phe Val Ala
    290                 295                 300

Thr Arg Ile Leu Phe Ser His Leu Asp Ser Val Phe Thr Leu Asn Leu
305                 310                 315                 320

Asp Glu Gln Glu Pro Glu Val Ala Glu Arg Leu Ser Ala Leu Arg Gln
                325                 330                 335
```

```
Ile Asn Glu Asn Asn Pro Gly Met Val Thr Gln Val Leu Thr Val Ala
            340                 345                 350

Arg Gln Ile Tyr Asn Asp Tyr Val Thr His His Pro Gly Leu Thr Pro
        355                 360                 365

Glu Gln Thr Ser Ala Gly Ala Gln Ala Ala Asp Ile Leu Ser Leu Phe
    370                 375                 380

Cys Pro Asp Ala Asp Lys Ser Cys Val Ala Ser Asn Asn Asp Gln Ala
385                 390                 395                 400

Asn Ile Asn Ile Glu Ser Arg Ser Gly Arg Ser Tyr Leu Pro Glu Asn
                405                 410                 415

Arg Ala Val Ile Thr Pro Gln Gly Val Thr Asn Trp Thr Tyr Gln Glu
            420                 425                 430

Leu Glu Ala Thr His Gln Ala Leu Thr Arg Glu Gly Tyr Val Phe Val
        435                 440                 445

Gly Tyr His Gly Thr Asn His Val Ala Ala Gln Thr Ile Val Asn Arg
    450                 455                 460

Ile Ala Pro Val Pro Arg Gly Asn Asn Thr Glu Asn Glu Glu Lys Trp
465                 470                 475                 480

Gly Gly Leu Tyr Val Ala Thr His Ala Glu Val Ala His Gly Tyr Ala
                485                 490                 495

Arg Ile Lys Glu Gly Thr Gly Glu Tyr Gly Leu Pro Thr Arg Ala Glu
            500                 505                 510

Arg Asp Ala Arg Gly Val Met Leu Arg Val Tyr Ile Pro Arg Ala Ser
        515                 520                 525

Leu Glu Arg Phe Tyr Arg Thr Asn Thr Pro Leu Glu Asn Ala Glu Glu
    530                 535                 540

His Ile Thr Gln Val Ile Gly His Ser Leu Pro Leu Arg Asn Glu Ala
545                 550                 555                 560
```

Phe Thr Gly Pro Glu Ser Ala Gly Gly Glu Asp Glu Thr Val Ile Gly
565 570 575

Trp Asp Met Ala Ile His Ala Val Ala Ile Pro Ser
580 585

<210> 84
<211> 588
<212> PRT
<213> Vibrio cholerae

<400> 84
Cys Ser Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser
1 5 10 15

Ile Pro Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met
20 25 30

Thr Ile Asn Asp Glu Gln Asn Asp Ile Met Asp Glu Gly Lys Gly Glu
35 40 45

Ser Ile Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His
50 55 60

Tyr Val Asn Gln Asp Ala Pro Phe Gly Val Ile Asn Leu Asp Ile Thr
65 70 75 80

Thr Glu Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu
85 90 95

Phe Ala Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser
100 105 110

Ile Lys Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu
115 120 125

Val Pro Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln
130 135 140

Trp Glu Asn Gln Gly Asn Val Ser Phe Ala Val Thr Arg Pro Glu Gln
145 150 155 160

```
Ser Ile Ala Lys Gln Ser Ile Ala Ile Ser Trp Pro Ser Val Ser Tyr
                165                 170                 175

Lys Ala Ala Gln Lys Glu Gly Ser Arg His Lys Arg Trp Ala His Trp
            180                 185                 190

His Thr Gly Leu Ala Leu Cys Trp Leu Val Pro Ile Asp Ala Ile Tyr
        195                 200                 205

Asn Tyr Ile Thr Gln Gln Asn Cys Thr Leu Gly Asp Asn Trp Phe Gly
    210                 215                 220

Gly Ser Tyr Glu Thr Val Ala Gly Thr Pro Lys Ala Ile Thr Val Lys
225                 230                 235                 240

Gln Gly Ile Glu Gln Lys Pro Val Glu Gln Arg Ile His Phe Ser Lys
                245                 250                 255

Lys Asn Ala Met Glu Ala Leu Ala Ala His Arg Val Cys Gly Val Pro
            260                 265                 270

Leu Glu Thr Leu Ala Arg Ser Arg Lys Pro Arg Asp Leu Thr Asp Asp
        275                 280                 285

Leu Ser Cys Ala Tyr Gln Ala Gln Asn Ile Val Ser Leu Phe Val Ala
    290                 295                 300

Thr Arg Ile Leu Phe Ser His Leu Asp Ser Val Phe Thr Leu Asn Leu
305                 310                 315                 320

Asp Glu Gln Glu Pro Glu Val Ala Glu Arg Leu Ser Ala Leu Arg Gln
                325                 330                 335

Ile Asn Glu Asn Asn Pro Gly Met Val Thr Gln Val Leu Thr Val Ala
            340                 345                 350

Arg Gln Ile Tyr Asn Asp Tyr Val Thr His His Pro Gly Leu Thr Pro
        355                 360                 365
```

```
Glu Gln Thr Ser Ala Gly Ala Gln Ala Ala Asp Ile Leu Ser Leu Phe
    370                 375                 380

Cys Pro Asp Ala Asp Lys Ser Cys Val Ala Ser Asn Asn Asp Gln Ala
385                 390                 395                 400

Asn Ile Asn Ile Glu Ser Arg Ser Gly Arg Ser Tyr Leu Pro Glu Asn
                405                 410                 415

Arg Ala Val Ile Thr Pro Gln Gly Val Thr Asn Trp Thr Tyr Gln Glu
            420                 425                 430

Leu Glu Ala Thr His Gln Ala Leu Thr Arg Glu Gly Tyr Val Phe Val
        435                 440                 445

Gly Tyr His Gly Thr Asn His Val Ala Ala Gln Thr Ile Val Asn Arg
    450                 455                 460

Ile Ala Pro Val Pro Arg Gly Asn Asn Thr Glu Asn Glu Glu Lys Trp
465                 470                 475                 480

Gly Gly Leu Tyr Val Ala Thr His Ala Glu Val Ala His Gly Tyr Ala
                485                 490                 495

Arg Ile Lys Glu Gly Thr Gly Glu Tyr Gly Leu Pro Thr Arg Ala Glu
            500                 505                 510

Arg Asp Ala Arg Gly Val Met Leu Arg Val Tyr Ile Pro Arg Ala Ser
        515                 520                 525

Leu Glu Arg Phe Tyr Arg Thr Asn Thr Pro Leu Glu Asn Ala Glu Glu
    530                 535                 540

His Ile Thr Gln Val Ile Gly His Ser Leu Pro Leu Arg Asn Glu Ala
545                 550                 555                 560

Phe Thr Gly Pro Glu Ser Ala Gly Gly Glu Asp Glu Thr Val Ile Gly
                565                 570                 575

Trp Asp Met Ala Ile His Ala Val Ala Ile Pro Ser
            580                 585
```

<210> 85
<211> 583
<212> PRT
<213> Vibrio cholerae

<400> 85
Met Thr Ile Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly
1   5   10   15

Glu Ser Ile Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg
            20   25   30

His Tyr Val Asn Gln Asp Ala Pro Phe Gly Val Ile Asn Leu Asp Ile
        35   40   45

Thr Thr Glu Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly
    50   55   60

Glu Phe Ala Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala
65   70   75   80

Ser Ile Lys Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile
                85   90   95

Glu Val Pro Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu
            100   105   110

Gln Trp Glu Asn Gln Gly Asn Val Ser Phe Ala Val Thr Arg Pro Glu
        115   120   125

Gln Ser Ile Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala His
    130   135   140

Lys Asn Gly Ser Arg His Lys Arg Trp Ala Asn Trp Leu Thr Thr Leu
145   150   155   160

Pro Lys Val Val Leu Cys Phe Tyr Glu Asp Pro Glu Leu Cys Thr Tyr
                165   170   175

Gly Asp Asp Trp His Gly Gly Ala Tyr Lys Thr Val Ala Gly Thr Pro
            180   185   190

```
Lys Ala Ile Thr Val Lys Gln Gly Ile Glu Gln Lys Ala Val Glu Gln
        195                 200                 205

Arg Ile His Phe Ser Lys Lys Asn Ala Met Glu Ala Leu Ala Ala His
    210                 215                 220

Arg Val Cys Gly Val Pro Leu Glu Thr Leu Ala Arg Ser Arg Lys Pro
225                 230                 235                 240

Arg Asp Leu Pro Asp Asp Leu Ser Cys Ala Tyr Gln Ala Gln Asn Ile
                245                 250                 255

Val Ser Leu Phe Val Ala Thr Arg Ile Leu Phe Ser His Leu Asp Ser
            260                 265                 270

Val Phe Thr Leu Asn Leu Asp Glu Gln Glu Pro Glu Val Ala Glu Arg
        275                 280                 285

Leu Ser Ala Leu Arg Gln Ile Asn Glu Asn Asn Pro Gly Met Val Thr
    290                 295                 300

Gln Val Leu Thr Val Ala Arg Gln Ile Tyr Asn Asp Tyr Val Thr His
305                 310                 315                 320

His Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala Gly Ala Gln Ala Ala
                325                 330                 335

Asp Ile Leu Ser Leu Phe Cys Pro Asp Ala Asp Lys Ser Cys Val Ala
            340                 345                 350

Ser Asn Asn Asp Gln Ala Asn Ile Asn Ile Glu Ser Arg Ser Gly Arg
        355                 360                 365

Ser Tyr Leu Pro Glu Asn Arg Ala Val Ile Thr Pro Gln Gly Val Thr
    370                 375                 380

Asn Trp Thr Tyr Gln Glu Leu Glu Ala Thr His Gln Ala Leu Thr Arg
385                 390                 395                 400
```

```
Glu Gly Tyr Val Phe Val Gly Tyr His Gly Thr Asn His Val Ala Ala
                405                 410                 415

Gln Thr Ile Val Asn Arg Ile Ala Pro Val Pro Arg Gly Asn Asn Thr
            420                 425                 430

Glu Asn Glu Glu Lys Trp Gly Gly Leu Tyr Val Ala Thr His Ala Glu
        435                 440                 445

Val Ala His Gly Tyr Ala Arg Ile Lys Glu Gly Thr Gly Asn Gly Gly
    450                 455                 460

Leu Pro Thr Arg Ala Glu Arg Glu Thr Arg Gly Val Met Leu Arg Val
465                 470                 475                 480

Tyr Ile Pro Arg Ala Ser Leu Glu Arg Phe Tyr Arg Thr Asn Thr Pro
                485                 490                 495

Leu Glu Asn Ala Glu Glu His Ile Thr Gln Val Ile Gly His Ser Leu
            500                 505                 510

Pro Leu Arg Asn Glu Ala Phe Thr Gly Pro Glu Ser Ala Gly Gly Glu
        515                 520                 525

Asp Glu Thr Val Ile Gly Trp Asp Met Ala Ile Tyr Ala Val Ala Ile
    530                 535                 540

Pro Ser Thr Ile Pro Gly Asn Ala Tyr Glu Glu Leu Ala Ile Asp Glu
545                 550                 555                 560

Glu Ala Val Ala Lys Glu Gln Ser Ile Ser Ala Lys Pro Pro Tyr Lys
                565                 570                 575

Glu Gln Lys Asp Glu Leu Lys
            580
```

<210> 86
<211> 583
<212> PRT
<213> Vibrio cholerae

<400> 86

```
Met Thr Ile Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly
1               5                  10                  15

Glu Ser Ile Ile Thr Ile Gly Asp Phe Ala Thr Val Arg Ala Thr Arg
            20                  25                  30

His Tyr Val Asn Gln Asp Ala Pro Phe Gly Val Ile Asn Leu Asp Ile
        35                  40                  45

Thr Thr Glu Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly
    50                  55                  60

Glu Phe Ala Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala
65                  70                  75                  80

Ser Ile Lys Ile Ser Val Asp Glu Ile Asp Gln Gln Arg Asn Ile Ile
                85                  90                  95

Glu Val Pro Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu
            100                 105                 110

Gln Trp Glu Asn Gln Gly Asn Val Ser Phe Ala Val Thr Arg Pro Glu
        115                 120                 125

Gln Ser Ile Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala His
    130                 135                 140

Lys Asn Gly Ser Arg His Lys Arg Trp Ala Asn Trp Phe Thr Thr Ser
145                 150                 155                 160

Pro Lys Val Thr Leu Cys Phe Tyr Glu Asp Pro Ala Gln Cys Thr Tyr
                165                 170                 175

Gly Asp Asp Trp His Gly Gly Ala Tyr Lys Thr Val Ala Gly Thr Pro
            180                 185                 190

Lys Ala Ile Thr Val Lys Gln Gly Ile Glu Gln Lys Thr Val Glu Gln
        195                 200                 205

Arg Ile His Phe Ser Lys Lys Asn Ala Met Glu Ala Leu Ala Ala His
    210                 215                 220
```

```
Arg Val Cys Gly Val Pro Leu Glu Thr Leu Ala Arg Ser Arg Lys Pro
225                 230                 235                 240

Arg Asp Leu Pro Asp Asp Leu Ser Cys Ala Tyr Gln Ala Gln Asn Ile
                245                 250                 255

Val Ser Leu Phe Val Ala Thr Arg Ile Leu Phe Ser His Leu Asp Ser
            260                 265                 270

Val Phe Thr Leu Asn Leu Asp Glu Gln Glu Pro Glu Val Ala Glu Arg
        275                 280                 285

Leu Ser Ala Leu Arg Gln Ile Asn Glu Asn Asn Pro Gly Met Val Thr
    290                 295                 300

Gln Val Leu Thr Val Ala Arg Gln Ile Tyr Asn Asp Tyr Val Thr His
305                 310                 315                 320

His Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala Gly Ala Gln Ala Ala
                325                 330                 335

Asp Ile Leu Ser Leu Phe Cys Pro Asp Ala Asp Lys Ser Cys Val Ala
            340                 345                 350

Ser Asn Asn Asp Gln Ala Asn Ile Asn Ile Glu Ser Arg Ser Gly Arg
        355                 360                 365

Ser Tyr Leu Pro Glu Asn Arg Ala Val Ile Thr Pro Gln Gly Val Thr
    370                 375                 380

Asn Trp Thr Tyr Gln Glu Leu Glu Ala Thr His Gln Ala Leu Thr Arg
385                 390                 395                 400

Glu Gly Tyr Val Phe Val Gly Tyr His Gly Thr Asn His Val Ala Ala
                405                 410                 415

Gln Thr Ile Val Asn Arg Ile Ala Pro Val Pro Arg Gly Asn Asn Thr
            420                 425                 430
```

```
Glu Asn Glu Glu Lys Trp Gly Gly Leu Tyr Val Ala Thr His Ala Glu
        435                 440                 445

Val Ala His Gly Tyr Ala Arg Ile Lys Glu Gly Thr Gly Glu Tyr Gly
    450                 455                 460

Leu Pro Thr Arg Ala Glu Arg Asp Ala Arg Gly Val Met Leu Arg Val
465                 470                 475                 480

Tyr Ile Pro Arg Ala Ser Leu Glu Arg Phe Tyr Arg Thr Asn Thr Pro
                485                 490                 495

Leu Glu Asn Ala Glu Glu His Ile Thr Gln Val Ile Gly His Ser Leu
            500                 505                 510

Pro Leu Arg Asn Glu Ala Phe Thr Gly Pro Glu Arg Val Asp Gly Glu
        515                 520                 525

Asp Glu Thr Val Ile Gly Trp Asp Met Ala Ile His Ala Val Ala Ile
    530                 535                 540

Pro Ser Thr Ile Pro Gly Asn Ala Tyr Glu Glu Leu Ala Ile Asp Glu
545                 550                 555                 560

Glu Ala Val Ala Lys Glu Gln Ser Ile Ser Thr Lys Pro Pro Tyr Lys
                565                 570                 575

Glu Arg Lys Asp Glu Leu Lys
            580
```

<210> 87
<211> 583
<212> PRT
<213> Vibrio cholerae

<400> 87

```
Cys Ser Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Gln Leu Ser
1               5                   10                  15

Ile Pro Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met
            20                  25                  30
```

```
Thr Ile Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu
        35                  40                  45

Ser Ile Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His
    50                  55                  60

Tyr Val Asn Gln Asp Ala Pro Phe Gly Val Ile His Leu Asp Ile Thr
65                  70                  75                  80

Thr Glu Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu
                85                  90                  95

Phe Ala Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser
            100                 105                 110

Ile Lys Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu
        115                 120                 125

Val Pro Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln
    130                 135                 140

Trp Glu Asn Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His
145                 150                 155                 160

Asn Ile Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys
                165                 170                 175

Glu Gly Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala
            180                 185                 190

Leu Cys Trp Leu Val Pro Ile Asp Ala Ile Tyr Asn Tyr Ile Thr Gln
        195                 200                 205

Gln Asn Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr
    210                 215                 220

Val Ala Gly Thr Pro Lys Ala Ile Thr Val Lys Gln Gly Ile Glu Gln
225                 230                 235                 240

Lys Thr Val Glu Gln Arg Ile His Phe Ser Lys Lys Asn Ala Met Glu
                245                 250                 255
```

```
Ala Leu Ala Ala His Arg Val Cys Gly Val Pro Leu Glu Thr Leu Ala
            260                 265                 270

Arg Ser Arg Lys Pro Arg Asp Leu Thr Asp Asp Leu Ser Cys Val Tyr
        275                 280                 285

Gln Ala Gln Asn Ile Val Ser Leu Phe Val Ala Thr Arg Ile Leu Phe
    290                 295                 300

Ser His Leu Asp Ser Val Phe Thr Leu Asn Leu Glu Glu Gln Glu Pro
305                 310                 315                 320

Glu Val Ala Glu Arg Leu Ser Ala Leu Arg Gln Ile Asn Glu Asn Asn
                325                 330                 335

Pro Gly Met Val Thr Gln Val Leu Thr Val Ala Arg Gln Ile Tyr Asn
            340                 345                 350

Asp Tyr Val Thr His His Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala
        355                 360                 365

Gly Ala Gln Ala Ala Asp Ile Leu Ser Leu Phe Cys Pro Asp Ala Asp
    370                 375                 380

Lys Ser Cys Val Ala Ser Asn Asn Asp Gln Ala Asn Ile Asn Ile Glu
385                 390                 395                 400

Ser Arg Ser Gly Arg Ser Tyr Leu Pro Glu Asn Arg Ala Val Ile Thr
                405                 410                 415

Pro Gln Gly Val Thr Asn Trp Thr Tyr Gln Glu Leu Glu Ala Thr His
            420                 425                 430

Gln Ala Leu Thr Arg Glu Gly Tyr Val Phe Val Gly Tyr His Gly Thr
        435                 440                 445

Asn His Val Ala Ala Gln Thr Ile Val Asn Arg Ile Ala Pro Val Pro
    450                 455                 460
```

```
Arg Gly Asn Asn Thr Glu Asn Glu Glu Lys Trp Gly Gly Leu Tyr Val
465                 470                 475                 480

Ala Thr His Ala Glu Val Ala His Gly Tyr Ala Arg Ile Lys Glu Gly
                485                 490                 495

Thr Gly Glu Tyr Gly Leu Pro Thr Arg Ala Glu Arg Asp Ala Arg Gly
            500                 505                 510

Val Met Leu Arg Val Tyr Ile Pro Arg Ala Ser Leu Glu Arg Phe Tyr
        515                 520                 525

Arg Thr Asn Thr Pro Leu Glu Asn Ala Glu Glu His Ile Thr Gln Val
    530                 535                 540

Ile Gly His Ser Leu Pro Leu Arg Asn Glu Ala Phe Thr Gly Pro Glu
545                 550                 555                 560

Arg Ala Gly Gly Glu Asp Glu Thr Val Ile Gly Trp Asp Met Ala Ile
                565                 570                 575

His Ala Val Ala Ile Pro Ser
            580
```

<210> 88
<211> 583
<212> PRT
<213> Vibrio cholerae

<400> 88

```
Cys Ser Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser
1               5                   10                  15

Ile Pro Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met
            20                  25                  30

Thr Ile Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu
        35                  40                  45

Ser Ile Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His
    50                  55                  60
```

```
Tyr Val Asn Gln Asp Ala Pro Phe Gly Val Ile Asn Leu Asp Ile Thr
65                  70                  75                  80

Thr Glu Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu
                85                  90                  95

Phe Ala Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser
            100                 105                 110

Ile Lys Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu
        115                 120                 125

Val Pro Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln
    130                 135                 140

Trp Lys Thr Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His
145                 150                 155                 160

Asn Ile Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys
                165                 170                 175

Glu Gly Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala
            180                 185                 190

Leu Cys Trp Leu Val Pro Met Asp Ala Ile Tyr Asn Tyr Ile Thr Gln
        195                 200                 205

Gln Asn Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr
    210                 215                 220

Val Ala Gly Thr Pro Lys Val Ile Thr Val Lys Gln Gly Ile Glu Gln
225                 230                 235                 240

Lys Pro Val Glu Gln Arg Ile His Phe Ser Lys Gly Asn Ala Met Ser
                245                 250                 255

Ala Leu Ala Ala His Arg Val Cys Gly Val Pro Leu Glu Thr Leu Ala
            260                 265                 270

Arg Ser Arg Lys Pro Arg Asp Leu Thr Asp Asp Leu Ser Cys Ala Tyr
        275                 280                 285
```

```
Gln Ala Gln Asn Ile Val Ser Leu Phe Val Ala Thr Arg Ile Leu Phe
    290                 295                 300

Ser His Leu Asp Ser Val Phe Thr Leu Asn Leu Asp Glu Gln Glu Pro
305                 310                 315                 320

Glu Val Ala Glu Arg Leu Ser Ala Leu Arg Gln Ile Asn Glu Asn Asn
                325                 330                 335

Pro Gly Met Val Thr Gln Val Leu Thr Val Ala Arg Gln Ile Tyr Asn
            340                 345                 350

Asp Tyr Val Thr His His Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala
        355                 360                 365

Gly Ala Gln Ala Ala Asp Ile Leu Ser Leu Phe Cys Pro Asp Ala Asp
    370                 375                 380

Lys Ser Cys Val Ala Ser Asn Asn Asp Gln Ala Asn Ile Asn Ile Glu
385                 390                 395                 400

Ser Arg Ser Gly Arg Ser Tyr Leu Pro Glu Asn Arg Ala Val Ile Thr
                405                 410                 415

Pro Gln Gly Val Thr Asn Trp Thr Tyr Gln Glu Leu Glu Ala Thr His
            420                 425                 430

Gln Ala Leu Thr Arg Glu Gly Tyr Val Phe Val Gly Tyr His Gly Thr
        435                 440                 445

Asn His Val Ala Ala Gln Thr Ile Val Asn Arg Ile Ala Pro Val Pro
    450                 455                 460

Arg Gly Asn Asn Thr Glu Asn Glu Glu Lys Trp Gly Gly Leu Tyr Val
465                 470                 475                 480

Ala Thr His Ala Glu Val Ala His Gly Tyr Ala Arg Ile Lys Glu Gly
                485                 490                 495
```

Thr Gly Glu Tyr Gly Leu Pro Thr Arg Ala Glu Arg Asp Ala Arg Gly
500 505 510

Val Met Leu Arg Val Tyr Ile Pro Arg Ala Ser Leu Glu Arg Phe Tyr
515 520 525

Arg Thr Asn Thr Pro Leu Glu Asn Ala Glu Glu His Ile Thr Gln Val
530 535 540

Ile Gly His Ser Leu Pro Leu Arg Asn Glu Ala Phe Thr Gly Pro Glu
545 550 555 560

Ser Ala Gly Gly Glu Asp Glu Thr Val Ile Gly Trp Asp Met Ala Ile
565 570 575

His Ala Val Ala Ile Pro Ser
580

<210> 89
<211> 583
<212> PRT
<213> Vibrio cholerae

<400> 89
Cys Ser Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser
1 5 10 15

Ile Pro Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met
20 25 30

Thr Ile Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu
35 40 45

Ser Ile Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His
50 55 60

Tyr Val Asn Gln Asp Ala Pro Phe Gly Val Ile Asn Leu Asp Ile Thr
65 70 75 80

Thr Glu Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu
85 90 95

```
Phe Ala Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser
            100                 105                 110

Ile Lys Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu
        115                 120                 125

Val Pro Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln
    130                 135                 140

Trp Lys Thr Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His
145                 150                 155                 160

Asn Ile Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys
                165                 170                 175

Glu Gly Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala
            180                 185                 190

Leu Cys Trp Leu Val Pro Ile Asp Ala Ile Tyr Asn Tyr Ile Thr Gln
        195                 200                 205

Gln Asn Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr
    210                 215                 220

Val Ala Gly Thr Pro Lys Ala Ile Thr Val Lys Gln Gly Ile Glu Gln
225                 230                 235                 240

Lys Pro Val Glu Gln Arg Ile His Phe Ser Lys Lys Asn Ala Met Glu
                245                 250                 255

Ala Leu Ala Ala His Arg Val Cys Gly Val Pro Leu Glu Thr Leu Ala
            260                 265                 270

Arg Ser Arg Lys Pro Arg Asp Leu Pro Asp Asp Leu Ser Cys Ala Tyr
        275                 280                 285

Gln Ala Gln Asn Ile Val Ser Leu Phe Val Ala Thr Arg Ile Leu Phe
    290                 295                 300

Ser His Leu Asp Ser Val Phe Thr Leu Asn Leu Asp Glu Gln Glu Pro
305                 310                 315                 320
```

```
Glu Val Ala Glu Arg Leu Ser Ala Leu Arg Gln Ile Asn Glu Asn Asn
                325                 330                 335

Pro Gly Met Val Thr Gln Val Leu Thr Val Ala Arg Gln Ile Tyr Asn
            340                 345                 350

Asp Tyr Val Thr His His Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala
        355                 360                 365

Gly Ala Gln Ala Ala Asp Ile Leu Ser Leu Phe Cys Pro Asp Ala Asp
    370                 375                 380

Lys Ser Cys Val Ala Ser Asn Asn Asp Gln Ala Asn Ile Asn Ile Glu
385                 390                 395                 400

Ser Arg Ser Gly Arg Ser Tyr Leu Pro Glu Asn Arg Ala Val Ile Thr
                405                 410                 415

Pro Gln Gly Val Thr Asn Trp Thr Tyr Gln Glu Leu Glu Ala Thr His
            420                 425                 430

Gln Ala Leu Thr Arg Glu Gly Tyr Val Phe Val Gly Tyr His Gly Thr
        435                 440                 445

Asn His Val Ala Ala Gln Thr Ile Val Asn Arg Ile Ala Pro Val Pro
    450                 455                 460

Arg Gly Asn Asn Thr Glu Asn Glu Glu Lys Trp Gly Gly Leu Tyr Val
465                 470                 475                 480

Ala Thr His Ala Glu Val Ala His Gly Tyr Ala Arg Ile Lys Glu Gly
                485                 490                 495

Thr Gly Glu Tyr Gly Leu Pro Thr Arg Ala Glu Arg Asp Ala Arg Gly
            500                 505                 510

Val Met Leu Arg Val Tyr Ile Pro Arg Ala Ser Leu Glu Arg Phe Tyr
        515                 520                 525
```

```
Arg Thr Asn Thr Pro Leu Glu Asn Ala Glu Glu His Ile Thr Gln Val
    530                 535                 540

Ile Gly His Ser Leu Pro Leu Arg Asn Glu Ala Phe Thr Gly Pro Glu
545                 550                 555                 560

Ser Ala Gly Gly Glu Asp Glu Thr Val Ile Gly Trp Asp Met Ala Ile
                565                 570                 575

His Ala Val Ala Ile Pro Ser
            580
```

<210> 90
<211> 583
<212> PRT
<213> Vibrio cholerae

<400> 90

```
Cys Ser Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser
1               5                   10                  15

Ile Pro Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met
            20                  25                  30

Thr Ile Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu
        35                  40                  45

Ser Ile Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His
    50                  55                  60

Tyr Val Asn Gln Asp Ala Pro Phe Gly Val Ile Asn Leu Asp Ile Thr
65                  70                  75                  80

Thr Glu Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu
                85                  90                  95

Phe Ala Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser
            100                 105                 110

Ile Lys Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu
        115                 120                 125
```

```
Val Pro Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln
    130                 135                 140

Trp Lys Thr Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His
145                 150                 155                 160

Asn Ile Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys
                165                 170                 175

Glu Gly Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala
            180                 185                 190

Leu Cys Trp Leu Val Pro Ile Asp Ala Ile Tyr Asn Tyr Ile Thr Gln
        195                 200                 205

Gln Asn Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr
    210                 215                 220

Val Ala Gly Thr Pro Lys Ala Ile Thr Val Lys Gln Gly Ile Glu Gln
225                 230                 235                 240

Lys Pro Val Glu Gln Arg Ile His Phe Ser Lys Lys Asn Ala Met Glu
                245                 250                 255

Ala Leu Ala Ala His Arg Val Cys Gly Val Pro Leu Glu Thr Leu Ala
            260                 265                 270

Arg Ser Arg Lys Pro Arg Asp Leu Pro Asp Asp Leu Ser Cys Ala Tyr
        275                 280                 285

Gln Ala Gln Asn Ile Val Ser Leu Phe Val Ala Thr Arg Ile Leu Phe
    290                 295                 300

Ser His Leu Asp Ser Val Phe Thr Leu Asn Leu Asp Glu Gln Glu Pro
305                 310                 315                 320

Glu Val Ala Glu Arg Leu Ser Ala Leu Arg Gln Ile Asn Glu Asn Asn
                325                 330                 335

Pro Gly Met Val Thr Gln Val Leu Thr Val Ala Arg Gln Ile Tyr Asn
            340                 345                 350
```

```
Asp Tyr Val Thr His His Pro Gly Leu Ile Pro Glu Gln Thr Ser Ala
        355                 360                 365

Gly Ala Gln Ala Ala Asp Ile Leu Ser Leu Phe Cys Pro Asp Ala Asp
    370                 375                 380

Lys Pro Cys Val Ala Ser Asn Asn Asp Gln Ala Asn Ile Asn Ile Glu
385                 390                 395                 400

Ser Arg Ser Gly Arg Ser Tyr Leu Pro Glu Asn Arg Ala Val Ile Thr
                405                 410                 415

Pro Gln Gly Val Thr Asn Trp Thr Tyr Gln Glu Leu Glu Ala Thr His
            420                 425                 430

Gln Ala Leu Thr Arg Glu Gly Tyr Val Phe Val Gly Tyr His Gly Thr
        435                 440                 445

Asn His Val Ala Ala Gln Thr Ile Val Asn Arg Ile Ala Pro Val Pro
    450                 455                 460

Arg Gly Asn Asn Thr Glu Asn Glu Glu Lys Trp Gly Gly Leu Tyr Val
465                 470                 475                 480

Ala Thr His Ala Glu Val Ala His Gly Tyr Ala Arg Ile Lys Glu Gly
                485                 490                 495

Thr Gly Glu Tyr Gly Leu Pro Thr Arg Ala Glu Arg Glu Ala Arg Gly
            500                 505                 510

Val Met Leu Arg Val Tyr Ile Pro Arg Ala Ser Leu Glu Arg Phe Tyr
        515                 520                 525

Arg Thr Asn Thr Pro Leu Glu Asn Ala Glu Arg His Ile Thr Gln Val
    530                 535                 540

Ile Gly His Ser Leu Pro Leu Arg Asn Glu Ala Phe Thr Gly Pro Glu
545                 550                 555                 560
```

Ser Ala Gly Gly Glu Asp Glu Thr Val Ile Gly Trp Asp Met Ala Ile
565 570 575

His Ala Val Ala Ile Pro Ser
580

<210> 91
<211> 583
<212> PRT
<213> Vibrio cholerae

<400> 91
Cys Ser Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser
1 5 10 15

Ile Pro Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met
20 25 30

Thr Ile Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu
35 40 45

Ser Ile Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His
50 55 60

Tyr Val Asn Gln Asp Ala Pro Phe Gly Val Ile Asn Leu Asp Ile Thr
65 70 75 80

Thr Glu Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu
85 90 95

Phe Ala Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser
100 105 110

Ile Lys Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu
115 120 125

Val Pro Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln
130 135 140

Trp Glu Asn Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His
145 150 155 160

```
Asn Ile Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys
                165                 170                 175

Glu Gly Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala
            180                 185                 190

Leu Cys Trp Leu Val Pro Ile Asp Ala Ile Tyr Asn Tyr Ile Thr Gln
        195                 200                 205

Gln Asn Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr
    210                 215                 220

Val Ala Gly Thr Pro Lys Ala Ile Thr Val Lys Gln Gly Ile Glu Gln
225                 230                 235                 240

Lys Thr Val Glu Gln Arg Ile His Phe Ser Lys Lys Asn Ala Met Glu
                245                 250                 255

Ala Leu Ala Ala His Arg Val Cys Gly Val Pro Leu Glu Thr Leu Ala
            260                 265                 270

Arg Ser Arg Lys Pro Arg Asp Leu Thr Asp Asp Leu Ser Cys Val Tyr
        275                 280                 285

Gln Ala Gln Asn Ile Val Ser Leu Phe Val Ala Thr Arg Ile Leu Phe
    290                 295                 300

Ser His Leu Asp Ser Val Phe Thr Leu Asn Leu Glu Glu Gln Glu Pro
305                 310                 315                 320

Glu Val Ala Glu Arg Leu Ser Ala Leu Arg Gln Ile Asn Glu Asn Asn
                325                 330                 335

Pro Gly Met Val Thr Gln Val Leu Thr Val Ala Arg Gln Ile Tyr Asn
            340                 345                 350

Asp Tyr Val Thr His His Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala
        355                 360                 365

Gly Ala Gln Ala Ala Asp Ile Leu Ser Leu Phe Cys Pro Asp Ala Asp
    370                 375                 380
```

```
Lys Ser Cys Val Ala Ser Asn Asn Asp Gln Ala Asn Ile Asn Ile Glu
385                 390                 395                 400

Ser Arg Ser Gly Arg Ser Tyr Leu Pro Glu Asn Arg Ala Val Ile Thr
                405                 410                 415

Pro Gln Gly Val Thr Asn Trp Thr Tyr Gln Glu Leu Glu Ala Thr His
            420                 425                 430

Gln Ala Leu Thr Arg Glu Gly Tyr Val Phe Val Gly Tyr His Gly Thr
        435                 440                 445

Asn His Val Ala Ala Gln Thr Ile Val Asn Arg Ile Ala Pro Val Pro
    450                 455                 460

Arg Gly Asn Asn Thr Glu Asn Glu Glu Lys Trp Gly Gly Leu Tyr Val
465                 470                 475                 480

Ala Thr His Ala Glu Val Ala His Gly Tyr Ala Arg Ile Lys Glu Gly
                485                 490                 495

Thr Gly Asn Gly Gly Leu Pro Thr Arg Ala Glu Arg Glu Thr Arg Gly
            500                 505                 510

Val Met Leu Arg Val Tyr Ile Pro Arg Ala Ser Leu Glu Arg Phe Tyr
        515                 520                 525

Arg Thr Asn Thr Pro Leu Glu Asn Ala Glu Glu His Ile Thr Asp Val
    530                 535                 540

Ile Gly His Ser Leu Pro Leu Arg Asn Glu Ala Phe Thr Gly Pro Glu
545                 550                 555                 560

Ser Ala Gly Gly Glu Asp Glu Thr Val Ile Gly Trp Asp Met Ala Ile
                565                 570                 575

His Ala Val Ala Ile Pro Ser
            580
```

<210> 92
<211> 583
<212> PRT
<213> Vibrio cholerae

<400> 92
Cys Ser Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser
1   5   10   15

Ile Pro Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met
            20   25   30

Thr Ile Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu
        35   40   45

Ser Ile Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His
    50   55   60

Tyr Val Asn Gln Asp Ala Pro Phe Gly Val Ile Asn Leu Asp Ile Thr
65   70   75   80

Thr Glu Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu
                85   90   95

Phe Ala Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser
            100   105   110

Ile Lys Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu
        115   120   125

Val Pro Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln
    130   135   140

Trp Glu Asn Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His
145   150   155   160

Asn Ile Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys
                165   170   175

Glu Gly Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala
            180   185   190

```
Leu Cys Trp Leu Val Pro Ile Asp Ala Ile Tyr Asn Tyr Ile Thr Gln
        195                 200                 205

Gln Asn Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr
    210                 215                 220

Val Ala Gly Thr Pro Lys Ala Ile Thr Val Lys Gln Gly Ile Glu Gln
225                 230                 235                 240

Lys Pro Val Glu Gln Arg Ile His Phe Ser Lys Lys Asn Ala Met Glu
                245                 250                 255

Ala Leu Ala Ala His Arg Val Cys Gly Val Pro Leu Glu Thr Leu Ala
            260                 265                 270

Arg Ser Arg Lys Pro Arg Asp Leu Pro Asp Asp Leu Ser Cys Ala Tyr
        275                 280                 285

Gln Ala Gln Asn Ile Val Ser Leu Phe Val Ala Thr Arg Ile Leu Phe
    290                 295                 300

Ser His Leu Asp Ser Val Phe Thr Leu Asn Leu Asp Glu Gln Glu Pro
305                 310                 315                 320

Ala Val Ala Glu Arg Leu Ser Ala Leu Arg Gln Ile Asn Glu Asn Asn
                325                 330                 335

Pro Gly Met Val Thr Gln Val Leu Thr Val Ala Arg Gln Ile Tyr Asn
            340                 345                 350

Asp Tyr Val Thr His His Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala
        355                 360                 365

Gly Ala Gln Ala Ala Asp Ile Leu Ser Leu Phe Cys Pro Asp Ala Asp
    370                 375                 380

Lys Ser Cys Val Ala Leu Asn Asn Asp Gln Ala Asn Ile Asn Ile Glu
385                 390                 395                 400

Ser Arg Ser Gly Arg Ser Tyr Leu Pro Glu Asn Arg Ala Val Ile Thr
                405                 410                 415
```

```
Pro Gln Gly Val Thr Asn Trp Thr Tyr Gln Glu Leu Glu Ala Thr His
            420                 425                 430

Gln Ala Leu Thr Arg Glu Gly Tyr Val Phe Val Gly Tyr His Gly Thr
        435                 440                 445

Asn His Val Ala Ala Gln Thr Ile Val Asn Arg Ile Ala Pro Val Pro
    450                 455                 460

Arg Gly Asn Asn Thr Glu Asn Glu Glu Lys Trp Gly Gly Leu Tyr Val
465                 470                 475                 480

Ala Thr His Ala Glu Val Ala His Gly Tyr Ala Arg Ile Lys Glu Gly
                485                 490                 495

Thr Gly Glu Tyr Gly Leu Pro Thr Arg Ala Glu Arg Asp Ala Arg Gly
            500                 505                 510

Val Met Leu Arg Val Tyr Ile Pro Arg Ala Ser Leu Glu Arg Phe Tyr
        515                 520                 525

Arg Thr Asn Thr Pro Leu Glu Asn Ala Glu Glu His Ile Thr Gln Val
    530                 535                 540

Ile Gly His Ser Leu Pro Leu Arg Asn Glu Ala Phe Thr Gly Pro Glu
545                 550                 555                 560

Ser Ala Gly Gly Glu Asp Glu Thr Val Ile Gly Trp Asp Met Ala Ile
                565                 570                 575

His Ala Val Ala Ile Pro Ser
            580
```

<210> 93
<211> 583
<212> PRT
<213> Vibrio cholerae

<400> 93

```
Cys Ser Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser
1               5                   10                  15
```

```
Ile Pro Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met
            20                  25                  30

Thr Ile Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu
        35                  40                  45

Ser Ile Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His
    50                  55                  60

Tyr Val Asn Gln Asp Ala Pro Phe Gly Val Ile Asn Leu Asp Ile Thr
65                  70                  75                  80

Thr Glu Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu
                85                  90                  95

Phe Ala Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser
            100                 105                 110

Ile Lys Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu
        115                 120                 125

Val Pro Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln
    130                 135                 140

Trp Glu Asn Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His
145                 150                 155                 160

Asn Ile Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys
                165                 170                 175

Glu Gly Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala
            180                 185                 190

Leu Cys Trp Leu Val Pro Ile Asp Ala Ile Tyr Asn Tyr Ile Thr Gln
        195                 200                 205

Gln Asn Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr
    210                 215                 220
```

```
Val Ala Gly Thr Pro Lys Ala Ile Met Val Lys Gln Gly Ile Glu Gln
225                 230                 235                 240

Lys Pro Val Glu Gln Arg Ile His Phe Ser Lys Lys Asn Ala Met Glu
                245                 250                 255

Ala Leu Ala Ala His Arg Val Cys Gly Val Pro Leu Glu Thr Leu Ala
            260                 265                 270

Arg Ser Arg Lys Pro Arg Tyr Leu Pro Asp Asp Leu Ser Cys Ala Tyr
        275                 280                 285

Gln Ala Gln Asn Ile Val Ser Leu Phe Val Ala Thr Arg Ile Leu Phe
    290                 295                 300

Ser His Leu Asp Ser Val Phe Thr Leu Asn Leu Asp Glu Gln Glu Pro
305                 310                 315                 320

Glu Val Ala Glu Arg Leu Ser Ala Leu Arg Gln Ile Asn Glu Asn Asn
                325                 330                 335

Pro Gly Met Val Thr Gln Val Leu Thr Val Ala Arg Gln Ile Tyr Asn
            340                 345                 350

Asp Tyr Val Thr His His Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala
        355                 360                 365

Gly Ala Gln Ala Ala Asp Ile Leu Ser Leu Phe Cys Pro Asp Ala Asp
    370                 375                 380

Lys Ser Cys Val Ala Ser Asn Asn Asp Gln Ala Asn Ile Asn Ile Glu
385                 390                 395                 400

Ser Arg Ser Gly Arg Ser Tyr Leu Pro Glu Asn Arg Ala Val Ile Thr
                405                 410                 415

Pro Gln Gly Val Thr Asn Trp Thr Tyr Gln Glu Leu Glu Ala Thr His
            420                 425                 430

Gln Ala Leu Thr Arg Glu Gly Tyr Val Phe Val Gly Tyr His Gly Thr
        435                 440                 445
```

```
Asn His Val Ala Ala Gln Thr Ile Val Asn Arg Ile Ala Pro Val Pro
    450                 455                 460

Arg Gly Asn Asn Thr Glu Asn Glu Glu Lys Trp Gly Gly Leu Tyr Val
465                 470                 475                 480

Ala Thr His Ala Glu Val Ala His Gly Tyr Ala Arg Ile Lys Glu Gly
                485                 490                 495

Thr Gly Glu Tyr Gly Leu Pro Thr Arg Ala Glu Arg Asp Ala Arg Gly
            500                 505                 510

Val Met Leu Arg Val Tyr Ile Pro Arg Ala Ser Leu Glu Arg Phe Tyr
        515                 520                 525

Arg Thr Asn Thr Pro Leu Glu Asn Ala Glu Glu His Ile Thr Gln Val
    530                 535                 540

Ile Gly His Ser Leu Pro Leu Arg Asn Glu Ala Phe Thr Gly Pro Glu
545                 550                 555                 560

Arg Val Asp Gly Glu Asp Glu Thr Val Ile Gly Trp Asp Met Ala Ile
                565                 570                 575

His Ala Val Ala Ile Pro Ser
            580
```

<210> 94
<211> 583
<212> PRT
<213> Vibrio cholerae

<400> 94

```
Cys Ser Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser
1               5                   10                  15

Ile Pro Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met
            20                  25                  30

Thr Ile Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu
        35                  40                  45
```

```
Ser Ile Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His
    50                  55                  60

Tyr Val Asn Gln Asp Ala Pro Phe Gly Val Ile Asn Leu Asp Ile Thr
65                  70                  75                  80

Thr Glu Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Asp Gly Glu
                85                  90                  95

Phe Ala Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser
            100                 105                 110

Ile Lys Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu
        115                 120                 125

Val Pro Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln
    130                 135                 140

Trp Lys Thr Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His
145                 150                 155                 160

Asn Ile Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys
                165                 170                 175

Glu Gly Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala
            180                 185                 190

Leu Cys Trp Leu Val Pro Ile Asp Ala Ile Tyr Asn Tyr Ile Thr Gln
        195                 200                 205

Gln Asn Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr
    210                 215                 220

Val Ala Gly Thr Pro Lys Ala Ile Thr Val Lys Gln Gly Ile Glu Gln
225                 230                 235                 240

Lys Pro Val Glu Gln Arg Ile His Phe Ser Lys Lys Asn Ala Met Glu
                245                 250                 255
```

```
Ala Leu Ala Ala His Arg Val Cys Gly Val Pro Leu Glu Thr Leu Ala
            260                 265                 270

Arg Ser Arg Lys Pro Arg Asp Leu Pro Asp Asp Leu Ser Cys Ala Tyr
        275                 280                 285

Gln Ala Gln Asn Ile Val Ser Leu Phe Val Ala Thr Arg Ile Leu Phe
    290                 295                 300

Ser His Leu Asp Ser Val Phe Thr Leu Asn Leu Asp Glu Gln Glu Pro
305                 310                 315                 320

Ala Val Ala Glu Arg Leu Ser Ala Ile Arg Gln Ile Asn Glu Asn Asn
                325                 330                 335

Pro Gly Met Val Thr Gln Val Leu Thr Val Ala Arg Gln Ile Tyr Asn
            340                 345                 350

Asp Tyr Val Thr His His Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala
        355                 360                 365

Gly Ala Gln Ala Ala Asp Ile Leu Ser Leu Phe Cys Pro Asp Ala Asp
    370                 375                 380

Lys Ser Cys Val Ala Ser Asp Asn Asp Gln Ala Asn Ile Asn Ile Glu
385                 390                 395                 400

Ser Arg Ser Gly Arg Ser Tyr Leu Pro Glu Asn Arg Ala Val Ile Thr
                405                 410                 415

Pro Gln Gly Val Thr Asn Trp Thr Tyr Gln Glu Leu Glu Ala Thr His
            420                 425                 430

Gln Ala Leu Thr Arg Glu Gly Tyr Val Phe Val Gly Tyr His Gly Thr
        435                 440                 445

Asn His Val Ala Ala Gln Thr Ile Val Asn Arg Ile Ala Pro Val Pro
    450                 455                 460

Arg Gly Asn Asn Thr Glu Asn Glu Glu Lys Trp Gly Gly Leu Tyr Val
465                 470                 475                 480
```

Ala Thr His Ala Glu Val Ala His Gly Tyr Ala Arg Ile Lys Glu Gly
485 490 495

Thr Gly Glu Tyr Gly Leu Pro Thr Arg Ala Glu Arg Asp Ala Arg Gly
500 505 510

Val Met Leu Arg Val Tyr Ile Pro Arg Ala Ser Leu Glu Arg Phe Tyr
515 520 525

Arg Thr Asn Thr Pro Leu Glu Asn Ala Glu Glu His Ile Thr Gln Val
530 535 540

Ile Gly His Ser Leu Pro Leu Arg Asn Glu Ala Phe Thr Gly Pro Glu
545 550 555 560

Ser Ala Gly Gly Glu Asp Glu Thr Val Ile Gly Trp Asp Met Ala Ile
565 570 575

His Ala Val Ala Ile Pro Ser
580

<210> 95
<211> 583
<212> PRT
<213> Vibrio cholerae

<400> 95
Cys Ser Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser
1 5 10 15

Ile Pro Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met
20 25 30

Thr Ile Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu
35 40 45

Ser Ile Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His
50 55 60

Tyr Val Asn Gln Asp Ala Pro Phe Gly Val Ile Asn Leu Asp Ile Thr
65 70 75 80

```
Thr Glu Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Asp Gly Glu
                85                  90                  95

Phe Ala Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser
            100                 105                 110

Ile Lys Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu
        115                 120                 125

Val Pro Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln
    130                 135                 140

Trp Lys Thr Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His
145                 150                 155                 160

Asn Ile Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys
                165                 170                 175

Glu Gly Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala
            180                 185                 190

Leu Cys Trp Leu Val Pro Ile Asp Ala Ile Tyr Asn Tyr Ile Thr Gln
        195                 200                 205

Gln Asn Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr
    210                 215                 220

Val Ala Gly Thr Pro Lys Ala Ile Thr Val Lys Gln Gly Ile Glu Gln
225                 230                 235                 240

Lys Pro Val Glu Gln Arg Ile His Phe Ser Lys Lys Asn Ala Met Glu
                245                 250                 255

Ala Leu Ala Ala His Arg Val Cys Gly Val Pro Leu Glu Thr Leu Ala
            260                 265                 270

Arg Ser Arg Lys Pro Arg Asp Leu Pro Asp Asp Leu Ser Cys Ala Tyr
        275                 280                 285
```

```
Gln Ala Gln Asn Ile Val Ser Leu Phe Val Ala Thr Arg Ile Leu Phe
    290                 295                 300

Ser His Leu Asp Ser Val Phe Thr Leu Asn Leu Asp Glu Gln Glu Pro
305                 310                 315                 320

Ala Val Ala Glu Arg Leu Ser Ala Leu Arg Gln Ile Asn Glu Asn Asn
                325                 330                 335

Pro Gly Met Val Thr Gln Val Leu Thr Val Ala Arg Gln Ile Tyr Asn
            340                 345                 350

Asp Tyr Val Thr His His Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala
        355                 360                 365

Gly Ala Gln Ala Ala Asp Ile Leu Ser Leu Phe Cys Pro Asp Ala Asp
    370                 375                 380

Lys Ser Cys Val Ala Ser Asp Asn Asp Gln Ala Asn Ile Asn Ile Glu
385                 390                 395                 400

Ser Arg Ser Gly Arg Ser Tyr Leu Pro Glu Asn Arg Ala Val Ile Thr
                405                 410                 415

Pro Gln Gly Val Thr Asn Trp Thr Tyr Gln Glu Leu Glu Ala Thr His
            420                 425                 430

Gln Ala Leu Thr Arg Glu Gly Tyr Val Phe Val Gly Tyr His Gly Thr
        435                 440                 445

Asn His Val Ala Ala Gln Thr Ile Val Asn Arg Ile Ala Pro Val Pro
    450                 455                 460

Arg Gly Asn Asn Thr Glu Asn Glu Glu Lys Trp Gly Gly Leu Tyr Val
465                 470                 475                 480

Ala Thr His Ala Glu Val Ala His Gly Tyr Ala Arg Ile Lys Glu Gly
                485                 490                 495

Thr Gly Glu Tyr Gly Leu Pro Thr Arg Ala Glu Arg Asp Ala Arg Gly
            500                 505                 510
```

Val Met Leu Arg Val Tyr Ile Pro Arg Ala Ser Leu Glu Arg Phe Tyr
515 520 525

Leu Thr Asn Thr Pro Leu Glu Asn Ala Glu Glu His Ile Thr Gln Val
530 535 540

Ile Gly His Ser Leu Pro Leu Arg Asn Glu Ala Phe Thr Gly Pro Glu
545 550 555 560

Ser Ala Gly Gly Glu Asp Glu Thr Val Ile Gly Trp Asp Met Ala Ile
565 570 575

His Ala Val Ala Ile Pro Ser
580

<210> 96
<211> 583
<212> PRT
<213> Vibrio cholerae

<400> 96
Cys Ser Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser
1 5 10 15

Ile Pro Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met
20 25 30

Thr Ile Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu
35 40 45

Ser Ile Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His
50 55 60

Tyr Val Asn Gln Asp Ala Pro Phe Gly Val Ile His Leu Asp Ile Thr
65 70 75 80

Thr Glu Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu
85 90 95

Phe Ala Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser
100 105 110

```
Ile Lys Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu
        115                 120                 125

Val Pro Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln
    130                 135                 140

Trp Lys Thr Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His
145                 150                 155                 160

Asn Ile Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys
                165                 170                 175

Glu Gly Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala
            180                 185                 190

Leu Cys Trp Leu Val Pro Met Asp Ala Ile Tyr Asn Tyr Ile Thr Gln
        195                 200                 205

Gln Asn Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr
    210                 215                 220

Val Ala Gly Thr Pro Lys Val Ile Thr Val Lys Gln Gly Ile Glu Gln
225                 230                 235                 240

Lys Pro Val Glu Gln Arg Ile His Phe Ser Lys Gly Asn Ala Met Ser
                245                 250                 255

Ala Leu Ala Ala His Arg Val Cys Gly Val Pro Leu Glu Thr Leu Ala
            260                 265                 270

Arg Ser Arg Lys Pro Arg Asp Leu Thr Asp Asp Leu Ser Cys Ala Tyr
        275                 280                 285

Gln Ala Gln Asn Ile Val Ser Leu Phe Val Ala Thr Arg Ile Leu Phe
    290                 295                 300

Ser His Leu Asp Ser Val Phe Thr Leu Asn Leu Asp Glu Gln Glu Pro
305                 310                 315                 320
```

```
Glu Val Ala Glu Arg Leu Ser Asp Leu Arg Arg Ile Asn Glu Asn Asn
                325                 330                 335

Pro Gly Met Val Thr Gln Val Leu Thr Val Ala Arg Gln Ile Tyr Asn
            340                 345                 350

Asp Tyr Val Thr His His Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala
        355                 360                 365

Gly Ala Gln Ala Ala Asp Ile Leu Ser Leu Phe Cys Pro Asp Ala Asp
    370                 375                 380

Lys Ser Cys Val Ala Ser Asn Asn Asp Gln Ala Asn Ile Asn Ile Glu
385                 390                 395                 400

Ser Arg Ser Gly Arg Ser Tyr Leu Pro Glu Asn Arg Ala Val Ile Thr
                405                 410                 415

Pro Gln Gly Val Thr Asn Trp Thr Tyr Gln Glu Leu Glu Ala Thr His
            420                 425                 430

Gln Ala Leu Thr Arg Glu Gly Tyr Val Phe Val Gly Tyr His Gly Thr
        435                 440                 445

Asn His Val Ala Ala Gln Thr Ile Val Asn Arg Ile Ala Pro Val Pro
    450                 455                 460

Arg Gly Asn Asn Thr Glu Asn Glu Glu Lys Trp Gly Gly Leu Tyr Val
465                 470                 475                 480

Ala Thr His Ala Glu Val Ala His Gly Tyr Ala Arg Ile Lys Glu Gly
                485                 490                 495

Thr Gly Glu Tyr Gly Leu Pro Thr Arg Ala Glu Arg Asp Ala Arg Gly
            500                 505                 510

Val Met Leu Arg Val Tyr Ile Pro Arg Ala Ser Leu Glu Arg Phe Tyr
        515                 520                 525

Arg Thr Asn Thr Pro Leu Glu Asn Ala Glu Glu His Ile Thr Gln Val
    530                 535                 540
```

```
Ile Gly His Ser Leu Pro Leu Arg Asn Glu Ala Phe Thr Gly Pro Glu
545                 550                 555                 560


Ser Ala Gly Gly Glu Asp Glu Thr Val Ile Gly Trp Asp Met Ala Ile
                565                 570                 575


His Ala Val Ala Ile Pro Ser
            580
```

<210> 97
<211> 583
<212> PRT
<213> Vibrio cholerae

<400> 97

```
Cys Ser Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser
1               5                   10                  15


Ile Pro Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met
            20                  25                  30


Thr Ile Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu
        35                  40                  45


Ser Ile Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His
    50                  55                  60


Tyr Val Asn Gln Asp Ala Pro Phe Gly Val Ile His Leu Asp Ile Thr
65                  70                  75                  80


Thr Glu Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu
                85                  90                  95


Phe Ala Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser
            100                 105                 110


Ile Lys Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu
        115                 120                 125


Val Pro Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln
    130                 135                 140
```

```
Trp Lys Thr Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His
145                 150                 155                 160

Asn Ile Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys
                165                 170                 175

Glu Gly Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala
            180                 185                 190

Leu Cys Trp Leu Val Pro Met Asp Ala Ile Tyr Asn Tyr Ile Thr Gln
        195                 200                 205

Gln Asn Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr
    210                 215                 220

Val Ala Gly Thr Pro Lys Val Ile Thr Val Lys Gln Gly Ile Glu Gln
225                 230                 235                 240

Lys Pro Val Glu Gln Arg Ile His Phe Ser Lys Gly Asn Ala Met Ser
                245                 250                 255

Ala Leu Ala Ala His Arg Val Cys Gly Val Pro Leu Glu Thr Leu Ala
            260                 265                 270

Arg Ser Arg Lys Pro Arg Asp Leu Thr Asp Asp Leu Ser Cys Ala Tyr
        275                 280                 285

Gln Ala Gln Asn Ile Val Ser Leu Phe Val Ala Thr Arg Ile Leu Phe
    290                 295                 300

Ser His Leu Asp Ser Val Phe Thr Leu Asn Leu Asp Glu Gln Glu Pro
305                 310                 315                 320

Glu Val Ala Glu Arg Leu Ser Asp Leu Arg Arg Ile Asn Glu Asn Asn
                325                 330                 335

Pro Gly Met Val Thr Gln Val Leu Thr Val Ala Arg Gln Ile Tyr Asn
            340                 345                 350
```

```
Asp Tyr Val Thr His His Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala
        355                 360                 365

Gly Ala Gln Ala Ala Asp Ile Leu Ser Leu Phe Cys Pro Asp Ala Asp
    370                 375                 380

Lys Ser Cys Val Ala Ser Asn Asn Asp Gln Ala Asn Ile Asn Ile Glu
385                 390                 395                 400

Ser Arg Ser Gly Arg Ser Tyr Leu Pro Glu Asn Arg Ala Val Ile Thr
                405                 410                 415

Pro Gln Gly Val Thr Asn Trp Thr Tyr Gln Glu Leu Glu Ala Thr His
            420                 425                 430

Gln Ala Leu Thr Arg Glu Gly Tyr Val Phe Val Gly Tyr His Gly Thr
        435                 440                 445

Asn His Val Ala Ala Gln Thr Ile Val Asn Arg Ile Ala Pro Val Pro
    450                 455                 460

Arg Gly Asn Asn Thr Glu Asn Glu Glu Lys Trp Gly Gly Leu Tyr Val
465                 470                 475                 480

Ala Thr His Ala Glu Val Ala His Gly Tyr Thr Arg Ile Lys Glu Gly
                485                 490                 495

Thr Gly Glu Tyr Gly Leu Pro Thr Arg Ala Glu Arg Asp Ala Arg Gly
            500                 505                 510

Val Met Leu Arg Val Tyr Ile Pro Arg Ala Ser Leu Glu Arg Phe Tyr
        515                 520                 525

Arg Thr Asn Thr Pro Leu Glu Asn Ala Glu Glu His Ile Thr Gln Val
    530                 535                 540

Ile Gly His Ser Leu Pro Leu Arg Asn Glu Ala Phe Thr Gly Pro Glu
545                 550                 555                 560

Ser Ala Gly Gly Glu Asp Glu Thr Val Ile Gly Trp Asp Met Ala Ile
                565                 570                 575
```

His Ala Val Ala Ile Pro Ser
580

<210> 98
<211> 583
<212> PRT
<213> Vibrio cholerae

<400> 98
Cys Ser Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser
1 5 10 15

Ile Pro Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met
20 25 30

Thr Ile Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu
35 40 45

Ser Ile Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His
50 55 60

Tyr Val Asn Gln Asp Ala Pro Phe Gly Val Ile His Leu Asp Ile Thr
65 70 75 80

Thr Glu Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu
85 90 95

Phe Ala Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser
100 105 110

Ile Lys Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu
115 120 125

Val Pro Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln
130 135 140

Trp Lys Thr Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His
145 150 155 160

Asn Ile Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys
165 170 175

```
Glu Gly Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala
            180                 185                 190

Leu Cys Trp Leu Val Pro Met Asp Ala Ile Tyr Asn Tyr Ile Thr Gln
        195                 200                 205

Gln Asn Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr
    210                 215                 220

Val Ala Gly Thr Pro Lys Val Ile Thr Val Lys Gln Gly Ile Glu Gln
225                 230                 235                 240

Lys Pro Val Glu Gln Arg Ile His Phe Ser Lys Gly Asn Ala Met Ser
                245                 250                 255

Ala Leu Ala Ala His Arg Val Cys Gly Val Pro Leu Glu Thr Leu Ala
            260                 265                 270

Arg Ser Arg Lys Pro Arg Asp Leu Thr Asp Asp Leu Ser Cys Ala Tyr
        275                 280                 285

Gln Ala Gln Asn Ile Val Ser Leu Phe Val Ala Thr Arg Ile Leu Phe
    290                 295                 300

Ser His Leu Asp Ser Val Phe Thr Leu Asn Leu Asp Glu Gln Glu Pro
305                 310                 315                 320

Glu Val Ala Glu Arg Leu Ser Asp Leu Arg Arg Ile Asn Glu Asn Asn
                325                 330                 335

Pro Gly Met Val Thr Gln Val Leu Thr Val Ala Arg Gln Ile Tyr Asn
            340                 345                 350

Asp Tyr Val Thr His His Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala
        355                 360                 365

Gly Ala Gln Ala Ala Asp Ile Leu Ser Leu Phe Tyr Pro Asp Ala Asp
    370                 375                 380
```

```
Lys Ser Cys Val Ala Ser Asn Asn Asp Gln Ala Asn Ile Asn Ile Glu
385                 390                 395                 400

Ser Arg Ser Gly Arg Ser Tyr Leu Pro Glu Asn Arg Ala Val Ile Thr
                405                 410                 415

Pro Gln Gly Val Thr Asn Trp Thr Tyr Gln Glu Leu Glu Ala Thr His
            420                 425                 430

Gln Ala Leu Thr Arg Glu Gly Tyr Val Phe Val Gly Tyr His Gly Thr
        435                 440                 445

Asn His Val Ala Ala Gln Thr Ile Val Asn Arg Ile Ala Pro Val Pro
    450                 455                 460

Arg Gly Asn Asn Thr Glu Asn Glu Glu Lys Trp Gly Gly Leu Tyr Val
465                 470                 475                 480

Ala Thr His Ala Glu Val Ala His Gly Tyr Ala Arg Ile Lys Glu Gly
                485                 490                 495

Thr Gly Glu Tyr Gly Leu Pro Thr Arg Ala Glu Arg Asp Ala Arg Gly
            500                 505                 510

Val Met Leu Arg Val Tyr Ile Pro Arg Ala Ser Leu Glu Arg Phe Tyr
        515                 520                 525

Arg Thr Asn Thr Pro Leu Glu Asn Ala Glu Glu His Ile Thr Gln Val
    530                 535                 540

Ile Gly His Ser Leu Pro Leu Arg Asn Glu Ala Phe Thr Gly Pro Glu
545                 550                 555                 560

Ser Ala Gly Gly Glu Asp Glu Thr Val Ile Gly Trp Asp Met Ala Ile
                565                 570                 575

His Ala Val Ala Ile Pro Ser
            580
```

<210> 99
<211> 583

<212> PRT
<213> Vibrio cholerae

<400> 99

```
Cys Ser Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser
1               5                  10                  15

Ile Pro Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met
            20                  25                  30

Thr Ile Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu
        35                  40                  45

Ser Ile Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His
    50                  55                  60

Tyr Val Asn Gln Asp Ala Pro Phe Gly Val Ile His Leu Asp Ile Thr
65                  70                  75                  80

Thr Glu Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu
                85                  90                  95

Phe Ala Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser
            100                 105                 110

Ile Lys Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu
        115                 120                 125

Val Pro Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln
    130                 135                 140

Trp Lys Thr Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His
145                 150                 155                 160

Asn Ile Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys
                165                 170                 175

Glu Gly Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala
            180                 185                 190

Leu Cys Trp Leu Val Pro Met Asp Ala Ile Tyr Asn Tyr Ile Thr Gln
        195                 200                 205
```

```
Gln Asn Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr
    210                 215                 220

Val Ala Gly Thr Pro Lys Val Ile Thr Val Lys Gln Gly Ile Glu Gln
225                 230                 235                 240

Lys Pro Val Glu Gln Arg Ile His Phe Ser Lys Gly Asn Ala Met Ser
                245                 250                 255

Ala Leu Ala Ala His Arg Val Cys Gly Val Pro Leu Glu Thr Leu Ala
            260                 265                 270

Arg Ser Arg Lys Pro Arg Asp Leu Thr Asp Asp Leu Ser Cys Ala Tyr
        275                 280                 285

Gln Ala Gln Asn Ile Val Ser Leu Phe Val Ala Thr Arg Ile Leu Phe
    290                 295                 300

Ser His Leu Asp Ser Val Phe Thr Leu Asn Leu Asp Glu Gln Glu Pro
305                 310                 315                 320

Glu Val Ala Glu Arg Leu Ser Asp Leu Arg Arg Ile Asn Glu Asn Asn
                325                 330                 335

Pro Gly Met Val Thr Gln Val Leu Thr Val Ala Arg Gln Ile Tyr Asn
            340                 345                 350

Asp Tyr Val Thr His His Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala
        355                 360                 365

Gly Ala Gln Ala Ala Asp Ile Leu Ser Leu Phe Cys Pro Asp Ala Asp
    370                 375                 380

Lys Ser Cys Val Ala Ser Asn Asn Asp Gln Ala Asn Ile Asn Ile Glu
385                 390                 395                 400

Ser Arg Ser Gly Arg Ser Tyr Leu Pro Glu Asn Arg Ala Val Ile Thr
                405                 410                 415
```

```
Pro Gln Gly Val Thr Asn Trp Thr Tyr Gln Glu Leu Glu Ala Thr His
            420                 425                 430

Gln Ala Leu Thr Arg Glu Gly Tyr Val Phe Val Gly Tyr His Gly Thr
        435                 440                 445

Asn His Val Ala Ala Gln Thr Ile Val Asn Arg Ile Ala Pro Val Pro
    450                 455                 460

Arg Gly Asn Asn Thr Glu Asn Glu Glu Lys Trp Gly Gly Leu Tyr Val
465                 470                 475                 480

Ala Thr His Ala Glu Val Ala His Gly Tyr Ala Arg Ile Lys Glu Gly
                485                 490                 495

Thr Gly Asn Gly Gly Leu Pro Thr Arg Ala Glu Arg Glu Thr Arg Gly
            500                 505                 510

Val Met Leu Arg Val Tyr Ile Pro Arg Ala Ser Leu Glu Arg Phe Tyr
        515                 520                 525

Arg Thr Asn Thr Pro Leu Glu Asn Ala Glu Glu His Ile Thr Gln Val
    530                 535                 540

Ile Gly His Ser Leu Pro Leu Arg Asn Glu Ala Phe Thr Gly Pro Glu
545                 550                 555                 560

Ser Ala Gly Gly Glu Asp Glu Thr Val Ile Gly Trp Asp Met Ala Ile
                565                 570                 575

His Ala Val Ala Ile Pro Ser
            580
```

<210> 100
<211> 583
<212> PRT
<213> Vibrio cholerae

<400> 100

```
Cys Ser Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser
1               5                   10                  15
```

```
Ile Pro Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met
            20                  25                  30

Thr Ile Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu
        35                  40                  45

Ser Ile Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His
    50                  55                  60

Tyr Val Asn Gln Asp Ala Pro Phe Gly Val Ile His Leu Asp Ile Thr
65                  70                  75                  80

Thr Glu Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu
                85                  90                  95

Phe Ala Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser
            100                 105                 110

Ile Lys Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu
        115                 120                 125

Val Pro Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln
    130                 135                 140

Trp Glu Asn Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His
145                 150                 155                 160

Asn Ile Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys
                165                 170                 175

Glu Gly Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala
            180                 185                 190

Leu Cys Trp Leu Val Pro Met Asp Ala Ile Tyr Asn Tyr Ile Thr Gln
        195                 200                 205

Lys Asn Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr
    210                 215                 220

Val Ala Gly Thr Pro Lys Val Ile Thr Val Lys Gln Gly Ile Glu Gln
225                 230                 235                 240
```

```
Lys Pro Val Glu Gln Arg Ile His Phe Ser Lys Gly Asn Ala Met Ser
                245                 250                 255

Ala Leu Ala Ala His Arg Val Cys Gly Val Pro Leu Glu Thr Leu Ala
            260                 265                 270

Arg Ser Arg Lys Pro Arg Asp Leu Thr Asp Asp Leu Ser Cys Ala Tyr
        275                 280                 285

Gln Ala Gln Asn Ile Val Ser Leu Phe Val Ala Thr Arg Ile Leu Phe
    290                 295                 300

Ser His Leu Asp Ser Val Phe Thr Leu Asn Leu Asp Glu Gln Glu Pro
305                 310                 315                 320

Glu Val Ala Glu Arg Leu Ser Asp Leu Arg Arg Ile Asn Glu Asn Asn
                325                 330                 335

Pro Gly Met Val Thr Gln Val Leu Thr Val Ala Arg Gln Ile Tyr Asn
            340                 345                 350

Asp Tyr Val Thr His His Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala
        355                 360                 365

Gly Ala Gln Ala Ala Asp Ile Leu Ser Leu Phe Cys Pro Asp Ala Asp
    370                 375                 380

Lys Ser Cys Val Ala Ser Asn Asn Asp Gln Ala Asn Ile Asn Ile Glu
385                 390                 395                 400

Ser Arg Ser Gly Arg Ser Tyr Leu Pro Glu Asn Arg Ala Val Ile Thr
                405                 410                 415

Pro Gln Gly Val Thr Asn Trp Thr Tyr Gln Glu Leu Glu Ala Thr His
            420                 425                 430

Gln Ala Leu Thr Arg Glu Gly Tyr Val Phe Val Gly Tyr His Gly Thr
        435                 440                 445
```

```
Asn His Val Ala Ala Gln Thr Ile Val Asn Arg Ile Ala Pro Val Pro
    450                 455                 460

Arg Gly Asn Asn Thr Glu Asn Glu Glu Lys Trp Gly Gly Leu Tyr Val
465                 470                 475                 480

Ala Thr His Ala Glu Val Ala His Gly Tyr Ala Arg Ile Lys Glu Gly
                485                 490                 495

Thr Gly Glu Tyr Gly Leu Pro Thr Arg Ala Glu Arg Asp Ala Arg Gly
            500                 505                 510

Val Met Leu Arg Val Tyr Ile Pro Arg Ala Ser Leu Glu Arg Phe Tyr
        515                 520                 525

Arg Thr Asn Thr Pro Leu Glu Asn Ala Glu Glu His Ile Thr Gln Val
    530                 535                 540

Ile Gly His Ser Leu Pro Leu Arg Asn Glu Ala Phe Thr Gly Pro Glu
545                 550                 555                 560

Ser Ala Gly Gly Glu Asp Glu Thr Val Ile Gly Trp Asp Met Ala Ile
                565                 570                 575

His Ala Val Ala Ile Pro Ser
            580
```

<210> 101
<211> 583
<212> PRT
<213> Vibrio cholerae

<400> 101

```
Cys Ser Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser
1               5                   10                  15

Ile Pro Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met
            20                  25                  30

Thr Ile Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu
        35                  40                  45
```

```
Ser Ile Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His
    50                  55                  60

Tyr Val Asn Gln Asp Ala Pro Phe Gly Val Ile His Leu Asp Ile Thr
65                  70                  75                  80

Thr Glu Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu
                85                  90                  95

Phe Ala Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser
            100                 105                 110

Ile Lys Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu
        115                 120                 125

Val Pro Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln
    130                 135                 140

Trp Glu Asn Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His
145                 150                 155                 160

Asn Ile Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys
                165                 170                 175

Glu Gly Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala
            180                 185                 190

Leu Cys Trp Leu Val Pro Ile Asp Ala Ile Tyr Asn Tyr Ile Thr Gln
        195                 200                 205

Gln Asn Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr
    210                 215                 220

Val Ala Gly Thr Pro Lys Ala Ile Thr Val Lys Gln Gly Ile Glu Gln
225                 230                 235                 240

Lys Pro Val Glu Gln Arg Ile His Phe Ser Lys Lys Asn Ala Met Glu
                245                 250                 255

Ala Leu Ala Ala His Arg Val Cys Gly Val Pro Leu Glu Thr Leu Ala
            260                 265                 270
```

```
Arg Ser Arg Lys Pro Arg Asp Leu Pro Asp Asp Leu Ser Cys Ala Tyr
        275                 280                 285

Gln Ala Gln Asn Ile Val Ser Leu Phe Val Ala Thr Arg Ile Leu Phe
    290                 295                 300

Ser His Leu Asp Ser Val Phe Thr Leu Asn Leu Asp Glu Gln Glu Pro
305                 310                 315                 320

Glu Val Ala Glu Arg Leu Ser Ala Leu Arg Gln Ile Asn Glu Asn Asn
                325                 330                 335

Pro Gly Met Val Thr Gln Val Leu Thr Val Ala Arg Gln Ile Tyr Asn
            340                 345                 350

Asp Tyr Val Thr His His Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala
        355                 360                 365

Gly Ala Gln Ala Ala Asp Ile Leu Ser Leu Phe Cys Pro Asp Ala Asp
    370                 375                 380

Lys Ser Cys Val Ala Ser Asn Asn Asp Gln Ala Asn Ile Asn Ile Glu
385                 390                 395                 400

Ser Arg Ser Gly Arg Ser Tyr Leu Pro Glu Asn Arg Ala Val Ile Thr
                405                 410                 415

Pro Gln Gly Val Thr Asn Trp Thr Tyr Gln Glu Leu Glu Ala Thr His
            420                 425                 430

Gln Ala Leu Thr Arg Glu Gly Tyr Val Phe Val Gly Tyr His Gly Thr
        435                 440                 445

Asn His Val Ala Ala Gln Thr Ile Val Asn Arg Ile Ala Pro Val Pro
    450                 455                 460

Arg Gly Asn Asn Thr Glu Asn Glu Glu Lys Trp Gly Gly Leu Tyr Val
465                 470                 475                 480
```

Ala Thr His Ala Glu Val Ala His Gly Tyr Ala Arg Ile Lys Glu Gly
485 490 495

Thr Gly Glu Tyr Gly Leu Pro Thr Arg Ala Glu Arg Asp Ala Arg Gly
500 505 510

Val Met Leu Arg Val Tyr Ile Pro Arg Ala Ser Leu Glu Arg Phe Tyr
515 520 525

Arg Thr Asn Thr Pro Leu Glu Asn Ala Glu Glu His Ile Thr Gln Val
530 535 540

Ile Gly His Ser Leu Pro Leu Arg Asn Glu Ala Phe Thr Gly Pro Glu
545 550 555 560

Ser Ala Gly Gly Glu Asp Glu Thr Val Ile Gly Trp Asp Met Ala Ile
565 570 575

His Ala Val Ala Ile Pro Ser
580

<210> 102
<211> 583
<212> PRT
<213> Vibrio cholerae

<400> 102
Cys Ser Leu Thr Pro Glu Leu Gly Lys Pro Ile Gln Ser Lys Leu Ser
1 5 10 15

Ile Ser Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met
20 25 30

Thr Ile Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu
35 40 45

Ser Ile Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His
50 55 60

Tyr Val Asn Gln Asp Ala Pro Phe Gly Val Ile Asn Leu Asp Ile Thr
65 70 75 80

```
Thr Glu Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu
                85                  90                  95

Phe Ala Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser
            100                 105                 110

Ile Lys Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu
        115                 120                 125

Val Pro Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln
    130                 135                 140

Trp Lys Thr Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His
145                 150                 155                 160

Asn Ile Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys
                165                 170                 175

Glu Gly Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala
            180                 185                 190

Leu Cys Trp Leu Val Pro Ile Asp Ala Ile Tyr Asn Tyr Ile Thr Gln
        195                 200                 205

Gln Asn Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr
    210                 215                 220

Val Ala Gly Thr Pro Lys Ala Ile Thr Val Lys Gln Gly Ile Glu Gln
225                 230                 235                 240

Lys Pro Val Glu Gln Arg Ile His Phe Ser Lys Lys Asn Ala Met Glu
                245                 250                 255

Ala Leu Ala Ala His Arg Val Cys Gly Val Pro Leu Glu Thr Leu Ala
            260                 265                 270

Arg Ser Arg Lys Pro Arg Asp Leu Pro Asp Asp Leu Ser Cys Ala Tyr
        275                 280                 285

Gln Ala Gln Asn Ile Val Ser Leu Phe Val Ala Thr Arg Ile Leu Phe
    290                 295                 300
```

```
Ser His Leu Asp Ser Val Phe Thr Leu Asn Leu Asp Glu Gln Glu Pro
305                 310                 315                 320

Glu Val Ala Glu Arg Leu Ser Ala Leu Arg Gln Ile Asn Glu Asn Asn
                325                 330                 335

Pro Gly Met Val Thr Gln Val Leu Thr Val Ala Arg Gln Ile Tyr Asn
            340                 345                 350

Asp Tyr Val Thr His His Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala
        355                 360                 365

Gly Ala Gln Ala Ala Asp Ile Leu Ser Leu Phe Cys Pro Asp Ala Asp
    370                 375                 380

Lys Pro Cys Val Ala Ser Asn Asn Asp Gln Ala Asn Ile Asn Val Glu
385                 390                 395                 400

Ser Arg Ser Gly Arg Ser Tyr Leu Pro Glu Asn Arg Ala Val Ile Thr
                405                 410                 415

Pro Gln Gly Val Thr Asn Trp Thr Tyr Gln Glu Leu Glu Ala Thr His
            420                 425                 430

Gln Ala Leu Thr Arg Glu Gly Tyr Val Phe Val Gly Tyr His Gly Thr
        435                 440                 445

Asn His Val Ala Ala Gln Thr Ile Val Asn Arg Ile Ala Pro Val Pro
    450                 455                 460

Arg Gly Asn Asn Thr Glu Asn Glu Glu Lys Trp Gly Gly Leu Tyr Val
465                 470                 475                 480

Ala Thr His Ala Glu Val Ala His Gly Tyr Ala Arg Ile Lys Glu Gly
                485                 490                 495

Thr Gly Glu Tyr Gly Leu Pro Thr Arg Ala Glu Arg Asp Ala Arg Gly
            500                 505                 510
```

Val Met Leu Arg Val Tyr Ile Pro Arg Ala Ser Leu Glu Arg Phe Tyr
515 520 525

Arg Thr Asn Thr Pro Leu Glu Asn Ala Glu Arg His Ile Thr Gln Val
530 535 540

Ile Gly His Ser Leu Pro Leu Arg Asn Glu Ala Phe Thr Gly Pro Glu
545 550 555 560

Ser Ala Gly Gly Glu Asp Glu Thr Val Ile Gly Trp Asp Met Ala Ile
565 570 575

His Ala Val Ala Ile Pro Ser
580

<210> 103
<211> 583
<212> PRT
<213> Vibrio cholerae

<400> 103
Cys Ser Leu Thr Pro Glu Leu Gly Lys Pro Ile Gln Ser Lys Leu Ser
1 5 10 15

Ile Pro Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met
20 25 30

Thr Ile Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu
35 40 45

Ser Ile Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His
50 55 60

Tyr Val Asn Gln Asp Ala Pro Phe Gly Val Ile Asn Leu Asp Ile Thr
65 70 75 80

Thr Glu Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu
85 90 95

Phe Ala Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser
100 105 110

```
Ile Lys Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu
        115                 120                 125

Val Pro Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln
    130                 135                 140

Trp Lys Thr Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His
145                 150                 155                 160

Asn Ile Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys
                165                 170                 175

Glu Gly Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala
            180                 185                 190

Leu Cys Trp Leu Val Pro Ile Asp Ala Ile Tyr Asn Tyr Ile Thr Gln
        195                 200                 205

Gln Asn Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr
    210                 215                 220

Val Ala Gly Thr Pro Lys Ala Ile Thr Val Lys Gln Gly Ile Glu Gln
225                 230                 235                 240

Lys Pro Val Glu Gln Arg Ile His Phe Ser Lys Lys Asn Ala Met Glu
                245                 250                 255

Ala Leu Ala Ala His Arg Val Cys Gly Val Pro Leu Glu Thr Leu Ala
            260                 265                 270

Arg Ser Arg Lys Pro Arg Asp Leu Pro Asp Asp Leu Ser Cys Ala Tyr
        275                 280                 285

Gln Ala Gln Asn Ile Val Ser Leu Phe Val Ala Thr Arg Ile Leu Phe
    290                 295                 300

Ser His Leu Asp Ser Val Phe Thr Leu Asn Leu Asp Glu Gln Glu Pro
305                 310                 315                 320

Glu Val Ala Glu Arg Leu Ser Ala Leu Arg Gln Ile Asn Glu Asn Asn
                325                 330                 335
```

```
Pro Gly Met Val Thr Gln Val Leu Thr Val Ala Arg Gln Ile Tyr Asn
            340                 345                 350

Asp Tyr Val Thr His His Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala
        355                 360                 365

Gly Ala Gln Ala Ala Asp Ile Leu Ser Leu Phe Cys Pro Asp Ala Asp
    370                 375                 380

Lys Ser Cys Val Ala Ser Asn Asn Asp Gln Ala Asn Ile Asn Ile Glu
385                 390                 395                 400

Ser Arg Ser Gly Arg Ser Tyr Leu Pro Glu Asn Arg Ala Val Ile Thr
                405                 410                 415

Pro Gln Gly Val Thr Asn Trp Thr Tyr Gln Glu Leu Glu Ala Thr His
            420                 425                 430

Gln Ala Leu Thr Arg Glu Gly Tyr Val Phe Val Gly Tyr His Gly Thr
        435                 440                 445

Asn His Val Ala Ala Gln Thr Ile Val Asn Arg Ile Ala Pro Val Pro
    450                 455                 460

Arg Gly Asn Asn Thr Glu Asn Glu Glu Lys Trp Gly Gly Leu Tyr Val
465                 470                 475                 480

Ala Thr His Ala Glu Val Ala His Gly Tyr Ala Arg Ile Lys Glu Gly
                485                 490                 495

Thr Gly Glu Tyr Gly Leu Pro Thr Arg Ala Glu Arg Asp Ala Arg Gly
            500                 505                 510

Val Met Leu Arg Val Tyr Ile Pro Arg Ala Ser Leu Glu Arg Phe Tyr
        515                 520                 525

Arg Thr Asn Thr Pro Leu Glu Asn Ala Glu Glu His Ile Thr Gln Val
    530                 535                 540
```

```
Ile Gly His Ser Leu Pro Leu Arg Asn Glu Ala Phe Thr Gly Pro Glu
545                 550                 555                 560


Ser Ala Gly Gly Glu Asp Glu Thr Val Ile Gly Trp Asp Met Ala Ile
                565                 570                 575


His Ala Val Ala Ile Pro Ser
            580


<210> 104
<211> 583
<212> PRT
<213> Vibrio cholerae

<400> 104
Cys Ser Leu Thr Pro Glu Leu Gly Lys Pro Ile Gln Ser Lys Leu Ser
1               5                   10                  15


Ile Pro Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met
            20                  25                  30


Thr Ile Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu
        35                  40                  45


Ser Ile Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His
    50                  55                  60


Tyr Val Asn Gln Asp Ala Pro Phe Gly Val Ile Asn Leu Asp Ile Thr
65                  70                  75                  80


Thr Glu Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu
                85                  90                  95


Phe Ala Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser
            100                 105                 110


Ile Lys Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu
        115                 120                 125


Val Pro Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln
    130                 135                 140
```

```
Trp Lys Thr Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His
145                 150                 155                 160

Asn Ile Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys
                165                 170                 175

Glu Gly Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala
            180                 185                 190

Leu Cys Trp Leu Val Pro Ile Asp Ala Ile Tyr Asn Tyr Ile Thr Gln
        195                 200                 205

Gln Asn Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr
    210                 215                 220

Val Ala Gly Thr Pro Lys Ala Ile Thr Val Lys Gln Gly Ile Glu Gln
225                 230                 235                 240

Lys Pro Val Glu Gln Arg Ile His Phe Ser Lys Lys Asn Ala Met Glu
                245                 250                 255

Ala Leu Ala Ala His Arg Val Cys Gly Val Pro Leu Glu Thr Leu Ala
            260                 265                 270

Arg Ser Arg Lys Pro Arg Asp Leu Pro Asp Asp Leu Ser Cys Ala Tyr
        275                 280                 285

Gln Ala Gln Asn Ile Val Ser Leu Phe Val Ala Thr Arg Ile Leu Phe
    290                 295                 300

Ser His Leu Asp Ser Val Phe Thr Leu Asn Leu Glu Glu Gln Glu Pro
305                 310                 315                 320

Glu Val Ala Glu Arg Leu Ser Ala Leu Arg Gln Ile Asn Glu Asn Asn
                325                 330                 335

Pro Gly Met Val Thr Gln Val Leu Thr Val Ala Arg Gln Ile Tyr Asn
            340                 345                 350

Asp Tyr Val Thr His His Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala
        355                 360                 365
```

```
Gly Ala Gln Ala Ala Asp Ile Leu Ser Leu Phe Cys Pro Asp Ala Asp
    370                 375                 380

Lys Ser Cys Val Ala Ser Asn Asn Asp Gln Ala Asn Ile Asn Ile Glu
385                 390                 395                 400

Ser Arg Ser Gly Arg Ser Tyr Leu Pro Glu Asn Arg Ala Val Ile Thr
                405                 410                 415

Pro Gln Gly Val Thr Asn Trp Thr Tyr Gln Glu Leu Glu Ala Thr His
            420                 425                 430

Gln Ala Leu Thr Arg Glu Gly Tyr Val Phe Val Gly Tyr His Gly Thr
        435                 440                 445

Asn His Val Ala Ala Gln Thr Ile Val Asn Arg Ile Ala Pro Val Pro
    450                 455                 460

Arg Gly Asn Asn Thr Glu Asn Glu Glu Lys Trp Gly Gly Leu Tyr Val
465                 470                 475                 480

Ala Thr His Ala Glu Val Ala His Gly Tyr Ala Arg Ile Lys Glu Gly
                485                 490                 495

Thr Gly Glu Tyr Gly Leu Pro Thr Arg Ala Glu Arg Asp Ala Arg Gly
            500                 505                 510

Val Met Leu Arg Val Tyr Ile Pro Arg Ala Ser Leu Glu Arg Phe Tyr
        515                 520                 525

Arg Thr Asn Thr Pro Leu Glu Asn Ala Glu Glu His Ile Thr Gln Val
    530                 535                 540

Ile Gly His Ser Leu Pro Leu Arg Asn Glu Ala Phe Thr Gly Pro Glu
545                 550                 555                 560

Ser Ala Gly Gly Glu Asp Glu Thr Val Ile Gly Trp Asp Met Ala Ile
                565                 570                 575
```

His Ala Val Ala Ile Pro Ser
580

<210> 105
<211> 583
<212> PRT
<213> Vibrio cholerae

<400> 105
Cys Ser Leu Thr Pro Glu Leu Gly Lys Pro Ile Gln Ser Lys Leu Ser
1 5 10 15

Ile Pro Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met
20 25 30

Thr Ile Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu
35 40 45

Ser Ile Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His
50 55 60

Tyr Val Asn Gln Asp Ala Pro Phe Gly Val Ile Asn Leu Asp Ile Thr
65 70 75 80

Thr Glu Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu
85 90 95

Phe Ala Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser
100 105 110

Ile Lys Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu
115 120 125

Val Pro Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln
130 135 140

Trp Lys Thr Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His
145 150 155 160

Asn Ile Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys
165 170 175

```
Glu Gly Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala
            180                 185                 190

Leu Cys Trp Leu Val Pro Ile Asp Ala Ile Tyr Asn Tyr Ile Thr Gln
        195                 200                 205

Gln Asn Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr
    210                 215                 220

Val Ala Gly Thr Pro Lys Ala Ile Thr Val Lys Gln Gly Ile Glu Gln
225                 230                 235                 240

Lys Pro Val Glu Gln Arg Ile His Phe Ser Lys Lys Asn Ala Met Glu
                245                 250                 255

Ala Leu Ala Ala His Arg Val Cys Gly Val Pro Leu Glu Thr Leu Ala
            260                 265                 270

Arg Ser Arg Lys Pro Arg Asp Leu Pro Asp Asp Leu Ser Cys Ala Tyr
        275                 280                 285

Gln Ala Gln Asn Ile Val Ser Leu Phe Val Ala Thr Arg Ile Leu Phe
    290                 295                 300

Ser His Leu Asp Ser Val Phe Thr Leu Asn Leu Asp Glu Gln Glu Pro
305                 310                 315                 320

Ala Val Ala Glu Arg Leu Ser Ala Leu Arg Gln Ile Asn Glu Asn Asn
                325                 330                 335

Pro Gly Met Val Thr Gln Val Leu Thr Val Ala Arg Gln Ile Tyr Asn
            340                 345                 350

Asp Tyr Val Thr His His Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala
        355                 360                 365

Gly Ala Gln Ala Ala Asp Ile Leu Ser Leu Phe Cys Pro Asp Ala Asp
    370                 375                 380

Lys Ser Cys Val Ala Ser Asp Asn Asp Gln Ala Asn Ile Asn Ile Glu
385                 390                 395                 400
```

```
Ser Arg Ser Gly Arg Ser Tyr Leu Pro Glu Asn Arg Ala Val Ile Thr
                405                 410                 415

Pro Gln Gly Val Thr Asn Trp Thr Tyr Gln Glu Leu Glu Ala Thr His
            420                 425                 430

Gln Ala Leu Thr Arg Glu Gly Tyr Val Phe Val Gly Tyr His Gly Thr
        435                 440                 445

Asn His Val Ala Ala Gln Thr Ile Val Asn Arg Ile Ala Pro Val Pro
    450                 455                 460

Arg Gly Asn Asn Thr Glu Asn Glu Glu Lys Trp Gly Gly Leu Tyr Val
465                 470                 475                 480

Ala Thr His Ala Glu Val Ala His Gly Tyr Ala Arg Ile Lys Glu Gly
                485                 490                 495

Thr Gly Glu Tyr Gly Leu Pro Thr Arg Ala Glu Arg Asp Ala Arg Gly
            500                 505                 510

Val Met Leu Arg Val Tyr Ile Pro Arg Ala Ser Leu Glu Arg Phe Tyr
        515                 520                 525

Arg Thr Asn Thr Pro Leu Glu Asn Ala Glu Glu His Ile Thr Gln Val
    530                 535                 540

Ile Gly His Ser Leu Pro Leu Arg Asn Glu Ala Phe Thr Gly Pro Glu
545                 550                 555                 560

Ser Ala Gly Gly Glu Asp Glu Thr Val Ile Gly Trp Asp Met Ala Ile
                565                 570                 575

His Ala Val Ala Ile Pro Ser
            580
```

<210> 106
<211> 583
<212> PRT
<213> Vibrio cholerae

<400> 106

```
Cys Ser Leu Thr Pro Glu Leu Gly Lys Pro Ile Gln Ser Lys Leu Ser
1               5                  10                  15

Ile Pro Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met
            20                  25                  30

Thr Ile Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu
        35                  40                  45

Ser Ile Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His
    50                  55                  60

Tyr Val Asn Gln Asp Ala Pro Phe Gly Val Ile Asn Leu Asp Ile Thr
65                  70                  75                  80

Thr Glu Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu
                85                  90                  95

Phe Ala Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser
            100                 105                 110

Ile Lys Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu
        115                 120                 125

Val Pro Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln
    130                 135                 140

Trp Lys Thr Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His
145                 150                 155                 160

Asn Ile Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys
                165                 170                 175

Glu Gly Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala
            180                 185                 190

Leu Cys Trp Leu Val Pro Ile Asp Ala Ile Tyr Asn Tyr Ile Thr Gln
        195                 200                 205
```

```
Gln Asn Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr
    210                 215                 220

Val Ala Gly Thr Pro Lys Ala Ile Thr Val Lys Gln Gly Ile Glu Gln
225                 230                 235                 240

Lys Pro Val Glu Gln Arg Ile His Phe Ser Lys Lys Asn Ala Met Glu
                245                 250                 255

Ala Leu Ala Ala His Arg Val Cys Gly Val Pro Leu Glu Thr Leu Ala
            260                 265                 270

Arg Ser Arg Lys Pro Arg Asp Leu Pro Asp Asp Leu Ser Cys Ala Tyr
        275                 280                 285

Gln Ala Gln Asn Ile Val Ser Leu Phe Val Ala Thr Arg Ile Leu Phe
    290                 295                 300

Ser His Leu Asp Ser Val Phe Thr Leu Asn Leu Asp Glu Gln Glu Pro
305                 310                 315                 320

Glu Val Ala Glu Arg Leu Ser Ala Leu Arg Gln Ile Asn Glu Asn Asn
                325                 330                 335

Pro Gly Met Val Thr Gln Val Leu Thr Val Ala Arg Gln Ile Tyr Asn
            340                 345                 350

Asp Tyr Val Thr His His Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala
        355                 360                 365

Gly Ala Gln Ala Ala Asp Ile Leu Ser Leu Phe Cys Pro Asp Ala Asp
    370                 375                 380

Lys Pro Cys Val Ala Ser Asn Asn Asp Gln Ala Asn Ile Asn Val Glu
385                 390                 395                 400

Ser Arg Ser Gly Arg Ser Tyr Leu Pro Glu Asn Arg Ala Val Ile Thr
                405                 410                 415

Pro Gln Gly Val Thr Asn Trp Thr Tyr Gln Glu Leu Glu Ala Thr His
            420                 425                 430
```

```
Gln Ala Leu Thr Arg Glu Gly Tyr Val Phe Val Gly Tyr His Gly Thr
        435                 440                 445

Asn His Val Ala Ala Gln Thr Ile Val Asn Arg Ile Ala Pro Val Pro
    450                 455                 460

Arg Gly Asn Asn Thr Glu Asn Glu Glu Lys Trp Gly Gly Leu Tyr Val
465                 470                 475                 480

Ala Thr His Ala Glu Val Ala His Gly Tyr Ala Arg Ile Lys Glu Gly
                485                 490                 495

Thr Gly Glu Tyr Gly Leu Pro Thr Arg Ala Glu Arg Glu Ala Arg Gly
            500                 505                 510

Val Met Leu Arg Val Tyr Ile Pro Arg Ala Ser Leu Glu Arg Phe Tyr
        515                 520                 525

Arg Thr Asn Thr Pro Leu Glu Asn Ala Glu Arg His Ile Thr Gln Val
    530                 535                 540

Ile Gly His Ser Leu Pro Leu Arg Asn Glu Ala Phe Thr Gly Pro Glu
545                 550                 555                 560

Ser Ala Gly Gly Glu Asp Glu Thr Val Ile Gly Trp Asp Met Ala Ile
                565                 570                 575

His Ala Val Ala Ile Pro Ser
            580
```

<210> 107
<211> 583
<212> PRT
<213> Vibrio cholerae

<400> 107

```
Cys Ser Leu Thr Pro Glu Leu Gly Lys Pro Ile Gln Ser Lys Leu Ser
1               5                   10                  15

Ile Pro Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met
            20                  25                  30
```

```
Thr Ile Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu
        35                  40                  45

Ser Ile Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His
    50                  55                  60

Tyr Val Asn Gln Asp Ala Pro Phe Gly Val Ile Asn Leu Asp Ile Thr
65                  70                  75                  80

Thr Glu Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu
                85                  90                  95

Phe Ala Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser
            100                 105                 110

Ile Lys Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu
        115                 120                 125

Val Pro Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln
    130                 135                 140

Trp Lys Thr Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His
145                 150                 155                 160

Asn Ile Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys
                165                 170                 175

Glu Gly Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala
            180                 185                 190

Leu Cys Trp Leu Val Pro Ile Asp Ala Ile Tyr Asn Tyr Ile Thr Gln
        195                 200                 205

Gln Asn Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr
    210                 215                 220

Val Ala Gly Thr Pro Lys Ala Ile Thr Val Lys Gln Gly Ile Glu Gln
225                 230                 235                 240
```

```
Lys Pro Val Glu Gln Arg Ile His Phe Ser Lys Lys Asn Ala Met Glu
                245                 250                 255

Ala Leu Ala Ala His Arg Val Cys Gly Val Pro Leu Glu Thr Leu Ala
            260                 265                 270

Arg Ser Arg Lys Pro Arg Asp Leu Pro Asp Asp Leu Ser Cys Ala Tyr
        275                 280                 285

Gln Ala Gln Asn Ile Val Ser Leu Phe Val Ala Thr Arg Ile Leu Phe
    290                 295                 300

Ser His Leu Asp Ser Val Phe Thr Leu Asn Leu Asp Glu Gln Glu Pro
305                 310                 315                 320

Ala Val Ala Glu Arg Leu Ser Ala Leu Arg Gln Ile Asn Glu Asn Asn
                325                 330                 335

Pro Gly Met Val Thr Gln Val Leu Thr Val Ala Arg Gln Ile Tyr Asn
            340                 345                 350

Asp Tyr Val Thr His His Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala
        355                 360                 365

Gly Ala Gln Ala Ala Asp Ile Leu Ser Leu Phe Cys Pro Asp Ala Asp
    370                 375                 380

Lys Ser Cys Val Ala Ser Asn Asn Asp Gln Ala Asn Ile Asn Ile Glu
385                 390                 395                 400

Ser Arg Ser Gly Arg Ser Tyr Leu Pro Glu Asn Arg Ala Val Ile Thr
                405                 410                 415

Pro Gln Gly Val Thr Asn Trp Thr Tyr Gln Glu Leu Glu Ala Thr His
            420                 425                 430

Gln Ala Leu Thr Arg Glu Gly Tyr Val Phe Val Gly Tyr His Gly Thr
        435                 440                 445

Asn His Val Ala Ala Gln Thr Ile Val Asn Arg Ile Ala Pro Val Pro
    450                 455                 460
```

```
Arg Gly Asn Asn Thr Glu Asn Glu Glu Lys Trp Gly Gly Leu Tyr Val
465                 470                 475                 480

Ala Thr His Ala Glu Val Ala His Gly Tyr Ala Arg Ile Lys Glu Gly
                485                 490                 495

Thr Gly Glu Tyr Gly Leu Pro Thr Arg Ala Glu Arg Asp Ala Arg Gly
            500                 505                 510

Val Met Leu Arg Val Tyr Ile Pro Arg Ala Ser Leu Glu Arg Phe Tyr
        515                 520                 525

Arg Thr Asn Thr Pro Leu Glu Asn Ala Glu Glu His Ile Thr Gln Val
    530                 535                 540

Ile Gly His Ser Leu Pro Leu Arg Asn Glu Ala Phe Thr Gly Pro Glu
545                 550                 555                 560

Arg Val Asp Gly Glu Asp Glu Thr Val Ile Gly Trp Asp Met Ala Ile
                565                 570                 575

His Ala Val Ala Ile Pro Ser
            580
```

<210> 108
<211> 583
<212> PRT
<213> Vibrio cholerae

<400> 108

```
Cys Ser Leu Thr Pro Glu Leu Gly Lys Pro Ile Gln Ser Lys Leu Ser
1               5                   10                  15

Ile Pro Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met
            20                  25                  30

Thr Ile Asn Asp Asp Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu
        35                  40                  45

Ser Ile Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His
    50                  55                  60
```

```
Tyr Val Asn Gln Asp Ala Pro Phe Gly Val Ile Asn Leu Asp Ile Thr
65                  70                  75                  80

Thr Glu Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu
                85                  90                  95

Phe Ala Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser
            100                 105                 110

Ile Lys Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu
        115                 120                 125

Val Pro Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln
    130                 135                 140

Trp Lys Thr Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His
145                 150                 155                 160

Asn Ile Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys
                165                 170                 175

Glu Gly Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala
            180                 185                 190

Leu Cys Trp Leu Val Pro Ile Asp Ala Ile Tyr Asn Tyr Ile Thr Gln
        195                 200                 205

Gln Asn Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr
    210                 215                 220

Val Ala Gly Thr Pro Lys Ala Ile Thr Val Lys Gln Gly Ile Glu Gln
225                 230                 235                 240

Lys Pro Val Glu Gln Arg Ile His Phe Ser Lys Lys Asn Ala Met Glu
                245                 250                 255

Ala Leu Ala Ala His Arg Val Cys Gly Val Pro Leu Glu Thr Leu Ala
            260                 265                 270
```

```
Arg Ser Arg Lys Pro Arg Asp Leu Pro Asp Asp Leu Ser Cys Ala Tyr
        275                 280                 285

Gln Ala Gln Asn Ile Val Ser Leu Phe Val Ala Thr Arg Ile Leu Phe
    290                 295                 300

Ser His Leu Asp Ser Val Phe Thr Leu Asn Leu Asp Glu Gln Glu Pro
305                 310                 315                 320

Glu Val Ala Glu Arg Leu Ser Ala Leu Arg Gln Ile Asn Glu Asn Asn
                325                 330                 335

Pro Gly Met Val Thr Gln Val Leu Thr Val Ala Arg Gln Ile Tyr Asn
            340                 345                 350

Asp Tyr Val Thr His His Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala
        355                 360                 365

Gly Ala Gln Ala Ala Asp Ile Leu Ser Leu Phe Cys Pro Asp Ala Asp
    370                 375                 380

Lys Pro Cys Val Ala Ser Asn Asn Asp Gln Ala Asn Ile Asn Ile Glu
385                 390                 395                 400

Ser Arg Ser Gly Arg Ser Tyr Leu Pro Glu Asn Arg Ala Val Ile Thr
                405                 410                 415

Pro Gln Gly Val Thr Asn Trp Thr Tyr Gln Glu Leu Glu Ala Thr His
            420                 425                 430

Gln Ala Leu Thr Arg Glu Gly Tyr Val Phe Val Gly Tyr His Gly Thr
        435                 440                 445

Asn His Val Ala Ala Gln Asn Ile Val Asn Arg Ile Ala Pro Val Pro
    450                 455                 460

Arg Gly Asn Asn Thr Glu Asn Glu Glu Lys Trp Gly Gly Leu Tyr Val
465                 470                 475                 480

Ala Thr His Ala Glu Val Ala His Gly Tyr Ala Arg Ile Lys Glu Gly
                485                 490                 495
```

Thr Gly Glu Tyr Gly Leu Pro Thr Arg Ala Glu Arg Asp Ala Arg Gly
500 505 510

Val Met Leu Arg Val Tyr Ile Pro Arg Ala Ser Leu Glu Arg Phe Tyr
515 520 525

Arg Thr Asn Thr Pro Leu Glu Asn Ala Glu Glu His Ile Thr Gln Val
530 535 540

Ile Gly His Ser Leu Pro Leu Arg Asn Glu Ala Phe Thr Gly Pro Glu
545 550 555 560

Ser Ala Gly Gly Glu Asp Glu Thr Val Ile Gly Trp Asp Met Ala Ile
565 570 575

His Ala Val Ala Ile Pro Ser
580

<210> 109
<211> 582
<212> PRT
<213> Vibrio cholerae

<400> 109
Cys Ser Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser
1 5 10 15

Ile Pro Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met
20 25 30

Thr Ile Asn Asp Glu Gln Asn Asp Ile Met Asp Glu Gly Lys Gly Glu
35 40 45

Ser Ile Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His
50 55 60

Tyr Val Asn Gln Asp Ala Pro Phe Gly Val Ile Asn Leu Asp Ile Thr
65 70 75 80

Thr Glu Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu
85 90 95

```
Phe Ala Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser
            100                 105                 110

Ile Lys Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu
        115                 120                 125

Val Pro Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln
    130                 135                 140

Trp Glu Asn Gln Gly Asn Val Ser Phe Ala Val Thr Arg Pro Glu Gln
145                 150                 155                 160

Ser Ile Ala Lys Gln Ser Ile Ala Ile Ser Trp Pro Ser Val Ser Tyr
                165                 170                 175

Lys Ala Ala His Lys Asn Gly Ser Arg His Lys Arg Trp Ala Asn Trp
            180                 185                 190

Leu Thr Thr Leu Pro Lys Val Val Leu Cys Phe Phe Glu Asp Pro Glu
        195                 200                 205

Leu Cys Thr Tyr Gly Glu Asp Trp His Gly Gly Ala Tyr Lys Thr Val
    210                 215                 220

Ala Gly Thr Pro Lys Ala Ile Thr Val Lys Gln Gly Ile Glu Gln Lys
225                 230                 235                 240

Thr Val Glu Gln Arg Ile His Phe Ser Lys Lys Asn Ala Met Glu Ala
                245                 250                 255

Leu Ala Ala His Arg Val Cys Gly Val Pro Leu Glu Thr Leu Ala Arg
            260                 265                 270

Ser Arg Lys Pro Arg Asp Leu Pro Asp Asp Leu Ser Cys Ala Tyr Gln
        275                 280                 285

Ala Gln Asn Ile Val Ser Leu Phe Val Ala Thr Arg Ile Leu Phe Ser
    290                 295                 300
```

```
His Leu Asp Ser Val Phe Thr Leu Asn Leu Asp Glu Gln Glu Pro Glu
305                 310                 315                 320

Val Ala Glu Arg Leu Ser Ala Leu Arg Gln Ile Asn Glu Asn Asn Pro
                325                 330                 335

Gly Met Val Thr Gln Val Leu Thr Val Ala Arg Gln Ile Tyr Asn Asp
            340                 345                 350

Tyr Val Thr His His Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala Gly
        355                 360                 365

Ala Gln Ala Ala Asp Ile Leu Ser Leu Phe Cys Pro Asp Ala Asp Lys
    370                 375                 380

Ser Cys Val Ala Ser Asn Asn Asp Gln Ala Asn Ile Asn Ile Glu Ser
385                 390                 395                 400

Arg Ser Gly Arg Ser Tyr Leu Pro Glu Asn Arg Ala Val Ile Thr Pro
                405                 410                 415

Gln Gly Val Thr Asn Trp Thr Tyr Gln Glu Leu Glu Ala Thr His Gln
            420                 425                 430

Ala Leu Thr Arg Glu Gly Tyr Val Phe Val Gly Tyr His Gly Thr Asn
        435                 440                 445

His Val Ala Ala Gln Thr Ile Val Asn Arg Ile Ala Pro Val Pro Arg
    450                 455                 460

Gly Asn Asn Thr Glu Asn Glu Glu Lys Trp Gly Gly Leu Tyr Val Ala
465                 470                 475                 480

Thr His Ala Glu Val Ala His Gly Tyr Ala Arg Ile Lys Glu Gly Thr
                485                 490                 495

Gly Glu Tyr Gly Leu Pro Thr Arg Ala Glu Arg Asp Ala Arg Gly Val
            500                 505                 510

Met Leu Arg Val Tyr Ile Pro Arg Ala Ser Leu Glu Arg Phe Tyr Arg
        515                 520                 525
```

```
Thr Asn Thr Leu Leu Glu Asn Ala Glu Glu His Ile Thr Gln Val Ile
    530                 535                 540

Gly His Ser Leu Pro Leu Arg Asn Glu Ala Phe Thr Gly Pro Glu Ser
545                 550                 555                 560

Ala Gly Gly Glu Asp Glu Thr Val Ile Gly Trp Asp Met Ala Ile His
                565                 570                 575

Ala Val Ala Ile Pro Ser
            580
```

<210> 110
<211> 577
<212> PRT
<213> Vibrio cholerae

<400> 110

```
Cys Ser Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser
1               5                   10                  15

Ile Pro Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met
            20                  25                  30

Thr Ile Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu
        35                  40                  45

Ser Ile Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His
    50                  55                  60

Tyr Val Ser Gln Asp Ala Pro Phe Gly Val Ile Asn Leu Asp Ile Thr
65                  70                  75                  80

Thr Glu Asn Gly Thr Lys Thr Tyr Ser Phe Asn Arg Lys Glu Ser Glu
                85                  90                  95

Phe Ala Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser
            100                 105                 110

Ile Lys Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu
        115                 120                 125
```

```
Val Pro Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln
    130                 135                 140

Trp Glu Thr Gln Gly Asn Val Ser Phe Ala Val Thr Arg Pro Glu Gln
145                 150                 155                 160

Ser Ile Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala His Lys
                165                 170                 175

Asn Gly Ser Arg His Lys Arg Trp Ala Asn Trp Phe Thr Thr Ser Pro
            180                 185                 190

Lys Val Thr Leu Cys Phe Tyr Glu Asp Pro Ala Gln Cys Thr Tyr Gly
        195                 200                 205

Asp Asp Trp His Gly Gly Ala Tyr Lys Thr Val Ala Gly Thr Pro Lys
    210                 215                 220

Ala Ile Thr Val Lys Gln Gly Ile Glu Gln Lys Thr Val Glu Gln Arg
225                 230                 235                 240

Ile His Phe Ser Lys Lys Asn Ala Met Glu Ala Leu Ala Ala His Arg
                245                 250                 255

Val Cys Gly Val Pro Leu Glu Thr Leu Ala Arg Ser Arg Lys Pro Arg
            260                 265                 270

Asp Leu Pro Asp Asp Leu Ser Cys Ala Tyr Gln Ala Gln Asn Ile Val
        275                 280                 285

Ser Leu Phe Val Ala Thr Arg Ile Leu Phe Ser His Leu Asp Ser Val
    290                 295                 300

Phe Thr Leu Asn Leu Asp Glu Gln Glu Pro Glu Val Ala Glu Arg Leu
305                 310                 315                 320

Ser Ala Leu Arg Gln Ile Asn Glu Asn Asn Pro Gly Met Val Thr Gln
                325                 330                 335
```

```
Val Leu Thr Val Ala Arg Gln Ile Tyr Asn Asp Tyr Val Thr His His
            340                 345                 350

Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala Gly Ala Gln Ala Ala Asp
        355                 360                 365

Ile Leu Ser Leu Phe Cys Pro Asp Ala Asp Lys Ser Cys Val Ala Ser
    370                 375                 380

Asn Asn Asp Gln Ala Asn Ile Asn Ile Glu Ser Arg Ser Gly Arg Ser
385                 390                 395                 400

Tyr Leu Pro Glu Asn Arg Ala Val Ile Thr Pro Gln Gly Val Thr Asn
                405                 410                 415

Trp Thr Tyr Gln Glu Leu Glu Ala Thr His Gln Ala Leu Thr Arg Glu
            420                 425                 430

Asp Tyr Val Phe Val Gly Tyr His Gly Thr Asn His Val Ala Ala Gln
        435                 440                 445

Thr Ile Val Asn Arg Ile Ala Pro Val Pro Arg Gly Asn Asn Thr Glu
    450                 455                 460

Asn Glu Glu Lys Trp Gly Gly Leu Tyr Val Ala Thr His Ala Glu Val
465                 470                 475                 480

Ala His Gly Tyr Ala Arg Ile Lys Glu Gly Thr Gly Glu Tyr Gly Leu
                485                 490                 495

Pro Thr Arg Ala Glu Arg Asp Ala Arg Gly Val Met Leu Arg Val Tyr
            500                 505                 510

Ile Pro Arg Ala Ser Leu Glu Arg Phe Tyr Arg Thr Asn Thr Pro Leu
        515                 520                 525

Glu Asn Ala Glu Glu His Ile Thr Gln Val Ile Gly His Ser Leu Pro
    530                 535                 540

Leu Arg Asn Glu Ala Phe Thr Gly Pro Glu Ser Ala Gly Gly Glu Asp
545                 550                 555                 560
```

Glu Thr Val Ile Gly Trp Asp Met Ala Ile His Ala Val Ala Ile Pro
565 570 575

Ser

<210> 111
<211> 577
<212> PRT
<213> Vibrio cholerae

<400> 111
Cys Ser Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser
1 5 10 15

Ile Pro Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met
20 25 30

Thr Ile Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu
35 40 45

Ser Ile Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His
50 55 60

Tyr Val Ser Gln Asp Ala Pro Phe Gly Val Ile Asn Leu Asp Ile Thr
65 70 75 80

Thr Glu Asn Gly Thr Lys Thr Tyr Ser Phe Asn Arg Lys Glu Ser Glu
85 90 95

Phe Ala Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser
100 105 110

Ile Lys Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu
115 120 125

Val Pro Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln
130 135 140

Trp Glu Thr Gln Gly Asn Val Ser Phe Ala Val Thr Arg Pro Glu Gln
145 150 155 160

```
Ser Ile Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala His Lys
                165                 170                 175

Asn Gly Ser Arg His Lys Arg Trp Ala Asn Trp Phe Thr Thr Ser Pro
            180                 185                 190

Lys Val Thr Leu Cys Phe Tyr Glu Asp Pro Ala Gln Cys Thr Tyr Gly
        195                 200                 205

Asp Asp Trp His Gly Gly Ala Tyr Lys Thr Val Ala Gly Thr Pro Lys
    210                 215                 220

Ala Ile Thr Val Lys Gln Gly Ile Glu Gln Lys Thr Val Glu Gln Arg
225                 230                 235                 240

Ile His Phe Ser Lys Lys Asn Ala Met Glu Ala Leu Ala Ala His Arg
                245                 250                 255

Val Cys Gly Val Pro Leu Glu Thr Leu Ala Arg Ser Arg Lys Pro Arg
            260                 265                 270

Asp Leu Pro Asp Asp Leu Ser Cys Ala Tyr Gln Ala Gln Asn Ile Val
        275                 280                 285

Ser Leu Phe Val Ala Thr Arg Ile Leu Phe Ser His Leu Asp Ser Val
    290                 295                 300

Phe Thr Leu Asn Leu Asp Glu Gln Glu Pro Glu Val Ala Glu Arg Leu
305                 310                 315                 320

Ser Ala Leu Arg Gln Ile Asn Glu Asn Asn Pro Gly Met Val Thr Gln
                325                 330                 335

Val Leu Thr Val Ala Arg Gln Ile Tyr Asn Asp Tyr Val Thr His His
            340                 345                 350

Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala Gly Ala Gln Ala Ala Asp
        355                 360                 365
```

```
Ile Leu Ser Leu Phe Cys Pro Asp Ala Asp Lys Ser Cys Val Ala Ser
    370                 375                 380

Asn Asn Asp Gln Ala Asn Ile Asn Ile Glu Ser Arg Ser Gly Arg Ser
385                 390                 395                 400

Tyr Leu Pro Glu Asn Arg Ala Val Ile Thr Pro Gln Gly Val Thr Asn
                405                 410                 415

Trp Thr Tyr Gln Glu Leu Glu Ala Thr His Gln Ala Leu Thr Arg Glu
            420                 425                 430

Asp Tyr Val Phe Val Gly Tyr His Gly Thr Asn His Ala Ala Ala Gln
        435                 440                 445

Thr Ile Val Asn Arg Ile Ala Pro Val Pro Arg Gly Asn Asn Thr Glu
    450                 455                 460

Asn Glu Glu Lys Trp Gly Gly Leu Tyr Val Ala Thr His Ala Glu Val
465                 470                 475                 480

Ala His Gly Tyr Ala Arg Ile Lys Glu Gly Thr Gly Glu Tyr Gly Leu
                485                 490                 495

Pro Thr Arg Ala Glu Gln Glu Thr Arg Gly Val Met Leu Arg Val Tyr
            500                 505                 510

Ile Pro Arg Ala Ser Leu Glu Arg Phe Tyr Arg Thr Asn Thr Pro Leu
        515                 520                 525

Glu Asn Ala Glu Glu His Ile Thr Gln Val Ile Gly His Ser Leu Pro
    530                 535                 540

Leu Arg Asn Glu Ala Phe Thr Gly Pro Glu Ser Ala Gly Gly Glu Asp
545                 550                 555                 560

Glu Thr Val Ile Gly Trp Asp Met Ala Ile His Ala Val Ala Ile Pro
                565                 570                 575

Ser
```

<210> 112
<211> 577
<212> PRT
<213> Vibrio cholerae

<400> 112
Cys Ser Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser
1   5   10   15

Ile Pro Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met
            20   25   30

Thr Ile Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu
        35   40   45

Ser Ile Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His
    50   55   60

Tyr Val Asn Gln Asp Ala Pro Phe Gly Val Ile Asn Leu Asp Ile Thr
65   70   75   80

Thr Glu Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu
                85   90   95

Phe Ala Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser
            100   105   110

Ile Lys Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu
        115   120   125

Val Pro Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln
    130   135   140

Trp Glu Asn Gln Gly Asn Val Ser Phe Ala Val Thr Arg Pro Glu Gln
145   150   155   160

Ser Ile Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala His Lys
                165   170   175

Asn Gly Ser Arg His Lys Arg Trp Ala Asn Trp Leu Thr Thr Leu Pro
            180   185   190

```
Lys Val Val Leu Cys Phe Tyr Glu Asp Pro Glu Leu Cys Thr Tyr Gly
        195                 200                 205

Asp Asp Trp His Gly Gly Ala Tyr Lys Thr Val Ala Gly Thr Pro Lys
    210                 215                 220

Ala Ile Thr Val Lys Gln Gly Ile Glu Gln Lys Thr Val Glu Gln Arg
225                 230                 235                 240

Ile His Phe Ser Lys Lys Asn Ala Met Glu Ala Leu Ala Ala His Arg
                245                 250                 255

Val Cys Gly Val Pro Leu Glu Thr Leu Ala Arg Ser Arg Lys Pro Arg
            260                 265                 270

Asp Leu Thr Asp Asp Leu Ser Cys Ala Tyr Gln Ala Gln Asn Ile Val
        275                 280                 285

Ser Leu Phe Val Ala Thr Arg Ile Leu Phe Ser His Leu Asp Ser Val
    290                 295                 300

Phe Thr Leu Asn Leu Asp Glu Gln Glu Pro Glu Val Ala Glu Arg Leu
305                 310                 315                 320

Ser Ala Leu Arg Gln Ile Asn Glu Asn Asn Pro Gly Met Val Thr Gln
                325                 330                 335

Val Leu Thr Val Ala Arg Gln Ile Tyr Asn Asp Tyr Val Thr His His
            340                 345                 350

Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala Gly Ala Gln Ala Ala Asp
        355                 360                 365

Ile Leu Ser Leu Phe Cys Pro Asp Ala Asp Lys Ser Cys Val Ala Ser
    370                 375                 380

Asn Asn Asp Gln Ala Asn Ile Asn Ile Glu Ser Arg Ser Gly Arg Ser
385                 390                 395                 400
```

```
Tyr Leu Pro Glu Asn Arg Ala Val Ile Thr Pro Gln Gly Val Thr Asn
                405                 410                 415

Trp Thr Tyr Gln Glu Leu Glu Ala Thr His Gln Ala Leu Thr Arg Glu
            420                 425                 430

Gly Tyr Val Phe Val Gly Tyr His Gly Thr Asn His Val Ala Ala Gln
        435                 440                 445

Thr Ile Val Asn Arg Ile Ala Pro Val Pro Arg Gly Asn Asn Thr Glu
    450                 455                 460

Asn Glu Glu Lys Trp Gly Gly Leu Tyr Val Ala Thr His Ala Glu Val
465                 470                 475                 480

Ala His Gly Tyr Ala Arg Ile Lys Glu Gly Thr Gly Glu Tyr Gly Leu
                485                 490                 495

Pro Thr Arg Ala Glu Arg Asp Ala Arg Gly Val Met Leu Arg Val Tyr
            500                 505                 510

Ile Pro Arg Ala Ser Leu Glu Arg Phe Tyr Arg Thr Asn Thr Pro Leu
        515                 520                 525

Glu Asn Ala Glu Glu His Ile Thr Gln Val Ile Gly His Ser Leu Pro
    530                 535                 540

Leu Arg Asn Glu Ala Phe Thr Gly Pro Glu Ser Ala Gly Gly Glu Asp
545                 550                 555                 560

Glu Thr Val Ile Gly Trp Asp Met Ala Ile His Ala Val Ala Ile Pro
                565                 570                 575

Ser
```

<210> 113
<211> 577
<212> PRT
<213> Vibrio cholerae

<400> 113

```
Cys Ser Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser
1               5                  10                  15

Ile Pro Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met
            20                  25                  30

Thr Ile Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu
        35                  40                  45

Ser Ile Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His
    50                  55                  60

Tyr Val Asn Gln Asp Ala Pro Phe Gly Val Ile Asn Leu Asp Ile Thr
65                  70                  75                  80

Thr Glu Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu
                85                  90                  95

Phe Ala Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser
            100                 105                 110

Ile Lys Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu
        115                 120                 125

Val Pro Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln
    130                 135                 140

Trp Glu Asn Gln Gly Asn Val Ser Phe Ala Val Thr Arg Pro Glu Gln
145                 150                 155                 160

Ser Ile Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala His Lys
                165                 170                 175

Asn Gly Ser Arg His Lys Arg Trp Ala Asn Trp Leu Thr Thr Leu Pro
            180                 185                 190

Lys Val Val Leu Cys Phe Tyr Glu Asp Pro Glu Leu Cys Thr Tyr Gly
        195                 200                 205

Asp Asp Trp His Gly Gly Ala Tyr Lys Thr Val Ala Gly Thr Pro Lys
    210                 215                 220
```

```
Ala Ile Thr Val Lys Gln Gly Ile Glu Gln Lys Thr Val Glu Gln Arg
225                 230                 235                 240

Ile His Phe Ser Lys Lys Asn Ala Met Glu Ala Leu Ala Ala His Arg
                245                 250                 255

Val Cys Gly Val Pro Leu Glu Thr Leu Ala Arg Ser Arg Lys Pro Arg
            260                 265                 270

Asp Leu Pro Asp Asp Leu Ser Cys Ala Tyr Gln Ala Gln Asn Ile Val
        275                 280                 285

Ser Leu Phe Val Ala Thr Arg Ile Leu Phe Ser His Leu Asp Ser Val
    290                 295                 300

Phe Thr Leu Asn Leu Asp Glu Gln Ala Pro Glu Val Ala Glu Arg Leu
305                 310                 315                 320

Ser Asp Leu Arg Arg Ile Asn Glu Asp Asn Pro Gly Met Val Thr Gln
                325                 330                 335

Val Leu Thr Val Ala Arg Gln Ile Tyr Asn Asp Tyr Val Thr His His
            340                 345                 350

Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala Gly Ala Gln Ala Ala Asp
        355                 360                 365

Ile Leu Ser Leu Phe Cys Pro Asp Ala Asp Lys Ser Cys Val Ala Ser
    370                 375                 380

Asn Asn Asp Gln Ala Asn Ile Asn Ile Glu Ser Arg Ser Gly Arg Ser
385                 390                 395                 400

Tyr Leu Pro Glu Asn Arg Ala Val Ile Thr Pro Gln Gly Val Thr Asn
                405                 410                 415

Trp Thr Tyr Gln Glu Leu Glu Thr Thr His Gln Ala Leu Thr Arg Glu
            420                 425                 430
```

```
Gly Tyr Val Phe Val Gly Tyr His Gly Thr Asn His Val Ala Ala Gln
        435                 440                 445

Thr Ile Val Asn Arg Ile Ala Pro Val Pro Arg Gly Asn Asn Thr Glu
    450                 455                 460

Asn Glu Glu Lys Trp Gly Gly Leu Tyr Val Ala Thr His Ala Glu Val
465                 470                 475                 480

Ala His Gly Tyr Ala Arg Ile Lys Glu Gly Thr Gly Glu Tyr Gly Leu
                485                 490                 495

Pro Thr Arg Ala Glu Arg Glu Thr Arg Gly Val Met Leu Arg Val Tyr
            500                 505                 510

Ile Pro Arg Ala Ser Leu Glu Arg Phe Tyr Arg Thr Asn Thr Pro Leu
        515                 520                 525

Glu Asn Ala Glu Glu His Ile Thr Gln Val Ile Gly His Ser Leu Pro
    530                 535                 540

Leu Arg Asn Glu Ala Phe Thr Gly Pro Glu Ser Ala Gly Gly Glu Asp
545                 550                 555                 560

Glu Thr Val Ile Gly Trp Asp Met Ala Ile His Ala Val Ala Ile Pro
                565                 570                 575

Ser
```

<210> 114
<211> 577
<212> PRT
<213> Vibrio cholerae

<400> 114

```
Cys Ser Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser
1               5                   10                  15

Ile Pro Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met
            20                  25                  30
```

```
Thr Ile Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu
        35                  40                  45

Ser Ile Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His
    50                  55                  60

Tyr Val Asn Gln Asp Ala Pro Phe Gly Val Ile Asn Leu Asp Ile Thr
65                  70                  75                  80

Thr Glu Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu
                85                  90                  95

Phe Ala Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser
            100                 105                 110

Ile Lys Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu
        115                 120                 125

Val Pro Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln
    130                 135                 140

Trp Glu Asn Gln Gly Asn Val Ser Phe Ala Val Thr Arg Pro Glu Gln
145                 150                 155                 160

Ser Ile Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala His Lys
                165                 170                 175

Asn Gly Ser Arg His Lys Arg Trp Ala Asn Trp Leu Thr Thr Leu Pro
            180                 185                 190

Lys Val Val Leu Cys Phe Tyr Glu Asp Pro Glu Leu Cys Thr Tyr Gly
        195                 200                 205

Asp Asp Trp His Gly Gly Ala Tyr Lys Thr Val Ala Gly Thr Pro Lys
    210                 215                 220

Ala Ile Thr Val Lys Gln Gly Ile Glu Gln Lys Thr Val Glu Gln Arg
225                 230                 235                 240

Ile His Phe Ser Lys Lys Asn Ala Met Glu Ala Leu Ala Ala His Arg
                245                 250                 255
```

```
Val Cys Gly Val Pro Leu Glu Thr Leu Ala Arg Ser Arg Lys Pro Arg
            260                 265                 270

Asp Leu Pro Asp Asp Leu Ser Cys Ala Tyr Gln Ala Gln Asn Ile Val
        275                 280                 285

Ser Leu Phe Val Ala Thr Arg Ile Leu Phe Ser His Leu Asp Ser Val
    290                 295                 300

Phe Thr Leu Asn Leu Asp Glu Gln Glu Pro Glu Val Ala Glu Arg Leu
305                 310                 315                 320

Ser Ala Leu Arg Gln Ile Asn Glu Asn Asn Pro Gly Met Val Thr Gln
                325                 330                 335

Val Leu Thr Val Ala Arg Gln Ile Tyr Asn Asp Tyr Val Thr His His
            340                 345                 350

Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala Gly Ala Gln Ala Ala Asp
        355                 360                 365

Ile Leu Ser Leu Phe Cys Pro Asp Ala Asp Lys Ser Cys Val Ala Ser
    370                 375                 380

Asn Asn Asp Gln Ala Asn Ile Asn Ile Glu Ser Arg Ser Gly Arg Ser
385                 390                 395                 400

Tyr Leu Pro Glu Asn Arg Ala Val Ile Thr Pro Gln Gly Val Thr Asn
                405                 410                 415

Trp Thr Tyr Gln Glu Leu Glu Ala Thr His Gln Ala Leu Thr Arg Glu
            420                 425                 430

Gly Tyr Val Phe Val Gly Tyr His Gly Thr Asn His Val Ala Ala Gln
        435                 440                 445

Thr Ile Val Asn Arg Ile Ala Pro Val Pro Arg Gly Asn Asn Thr Glu
    450                 455                 460
```

```
Asn Glu Glu Lys Trp Gly Gly Leu Tyr Val Ala Thr His Ala Glu Val
465                 470                 475                 480

Ala His Gly Tyr Ala Arg Ile Lys Glu Gly Thr Gly Asn Gly Gly Leu
                485                 490                 495

Pro Thr Arg Ala Glu Arg Glu Thr Arg Gly Val Met Leu Arg Val Tyr
            500                 505                 510

Ile Pro Arg Ala Ser Leu Glu Arg Phe Tyr Arg Thr Asn Thr Pro Leu
        515                 520                 525

Glu Asn Ala Glu Glu His Ile Thr Gln Val Ile Gly His Ser Leu Pro
    530                 535                 540

Leu Arg Asn Glu Ala Phe Thr Gly Pro Glu Ser Ala Gly Gly Glu Asp
545                 550                 555                 560

Glu Thr Val Ile Gly Trp Asp Met Ala Ile Tyr Ala Val Ala Ile Pro
                565                 570                 575

Ser
```

<210> 115
<211> 577
<212> PRT
<213> Vibrio cholerae

<400> 115

```
Cys Ser Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser
1               5                   10                  15

Ile Pro Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met
            20                  25                  30

Thr Ile Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu
        35                  40                  45

Ser Ile Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His
    50                  55                  60
```

```
Tyr Val Asn Gln Asp Ala Pro Phe Gly Val Ile Asn Leu Asp Ile Thr
65                  70                  75                  80

Thr Glu Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu
                85                  90                  95

Phe Ala Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser
            100                 105                 110

Ile Lys Ile Ser Val Asp Glu Ile Asp Gln Gln Arg Asn Ile Ile Glu
        115                 120                 125

Val Pro Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln
    130                 135                 140

Trp Glu Asn Gln Gly Asn Val Ser Phe Ala Val Thr Arg Pro Glu Gln
145                 150                 155                 160

Ser Ile Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala His Lys
                165                 170                 175

Asn Gly Ser Arg His Lys Arg Trp Ala Asn Trp Phe Thr Thr Ser Pro
            180                 185                 190

Lys Val Thr Leu Cys Phe Tyr Glu Asp Pro Ala Gln Cys Thr Tyr Gly
        195                 200                 205

Asp Asp Trp His Gly Gly Ala Tyr Lys Thr Val Ala Gly Ile Pro Lys
    210                 215                 220

Ala Ile Thr Val Lys Gln Gly Ile Glu Gln Lys Thr Val Glu Gln Arg
225                 230                 235                 240

Ile His Phe Ser Lys Lys Asn Ala Met Glu Ala Leu Ala Ala His Arg
                245                 250                 255

Val Cys Gly Val Pro Leu Glu Thr Leu Ala Arg Ser Arg Lys Pro Arg
            260                 265                 270

Asp Leu Pro Asp Asp Leu Ser Cys Ala Tyr Gln Ala Gln Asn Ile Val
        275                 280                 285
```

```
Ser Leu Phe Val Ala Thr Arg Ile Leu Phe Ser His Leu Asp Ser Val
    290                 295                 300

Phe Thr Leu Asn Leu Asp Glu Gln Glu Pro Glu Val Ala Glu Arg Leu
305                 310                 315                 320

Ser Ala Leu Arg Gln Ile Asn Glu Asn Asn Pro Gly Met Val Thr Gln
                325                 330                 335

Val Leu Thr Val Ala Arg Gln Ile Tyr Asn Asp Tyr Val Thr His His
            340                 345                 350

Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala Gly Ala Gln Ala Ala Asp
        355                 360                 365

Ile Leu Ser Leu Phe Cys Pro Asp Ala Asp Lys Ser Cys Val Ala Ser
    370                 375                 380

Asn Asn Asp Gln Ala Asn Ile Asn Ile Glu Ser Arg Ser Gly Arg Ser
385                 390                 395                 400

Tyr Leu Pro Glu Asn Arg Ala Val Ile Thr Pro Gln Gly Val Thr Asn
                405                 410                 415

Trp Thr Tyr Gln Glu Leu Glu Ala Thr His Gln Ala Leu Thr Arg Glu
            420                 425                 430

Asp Tyr Val Phe Val Gly Tyr His Gly Thr Asn His Val Ala Ala Gln
        435                 440                 445

Thr Ile Val Asn Arg Ile Ala Pro Val Pro Arg Gly Asn Asn Thr Glu
    450                 455                 460

Asn Glu Glu Lys Trp Gly Gly Leu Tyr Val Ala Thr His Ala Glu Val
465                 470                 475                 480

Ala His Gly Tyr Ala Arg Ile Lys Glu Gly Thr Gly Glu Tyr Gly Leu
                485                 490                 495
```

```
Pro Thr Arg Ala Glu Gln Glu Thr Arg Gly Val Met Leu Arg Val Tyr
            500                 505                 510

Ile Pro Arg Ala Ser Leu Glu Arg Phe Tyr Arg Thr Asn Thr Pro Leu
        515                 520                 525

Glu Asn Ala Glu Glu His Ile Thr Gln Val Ile Gly His Ser Leu Pro
    530                 535                 540

Leu Arg Asn Glu Ala Phe Thr Gly Pro Glu Ser Ala Gly Gly Glu Asp
545                 550                 555                 560

Glu Thr Val Ile Gly Trp Asp Met Ala Ile His Ala Val Ala Ile Pro
                565                 570                 575

Ser
```

<210> 116
<211> 577
<212> PRT
<213> Vibrio cholerae

<400> 116

```
Cys Ser Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser
1               5                   10                  15

Ile Pro Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met
            20                  25                  30

Thr Ile Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu
        35                  40                  45

Ser Ile Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His
    50                  55                  60

Tyr Val Asn Gln Asp Ala Pro Phe Gly Val Ile His Leu Asp Ile Thr
65                  70                  75                  80

Thr Glu Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu
                85                  90                  95
```

```
Phe Ala Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser
            100                 105                 110

Ile Lys Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu
        115                 120                 125

Val Pro Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln
    130                 135                 140

Trp Glu Asn Gln Gly Asn Val Ser Phe Ala Val Thr Arg Pro Glu Gln
145                 150                 155                 160

Ser Ile Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala His Lys
                165                 170                 175

Asn Gly Ser Arg His Lys Arg Trp Ala Asn Trp Leu Thr Thr Leu Pro
            180                 185                 190

Lys Val Val Leu Cys Phe Tyr Glu Glu Pro Glu Leu Cys Thr Tyr Gly
        195                 200                 205

Glu Asp Trp His Gly Gly Ala Tyr Lys Thr Val Ala Gly Thr Pro Gly
    210                 215                 220

Ala Ile Thr Val Lys Gln Gly Ile Glu Gln Lys Thr Val Glu Gln Arg
225                 230                 235                 240

Ile His Phe Ser Lys Gly Asn Ala Met Ser Ala Leu Ala Ala His Arg
                245                 250                 255

Val Cys Gly Val Pro Leu Glu Thr Leu Ala Arg Ser Arg Lys Pro Arg
            260                 265                 270

Asp Leu Thr Asp Asp Leu Ser Cys Ala Tyr Gln Ala Gln Asn Ile Val
        275                 280                 285

Ser Leu Phe Val Ala Thr Arg Ile Leu Phe Ser His Leu Asp Ser Val
    290                 295                 300

Phe Thr Leu Asn Leu Asp Glu Gln Glu Pro Glu Val Ala Glu Arg Leu
305                 310                 315                 320
```

```
Ser Ala Leu Arg Gln Ile Asn Glu Asn Asn Pro Gly Met Val Thr Gln
                325                 330                 335

Val Leu Thr Val Ala Arg Gln Ile Tyr Asn Asp Tyr Val Thr His His
            340                 345                 350

Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala Gly Ala Gln Ala Ala Asp
        355                 360                 365

Ile Leu Ser Leu Phe Cys Pro Asp Ala Asp Lys Ser Cys Val Ala Ser
    370                 375                 380

Asn Asn Asp Gln Ala Asn Ile Asn Ile Glu Ser Arg Ser Gly Arg Ser
385                 390                 395                 400

Tyr Leu Pro Glu Asn Arg Ala Val Ile Thr Pro Gln Gly Val Thr Asn
                405                 410                 415

Trp Thr Tyr Gln Glu Leu Glu Ala Thr His Gln Ala Leu Thr Arg Glu
            420                 425                 430

Gly Tyr Val Phe Val Gly Tyr His Gly Thr Asn His Val Ala Ala Gln
        435                 440                 445

Thr Ile Val Asn Arg Ile Ala Pro Val Pro Arg Gly Asn Asn Thr Glu
    450                 455                 460

Asn Glu Glu Lys Trp Gly Gly Leu Tyr Val Ala Thr His Ala Glu Val
465                 470                 475                 480

Ala His Gly Tyr Ala Arg Ile Lys Glu Gly Thr Gly Glu Tyr Gly Leu
                485                 490                 495

Pro Thr Arg Ala Glu Arg Asp Ala Arg Gly Val Met Leu Arg Val Tyr
            500                 505                 510

Ile Pro Arg Ala Ser Leu Glu Arg Phe Tyr Arg Thr Asn Thr Pro Leu
        515                 520                 525
```

```
Glu Asn Ala Glu Glu His Ile Thr Gln Val Ile Gly His Ser Leu Pro
    530                 535                 540

Leu Arg Asn Glu Ala Phe Thr Gly Pro Glu Ser Ala Gly Gly Glu Asp
545                 550                 555                 560

Glu Thr Val Ile Gly Trp Asp Met Ala Ile His Ala Val Ala Ile Pro
                565                 570                 575

Ser
```

<210> 117
<211> 577
<212> PRT
<213> Vibrio cholerae

<400> 117

```
Cys Ser Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser
1               5                   10                  15

Ile Pro Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met
            20                  25                  30

Thr Ile Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu
        35                  40                  45

Ser Ile Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His
    50                  55                  60

Tyr Val Asn Gln Asp Ala Pro Phe Gly Val Ile His Leu Asp Ile Thr
65                  70                  75                  80

Thr Glu Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu
                85                  90                  95

Phe Ala Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser
            100                 105                 110

Ile Lys Ile Ser Val Asp Glu Leu Asp Gln Lys Arg Asn Ile Ile Glu
        115                 120                 125
```

```
Val Pro Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln
    130                 135                 140

Trp Glu Asn Gln Gly Asn Val Ser Phe Ala Val Thr Arg Pro Glu Gln
145                 150                 155                 160

Ser Ile Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala His Lys
                165                 170                 175

Asn Gly Ser Arg His Lys Arg Trp Ala Asn Trp Leu Thr Thr Leu Pro
            180                 185                 190

Lys Val Val Leu Cys Phe Tyr Glu Glu Pro Glu Leu Cys Thr Tyr Gly
        195                 200                 205

Glu Asp Trp His Gly Gly Ala Tyr Lys Thr Val Ala Gly Thr Pro Glu
    210                 215                 220

Ala Ile Thr Val Lys Gln Gly Ile Glu Gln Lys Thr Val Glu Gln Arg
225                 230                 235                 240

Ile His Phe Ser Lys Lys Asn Ala Met Glu Ala Leu Ala Ala His Arg
                245                 250                 255

Val Cys Gly Val Pro Leu Glu Thr Leu Ala Arg Ser Arg Lys Pro Arg
            260                 265                 270

Asp Leu Pro Asp Asp Leu Ser Cys Ala Tyr Gln Ala Gln Asn Ile Val
        275                 280                 285

Ser Leu Phe Val Ala Thr Arg Ile Leu Phe Ser His Leu Asp Ser Val
    290                 295                 300

Phe Thr Leu Asn Leu Asp Glu Gln Glu Pro Ala Val Ala Glu Arg Leu
305                 310                 315                 320

Ser Ala Leu Arg Gln Ile Asn Glu Asn Asn Pro Gly Met Val Thr Gln
                325                 330                 335

Val Leu Thr Val Ala Arg Gln Ile Tyr Asn Asp Tyr Val Thr His His
            340                 345                 350
```

```
Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala Gly Ala Gln Ala Ala Asp
        355                 360                 365

Ile Leu Ser Leu Phe Cys Pro Asp Ala Asp Lys Ser Cys Val Ala Ser
    370                 375                 380

Asn Asn Asp Gln Ala Asn Ile Asn Ile Glu Ser Arg Ser Gly Arg Ser
385                 390                 395                 400

Tyr Leu Pro Glu Asn Arg Ala Val Ile Thr Pro Gln Gly Val Thr Asn
                405                 410                 415

Trp Thr Tyr Gln Glu Leu Glu Ala Thr His Gln Ala Leu Thr Arg Glu
            420                 425                 430

Gly Tyr Val Phe Val Gly Tyr His Gly Thr Asn His Val Ala Ala Gln
        435                 440                 445

Thr Ile Val Asn Arg Ile Ala Pro Val Pro Arg Gly Asn Asn Thr Glu
    450                 455                 460

Asn Glu Glu Lys Trp Gly Gly Leu Tyr Val Ala Thr His Ala Glu Val
465                 470                 475                 480

Ala His Gly Tyr Ala Arg Ile Lys Glu Gly Thr Gly Glu Tyr Gly Leu
                485                 490                 495

Pro Thr Arg Ala Glu Arg Asp Ala Arg Gly Val Met Leu Arg Val Tyr
            500                 505                 510

Ile Pro Arg Ala Ser Leu Glu Arg Phe Tyr Arg Thr Asn Thr Pro Leu
        515                 520                 525

Glu Asn Ala Glu Glu His Ile Thr Gln Val Ile Gly His Ser Leu Pro
    530                 535                 540

Leu Arg Asn Glu Ala Phe Thr Gly Pro Glu Ser Ala Gly Gly Glu Asp
545                 550                 555                 560
```

Glu Thr Val Ile Gly Trp Asp Met Ala Ile His Ala Val Ala Ile Pro
565 570 575

Ser

<210> 118
<211> 577
<212> PRT
<213> Vibrio cholerae

<400> 118
Cys Ser Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser
1 5 10 15

Ile Pro Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met
20 25 30

Thr Ile Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu
35 40 45

Ser Ile Ile Ile Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His
50 55 60

Tyr Val Asn Gln Asp Ala Pro Phe Gly Val Ile Asn Leu Asp Ile Thr
65 70 75 80

Thr Glu Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu
85 90 95

Phe Ala Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser
100 105 110

Ile Lys Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu
115 120 125

Val Pro Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln
130 135 140

Trp Glu Asn Gln Gly Asn Val Ser Phe Ala Val Thr Arg Pro Glu Gln
145 150 155 160

```
Ser Ile Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala His Lys
                165                 170                 175

Asn Gly Ser Arg His Lys Arg Trp Ala Asn Trp Leu Thr Thr Leu Pro
            180                 185                 190

Lys Val Val Leu Cys Phe Tyr Glu Asp Pro Glu Leu Cys Thr Tyr Gly
        195                 200                 205

Asp Asp Trp His Gly Gly Ala Tyr Lys Thr Val Ala Gly Thr Pro Lys
    210                 215                 220

Ala Ile Thr Val Lys Gln Gly Ile Glu Gln Lys Thr Val Glu Gln Arg
225                 230                 235                 240

Ile His Phe Ser Lys Gly Asn Ala Met Ser Ala Leu Ala Ala His Arg
                245                 250                 255

Val Cys Gly Val Pro Leu Glu Thr Leu Ala Arg Ser Arg Lys Pro Arg
            260                 265                 270

Asp Leu Thr Asp Asp Leu Ser Cys Ala Tyr Gln Ala Gln Asn Ile Val
        275                 280                 285

Ser Leu Phe Val Ala Thr Arg Ile Leu Phe Ser His Leu Asp Ser Val
    290                 295                 300

Phe Thr Leu Asn Leu Asp Glu Gln Glu Pro Glu Val Ala Glu Arg Leu
305                 310                 315                 320

Ser Asp Leu Arg Arg Ile Asn Glu Asn Asn Pro Gly Met Val Thr Gln
                325                 330                 335

Val Leu Thr Val Ala Arg Gln Ile Tyr Asn Asp Tyr Val Thr His His
            340                 345                 350

Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala Gly Ala Gln Ala Ala Asp
        355                 360                 365

Ile Leu Ser Leu Phe Cys Pro Asp Ala Asp Lys Ser Cys Val Ala Ser
    370                 375                 380
```

```
Asn Asn Asp Gln Ala Asn Ile Asn Ile Glu Ser Arg Ser Gly Arg Ser
385                 390                 395                 400

Tyr Leu Pro Glu Asn Arg Val Val Ile Thr Pro Gln Gly Val Thr Asn
                405                 410                 415

Trp Thr Tyr Gln Glu Leu Asp Ala Thr His Gln Ala Leu Thr Arg Glu
            420                 425                 430

Asp Tyr Val Phe Val Gly Tyr His Gly Thr Asn His Val Ala Ala Gln
        435                 440                 445

Thr Ile Val Asn Arg Ile Ala Pro Val Pro Arg Gly Asn Asn Thr Glu
    450                 455                 460

Asn Glu Glu Lys Trp Gly Gly Leu Tyr Val Ala Thr His Ala Glu Val
465                 470                 475                 480

Ala His Gly Tyr Ala Arg Ile Lys Glu Gly Thr Gly Glu Tyr Gly Leu
                485                 490                 495

Pro Thr Arg Ala Glu Arg Glu Thr Arg Gly Val Met Leu Arg Val Tyr
            500                 505                 510

Ile Pro Arg Ala Ser Leu Glu Arg Phe Tyr Arg Thr Asn Thr Pro Leu
        515                 520                 525

Glu Asn Ala Glu Glu His Ile Thr Gln Val Ile Gly His Ser Leu Pro
    530                 535                 540

Leu Arg Asn Glu Ala Phe Thr Gly Pro Glu Ser Ala Gly Gly Glu Asp
545                 550                 555                 560

Glu Thr Val Ile Gly Trp Asp Met Ala Ile His Ala Val Ala Ile Pro
                565                 570                 575

Ser
```

<210> 119
<211> 577
<212> PRT
<213> Vibrio cholerae

<400> 119
Cys Ser Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser
1   5   10   15

Ile Pro Gly Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met
            20   25   30

Thr Ile Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu
        35   40   45

Ser Ile Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His
    50   55   60

Tyr Val Ser Gln Asp Ala Pro Phe Gly Val Ile Asn Leu Asp Ile Thr
65   70   75   80

Thr Glu Asn Gly Thr Lys Thr Tyr Ser Phe Asn Arg Lys Glu Ser Glu
                85   90   95

Phe Ala Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser
            100   105   110

Ile Lys Ile Ser Ile Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu
        115   120   125

Val Pro Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln
    130   135   140

Trp Glu Asn Gln Gly Asn Val Ser Phe Ala Val Thr Arg Pro Glu Gln
145   150   155   160

Ser Ile Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala His Lys
                165   170   175

Asn Gly Ser Arg His Lys Arg Trp Ala Asn Trp Leu Thr Thr Leu Pro
            180   185   190

```
Glu Val Val Leu Cys Phe Phe Glu Asp Pro Glu Leu Cys Thr Tyr Gly
        195                 200                 205

Asp Asp Trp His Gly Gly Ala Tyr Lys Thr Val Ala Gly Thr Pro Lys
    210                 215                 220

Ala Ile Thr Val Lys Gln Gly Ile Glu Gln Lys Thr Val Glu Gln Arg
225                 230                 235                 240

Ile His Phe Ser Lys Lys Asn Ala Met Glu Ala Leu Ala Ala His Arg
                245                 250                 255

Val Cys Gly Val Pro Leu Glu Thr Leu Ala Arg Ser Arg Lys Pro Arg
            260                 265                 270

Asp Leu Pro Asp Asp Leu Ser Cys Ala Tyr Asn Ala Gln Gln Ile Val
        275                 280                 285

Ser Leu Phe Leu Ala Thr Arg Ile Leu Phe Thr His Ile Asp Ser Ile
    290                 295                 300

Phe Thr Leu Asn Leu Asp Gly Gln Glu Pro Glu Val Ala Glu Arg Leu
305                 310                 315                 320

Asp Asp Leu Arg Arg Ile Asn Glu Asn Asn Pro Gly Met Val Ile Gln
                325                 330                 335

Val Leu Thr Val Ala Arg Gln Ile Tyr Asn Asp Tyr Val Thr His His
            340                 345                 350

Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala Gly Ala Gln Ala Ala Asp
        355                 360                 365

Ile Leu Ser Leu Phe Cys Pro Asp Ala Asp Lys Ser Cys Val Ala Ser
    370                 375                 380

Asn Ser Asp Gln Ala Asn Ile Asn Ile Glu Ser Arg Ser Gly Arg Ser
385                 390                 395                 400

Tyr Leu Pro Glu Asn Arg Ala Val Ile Thr Gln Gln Gly Val Thr Asn
                405                 410                 415
```

```
Trp Thr Tyr Gln Glu Leu Glu Ala Thr His Gln Ala Leu Thr Gln Glu
            420                 425                 430

Gly Tyr Val Phe Val Gly Tyr His Gly Thr Asn His Val Ala Ala Gln
        435                 440                 445

Ser Ile Val Asn Arg Ile Ser Pro Val Pro Arg Gly Ser Asp Thr Glu
    450                 455                 460

Ser Glu Arg Ala Trp Gly Gly Leu Tyr Val Ser Thr Asp Ala Ser Val
465                 470                 475                 480

Ala Tyr Gly Tyr Ala Arg Ile Gln Glu Gly Thr Ala Asp Gly Gly Gly
                485                 490                 495

Leu Thr Pro Ala Glu Arg Lys Ala Arg Gly Val Met Leu Arg Val Tyr
            500                 505                 510

Leu Pro Gln Ala Ser Leu Glu Arg Phe Tyr Arg Ile Asn Ala Asp Leu
        515                 520                 525

Glu Lys Glu Arg Asn Leu Val Glu Arg Val Ile Gly His Pro Leu Pro
    530                 535                 540

Leu Arg Asn Glu Ala Phe Thr Gly Thr Asp Ala Glu Glu Gly Ser Asp
545                 550                 555                 560

Glu Thr Ala Ile Gly Trp Asp Met Ala Ile His Gly Val Ala Ile Pro
                565                 570                 575

Ser
```

<210> 120
<211> 577
<212> PRT
<213> Vibrio cholerae

<400> 120

```
Cys Ser Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser
1               5                   10                  15
```

```
Ile Pro Gly Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met
            20                  25                  30

Thr Ile Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu
        35                  40                  45

Ser Ile Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His
    50                  55                  60

Tyr Val Ser Gln Asp Ala Pro Phe Gly Val Ile Asn Leu Asp Ile Thr
65                  70                  75                  80

Thr Glu Asn Gly Thr Lys Thr Tyr Ser Phe Asn Arg Lys Glu Ser Glu
                85                  90                  95

Phe Ala Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser
            100                 105                 110

Ile Lys Ile Ser Ile Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu
        115                 120                 125

Val Pro Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln
    130                 135                 140

Trp Glu Asn Gln Gly Asn Val Ser Phe Ala Val Thr Arg Pro Glu Gln
145                 150                 155                 160

Ser Ile Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala His Lys
                165                 170                 175

Asn Gly Ser Arg His Lys Arg Trp Ala Asn Trp Leu Thr Thr Leu Pro
            180                 185                 190

Glu Val Val Leu Cys Phe Phe Glu Asp Pro Glu Leu Cys Thr Tyr Gly
        195                 200                 205

Asp Asp Trp His Gly Gly Ala Tyr Lys Thr Val Ala Gly Thr Pro Lys
    210                 215                 220
```

```
Ala Ile Thr Val Lys Gln Gly Ile Glu Gln Lys Thr Val Glu Gln Arg
225                 230                 235                 240

Ile His Phe Ser Lys Lys Asn Ala Met Glu Ala Leu Ala Ala His Arg
                245                 250                 255

Val Cys Gly Val Pro Leu Glu Thr Leu Ala Arg Ser Arg Lys Pro Arg
            260                 265                 270

Asp Leu Pro Asp Asp Leu Ser Cys Ala Tyr Asn Ala Gln Gln Ile Val
        275                 280                 285

Ser Leu Phe Leu Ala Thr Arg Ile Leu Phe Thr His Ile Asp Ser Ile
    290                 295                 300

Phe Thr Leu Asn Leu Asp Gly Gln Glu Pro Glu Val Ala Glu Arg Leu
305                 310                 315                 320

Asp Asp Leu Arg Arg Ile Asn Glu Asn Asn Pro Gly Met Val Ile Gln
                325                 330                 335

Val Leu Thr Val Ala Arg Gln Ile Tyr Asn Asp Tyr Val Thr His His
            340                 345                 350

Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala Ser Ala Gln Ala Ala Asp
        355                 360                 365

Ile Leu Ser Leu Phe Cys Pro Asp Ala Asp Lys Ser Cys Val Ala Ser
    370                 375                 380

Asn Ser Asp Gln Ala Asn Ile Asn Ile Glu Ser Arg Ser Gly Arg Ser
385                 390                 395                 400

Tyr Leu Pro Glu Asn Arg Ala Val Ile Thr Gln Gln Gly Val Thr Asn
                405                 410                 415

Trp Thr Tyr Gln Glu Leu Glu Ala Thr His Gln Ala Leu Thr Gln Glu
            420                 425                 430

Gly Tyr Val Phe Val Gly Tyr His Gly Thr Asn His Val Ala Ala Gln
        435                 440                 445
```

```
Ser Ile Val Asn Arg Ile Ser Pro Val Pro Arg Gly Ser Asp Thr Glu
    450                 455                 460

Ser Glu Arg Ala Trp Gly Gly Leu Tyr Val Ser Thr Asp Ala Ser Val
465                 470                 475                 480

Ala Tyr Gly Tyr Ala Arg Ile Gln Glu Gly Thr Ala Asp Gly Gly Gly
                485                 490                 495

Leu Thr Pro Ala Glu Arg Lys Ala Arg Gly Val Met Leu Arg Val Tyr
            500                 505                 510

Leu Pro Gln Ala Ser Leu Glu Arg Phe Tyr Arg Ile Asn Ala Asp Leu
        515                 520                 525

Glu Lys Glu Arg Asn Leu Val Glu Arg Val Ile Gly His Pro Leu Pro
    530                 535                 540

Leu Arg Asn Glu Ala Phe Thr Gly Thr Asp Ala Glu Glu Gly Ser Asp
545                 550                 555                 560

Glu Thr Ala Ile Gly Trp Asp Met Ala Ile His Gly Val Ala Ile Pro
                565                 570                 575

Ser
```

<210> 121
<211> 531
<212> PRT
<213> Vibrio cholerae

<400> 121

```
Val Glu Asp Glu Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys Ser
1               5                   10                  15

Leu Thr Pro Glu Pro Gly Lys Gln Ile Gln Ser Lys Leu Ser Ile Pro
            20                  25                  30

Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr Ile
        35                  40                  45
```

```
Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser Ile
    50                  55                  60

Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr Val
65                  70                  75                  80

Asn Gln Asp Ala Pro Phe Gly Val Ile Asn Leu Asp Ile Thr Thr Glu
                85                  90                  95

Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe Ala
            100                 105                 110

Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile Lys
        115                 120                 125

Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val Pro
    130                 135                 140

Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp Lys
145                 150                 155                 160

Thr Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His Asn Ile
                165                 170                 175

Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys Glu Gly
            180                 185                 190

Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala Leu Cys
        195                 200                 205

Trp Leu Val Pro Ile Asp Ala Ile Tyr Asn Tyr Ile Thr Gln Gln Asn
    210                 215                 220

Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr Val Ala
225                 230                 235                 240

Gly Thr Pro Lys Ala Ile Thr Val Lys Gln Gly Ile Glu Gln Lys Pro
                245                 250                 255
```

```
Val Glu Gln Arg Ile His Phe Ser Lys Lys Asn Ala Met Glu Ala Leu
            260                 265                 270

Ala Ala His Arg Val Cys Gly Val Pro Leu Glu Thr Leu Ala Arg Ser
        275                 280                 285

Arg Lys Pro Arg Asp Leu Thr Asp Asp Leu Ser Cys Val Tyr Gln Ala
    290                 295                 300

Gln Asn Ile Val Ser Leu Phe Val Ala Thr Arg Ile Leu Phe Ser His
305                 310                 315                 320

Leu Asp Ser Val Phe Thr Leu Asn Leu Asp Glu Gln Glu Pro Glu Val
                325                 330                 335

Ala Glu Arg Leu Ser Ala Leu Arg Gln Ile Asn Glu Asn Asn Pro Gly
            340                 345                 350

Met Val Thr Gln Val Leu Thr Val Ala Arg Gln Ile Tyr Asn Asp Tyr
        355                 360                 365

Val Thr His His Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala Gly Ala
    370                 375                 380

Gln Ala Ala Asp Ile Leu Ser Leu Phe Cys Pro Asp Ala Asp Lys Ser
385                 390                 395                 400

Cys Val Ala Ser Asn Asn Asp Gln Ala Asn Ile Asn Ile Glu Ser Arg
                405                 410                 415

Ser Gly Arg Ser Tyr Leu Pro Glu Asn Arg Ala Val Ile Thr Pro Gln
            420                 425                 430

Gly Val Thr Asn Trp Thr Tyr Gln Glu Leu Glu Ala Thr His Gln Ala
        435                 440                 445

Leu Thr Arg Glu Gly Tyr Val Phe Val Gly Tyr His Gly Thr Asn His
    450                 455                 460

Val Ala Ala Gln Thr Ile Val Asn Arg Ile Ala Pro Val Pro Arg Gly
465                 470                 475                 480
```

Asn Asn Thr Glu Asn Glu Lys Lys Trp Gly Gly Leu Tyr Val Ala Thr
485 490 495

His Ala Glu Val Ala His Gly Tyr Ala Arg Ile Lys Glu Gly Thr Gly
500 505 510

Glu Tyr Gly Leu Pro Thr Arg Ala Glu Arg Asp Ala Arg Gly Val Met
515 520 525

Leu Arg Val
530

<210> 122
<211> 491
<212> PRT
<213> Vibrio cholerae

<400> 122
Val Glu Asp Glu Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys Ser
1 5 10 15

Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile Pro
20 25 30

Gly Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr Ile
35 40 45

Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser Ile
50 55 60

Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr Val
65 70 75 80

Ser Gln Asp Ala Pro Phe Gly Val Ile Asn Leu Asp Ile Thr Thr Glu
85 90 95

Asn Gly Thr Lys Thr Tyr Ser Phe Asn Arg Lys Glu Gly Glu Phe Ala
100 105 110

Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile Lys
115 120 125

```
Ile Ser Ile Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val Pro
    130                 135                 140

Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp Glu
145                 150                 155                 160

Thr Gln Gly Asn Val Ser Phe Ala Val Thr Arg Pro Glu Gln Ser Ile
                165                 170                 175

Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Glu Lys Asp Gly
            180                 185                 190

Ala Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala Leu Cys
        195                 200                 205

Trp Leu Val Pro Leu Asp Ala Ile Tyr Asn Tyr Ile Thr Gln Gln Asn
    210                 215                 220

Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr Val Ala
225                 230                 235                 240

Gly Thr Pro Lys Ala Ile Thr Val Lys Gln Gly Met Glu Gln Lys Pro
                245                 250                 255

Val Glu Gln Arg Ile His Phe Ser Lys Lys Asn Ala Met Glu Ala Leu
            260                 265                 270

Ala Ala His Arg Val Cys Gly Val Pro Leu Glu Thr Leu Ala Arg Gly
        275                 280                 285

Arg Lys Pro Arg Asp Leu Thr Asp Asp Leu Gln Cys Ala Tyr Gln Ala
    290                 295                 300

Gln Asn Ile Val Ser Leu Phe Leu Ala Thr Arg Ile Leu Phe Ser His
305                 310                 315                 320

Leu Asp Ser Val Phe Thr Leu Asn Leu Asp Glu Gln Glu Pro Glu Val
                325                 330                 335
```

```
Ala Glu Arg Leu Thr Asp Leu Arg Arg Ile Asn Glu Asn Asn Pro Gly
            340                 345                 350

Met Val Thr Gln Val Leu Thr Ile Ala Arg Gln Ile Tyr Asn Asp Tyr
        355                 360                 365

Val Thr Glu His Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala Gly Ala
    370                 375                 380

Gln Ala Ala Asp Ile Leu Ser Leu Leu Cys Pro Asp Ala Asp Gly Ser
385                 390                 395                 400

Cys Val Ala Ser Asn Ser Asp Gln Ala Asn Ile Asn Ile Glu Ser Arg
                405                 410                 415

Ser Gly Arg Ser Tyr Leu Pro Glu Asn Arg Ala Val Ile Thr Pro Gln
            420                 425                 430

Gly Val Thr Asn Trp Thr Tyr Gln Glu Leu Glu Ala Lys His Gln Thr
        435                 440                 445

Leu Thr Arg Glu Gly Tyr Val Phe Val Gly Tyr His Gly Thr Asn His
    450                 455                 460

Val Ala Ala Gln Ser Ile Val Asn Arg Ile Thr Pro Val Pro Arg Gly
465                 470                 475                 480

Asn Asn Thr Glu Lys Glu Glu Glu Trp Gly Gly
                485                 490


<210> 123
<211> 491
<212> PRT
<213> Vibrio cholerae

<400> 123
Val Glu Asp Glu Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys Ser
1               5                   10                  15

Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile Pro
            20                  25                  30
```

```
Gly Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr Ile
        35                  40                  45

Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser Ile
    50                  55                  60

Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr Val
65                  70                  75                  80

Asn Gln Asp Ala Pro Phe Gly Val Ile His Leu Asp Ile Thr Thr Glu
                85                  90                  95

Asn Gly Thr Lys Thr Tyr Ser Phe Asn Arg Lys Glu Gly Glu Phe Ala
            100                 105                 110

Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile Lys
        115                 120                 125

Ile Ser Ile Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val Pro
    130                 135                 140

Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp Glu
145                 150                 155                 160

Thr Gln Gly Asn Val Ser Phe Ala Val Thr Arg Pro Glu Gln Ser Ile
                165                 170                 175

Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Glu Lys Asp Gly
            180                 185                 190

Ala Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala Leu Cys
        195                 200                 205

Trp Leu Val Pro Leu Asp Ala Ile Tyr Asn Tyr Ile Thr Gln Gln Asn
    210                 215                 220

Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr Val Ala
225                 230                 235                 240

Gly Thr Pro Lys Ala Ile Thr Val Lys Gln Gly Met Glu Gln Lys Pro
                245                 250                 255
```

```
Val Glu Gln Arg Ile His Phe Ser Lys Lys Asn Ala Met Glu Ala Leu
            260                 265                 270

Ala Ala His Arg Val Cys Gly Val Pro Leu Glu Thr Leu Ala Arg Gly
        275                 280                 285

Arg Lys Pro Arg Asp Leu Thr Asp Asp Leu Gln Cys Ala Tyr Gln Ala
    290                 295                 300

Gln Asn Ile Val Ser Leu Phe Leu Ala Thr Arg Ile Leu Phe Ser His
305                 310                 315                 320

Leu Asp Ser Val Phe Thr Leu Asn Leu Asp Glu Gln Glu Pro Glu Val
                325                 330                 335

Ala Glu Arg Leu Thr Asp Leu Arg Arg Ile Asn Glu Asn Asn Pro Gly
            340                 345                 350

Met Val Thr Gln Val Leu Thr Ile Ala Arg Gln Ile Tyr Asn Asp Tyr
        355                 360                 365

Val Thr Glu His Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala Gly Ala
    370                 375                 380

Gln Ala Ala Asp Ile Leu Ser Leu Phe Cys Pro Asp Ala Asp Glu Ser
385                 390                 395                 400

Cys Val Ala Ser Asn Ser Asp Gln Ala Asn Ile Asn Ile Glu Ser Arg
                405                 410                 415

Ser Gly Arg Ser Tyr Leu Pro Glu Asn Arg Ala Val Ile Thr Pro Gln
            420                 425                 430

Gly Val Thr Asn Trp Thr Tyr Gln Glu Leu Glu Ala Lys His Gln Thr
        435                 440                 445

Leu Thr Arg Glu Gly Tyr Val Phe Val Gly Tyr His Gly Thr Asn His
    450                 455                 460
```

```
Val Ala Ala Gln Ser Ile Val Asn Arg Ile Thr Pro Val Pro Arg Gly
465                 470                 475                 480


Asn Asn Thr Glu Lys Glu Glu Glu Trp Gly Gly
                485                 490


<210> 124
<211> 488
<212> PRT
<213> Vibrio cholerae

<400> 124
Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp Lys Thr Gln
1               5                   10                  15


Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His Asn Ile Ala Ile
            20                  25                  30


Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys Glu Gly Ser Arg
        35                  40                  45


His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala Leu Cys Trp Leu
    50                  55                  60


Val Pro Met Asp Ala Ile Tyr Asn Tyr Ile Thr Gln Gln Asn Cys Thr
65                  70                  75                  80


Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr Val Ala Gly Thr
                85                  90                  95


Pro Lys Val Ile Thr Val Lys Gln Gly Ile Glu Gln Lys Pro Val Glu
            100                 105                 110


Gln Arg Ile His Phe Ser Asn Gly Asn Ala Met Ser Ala Leu Ala Ala
        115                 120                 125


His Arg Val Cys Gly Val Pro Leu Glu Thr Leu Ala Arg Ser Arg Lys
    130                 135                 140


Pro Arg Asp Leu Thr Asp Asp Leu Ser Cys Ala Tyr Gln Ala Gln Asn
145                 150                 155                 160
```

```
Ile Val Ser Leu Phe Val Ala Thr Arg Ile Leu Phe Ser His Leu Asp
                165                 170                 175

Ser Val Phe Thr Leu Asn Leu Asp Glu Gln Glu Pro Glu Val Ala Glu
            180                 185                 190

Arg Leu Ser Asp Leu Arg Arg Ile Asn Glu Asn Asn Pro Gly Met Val
        195                 200                 205

Thr Gln Val Leu Thr Val Ala Arg Gln Ile Tyr Asn Asp Tyr Val Thr
    210                 215                 220

His His Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala Gly Ala Gln Ala
225                 230                 235                 240

Ala Asp Ile Leu Ser Leu Phe Cys Pro Asp Ala Asp Lys Ser Cys Val
                245                 250                 255

Ala Ser Asn Asn Asp Gln Ala Asn Ile Asn Ile Glu Ser Arg Ser Gly
            260                 265                 270

Arg Ser Tyr Leu Pro Glu Asn Arg Ala Val Ile Thr Pro Gln Gly Val
        275                 280                 285

Thr Asn Trp Thr Tyr Gln Glu Leu Glu Ala Thr His Gln Ala Leu Thr
    290                 295                 300

Arg Glu Gly Tyr Val Phe Val Gly Tyr His Gly Thr Asn His Val Ala
305                 310                 315                 320

Ala Gln Thr Ile Val Asn Arg Ile Ala Pro Val Pro Arg Gly Asn Asn
                325                 330                 335

Thr Glu Asn Glu Glu Lys Trp Gly Gly Leu Tyr Val Ala Thr His Ala
            340                 345                 350

Glu Val Ala His Gly Tyr Ala Arg Ile Lys Glu Gly Thr Gly Glu Tyr
        355                 360                 365

Gly Leu Pro Thr Arg Ala Glu Arg Asp Ala Arg Gly Val Met Leu Arg
    370                 375                 380
```

```
Val Tyr Ile Pro Arg Ala Ser Leu Glu Arg Phe Tyr Arg Thr Asn Thr
385                 390                 395                 400

Pro Leu Glu Asn Ala Glu Glu His Ile Thr Gln Val Ile Gly His Ser
                405                 410                 415

Leu Pro Leu Arg Asn Glu Ala Phe Thr Gly Pro Glu Ser Ala Gly Gly
            420                 425                 430

Glu Asp Glu Thr Val Ile Gly Trp Asp Met Ala Ile His Ala Val Ala
        435                 440                 445

Ile Pro Ser Thr Ile Pro Gly Asn Ala Tyr Glu Glu Leu Ala Ile Asp
    450                 455                 460

Glu Glu Ala Val Ala Lys Glu Gln Ser Ile Ser Ala Lys Pro Pro Tyr
465                 470                 475                 480

Lys Glu Arg Lys Asp Glu Leu Lys
                485
```

<210> 125
<211> 459
<212> PRT
<213> Vibrio cholerae

<400> 125

```
Val Glu Asp Glu Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys Ser
1               5                   10                  15

Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile Pro
            20                  25                  30

Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr Ile
        35                  40                  45

Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser Ile
    50                  55                  60

Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr Val
65                  70                  75                  80
```

```
Asn Gln Asp Ala Pro Phe Gly Val Ile His Leu Asp Ile Thr Thr Glu
                85                  90                  95

Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe Ala
            100                 105                 110

Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile Lys
        115                 120                 125

Ile Ser Val Asp Glu Leu Asp Gln Lys Arg Asn Ile Ile Glu Val Pro
    130                 135                 140

Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp Glu
145                 150                 155                 160

Asn Gln Gly Asn Val Ser Phe Ala Val Thr Arg Pro Glu Gln Ser Ile
                165                 170                 175

Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala His Lys Asn Gly
            180                 185                 190

Ser Arg His Lys Arg Trp Ala Asn Trp Leu Thr Thr Leu Pro Lys Val
        195                 200                 205

Val Leu Cys Phe Tyr Glu Glu Pro Glu Leu Cys Thr Tyr Gly Glu Asp
    210                 215                 220

Trp His Gly Gly Ala Tyr Lys Thr Val Ala Gly Thr Pro Glu Ala Ile
225                 230                 235                 240

Thr Val Lys Gln Gly Ile Glu Gln Lys Thr Val Glu Gln Arg Ile His
                245                 250                 255

Phe Ser Lys Lys Asn Ala Met Glu Ala Leu Ala Ala His Arg Val Cys
            260                 265                 270

Gly Val Pro Leu Glu Thr Leu Ala Arg Ser Arg Lys Pro Arg Asp Leu
        275                 280                 285
```

```
Gln Asp Asp Leu Ser Cys Ala Tyr Gln Ala Gln Asn Ile Val Ser Leu
    290                 295                 300

Phe Val Ala Thr Arg Ile Leu Phe Ser His Leu Asp Ser Val Phe Thr
305                 310                 315                 320

Leu Asn Leu Asp Glu Gln Glu Pro Ala Val Ala Glu Arg Leu Ser Ala
                325                 330                 335

Leu Arg Gln Ile Asn Glu Asn Asn Pro Gly Met Val Thr Gln Val Leu
            340                 345                 350

Thr Val Ala Arg Gln Ile Tyr Asn Asp Tyr Val Thr His His Pro Gly
        355                 360                 365

Leu Thr Pro Glu Gln Thr Ser Ala Gly Ala Gln Ala Ala Asp Ile Leu
    370                 375                 380

Ser Leu Phe Cys Pro Asp Ala Asp Lys Ser Cys Val Ala Ser Asn Asn
385                 390                 395                 400

Asp Gln Ala Asn Ile Asn Ile Glu Ser Arg Ser Gly Arg Ser Tyr Leu
                405                 410                 415

Pro Glu Asn Arg Ala Val Ile Thr Pro Gln Gly Val Thr Asn Trp Thr
            420                 425                 430

Tyr Gln Glu Leu Glu Ala Thr His Gln Ala Leu Thr Arg Glu Gly Tyr
        435                 440                 445

Val Phe Val Gly Tyr His Gly Thr Asn His Val
    450                 455
```

<210> 126
<211> 415
<212> PRT
<213> Secuencia Artificial

<220>
<223> Descripción de Secuencia Artificial:
polipéptido sintético

<400> 126

```
Val Glu Glu Ala Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys Ser
1               5                  10                  15

Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile Pro
            20                  25                  30

Gly Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr Ile
        35                  40                  45

Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser Ile
    50                  55                  60

Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr Val
65                  70                  75                  80

Ser Gln Asp Ala Pro Phe Gly Val Ile Asn Leu Asp Ile Thr Thr Glu
                85                  90                  95

Asn Gly Thr Lys Thr Tyr Ser Phe Asn Arg Lys Glu Ser Glu Phe Ala
            100                 105                 110

Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile Lys
        115                 120                 125

Ile Ser Ile Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val Pro
    130                 135                 140

Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp Lys
145                 150                 155                 160

Thr Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His Asn Ile
                165                 170                 175

Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys Glu Gly
            180                 185                 190

Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala Leu Cys
        195                 200                 205

Trp Leu Val Pro Ile Asp Ala Ile Tyr Asn Tyr Ile Thr Gln Gln Asn
    210                 215                 220
```

```
Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr Val Ala
225                 230                 235                 240

Gly Thr Pro Lys Ala Ile Thr Val Lys Gln Gly Ile Glu Gln Lys Pro
                245                 250                 255

Val Glu Gln Arg Ile His Phe Ser Lys Lys Asn Ala Met Glu Ala Leu
            260                 265                 270

Ala Ala His Arg Val Cys Gly Val Pro Leu Glu Thr Leu Ala Arg Ser
        275                 280                 285

Arg Lys Pro Arg Asp Leu Pro Asp Asp Leu Ser Cys Ala Tyr Asn Ala
    290                 295                 300

Gln Gln Ile Val Ser Leu Phe Leu Ala Thr Arg Ile Leu Phe Thr His
305                 310                 315                 320

Ile Asp Ser Ile Phe Thr Leu Asn Leu Asp Gly Gln Glu Pro Glu Val
                325                 330                 335

Ala Glu Arg Leu Asp Asp Leu Arg Arg Ile Asn Glu Asn Asn Pro Gly
            340                 345                 350

Met Val Ile Gln Val Leu Thr Val Ala Arg Gln Ile Tyr Asn Asp Tyr
        355                 360                 365

Val Thr His His Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala Gly Ala
    370                 375                 380

Gln Ala Ala Asp Ile Leu Ser Leu Phe Cys Pro Asp Ala Asp Lys Ser
385                 390                 395                 400

Cys Val Ala Ser Asn Ser Asp Gln Ala Asn Ile Asn Ile Glu Ser
                405                 410                 415
```

<210> 127
<211> 318
<212> PRT
<213> Vibrio cholerae

<400> 127

```
Leu Phe Ser His Leu Asp Ser Val Phe Thr Leu Asn Leu His Glu Gln
1               5                  10                  15

Glu Pro Ala Val Ala Glu Arg Leu Ser Ala Leu Arg Gln Ile Asn Glu
            20                  25                  30

Asn Asn Pro Gly Met Val Thr Gln Val Leu Thr Val Ala Arg Gln Ile
        35                  40                  45

Tyr Asn Asp Tyr Val Thr His His Pro Gly Leu Thr Pro Glu Gln Thr
    50                  55                  60

Ser Ala Gly Ala Gln Ala Ala Asp Ile Leu Ser Leu Phe Cys Pro Asp
65                  70                  75                  80

Ala Asp Lys Ser Cys Val Ala Ser Asn Asn Asp Gln Ala Asn Ile Asn
                85                  90                  95

Ile Glu Ser Arg Ser Gly Arg Ser Tyr Leu Pro Glu Asn Arg Ala Val
            100                 105                 110

Ile Thr Pro Gln Gly Val Thr Asn Trp Thr Tyr Gln Glu Leu Glu Ala
        115                 120                 125

Thr His Gln Ala Leu Thr Arg Glu Gly Tyr Val Phe Val Gly Tyr His
    130                 135                 140

Gly Thr Asn His Val Ala Ala Gln Thr Ile Val Asn Arg Ile Ala Pro
145                 150                 155                 160

Val Pro Arg Gly Asn Asn Thr Glu Asn Glu Glu Lys Trp Gly Gly Leu
                165                 170                 175

Tyr Val Ala Thr His Ala Glu Val Ala His Gly Tyr Ala Arg Ile Lys
            180                 185                 190

Glu Gly Thr Gly Glu Tyr Gly Leu Pro Thr Arg Ala Glu Arg Asp Ala
        195                 200                 205
```

```
Arg Gly Val Met Leu Arg Val Tyr Ile Pro Arg Ala Ser Leu Glu Arg
    210                 215                 220

Phe Tyr Arg Thr Asn Thr Pro Leu Glu Asn Ala Glu Glu His Ile Thr
225                 230                 235                 240

Gln Val Ile Gly His Ser Leu Pro Leu Arg Asn Glu Ala Phe Thr Gly
                245                 250                 255

Pro Glu Ser Ala Gly Gly Glu Asp Glu Thr Val Ile Gly Trp Asp Met
            260                 265                 270

Ala Ile His Ala Val Ala Ile Pro Ser Thr Ile Pro Gly Asn Ala Tyr
        275                 280                 285

Glu Glu Leu Ala Ile Asp Glu Glu Ala Val Ala Lys Glu Gln Ser Ile
    290                 295                 300

Ser Ala Lys Pro Pro Tyr Lys Glu Arg Lys Asp Glu Leu Lys
305                 310                 315
```

<210> 128
<211> 208
<212> PRT
<213> Vibrio cholerae

<400> 128

```
Ala Val Ile Thr Pro Gln Gly Val Thr Asn Trp Thr Tyr Gln Glu Leu
1               5                   10                  15

Glu Ala Thr His Gln Ala Leu Thr Arg Glu Gly Tyr Val Phe Val Gly
            20                  25                  30

Tyr His Gly Thr Asn His Val Ala Ala Gln Thr Ile Val Asn Arg Ile
        35                  40                  45

Ala Pro Val Pro Arg Gly Asn Asn Thr Glu Asn Glu Glu Lys Trp Gly
    50                  55                  60

Gly Leu Tyr Val Ala Thr His Ala Glu Val Ala His Gly Tyr Ala Arg
65                  70                  75                  80
```

```
Ile Lys Glu Gly Thr Gly Glu Tyr Gly Leu Pro Thr Arg Ala Glu Arg
                85                  90                  95

Asp Ala Arg Gly Val Met Leu Arg Val Tyr Ile Pro Arg Ala Ser Leu
            100                 105                 110

Glu Arg Phe Tyr Arg Thr Asn Thr Pro Leu Glu Asn Ala Glu Glu His
        115                 120                 125

Ile Thr Gln Val Ile Gly His Ser Leu Pro Leu Arg Asn Glu Ala Phe
    130                 135                 140

Thr Gly Pro Glu Ser Ala Gly Gly Glu Asp Glu Thr Val Ile Gly Trp
145                 150                 155                 160

Asp Met Ala Ile His Ala Val Ala Ile Pro Ser Thr Ile Pro Gly Asn
                165                 170                 175

Ala Tyr Glu Glu Leu Ala Ile Asp Glu Glu Ala Val Ala Lys Glu Gln
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Ser Ile Ser Thr Lys Pro Pro Tyr Lys Glu Arg Lys Asp Glu Leu Lys
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Glu Ala Thr His Gln Ala Leu Thr Arg Glu Gly Tyr Val Phe Val Gly
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Tyr His Gly Thr Asn His Val Ala Ala Gln Thr Ile Val Asn Arg Ile
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Ala Pro Val Pro Arg Gly Asn Asn Thr Glu Asn Glu Glu Lys Trp Gly
    50                  55                  60
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Gly Leu Tyr Val Ala Thr His Ala Glu Val Ala His Gly Tyr Ala Arg
65                  70                  75                  80

Ile Lys Glu Gly Thr Gly Glu Tyr Gly Leu Pro Thr Arg Ala Glu Arg
                85                  90                  95

Asp Ala Arg Gly Val Met Leu Arg Val Tyr Ile Pro Arg Ala Ser Leu
            100                 105                 110

Glu Arg Phe Tyr Arg Thr Asn Thr Pro Leu Glu Asn Ala Glu Glu His
        115                 120                 125

Ile Thr Gln Val Ile Gly His Ser Leu Pro Leu Arg Asn Glu Ala Phe
    130                 135                 140

Thr Gly Pro Glu Ser Ala Gly Gly Glu Asp Glu Thr Val Ile Gly Trp
145                 150                 155                 160

Asp Met Ala Ile His Ala Val Ala Ile Pro Ser Thr Ile Pro Gly Asn
                165                 170                 175

Ala Tyr Glu Glu Leu Ala Ile Asp Glu Glu Ala Val Ala Lys Glu Gln
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Ser Ile Ser Thr Lys Pro Pro Tyr Lys Glu Arg Lys Asp Glu Leu
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"N", "S", "SIAKQS", o "SIAKQSIAKQS"

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"V" o "VVKEAI"

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Leu Thr Pro Glu Xaa Gly Lys Xaa Ile Gln Ser Lys Leu Xaa Ile Pro
20 25 30

Xaa Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr Ile
35 40 45

Asn Asp Glu Gln Asn Asp Ile Xaa Asp Glu Xaa Lys Gly Glu Ser Ile
50 55 60

Ile Thr Xaa Gly Glu Phe Ala Thr Xaa Arg Ala Thr Arg His Tyr Val
65 70 75 80

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Xaa Gln Asp Ala Pro Phe Gly Val Ile Xaa Leu Asp Ile Thr Thr Glu
                85                  90                  95

Asn Gly Thr Lys Xaa Tyr Ser Xaa Asn Arg Lys Xaa Xaa Glu Phe Xaa
            100                 105                 110

Ile Xaa Trp Leu Val Xaa Xaa Gly Glu Asp Ser Pro Ala Ser Ile Lys
        115                 120                 125

Ile Ser Xaa Asp Glu Xaa Asp Gln Xaa Arg Asn Ile Ile Glu Val Pro
    130                 135                 140

Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp Xaa
145                 150                 155                 160

Xaa Gln Gly Asn Val Xaa Phe Xaa Val Thr Arg Pro Glu Xaa Xaa Xaa
                165                 170                 175

Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Ile Ala Ile Ser Trp Pro Ser
            180                 185                 190

Val Ser Tyr Xaa Ala Ala Xaa Lys Xaa Gly Xaa Arg His Lys Arg Trp
        195                 200                 205

Ala Xaa Trp Xaa Thr Xaa Xaa Xaa Xaa Xaa Xaa Leu Xaa Xaa Xaa Xaa
    210                 215                 220

Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Cys Thr Xaa Gly Xaa Xaa
225                 230                 235                 240

Trp Xaa Gly Gly Xaa Tyr Xaa Thr Val Ala Gly Xaa Pro Xaa Xaa Ile
                245                 250                 255

Xaa Val Lys Gln Gly Xaa Glu Gln Lys Xaa Val Glu Gln Arg Ile His
            260                 265                 270

Phe Ser Xaa Xaa Asn Ala Xaa Xaa Xaa Leu Ala Ala His Arg Val Cys
        275                 280                 285
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Gly Val Pro Leu Glu Thr Leu Ala Arg Xaa Arg Lys Pro Arg Xaa Leu
290 295 300

Xaa Asp Asp Leu Xaa Cys Xaa Tyr Xaa Ala Gln Xaa Ile Val Ser Leu
305 310 315 320

Phe Xaa Ala Thr Arg Xaa Leu Phe Xaa His Xaa Asp Ser Xaa Phe Thr
325 330 335

Leu Asn Leu Xaa Xaa Gln Xaa Pro Xaa Val Xaa Glu Arg Leu Xaa Xaa
340 345 350

Xaa Arg Xaa Ile Asn Glu Xaa Asn Pro Gly Xaa Val Xaa Gln Val Leu
355 360 365

Thr Xaa Ala Arg Gln Ile Tyr Asn Asp Tyr Val Thr Xaa His Pro Xaa
370 375 380

Leu Xaa Pro Glu Gln Thr Ser Ala Xaa Ala Gln Ala Ala Asp Ile Leu
385 390 395 400

Ser Leu Xaa Xaa Pro Asp Xaa Asp Xaa Xaa Cys Val Ala Xaa Xaa Xaa
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Asp Gln Ala Asn Ile Asn Xaa Glu Ser Arg Ser Gly Arg Ser Tyr Leu
420 425 430

Xaa Glu Asn Arg Ala Val Ile Thr Xaa Gln Gly Val Thr Asn Trp Thr
435 440 445

Tyr Gln Glu Leu Xaa Xaa Xaa His Gln Xaa Leu Thr Xaa Glu Xaa Tyr
450 455 460

Val Phe Val Gly Tyr His Gly Thr Asn His Xaa Ala Ala Gln Xaa Ile
465 470 475 480

Val Asn Arg Ile Xaa Pro Val Pro Arg Gly Xaa Xaa Thr Glu Xaa Glu
485 490 495

Xaa Xaa Trp Gly Gly Xaa Tyr Val Xaa Thr Xaa Ala Xaa Xaa Xaa Xaa
500 505 510

Xaa Tyr Xaa Arg Xaa Xaa Xaa Gly Thr Xaa Xaa Xaa Xaa Xaa Xaa Thr
515 520 525

Xaa Xaa Xaa Xaa Xaa Xaa Arg Gly Val Met Leu Xaa Val Tyr Xaa Xaa
530 535 540

Xaa Ala Ser Leu Glu Arg Phe Tyr Arg Xaa Asn Xaa Xaa Leu Glu Xaa
545 550 555 560

Xaa Xaa Xaa Xaa Xaa Xaa Xaa Val Ile Gly His Xaa Leu Pro Leu Arg
565 570 575

Asn Glu Ala Phe Thr Gly Xaa Xaa Xaa Xaa Xaa Gly Xaa Xaa Glu Thr
580 585 590

Xaa Ile Gly Trp Asp Xaa Ala Ile Xaa Xaa Val Ala Ile Pro Ser Thr
595 600 605

Ile Pro Gly Asn Xaa Tyr Xaa Xaa Leu Xaa Xaa Xaa Glu Glu Ala Xaa
610 615 620

Xaa Xaa Xaa Xaa Xaa Ala Xaa Glu Gln Ser Ile Ser Xaa Lys Pro Pro
625 630 635 640

Tyr Lys Glu Xaa Xaa Asp Glu Leu Lys
645

<210> 131
<211> 207
<212> PRT
<213> Secuencia Artificial

<220>
<223> Descripción de Secuencia Artificial:
polipéptido sintético

<400> 131
Met Val Glu Glu Ala Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys
1 5 10 15

Ser Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile
20 25 30

```
Pro Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr
        35                  40                  45

Ile Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser
    50                  55                  60

Ile Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr
65                  70                  75                  80

Val Asn Gln Asp Ala Pro Phe Gly Val Ile His Leu Asp Ile Thr Thr
                85                  90                  95

Glu Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe
            100                 105                 110

Ala Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile
        115                 120                 125

Lys Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val
    130                 135                 140

Pro Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp
145                 150                 155                 160

Lys Thr Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His Asn
                165                 170                 175

Ile Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys Glu
            180                 185                 190

Gly Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala
        195                 200                 205
```

<210> 132
<211> 246
<212> PRT
<213> Secuencia Artificial

<220>
<223> Descripción de Secuencia Artificial:
polipéptido sintético

<400> 132

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Met Val Glu Glu Ala Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys
1               5                  10                  15

Ser Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile
            20                  25                  30

Pro Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr
        35                  40                  45

Ile Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser
    50                  55                  60

Ile Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr
65                  70                  75                  80

Val Asn Gln Asp Ala Pro Phe Gly Val Ile His Leu Asp Ile Thr Thr
                85                  90                  95

Glu Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe
            100                 105                 110

Ala Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile
        115                 120                 125

Lys Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val
    130                 135                 140

Pro Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp
145                 150                 155                 160

Lys Thr Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His Asn
                165                 170                 175

Ile Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys Glu
            180                 185                 190

Gly Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala Leu
        195                 200                 205
```

Cys Trp Leu Val Pro Met Asp Ala Ile Tyr Asn Tyr Ile Thr Gln Gln
210 215 220

Asn Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr Val
225 230 235 240

Ala Gly Thr Pro Lys Val
245

<210> 133
<211> 252
<212> PRT
<213> Secuencia Artificial

<220>
<223> Descripción de Secuencia Artificial:
polipéptido sintético

<400> 133
Met Val Glu Glu Ala Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys
1 5 10 15

Ser Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile
20 25 30

Pro Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr
35 40 45

Ile Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser
50 55 60

Ile Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr
65 70 75 80

Val Asn Gln Asp Ala Pro Phe Gly Val Ile His Leu Asp Ile Thr Thr
85 90 95

Glu Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe
100 105 110

Ala Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile
115 120 125

```
Lys Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val
    130                 135                 140

Pro Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp
145                 150                 155                 160

Lys Thr Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His Asn
                165                 170                 175

Ile Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys Glu
            180                 185                 190

Gly Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala Leu
        195                 200                 205

Cys Trp Leu Val Pro Met Asp Ala Ile Tyr Asn Tyr Ile Thr Gln Gln
    210                 215                 220

Asn Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr Val
225                 230                 235                 240

Ala Gly Thr Pro Lys Val Ile Thr Val Lys Gln Gly
                245                 250
```

<210> 134
<211> 267
<212> PRT
<213> Secuencia Artificial

<220>
<223> Descripción de Secuencia Artificial:
polipéptido sintético

<400> 134

```
Met Val Glu Glu Ala Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys
1               5                   10                  15

Ser Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile
            20                  25                  30

Pro Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr
        35                  40                  45
```

```
Ile Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser
    50                  55                  60

Ile Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr
65                  70                  75                  80

Val Asn Gln Asp Ala Pro Phe Gly Val Ile His Leu Asp Ile Thr Thr
                85                  90                  95

Glu Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe
            100                 105                 110

Ala Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile
        115                 120                 125

Lys Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val
    130                 135                 140

Pro Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp
145                 150                 155                 160

Lys Thr Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His Asn
                165                 170                 175

Ile Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys Glu
            180                 185                 190

Gly Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala Leu
        195                 200                 205

Cys Trp Leu Val Pro Met Asp Ala Ile Tyr Asn Tyr Ile Thr Gln Gln
    210                 215                 220

Asn Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr Val
225                 230                 235                 240

Ala Gly Thr Pro Lys Val Ile Thr Val Lys Gln Gly Ile Glu Gln Lys
                245                 250                 255

Pro Val Glu Gln Arg Ile His Phe Ser Lys Gly
            260                 265
```

<210> 135
<211> 387
<212> PRT
<213> Secuencia Artificial

<220>
<223> Descripción de Secuencia Artificial:
polipéptido sintético

<400> 135
Met Val Glu Glu Ala Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys
1 5 10 15

Ser Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile
20 25 30

Pro Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr
35 40 45

Ile Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser
50 55 60

Ile Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr
65 70 75 80

Val Asn Gln Asp Ala Pro Phe Gly Val Ile His Leu Asp Ile Thr Thr
85 90 95

Glu Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe
100 105 110

Ala Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile
115 120 125

Lys Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val
130 135 140

Pro Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp
145 150 155 160

Lys Thr Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His Asn
165 170 175

```
Ile Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys Glu
            180                 185                 190

Gly Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala Leu
        195                 200                 205

Cys Trp Leu Val Pro Met Asp Ala Ile Tyr Asn Tyr Ile Thr Gln Gln
    210                 215                 220

Asn Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr Val
225                 230                 235                 240

Ala Gly Thr Pro Lys Val Ile Thr Val Lys Gln Gly Ile Glu Gln Lys
                245                 250                 255

Pro Val Glu Gln Arg Ile His Phe Ser Lys Gly Asn Ala Met Ser Ala
            260                 265                 270

Leu Ala Ala His Arg Val Cys Gly Val Pro Leu Glu Thr Leu Ala Arg
        275                 280                 285

Ser Arg Lys Pro Arg Asp Leu Thr Asp Asp Leu Ser Cys Ala Tyr Gln
    290                 295                 300

Ala Gln Asn Ile Val Ser Leu Phe Val Ala Thr Arg Ile Leu Phe Ser
305                 310                 315                 320

His Leu Asp Ser Val Phe Thr Leu Asn Leu Asp Glu Gln Glu Pro Glu
                325                 330                 335

Val Ala Glu Arg Leu Ser Asp Leu Arg Arg Ile Asn Glu Asn Asn Pro
            340                 345                 350

Gly Met Val Thr Gln Val Leu Thr Val Ala Arg Gln Ile Tyr Asn Asp
        355                 360                 365

Tyr Val Thr His His Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala Gly
    370                 375                 380
```

Ala Gln Ala
385

<210> 136
<211> 188
<212> PRT
<213> Secuencia Artificial

<220>
<223> Descripción de Secuencia Artificial:
polipéptido sintético

<400> 136
Met Val Glu Glu Ala Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys
1 5 10 15

Ser Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile
20 25 30

Pro Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr
35 40 45

Ile Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser
50 55 60

Ile Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr
65 70 75 80

Val Asn Gln Asp Ala Pro Phe Gly Val Ile His Leu Asp Ile Thr Thr
85 90 95

Glu Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe
100 105 110

Ala Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile
115 120 125

Lys Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val
130 135 140

Pro Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp
145 150 155 160

Lys Thr Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His Asn
165 170 175

Ile Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala
180 185

<210> 137
<211> 148
<212> PRT
<213> Secuencia Artificial

<220>
<223> Descripción de Secuencia Artificial:
polipéptido sintético

<400> 137
Met Val Leu Tyr Tyr Ser Met Thr Ile Asn Asp Glu Gln Asn Asp Ile
1 5 10 15

Lys Asp Glu Asp Lys Gly Glu Ser Ile Ile Thr Ile Gly Glu Phe Ala
20 25 30

Thr Val Arg Ala Thr Arg His Tyr Val Asn Gln Asp Ala Pro Phe Gly
35 40 45

Val Ile His Leu Asp Ile Thr Thr Glu Asn Gly Thr Lys Thr Tyr Ser
50 55 60

Tyr Asn Arg Lys Glu Gly Glu Phe Ala Ile Asn Trp Leu Val Pro Ile
65 70 75 80

Gly Glu Asp Ser Pro Ala Ser Ile Lys Ile Ser Val Asp Glu Leu Asp
85 90 95

Gln Gln Arg Asn Ile Ile Glu Val Pro Lys Leu Tyr Ser Ile Asp Leu
100 105 110

Asp Asn Gln Thr Leu Glu Gln Trp Lys Thr Gln Gly Asn Val Ser Phe
115 120 125

Ser Val Thr Arg Pro Glu His Asn Ile Ala Ile Ser Trp Pro Ser Val
130 135 140

Ser Tyr Lys Ala
145

<210> 138
<211> 167
<212> PRT
<213> Secuencia Artificial

<220>
<223> Descripción de Secuencia Artificial:
polipéptido sintético

<400> 138
Met Gly Val Leu Tyr Tyr Ser Met Thr Ile Asn Asp Glu Gln Asn Asp
1 5 10 15

Ile Lys Asp Glu Asp Lys Gly Glu Ser Ile Ile Thr Ile Gly Glu Phe
20 25 30

Ala Thr Val Arg Ala Thr Arg His Tyr Val Asn Gln Asp Ala Pro Phe
35 40 45

Gly Val Ile His Leu Asp Ile Thr Thr Glu Asn Gly Thr Lys Thr Tyr
50 55 60

Ser Tyr Asn Arg Lys Glu Gly Glu Phe Ala Ile Asn Trp Leu Val Pro
65 70 75 80

Ile Gly Glu Asp Ser Pro Ala Ser Ile Lys Ile Ser Val Asp Glu Leu
85 90 95

Asp Gln Gln Arg Asn Ile Ile Glu Val Pro Lys Leu Tyr Ser Ile Asp
100 105 110

Leu Asp Asn Gln Thr Leu Glu Gln Trp Lys Thr Gln Gly Asn Val Ser
115 120 125

Phe Ser Val Thr Arg Pro Glu His Asn Ile Ala Ile Ser Trp Pro Ser
130 135 140

Val Ser Tyr Lys Ala Ala Gln Lys Glu Gly Ser Arg His Lys Arg Trp
145 150 155 160

Ala His Trp His Thr Gly Leu
165

<210> 139
<211> 152
<212> PRT
<213> Secuencia Artificial

<220>
<223> Descripción de Secuencia Artificial:
polipéptido sintético

<400> 139
Met Val Glu Glu Ala Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys
1 5 10 15

Ser Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile
20 25 30

Pro Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr
35 40 45

Ile Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser
50 55 60

Ile Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr
65 70 75 80

Val Asn Gln Asp Ala Pro Phe Gly Val Ile His Leu Asp Ile Thr Thr
85 90 95

Glu Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe
100 105 110

Ala Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile
115 120 125

Lys Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val
130 135 140

Pro Lys Leu Tyr Ser Ile Asp Leu
145 150

<210> 140
<211> 135
<212> PRT
<213> Secuencia Artificial

<220>
<223> Descripción de Secuencia Artificial:
polipéptido sintético

<400> 140
Met Val Glu Glu Ala Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys
1 5 10 15

Ser Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile
20 25 30

Pro Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr
35 40 45

Ile Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser
50 55 60

Ile Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr
65 70 75 80

Val Asn Gln Asp Ala Pro Phe Gly Val Ile His Leu Asp Ile Thr Thr
85 90 95

Glu Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe
100 105 110

Ala Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile
115 120 125

Lys Ile Ser Val Asp Glu Leu
130 135

<210> 141
<211> 179
<212> PRT
<213> Secuencia Artificial

<220>
<223> Descripción de Secuencia Artificial:
polipéptido sintético

<400> 141
Met Ala Ala Leu Gln Lys Ser Val Ser Ser Phe Leu Met Gly Thr Leu
1 5 10 15

Ala Thr Ser Cys Leu Leu Leu Leu Ala Leu Leu Val Gln Gly Gly Ala
20 25 30

Ala Ala Pro Ile Ser Ser His Cys Arg Leu Asp Lys Ser Asn Phe Gln
35 40 45

Gln Pro Tyr Ile Thr Asn Arg Thr Phe Met Leu Ala Lys Glu Ala Ser
50 55 60

Leu Ala Asp Asn Asn Thr Asp Val Arg Leu Ile Gly Glu Lys Leu Phe
65 70 75 80

His Gly Val Ser Met Ser Glu Arg Cys Tyr Leu Met Lys Gln Val Leu
85 90 95

Asn Phe Thr Leu Glu Glu Val Leu Phe Pro Gln Ser Asp Arg Phe Gln
100 105 110

Pro Tyr Met Gln Glu Val Val Pro Phe Leu Ala Arg Leu Ser Asn Arg
115 120 125

Leu Ser Thr Cys His Ile Glu Gly Asp Asp Leu His Ile Gln Arg Asn
130 135 140

Val Gln Lys Leu Lys Asp Thr Val Lys Lys Leu Gly Glu Ser Gly Glu
145 150 155 160

Ile Lys Ala Ile Gly Glu Leu Asp Leu Leu Phe Met Ser Leu Arg Asn
165 170 175

Ala Cys Ile

<210> 142
<211> 146
<212> PRT
<213> Secuencia Artificial

<220>
<223> Descripción de Secuencia Artificial:
polipéptido sintético

<400> 142
Ala Pro Ile Ser Ser His Cys Arg Leu Asp Lys Ser Asn Phe Gln Gln
1 5 10 15

Pro Tyr Ile Thr Asn Arg Thr Phe Met Leu Ala Lys Glu Ala Ser Leu
20 25 30

Ala Asp Asn Asn Thr Asp Val Arg Leu Ile Gly Glu Lys Leu Phe His
35 40 45

Gly Val Ser Met Ser Glu Arg Cys Tyr Leu Met Lys Gln Val Leu Asn
50 55 60

Phe Thr Leu Glu Glu Val Leu Phe Pro Gln Ser Asp Arg Phe Gln Pro
65 70 75 80

Tyr Met Gln Glu Val Val Pro Phe Leu Ala Arg Leu Ser Asn Arg Leu
85 90 95

Ser Thr Cys His Ile Glu Gly Asp Asp Leu His Ile Gln Arg Asn Val
100 105 110

Gln Lys Leu Lys Asp Thr Val Lys Lys Leu Gly Glu Ser Gly Glu Ile
115 120 125

Lys Ala Ile Gly Glu Leu Asp Leu Leu Phe Met Ser Leu Arg Asn Ala
130 135 140

Cys Ile
145

<210> 143
<211> 147
<212> PRT
<213> Secuencia Artificial

<220>
<223> Descripción de Secuencia Artificial:
polipéptido sintético

<400> 143
Met Ala Pro Ile Ser Ser His Cys Arg Leu Asp Lys Ser Asn Phe Gln
1   5   10   15

Gln Pro Tyr Ile Thr Asn Arg Thr Phe Met Leu Ala Lys Glu Ala Ser
            20   25   30

Leu Ala Asp Asn Asn Thr Asp Val Arg Leu Ile Gly Glu Lys Leu Phe
        35   40   45

His Gly Val Ser Met Ser Glu Arg Cys Tyr Leu Met Lys Gln Val Leu
    50   55   60

Asn Phe Thr Leu Glu Glu Val Leu Phe Pro Gln Ser Asp Arg Phe Gln
65   70   75   80

Pro Tyr Met Gln Glu Val Val Pro Phe Leu Ala Arg Leu Ser Asn Arg
                85   90   95

Leu Ser Thr Cys His Ile Glu Gly Asp Asp Leu His Ile Gln Arg Asn
            100   105   110

Val Gln Lys Leu Lys Asp Thr Val Lys Lys Leu Gly Glu Ser Gly Glu
        115   120   125

Ile Lys Ala Ile Gly Glu Leu Asp Leu Leu Phe Met Ser Leu Arg Asn
    130   135   140

Ala Cys Ile
145

<210> 144
<211> 178
<212> PRT
<213> Secuencia Artificial

<220>
<223> Descripción de Secuencia Artificial:
      polipéptido sintético

<400> 144
Met His Ser Ser Ala Leu Leu Cys Cys Leu Val Leu Leu Thr Gly Val
1   5   10   15

Arg Ala Ser Pro Gly Gln Gly Thr Gln Ser Glu Asn Ser Cys Thr His
20 25 30

Phe Pro Gly Asn Leu Pro Asn Met Leu Arg Asp Leu Arg Asp Ala Phe
35 40 45

Ser Arg Val Lys Thr Phe Phe Gln Met Lys Asp Gln Leu Asp Asn Leu
50 55 60

Leu Leu Lys Glu Ser Leu Leu Glu Asp Phe Lys Gly Tyr Leu Gly Cys
65 70 75 80

Gln Ala Leu Ser Glu Met Ile Gln Phe Tyr Leu Glu Glu Val Met Pro
85 90 95

Gln Ala Glu Asn Gln Asp Pro Asp Ile Lys Ala His Val Asn Ser Leu
100 105 110

Gly Glu Asn Leu Lys Thr Leu Arg Leu Arg Leu Arg Arg Cys His Arg
115 120 125

Phe Leu Pro Cys Glu Asn Lys Ser Lys Ala Val Glu Gln Val Lys Asn
130 135 140

Ala Phe Asn Lys Leu Gln Glu Lys Gly Ile Tyr Lys Ala Met Ser Glu
145 150 155 160

Phe Asp Ile Phe Ile Asn Tyr Ile Glu Ala Tyr Met Thr Met Lys Ile
165 170 175

Arg Asn

<210> 145
<211> 160
<212> PRT
<213> Secuencia Artificial

<220>
<223> Descripción de Secuencia Artificial:
polipéptido sintético

<400> 145
Ser Pro Gly Gln Gly Thr Gln Ser Glu Asn Ser Cys Thr His Phe Pro
1 5 10 15

Gly Asn Leu Pro Asn Met Leu Arg Asp Leu Arg Asp Ala Phe Ser Arg
20 25 30

Val Lys Thr Phe Phe Gln Met Lys Asp Gln Leu Asp Asn Leu Leu Leu
35 40 45

Lys Glu Ser Leu Leu Glu Asp Phe Lys Gly Tyr Leu Gly Cys Gln Ala
50 55 60

Leu Ser Glu Met Ile Gln Phe Tyr Leu Glu Glu Val Met Pro Gln Ala
65 70 75 80

Glu Asn Gln Asp Pro Asp Ile Lys Ala His Val Asn Ser Leu Gly Glu
85 90 95

Asn Leu Lys Thr Leu Arg Leu Arg Leu Arg Arg Cys His Arg Phe Leu
100 105 110

Pro Cys Glu Asn Lys Ser Lys Ala Val Glu Gln Val Lys Asn Ala Phe
115 120 125

Asn Lys Leu Gln Glu Lys Gly Ile Tyr Lys Ala Met Ser Glu Phe Asp
130 135 140

Ile Phe Ile Asn Tyr Ile Glu Ala Tyr Met Thr Met Lys Ile Arg Asn
145 150 155 160

<210> 146
<211> 191
<212> PRT
<213> Secuencia Artificial

<220>
<223> Descripción de Secuencia Artificial:
polipéptido sintético

<400> 146
Phe Pro Thr Ile Pro Leu Ser Arg Leu Phe Asp Asn Ala Met Leu Arg
1 5 10 15

```
Ala His Arg Leu His Gln Leu Ala Phe Asp Thr Tyr Gln Glu Phe Glu
            20                  25                  30

Glu Ala Tyr Ile Pro Lys Glu Gln Lys Tyr Ser Phe Leu Gln Asn Pro
        35                  40                  45

Gln Thr Ser Leu Cys Phe Ser Glu Ser Ile Pro Thr Pro Ser Asn Arg
    50                  55                  60

Glu Glu Thr Gln Gln Lys Ser Asn Leu Glu Leu Leu Arg Ile Ser Leu
65                  70                  75                  80

Leu Leu Ile Gln Ser Trp Leu Glu Pro Val Gln Phe Leu Arg Ser Val
                85                  90                  95

Phe Ala Asn Ser Leu Val Tyr Gly Ala Ser Asp Ser Asn Val Tyr Asp
            100                 105                 110

Leu Leu Lys Asp Leu Glu Glu Gly Ile Gln Thr Leu Met Gly Arg Leu
        115                 120                 125

Glu Asp Gly Ser Pro Arg Thr Gly Gln Ile Phe Lys Gln Thr Tyr Ser
    130                 135                 140

Lys Phe Asp Thr Asn Ser His Asn Asp Asp Ala Leu Leu Lys Asn Tyr
145                 150                 155                 160

Gly Leu Leu Tyr Cys Phe Arg Lys Asp Met Asp Lys Val Glu Thr Phe
                165                 170                 175

Leu Arg Ile Val Gln Cys Arg Ser Val Glu Gly Ser Cys Gly Phe
            180                 185                 190
```

<210> 147
<211> 428
<212> PRT
<213> Secuencia Artificial

<220>
<223> Descripción de Secuencia Artificial:
polipéptido sintético

<400> 147

```
Met Val Glu Glu Ala Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys
1               5                  10                  15

Ser Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile
            20                  25                  30

Pro Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr
        35                  40                  45

Ile Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser
    50                  55                  60

Ile Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr
65                  70                  75                  80

Val Asn Gln Asp Ala Pro Phe Gly Val Ile His Leu Asp Ile Thr Thr
                85                  90                  95

Glu Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe
            100                 105                 110

Ala Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile
        115                 120                 125

Lys Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val
    130                 135                 140

Pro Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp
145                 150                 155                 160

Lys Thr Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His Asn
                165                 170                 175

Ile Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys Glu
            180                 185                 190

Gly Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala Leu
        195                 200                 205
```

```
Cys Trp Leu Val Pro Met Asp Ala Ile Tyr Asn Tyr Ile Thr Gln Gln
    210                 215                 220

Asn Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr Val
225                 230                 235                 240

Ala Gly Thr Pro Lys Val Ile Thr Val Lys Gln Gly Ile Glu Gln Lys
                245                 250                 255

Pro Val Glu Gln Arg Ile His Phe Ser Lys Gly Gly Gly Gly Gly Ser
            260                 265                 270

Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Ala Pro Ile Ser Ser His
        275                 280                 285

Cys Arg Leu Asp Lys Ser Asn Phe Gln Gln Pro Tyr Ile Thr Asn Arg
    290                 295                 300

Thr Phe Met Leu Ala Lys Glu Ala Ser Leu Ala Asp Asn Asn Thr Asp
305                 310                 315                 320

Val Arg Leu Ile Gly Glu Lys Leu Phe His Gly Val Ser Met Ser Glu
                325                 330                 335

Arg Cys Tyr Leu Met Lys Gln Val Leu Asn Phe Thr Leu Glu Glu Val
            340                 345                 350

Leu Phe Pro Gln Ser Asp Arg Phe Gln Pro Tyr Met Gln Glu Val Val
        355                 360                 365

Pro Phe Leu Ala Arg Leu Ser Asn Arg Leu Ser Thr Cys His Ile Glu
    370                 375                 380

Gly Asp Asp Leu His Ile Gln Arg Asn Val Gln Lys Leu Lys Asp Thr
385                 390                 395                 400

Val Lys Lys Leu Gly Glu Ser Gly Glu Ile Lys Ala Ile Gly Glu Leu
                405                 410                 415

Asp Leu Leu Phe Met Ser Leu Arg Asn Ala Cys Ile
            420                 425
```

<210> 148
<211> 548
<212> PRT
<213> Secuencia Artificial

<220>
<223> Descripción de Secuencia Artificial:
polipéptido sintético

<400> 148

```
Met Val Glu Glu Ala Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys
1               5                  10                  15

Ser Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile
            20                  25                  30

Pro Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr
        35                  40                  45

Ile Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser
    50                  55                  60

Ile Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr
65                  70                  75                  80

Val Asn Gln Asp Ala Pro Phe Gly Val Ile His Leu Asp Ile Thr Thr
                85                  90                  95

Glu Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe
            100                 105                 110

Ala Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile
        115                 120                 125

Lys Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val
    130                 135                 140

Pro Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp
145                 150                 155                 160

Lys Thr Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His Asn
                165                 170                 175
```

```
Ile Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys Glu
            180                 185                 190

Gly Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala Leu
        195                 200                 205

Cys Trp Leu Val Pro Met Asp Ala Ile Tyr Asn Tyr Ile Thr Gln Gln
    210                 215                 220

Asn Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr Val
225                 230                 235                 240

Ala Gly Thr Pro Lys Val Ile Thr Val Lys Gln Gly Ile Glu Gln Lys
                245                 250                 255

Pro Val Glu Gln Arg Ile His Phe Ser Lys Gly Asn Ala Met Ser Ala
            260                 265                 270

Leu Ala Ala His Arg Val Cys Gly Val Pro Leu Glu Thr Leu Ala Arg
        275                 280                 285

Ser Arg Lys Pro Arg Asp Leu Thr Asp Asp Leu Ser Cys Ala Tyr Gln
    290                 295                 300

Ala Gln Asn Ile Val Ser Leu Phe Val Ala Thr Arg Ile Leu Phe Ser
305                 310                 315                 320

His Leu Asp Ser Val Phe Thr Leu Asn Leu Asp Glu Gln Glu Pro Glu
                325                 330                 335

Val Ala Glu Arg Leu Ser Asp Leu Arg Arg Ile Asn Glu Asn Asn Pro
            340                 345                 350

Gly Met Val Thr Gln Val Leu Thr Val Ala Arg Gln Ile Tyr Asn Asp
        355                 360                 365

Tyr Val Thr His His Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala Gly
    370                 375                 380
```

Ala Gln Ala Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly
385 390 395 400

Gly Ser Ala Pro Ile Ser Ser His Cys Arg Leu Asp Lys Ser Asn Phe
405 410 415

Gln Gln Pro Tyr Ile Thr Asn Arg Thr Phe Met Leu Ala Lys Glu Ala
420 425 430

Ser Leu Ala Asp Asn Asn Thr Asp Val Arg Leu Ile Gly Glu Lys Leu
435 440 445

Phe His Gly Val Ser Met Ser Glu Arg Cys Tyr Leu Met Lys Gln Val
450 455 460

Leu Asn Phe Thr Leu Glu Glu Val Leu Phe Pro Gln Ser Asp Arg Phe
465 470 475 480

Gln Pro Tyr Met Gln Glu Val Val Pro Phe Leu Ala Arg Leu Ser Asn
485 490 495

Arg Leu Ser Thr Cys His Ile Glu Gly Asp Asp Leu His Ile Gln Arg
500 505 510

Asn Val Gln Lys Leu Lys Asp Thr Val Lys Lys Leu Gly Glu Ser Gly
515 520 525

Glu Ile Lys Ala Ile Gly Glu Leu Asp Leu Leu Phe Met Ser Leu Arg
530 535 540

Asn Ala Cys Ile
545

<210> 149
<211> 561
<212> PRT
<213> Secuencia Artificial

<220>
<223> Descripción de Secuencia Artificial:
polipéptido sintético

<400> 149

```
Met Val Glu Glu Ala Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys
1               5                  10                  15

Ser Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile
            20                  25                  30

Pro Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr
        35                  40                  45

Ile Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser
    50                  55                  60

Ile Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr
65                  70                  75                  80

Val Asn Gln Asp Ala Pro Phe Gly Val Ile His Leu Asp Ile Thr Thr
                85                  90                  95

Glu Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe
            100                 105                 110

Ala Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile
        115                 120                 125

Lys Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val
    130                 135                 140

Pro Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp
145                 150                 155                 160

Lys Thr Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His Asn
                165                 170                 175

Ile Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys Glu
            180                 185                 190

Gly Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala Leu
        195                 200                 205

Cys Trp Leu Val Pro Met Asp Ala Ile Tyr Asn Tyr Ile Thr Gln Gln
    210                 215                 220
```

```
Asn Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr Val
225                 230                 235                 240

Ala Gly Thr Pro Lys Val Ile Thr Val Lys Gln Gly Ile Glu Gln Lys
                245                 250                 255

Pro Val Glu Gln Arg Ile His Phe Ser Lys Gly Asn Ala Met Ser Ala
            260                 265                 270

Leu Ala Ala His Arg Val Cys Gly Val Pro Leu Glu Thr Leu Ala Arg
        275                 280                 285

Ser Arg Lys Pro Arg Asp Leu Thr Asp Asp Leu Ser Cys Ala Tyr Gln
    290                 295                 300

Ala Gln Asn Ile Val Ser Leu Phe Val Ala Thr Arg Ile Leu Phe Ser
305                 310                 315                 320

His Leu Asp Ser Val Phe Thr Leu Asn Leu Asp Glu Gln Glu Pro Glu
                325                 330                 335

Val Ala Glu Arg Leu Ser Asp Leu Arg Arg Ile Asn Glu Asn Asn Pro
            340                 345                 350

Gly Met Val Thr Gln Val Leu Thr Val Ala Arg Gln Ile Tyr Asn Asp
        355                 360                 365

Tyr Val Thr His His Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala Gly
    370                 375                 380

Ala Gln Ala Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly
385                 390                 395                 400

Gly Ser Pro Gly Gln Gly Thr Gln Ser Glu Asn Ser Cys Thr His Phe
                405                 410                 415

Pro Gly Asn Leu Pro Asn Met Leu Arg Asp Leu Arg Asp Ala Phe Ser
            420                 425                 430
```

Arg Val Lys Thr Phe Phe Gln Met Lys Asp Gln Leu Asp Asn Leu Leu
        435   440   445

Leu Lys Glu Ser Leu Leu Glu Asp Phe Lys Gly Tyr Leu Gly Cys Gln
    450   455   460

Ala Leu Ser Glu Met Ile Gln Phe Tyr Leu Glu Glu Val Met Pro Gln
465   470   475   480

Ala Glu Asn Gln Asp Pro Asp Ile Lys Ala His Val Asn Ser Leu Gly
                485   490   495

Glu Asn Leu Lys Thr Leu Arg Leu Arg Leu Arg Arg Cys His Arg Phe
            500   505   510

Leu Pro Cys Glu Asn Lys Ser Lys Ala Val Glu Gln Val Lys Asn Ala
        515   520   525

Phe Asn Lys Leu Gln Glu Lys Gly Ile Tyr Lys Ala Met Ser Glu Phe
    530   535   540

Asp Ile Phe Ile Asn Tyr Ile Glu Ala Tyr Met Thr Met Lys Ile Arg
545   550   555   560

Asn

<210> 150
<211> 473
<212> PRT
<213> Secuencia Artificial

<220>
<223> Descripción de Secuencia Artificial:
      polipéptido sintético

<400> 150
Met Val Glu Glu Ala Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys
1   5   10   15

Ser Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile
            20   25   30

```
Pro Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr
        35                  40                  45

Ile Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser
    50                  55                  60

Ile Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr
65                  70                  75                  80

Val Asn Gln Asp Ala Pro Phe Gly Val Ile His Leu Asp Ile Thr Thr
                85                  90                  95

Glu Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe
            100                 105                 110

Ala Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile
        115                 120                 125

Lys Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val
    130                 135                 140

Pro Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp
145                 150                 155                 160

Lys Thr Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His Asn
                165                 170                 175

Ile Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys Glu
            180                 185                 190

Gly Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala Leu
        195                 200                 205

Cys Trp Leu Val Pro Met Asp Ala Ile Tyr Asn Tyr Ile Thr Gln Gln
    210                 215                 220

Asn Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr Val
225                 230                 235                 240

Ala Gly Thr Pro Lys Val Ile Thr Val Lys Gln Gly Ile Glu Gln Lys
                245                 250                 255
```

```
Pro Val Glu Gln Arg Ile His Phe Ser Lys Gly Gly Gly Gly Gly Ser
            260                 265                 270

Asn Leu Gln Gly Gly Leu Arg Gln Pro Arg Phe Pro Thr Ile Pro Leu
        275                 280                 285

Ser Arg Leu Phe Asp Asn Ala Met Leu Arg Ala His Arg Leu His Gln
    290                 295                 300

Leu Ala Phe Asp Thr Tyr Gln Glu Phe Glu Glu Ala Tyr Ile Pro Lys
305                 310                 315                 320

Glu Gln Lys Tyr Ser Phe Leu Gln Asn Pro Gln Thr Ser Leu Cys Phe
                325                 330                 335

Ser Glu Ser Ile Pro Thr Pro Ser Asn Arg Glu Glu Thr Gln Gln Lys
            340                 345                 350

Ser Asn Leu Glu Leu Leu Arg Ile Ser Leu Leu Leu Ile Gln Ser Trp
        355                 360                 365

Leu Glu Pro Val Gln Phe Leu Arg Ser Val Phe Ala Asn Ser Leu Val
    370                 375                 380

Tyr Gly Ala Ser Asp Ser Asn Val Tyr Asp Leu Leu Lys Asp Leu Glu
385                 390                 395                 400

Glu Gly Ile Gln Thr Leu Met Gly Arg Leu Glu Asp Gly Ser Pro Arg
                405                 410                 415

Thr Gly Gln Ile Phe Lys Gln Thr Tyr Ser Lys Phe Asp Thr Asn Ser
            420                 425                 430

His Asn Asp Asp Ala Leu Leu Lys Asn Tyr Gly Leu Leu Tyr Cys Phe
        435                 440                 445

Arg Lys Asp Met Asp Lys Val Glu Thr Phe Leu Arg Ile Val Gln Cys
    450                 455                 460
```

Arg Ser Val Glu Gly Ser Cys Gly Phe
465 470

<210> 151
<211> 341
<212> PRT
<213> Secuencia Artificial

<220>
<223> Descripción de Secuencia Artificial:
polipéptido sintético

<400> 151
Met Val Glu Glu Ala Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys
1 5 10 15

Ser Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile
20 25 30

Pro Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr
35 40 45

Ile Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser
50 55 60

Ile Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr
65 70 75 80

Val Asn Gln Asp Ala Pro Phe Gly Val Ile His Leu Asp Ile Thr Thr
85 90 95

Glu Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe
100 105 110

Ala Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile
115 120 125

Lys Ile Ser Val Asp Glu Leu Gly Gly Gly Gly Ser Gly Gly Gly Gly
130 135 140

Ser Gly Gly Gly Gly Ser Phe Pro Thr Ile Pro Leu Ser Arg Leu Phe
145 150 155 160

```
Asp Asn Ala Met Leu Arg Ala His Arg Leu His Gln Leu Ala Phe Asp
                165                 170                 175

Thr Tyr Gln Glu Phe Glu Glu Ala Tyr Ile Pro Lys Glu Gln Lys Tyr
            180                 185                 190

Ser Phe Leu Gln Asn Pro Gln Thr Ser Leu Cys Phe Ser Glu Ser Ile
        195                 200                 205

Pro Thr Pro Ser Asn Arg Glu Glu Thr Gln Gln Lys Ser Asn Leu Glu
    210                 215                 220

Leu Leu Arg Ile Ser Leu Leu Leu Ile Gln Ser Trp Leu Glu Pro Val
225                 230                 235                 240

Gln Phe Leu Arg Ser Val Phe Ala Asn Ser Leu Val Tyr Gly Ala Ser
                245                 250                 255

Asp Ser Asn Val Tyr Asp Leu Leu Lys Asp Leu Glu Glu Gly Ile Gln
            260                 265                 270

Thr Leu Met Gly Arg Leu Glu Asp Gly Ser Pro Arg Thr Gly Gln Ile
        275                 280                 285

Phe Lys Gln Thr Tyr Ser Lys Phe Asp Thr Asn Ser His Asn Asp Asp
    290                 295                 300

Ala Leu Leu Lys Asn Tyr Gly Leu Leu Tyr Cys Phe Arg Lys Asp Met
305                 310                 315                 320

Asp Lys Val Glu Thr Phe Leu Arg Ile Val Gln Cys Arg Ser Val Glu
                325                 330                 335

Gly Ser Cys Gly Phe
            340
```

<210> 152
<211> 358
<212> PRT
<213> Secuencia Artificial

<220>

<223> Descripción de Secuencia Artificial:
polipéptido sintético

<400> 152

```
Met Val Glu Glu Ala Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys
1               5                  10                  15

Ser Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile
            20                  25                  30

Pro Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr
        35                  40                  45

Ile Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser
    50                  55                  60

Ile Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr
65                  70                  75                  80

Val Asn Gln Asp Ala Pro Phe Gly Val Ile His Leu Asp Ile Thr Thr
                85                  90                  95

Glu Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe
            100                 105                 110

Ala Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile
        115                 120                 125

Lys Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val
    130                 135                 140

Pro Lys Leu Tyr Ser Ile Asp Leu Gly Gly Gly Gly Ser Gly Gly Gly
145                 150                 155                 160

Gly Ser Gly Gly Gly Gly Ser Phe Pro Thr Ile Pro Leu Ser Arg Leu
                165                 170                 175

Phe Asp Asn Ala Met Leu Arg Ala His Arg Leu His Gln Leu Ala Phe
            180                 185                 190

Asp Thr Tyr Gln Glu Phe Glu Glu Ala Tyr Ile Pro Lys Glu Gln Lys
        195                 200                 205
```

Tyr Ser Phe Leu Gln Asn Pro Gln Thr Ser Leu Cys Phe Ser Glu Ser
210 215 220

Ile Pro Thr Pro Ser Asn Arg Glu Glu Thr Gln Gln Lys Ser Asn Leu
225 230 235 240

Glu Leu Leu Arg Ile Ser Leu Leu Leu Ile Gln Ser Trp Leu Glu Pro
245 250 255

Val Gln Phe Leu Arg Ser Val Phe Ala Asn Ser Leu Val Tyr Gly Ala
260 265 270

Ser Asp Ser Asn Val Tyr Asp Leu Leu Lys Asp Leu Glu Glu Gly Ile
275 280 285

Gln Thr Leu Met Gly Arg Leu Glu Asp Gly Ser Pro Arg Thr Gly Gln
290 295 300

Ile Phe Lys Gln Thr Tyr Ser Lys Phe Asp Thr Asn Ser His Asn Asp
305 310 315 320

Asp Ala Leu Leu Lys Asn Tyr Gly Leu Leu Tyr Cys Phe Arg Lys Asp
325 330 335

Met Asp Lys Val Glu Thr Phe Leu Arg Ile Val Gln Cys Arg Ser Val
340 345 350

Glu Gly Ser Cys Gly Phe
355

<210> 153
<211> 394
<212> PRT
<213> Secuencia Artificial

<220>
<223> Descripción de Secuencia Artificial:
polipéptido sintético

<400> 153
Met Val Glu Glu Ala Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys
1 5 10 15

```
Ser Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile
            20                  25                  30

Pro Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr
        35                  40                  45

Ile Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser
    50                  55                  60

Ile Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr
65                  70                  75                  80

Val Asn Gln Asp Ala Pro Phe Gly Val Ile His Leu Asp Ile Thr Thr
                85                  90                  95

Glu Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe
            100                 105                 110

Ala Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile
        115                 120                 125

Lys Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val
    130                 135                 140

Pro Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp
145                 150                 155                 160

Lys Thr Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His Asn
                165                 170                 175

Ile Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Gly Gly Gly Gly
            180                 185                 190

Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Phe Pro Thr Ile Pro
        195                 200                 205

Leu Ser Arg Leu Phe Asp Asn Ala Met Leu Arg Ala His Arg Leu His
    210                 215                 220
```

Gln Leu Ala Phe Asp Thr Tyr Gln Glu Phe Glu Glu Ala Tyr Ile Pro
225 230 235 240

Lys Glu Gln Lys Tyr Ser Phe Leu Gln Asn Pro Gln Thr Ser Leu Cys
245 250 255

Phe Ser Glu Ser Ile Pro Thr Pro Ser Asn Arg Glu Glu Thr Gln Gln
260 265 270

Lys Ser Asn Leu Glu Leu Leu Arg Ile Ser Leu Leu Leu Ile Gln Ser
275 280 285

Trp Leu Glu Pro Val Gln Phe Leu Arg Ser Val Phe Ala Asn Ser Leu
290 295 300

Val Tyr Gly Ala Ser Asp Ser Asn Val Tyr Asp Leu Leu Lys Asp Leu
305 310 315 320

Glu Glu Gly Ile Gln Thr Leu Met Gly Arg Leu Glu Asp Gly Ser Pro
325 330 335

Arg Thr Gly Gln Ile Phe Lys Gln Thr Tyr Ser Lys Phe Asp Thr Asn
340 345 350

Ser His Asn Asp Asp Ala Leu Leu Lys Asn Tyr Gly Leu Leu Tyr Cys
355 360 365

Phe Arg Lys Asp Met Asp Lys Val Glu Thr Phe Leu Arg Ile Val Gln
370 375 380

Cys Arg Ser Val Glu Gly Ser Cys Gly Phe
385 390

<210> 154
<211> 354
<212> PRT
<213> Secuencia Artificial

<220>
<223> Descripción de Secuencia Artificial:
polipéptido sintético

<400> 154

```
Met Val Leu Tyr Tyr Ser Met Thr Ile Asn Asp Glu Gln Asn Asp Ile
1               5                  10                  15

Lys Asp Glu Asp Lys Gly Glu Ser Ile Ile Thr Ile Gly Glu Phe Ala
            20                  25                  30

Thr Val Arg Ala Thr Arg His Tyr Val Asn Gln Asp Ala Pro Phe Gly
        35                  40                  45

Val Ile His Leu Asp Ile Thr Thr Glu Asn Gly Thr Lys Thr Tyr Ser
    50                  55                  60

Tyr Asn Arg Lys Glu Gly Glu Phe Ala Ile Asn Trp Leu Val Pro Ile
65                  70                  75                  80

Gly Glu Asp Ser Pro Ala Ser Ile Lys Ile Ser Val Asp Glu Leu Asp
                85                  90                  95

Gln Gln Arg Asn Ile Ile Glu Val Pro Lys Leu Tyr Ser Ile Asp Leu
            100                 105                 110

Asp Asn Gln Thr Leu Glu Gln Trp Lys Thr Gln Gly Asn Val Ser Phe
        115                 120                 125

Ser Val Thr Arg Pro Glu His Asn Ile Ala Ile Ser Trp Pro Ser Val
    130                 135                 140

Ser Tyr Lys Ala Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly
145                 150                 155                 160

Gly Gly Ser Phe Pro Thr Ile Pro Leu Ser Arg Leu Phe Asp Asn Ala
                165                 170                 175

Met Leu Arg Ala His Arg Leu His Gln Leu Ala Phe Asp Thr Tyr Gln
            180                 185                 190

Glu Phe Glu Glu Ala Tyr Ile Pro Lys Glu Gln Lys Tyr Ser Phe Leu
        195                 200                 205

Gln Asn Pro Gln Thr Ser Leu Cys Phe Ser Glu Ser Ile Pro Thr Pro
    210                 215                 220
```

Ser Asn Arg Glu Glu Thr Gln Gln Lys Ser Asn Leu Glu Leu Leu Arg
225 230 235 240

Ile Ser Leu Leu Leu Ile Gln Ser Trp Leu Glu Pro Val Gln Phe Leu
245 250 255

Arg Ser Val Phe Ala Asn Ser Leu Val Tyr Gly Ala Ser Asp Ser Asn
260 265 270

Val Tyr Asp Leu Leu Lys Asp Leu Glu Glu Gly Ile Gln Thr Leu Met
275 280 285

Gly Arg Leu Glu Asp Gly Ser Pro Arg Thr Gly Gln Ile Phe Lys Gln
290 295 300

Thr Tyr Ser Lys Phe Asp Thr Asn Ser His Asn Asp Asp Ala Leu Leu
305 310 315 320

Lys Asn Tyr Gly Leu Leu Tyr Cys Phe Arg Lys Asp Met Asp Lys Val
325 330 335

Glu Thr Phe Leu Arg Ile Val Gln Cys Arg Ser Val Glu Gly Ser Cys
340 345 350

Gly Phe

<210> 155
<211> 413
<212> PRT
<213> Secuencia Artificial

<220>
<223> Descripción de Secuencia Artificial:
polipéptido sintético

<400> 155
Met Val Glu Glu Ala Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys
1 5 10 15

Ser Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile
20 25 30

```
Pro Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr
        35                  40                  45

Ile Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser
    50                  55                  60

Ile Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr
65                  70                  75                  80

Val Asn Gln Asp Ala Pro Phe Gly Val Ile His Leu Asp Ile Thr Thr
                85                  90                  95

Glu Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe
            100                 105                 110

Ala Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile
        115                 120                 125

Lys Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val
    130                 135                 140

Pro Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp
145                 150                 155                 160

Lys Thr Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His Asn
                165                 170                 175

Ile Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys Glu
            180                 185                 190

Gly Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala Gly
        195                 200                 205

Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Phe Pro
    210                 215                 220

Thr Ile Pro Leu Ser Arg Leu Phe Asp Asn Ala Met Leu Arg Ala His
225                 230                 235                 240
```

```
Arg Leu His Gln Leu Ala Phe Asp Thr Tyr Gln Glu Phe Glu Glu Ala
                245                 250                 255

Tyr Ile Pro Lys Glu Gln Lys Tyr Ser Phe Leu Gln Asn Pro Gln Thr
            260                 265                 270

Ser Leu Cys Phe Ser Glu Ser Ile Pro Thr Pro Ser Asn Arg Glu Glu
        275                 280                 285

Thr Gln Gln Lys Ser Asn Leu Glu Leu Leu Arg Ile Ser Leu Leu Leu
    290                 295                 300

Ile Gln Ser Trp Leu Glu Pro Val Gln Phe Leu Arg Ser Val Phe Ala
305                 310                 315                 320

Asn Ser Leu Val Tyr Gly Ala Ser Asp Ser Asn Val Tyr Asp Leu Leu
                325                 330                 335

Lys Asp Leu Glu Glu Gly Ile Gln Thr Leu Met Gly Arg Leu Glu Asp
            340                 345                 350

Gly Ser Pro Arg Thr Gly Gln Ile Phe Lys Gln Thr Tyr Ser Lys Phe
        355                 360                 365

Asp Thr Asn Ser His Asn Asp Asp Ala Leu Leu Lys Asn Tyr Gly Leu
    370                 375                 380

Leu Tyr Cys Phe Arg Lys Asp Met Asp Lys Val Glu Thr Phe Leu Arg
385                 390                 395                 400

Ile Val Gln Cys Arg Ser Val Glu Gly Ser Cys Gly Phe
                405                 410
```

<210> 156
<211> 379
<212> PRT
<213> Secuencia Artificial

<220>
<223> Descripción de Secuencia Artificial:
polipéptido sintético

<400> 156

```
Met Gly Val Leu Tyr Tyr Ser Met Thr Ile Asn Asp Glu Gln Asn Asp
1               5                  10                  15

Ile Lys Asp Glu Asp Lys Gly Glu Ser Ile Ile Thr Ile Gly Glu Phe
            20                  25                  30

Ala Thr Val Arg Ala Thr Arg His Tyr Val Asn Gln Asp Ala Pro Phe
        35                  40                  45

Gly Val Ile His Leu Asp Ile Thr Thr Glu Asn Gly Thr Lys Thr Tyr
    50                  55                  60

Ser Tyr Asn Arg Lys Glu Gly Glu Phe Ala Ile Asn Trp Leu Val Pro
65                  70                  75                  80

Ile Gly Glu Asp Ser Pro Ala Ser Ile Lys Ile Ser Val Asp Glu Leu
                85                  90                  95

Asp Gln Gln Arg Asn Ile Ile Glu Val Pro Lys Leu Tyr Ser Ile Asp
            100                 105                 110

Leu Asp Asn Gln Thr Leu Glu Gln Trp Lys Thr Gln Gly Asn Val Ser
        115                 120                 125

Phe Ser Val Thr Arg Pro Glu His Asn Ile Ala Ile Ser Trp Pro Ser
    130                 135                 140

Val Ser Tyr Lys Ala Ala Gln Lys Glu Gly Ser Arg His Lys Arg Trp
145                 150                 155                 160

Ala His Trp His Thr Gly Leu Gly Gly Gly Gly Ser Gly Gly Gly Gly
                165                 170                 175

Ser Gly Gly Gly Gly Ser Phe Pro Thr Ile Pro Leu Ser Arg Leu Phe
            180                 185                 190

Asp Asn Ala Met Leu Arg Ala His Arg Leu His Gln Leu Ala Phe Asp
        195                 200                 205

Thr Tyr Gln Glu Phe Glu Glu Ala Tyr Ile Pro Lys Glu Gln Lys Tyr
    210                 215                 220
```

Ser Phe Leu Gln Asn Pro Gln Thr Ser Leu Cys Phe Ser Glu Ser Ile
225 230 235 240

Pro Thr Pro Ser Asn Arg Glu Glu Thr Gln Gln Lys Ser Asn Leu Glu
245 250 255

Leu Leu Arg Ile Ser Leu Leu Leu Ile Gln Ser Trp Leu Glu Pro Val
260 265 270

Gln Phe Leu Arg Ser Val Phe Ala Asn Ser Leu Val Tyr Gly Ala Ser
275 280 285

Asp Ser Asn Val Tyr Asp Leu Leu Lys Asp Leu Glu Glu Gly Ile Gln
290 295 300

Thr Leu Met Gly Arg Leu Glu Asp Gly Ser Pro Arg Thr Gly Gln Ile
305 310 315 320

Phe Lys Gln Thr Tyr Ser Lys Phe Asp Thr Asn Ser His Asn Asp Asp
325 330 335

Ala Leu Leu Lys Asn Tyr Gly Leu Leu Tyr Cys Phe Arg Lys Asp Met
340 345 350

Asp Lys Val Glu Thr Phe Leu Arg Ile Val Gln Cys Arg Ser Val Glu
355 360 365

Gly Ser Cys Gly Phe His His His His His His
370 375

<210> 157
<211> 452
<212> PRT
<213> Secuencia Artificial

<220>
<223> Descripción de Secuencia Artificial:
polipéptido sintético

<400> 157
Met Val Glu Glu Ala Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys
1 5 10 15

```
Ser Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile
            20                  25                  30

Pro Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr
        35                  40                  45

Ile Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser
    50                  55                  60

Ile Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr
65                  70                  75                  80

Val Asn Gln Asp Ala Pro Phe Gly Val Ile His Leu Asp Ile Thr Thr
                85                  90                  95

Glu Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe
            100                 105                 110

Ala Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile
        115                 120                 125

Lys Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val
    130                 135                 140

Pro Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp
145                 150                 155                 160

Lys Thr Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His Asn
                165                 170                 175

Ile Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys Glu
            180                 185                 190

Gly Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala Leu
        195                 200                 205

Cys Trp Leu Val Pro Met Asp Ala Ile Tyr Asn Tyr Ile Thr Gln Gln
    210                 215                 220
```

```
Asn Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr Val
225                 230                 235                 240

Ala Gly Thr Pro Lys Val Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser
                245                 250                 255

Gly Gly Gly Gly Ser Phe Pro Thr Ile Pro Leu Ser Arg Leu Phe Asp
            260                 265                 270

Asn Ala Met Leu Arg Ala His Arg Leu His Gln Leu Ala Phe Asp Thr
        275                 280                 285

Tyr Gln Glu Phe Glu Glu Ala Tyr Ile Pro Lys Glu Gln Lys Tyr Ser
    290                 295                 300

Phe Leu Gln Asn Pro Gln Thr Ser Leu Cys Phe Ser Glu Ser Ile Pro
305                 310                 315                 320

Thr Pro Ser Asn Arg Glu Glu Thr Gln Gln Lys Ser Asn Leu Glu Leu
                325                 330                 335

Leu Arg Ile Ser Leu Leu Leu Ile Gln Ser Trp Leu Glu Pro Val Gln
            340                 345                 350

Phe Leu Arg Ser Val Phe Ala Asn Ser Leu Val Tyr Gly Ala Ser Asp
        355                 360                 365

Ser Asn Val Tyr Asp Leu Leu Lys Asp Leu Glu Glu Gly Ile Gln Thr
    370                 375                 380

Leu Met Gly Arg Leu Glu Asp Gly Ser Pro Arg Thr Gly Gln Ile Phe
385                 390                 395                 400

Lys Gln Thr Tyr Ser Lys Phe Asp Thr Asn Ser His Asn Asp Asp Ala
                405                 410                 415

Leu Leu Lys Asn Tyr Gly Leu Leu Tyr Cys Phe Arg Lys Asp Met Asp
            420                 425                 430

Lys Val Glu Thr Phe Leu Arg Ile Val Gln Cys Arg Ser Val Glu Gly
        435                 440                 445
```

Ser Cys Gly Phe
450

<210> 158
<211> 458
<212> PRT
<213> Secuencia Artificial

<220>
<223> Descripción de Secuencia Artificial:
polipéptido sintético

<400> 158
Met Val Glu Glu Ala Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys
1 5 10 15

Ser Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile
20 25 30

Pro Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr
35 40 45

Ile Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser
50 55 60

Ile Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr
65 70 75 80

Val Asn Gln Asp Ala Pro Phe Gly Val Ile His Leu Asp Ile Thr Thr
85 90 95

Glu Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe
100 105 110

Ala Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile
115 120 125

Lys Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val
130 135 140

Pro Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp
145 150 155 160

```
Lys Thr Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His Asn
                165                 170                 175

Ile Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys Glu
            180                 185                 190

Gly Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala Leu
        195                 200                 205

Cys Trp Leu Val Pro Met Asp Ala Ile Tyr Asn Tyr Ile Thr Gln Gln
    210                 215                 220

Asn Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr Val
225                 230                 235                 240

Ala Gly Thr Pro Lys Val Ile Thr Val Lys Gln Gly Gly Gly Gly Gly
                245                 250                 255

Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Phe Pro Thr Ile Pro
            260                 265                 270

Leu Ser Arg Leu Phe Asp Asn Ala Met Leu Arg Ala His Arg Leu His
        275                 280                 285

Gln Leu Ala Phe Asp Thr Tyr Gln Glu Phe Glu Glu Ala Tyr Ile Pro
    290                 295                 300

Lys Glu Gln Lys Tyr Ser Phe Leu Gln Asn Pro Gln Thr Ser Leu Cys
305                 310                 315                 320

Phe Ser Glu Ser Ile Pro Thr Pro Ser Asn Arg Glu Glu Thr Gln Gln
                325                 330                 335

Lys Ser Asn Leu Glu Leu Leu Arg Ile Ser Leu Leu Leu Ile Gln Ser
            340                 345                 350

Trp Leu Glu Pro Val Gln Phe Leu Arg Ser Val Phe Ala Asn Ser Leu
        355                 360                 365
```

Val Tyr Gly Ala Ser Asp Ser Asn Val Tyr Asp Leu Leu Lys Asp Leu
370 375 380

Glu Glu Gly Ile Gln Thr Leu Met Gly Arg Leu Glu Asp Gly Ser Pro
385 390 395 400

Arg Thr Gly Gln Ile Phe Lys Gln Thr Tyr Ser Lys Phe Asp Thr Asn
405 410 415

Ser His Asn Asp Asp Ala Leu Leu Lys Asn Tyr Gly Leu Leu Tyr Cys
420 425 430

Phe Arg Lys Asp Met Asp Lys Val Glu Thr Phe Leu Arg Ile Val Gln
435 440 445

Cys Arg Ser Val Glu Gly Ser Cys Gly Phe
450 455

<210> 159
<211> 473
<212> PRT
<213> Secuencia Artificial

<220>
<223> Descripción de Secuencia Artificial:
polipéptido sintético

<400> 159
Met Val Glu Glu Ala Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys
1 5 10 15

Ser Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile
20 25 30

Pro Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr
35 40 45

Ile Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser
50 55 60

Ile Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr
65 70 75 80

```
Val Asn Gln Asp Ala Pro Phe Gly Val Ile His Leu Asp Ile Thr Thr
                85                  90                  95

Glu Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe
            100                 105                 110

Ala Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile
        115                 120                 125

Lys Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val
    130                 135                 140

Pro Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp
145                 150                 155                 160

Lys Thr Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His Asn
                165                 170                 175

Ile Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys Glu
            180                 185                 190

Gly Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala Leu
        195                 200                 205

Cys Trp Leu Val Pro Met Asp Ala Ile Tyr Asn Tyr Ile Thr Gln Gln
    210                 215                 220

Asn Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr Val
225                 230                 235                 240

Ala Gly Thr Pro Lys Val Ile Thr Val Lys Gln Gly Ile Glu Gln Lys
                245                 250                 255

Pro Val Glu Gln Arg Ile His Phe Ser Lys Gly Gly Gly Gly Gly Ser
            260                 265                 270

Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Phe Pro Thr Ile Pro Leu
        275                 280                 285

Ser Arg Leu Phe Asp Asn Ala Met Leu Arg Ala His Arg Leu His Gln
    290                 295                 300
```

```
Leu Ala Phe Asp Thr Tyr Gln Glu Phe Glu Glu Ala Tyr Ile Pro Lys
305                 310                 315                 320

Glu Gln Lys Tyr Ser Phe Leu Gln Asn Pro Gln Thr Ser Leu Cys Phe
                325                 330                 335

Ser Glu Ser Ile Pro Thr Pro Ser Asn Arg Glu Glu Thr Gln Gln Lys
            340                 345                 350

Ser Asn Leu Glu Leu Leu Arg Ile Ser Leu Leu Leu Ile Gln Ser Trp
        355                 360                 365

Leu Glu Pro Val Gln Phe Leu Arg Ser Val Phe Ala Asn Ser Leu Val
    370                 375                 380

Tyr Gly Ala Ser Asp Ser Asn Val Tyr Asp Leu Leu Lys Asp Leu Glu
385                 390                 395                 400

Glu Gly Ile Gln Thr Leu Met Gly Arg Leu Glu Asp Gly Ser Pro Arg
                405                 410                 415

Thr Gly Gln Ile Phe Lys Gln Thr Tyr Ser Lys Phe Asp Thr Asn Ser
            420                 425                 430

His Asn Asp Asp Ala Leu Leu Lys Asn Tyr Gly Leu Leu Tyr Cys Phe
        435                 440                 445

Arg Lys Asp Met Asp Lys Val Glu Thr Phe Leu Arg Ile Val Gln Cys
    450                 455                 460

Arg Ser Val Glu Gly Ser Cys Gly Phe
465                 470
```

<210> 160
<211> 9
<212> PRT
<213> Secuencia Artificial

<220>
<223> Descripción de Secuencia Artificial:
péptido sintético

<400> 160
Leu Thr Pro Glu Pro Gly Lys Pro Ile
1 5

<210> 161
<211> 7
<212> PRT
<213> Secuencia Artificial

<220>
<223> Descripción de Secuencia Artificial:
péptido sintético

<400> 161
Thr Arg Pro Glu His Asn Ile
1 5

<210> 162
<211> 17
<212> PRT
<213> Secuencia Artificial

<220>
<223> Descripción de Secuencia Artificial:
péptido sintético

<400> 162
Lys Ala Ala Gln Lys Glu Gly Ser Arg His Lys Arg Trp Ala His Trp
1 5 10 15

His

<210> 163
<211> 9
<212> PRT
<213> Secuencia Artificial

<220>
<223> Descripción de Secuencia Artificial:
péptido sintético

<400> 163
Ile Pro Ser Asp Val Val Leu Asp Glu
1 5

<210> 164
<211> 5

<212> PRT
<213> Secuencia Artificial

<220>
<223> Descripción de Secuencia Artificial:
péptido sintético

<400> 164
Asp Gln Gln Arg Asn
1 5

<210> 165
<211> 17
<212> PRT
<213> Secuencia Artificial

<220>
<223> Descripción de Secuencia Artificial:
péptido sintético

<400> 165
Asp Gln Gln Arg Asn Ile Ile Glu Val Pro Lys Leu Tyr Ser Ile Asp
1 5 10 15

Leu

<210> 166
<211> 40
<212> PRT
<213> Secuencia Artificial

<220>
<223> Descripción de Secuencia Artificial:
polipéptido sintético

<400> 166
Val Glu Glu Ala Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys Ser
1 5 10 15

Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile Pro
20 25 30

Ser Asp Val Val Leu Asp Glu Gly
35 40

<210> 167
<211> 37

<212> PRT
<213> Secuencia Artificial

<220>
<223> Descripción de Secuencia Artificial:
polipéptido sintético

<400> 167
Leu Asp Asn Gln Thr Leu Glu Gln Trp Lys Thr Gln Gly Asn Val Ser
1 5 10 15

Phe Ser Val Thr Arg Pro Glu His Asn Ile Ala Ile Ser Trp Pro Ser
20 25 30

Val Ser Tyr Lys Ala
35

<210> 168
<211> 19
<212> PRT
<213> Secuencia Artificial

<220>
<223> Descripción de Secuencia Artificial:
péptido sintético

<400> 168
Ala Gln Lys Glu Gly Ser Arg His Lys Arg Trp Ala His Trp His Thr
1 5 10 15

Gly Leu Ala

<210> 169
<211> 30
<212> PRT
<213> Secuencia Artificial

<220>
<223> Descripción de Secuencia Artificial:
polipéptido sintético

<220>
<221> MISC_CARACTERÍSTICA
<222> (1)..(30)
<223> Esta secuencia puede comprender 1-15 "Gly Ser"
unidades de repetición

<400> 169
Gly Ser Gly Ser Gly Ser Gly Ser Gly Ser Gly Ser Gly Ser Gly Ser
1   5   10   15

Gly Ser Gly Ser Gly Ser Gly Ser Gly Ser Gly Ser Gly Ser
            20   25   30

<210> 170
<211> 45
<212> PRT
<213> Secuencia Artificial

<220>
<223> Descripción de Secuencia Artificial:
      polipéptido sintético

<220>
<221> MISC_CARACTERÍSTICA
<222> (1)..(45)
<223> Esta secuencia puede comprender 1-15 "Gly Gly Ser"
      unidades de repetición

<400> 170
Gly Gly Ser Gly Gly Ser Gly Gly Ser Gly Gly Ser Gly Gly Ser Gly
1   5   10   15

Gly Ser Gly Gly Ser Gly Gly Ser Gly Gly Ser Gly Gly Ser Gly Gly
            20   25   30

Ser Gly Gly Ser Gly Gly Ser Gly Gly Ser Gly Gly Ser
        35   40   45

<210> 171
<211> 60
<212> PRT
<213> Secuencia Artificial

<220>
<223> Descripción de Secuencia Artificial:
      polipéptido sintético

<220>
<221> MISC_CARACTERÍSTICA
<222> (1)..(60)
<223> Esta secuencia puede comprender 1-15 "Gly Gly Gly Ser"
      unidades de repetición

<400> 171
Gly Gly Gly Ser Gly Gly Gly Ser Gly Gly Gly Ser Gly Gly Gly Ser
1   5   10   15

Gly Gly Gly Ser Gly Gly Gly Ser Gly Gly Gly Ser Gly Gly Gly Ser
            20   25   30

Gly Gly Gly Ser Gly Gly Gly Ser Gly Gly Gly Ser Gly Gly Gly Ser
        35   40   45

Gly Gly Gly Ser Gly Gly Gly Ser Gly Gly Gly Ser
    50   55   60

<210> 172
<211> 75
<212> PRT
<213> Secuencia Artificial

<220>
<223> Descripción de Secuencia Artificial:
      polipéptido sintético

<220>
<221> MISC_CARACTERÍSTICA
<222> (1)..(75)
<223> Esta secuencia puede comprender 1-15 "Gly Gly Gly Gly Ser"
      unidades de repetición

<400> 172
Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly
1   5   10   15

Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly
            20   25   30

Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly
        35   40   45

Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly
    50   55   60

Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser
65   70   75

<210> 173
<211> 90
<212> PRT
<213> Secuencia Artificial

<220>
<223> Descripción de Secuencia Artificial:
polipéptido sintético

<220>
<221> MISC_CARACTERÍSTICA
<222> (1)..(90)
<223> Esta secuencia puede comprender 1-15 "Gly Gly Gly Gly Gly Ser"
unidades de repetición

<400> 173
Gly Gly Gly Gly Gly Ser Gly Gly Gly Gly Gly Ser Gly Gly Gly Gly
1 5 10 15

Gly Ser Gly Gly Gly Gly Gly Ser Gly Gly Gly Gly Gly Ser Gly Gly
20 25 30

Gly Gly Gly Ser Gly Gly Gly Gly Gly Ser Gly Gly Gly Gly Gly Ser
35 40 45

Gly Gly Gly Gly Gly Ser Gly Gly Gly Gly Gly Ser Gly Gly Gly Gly
50 55 60

Gly Ser Gly Gly Gly Gly Gly Ser Gly Gly Gly Gly Gly Ser Gly Gly
65 70 75 80

Gly Gly Gly Ser Gly Gly Gly Gly Gly Ser
85 90

<210> 174
<211> 25
<212> PRT
<213> Secuencia Artificial

<220>
<223> Descripción de Secuencia Artificial:
péptido sintético

<220>
<221> MISC_CARACTERÍSTICA
<222> (1)..(25)

<223> Esta secuencia puede comprender 1-5 "Gly Gly Gly Gly Ser"
unidades de repetición

<400> 174
Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly
1 5 10 15

Gly Gly Gly Ser Gly Gly Gly Gly Ser
20 25

<210> 175
<211> 15
<212> PRT
<213> Secuencia Artificial

<220>
<223> Descripción de Secuencia Artificial:
péptido sintético

<400> 175
Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser
1 5 10 15

<210> 176
<211> 14
<212> PRT
<213> Secuencia Artificial

<220>
<223> Descripción de Secuencia Artificial:
péptido sintético

<400> 176
Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly
1 5 10

<210> 177
<211> 15
<212> PRT
<213> Secuencia Artificial

<220>
<223> Descripción de Secuencia Artificial:
péptido sintético

<400> 177
Gly Gly Gly Gly Ser Asn Leu Gln Gly Gly Leu Arg Gln Pro Arg
1 5 10 15

<210> 178
<211> 266
<212> PRT
<213> Secuencia Artificial

<220>
<223> Descripción de Secuencia Artificial:
polipéptido sintético

<400> 178
Met Val Glu Glu Ala Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys
1 5 10 15

Ser Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile
20 25 30

Pro Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr
35 40 45

Ile Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser
50 55 60

Ile Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr
65 70 75 80

Val Asn Gln Asp Ala Pro Phe Gly Val Ile His Leu Asp Ile Thr Thr
85 90 95

Glu Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe
100 105 110

Ala Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile
115 120 125

Lys Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val
130 135 140

Pro Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp
145 150 155 160

Lys Thr Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His Asn
165 170 175

```
Ile Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys Glu
            180                 185                 190

Gly Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala Leu
        195                 200                 205

Cys Trp Leu Val Pro Met Asp Ala Ile Tyr Asn Tyr Ile Thr Gln Gln
    210                 215                 220

Asn Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr Val
225                 230                 235                 240

Ala Gly Thr Pro Lys Val Ile Thr Val Lys Gln Gly Ile Glu Gln Lys
                245                 250                 255

Pro Val Glu Gln Arg Ile His Phe Ser Lys
            260                 265
```

<210> 179
<211> 348
<212> PRT
<213> Secuencia Artificial

<220>
<223> Descripción de Secuencia Artificial:
polipéptido sintético

<400> 179

```
Val Glu Asp Glu Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys Ser
1               5                   10                  15

Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile Pro
            20                  25                  30

Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr Ile
        35                  40                  45

Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser Ile
    50                  55                  60

Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr Val
65                  70                  75                  80
```

```
Asn Gln Asp Ala Pro Phe Gly Val Ile His Leu Asp Ile Thr Thr Glu
                85                  90                  95

Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe Ala
            100                 105                 110

Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile Lys
        115                 120                 125

Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val Pro
    130                 135                 140

Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp Lys
145                 150                 155                 160

Thr Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His Asn Ile
                165                 170                 175

Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys Glu Gly
            180                 185                 190

Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala Leu Cys
        195                 200                 205

Trp Leu Val Pro Met Asp Ala Ile Tyr Asn Tyr Ile Thr Gln Gln Asn
    210                 215                 220

Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr Val Ala
225                 230                 235                 240

Gly Thr Pro Lys Val Ile Thr Val Lys Gln Gly Ile Glu Gln Lys Pro
                245                 250                 255

Val Glu Gln Arg Ile His Phe Ser Lys Gly Asn Ala Met Ser Ala Leu
            260                 265                 270

Ala Ala His Arg Val Cys Gly Val Pro Leu Glu Thr Leu Ala Arg Ser
        275                 280                 285

Arg Lys Pro Arg Asp Leu Thr Asp Asp Leu Ser Cys Ala Tyr Gln Ala
    290                 295                 300
```

Gln Asn Ile Val Ser Leu Phe Val Ala Thr Arg Ile Leu Phe Ser His
305 310 315 320

Leu Asp Ser Val Phe Thr Leu Asn Leu Asp Glu Gln Glu Pro Glu Val
325 330 335

Ala Glu Arg Leu Ser Asp Leu Arg Arg Ile Asn Glu
340 345

<210> 180
<211> 386
<212> PRT
<213> Secuencia Artificial

<220>
<223> Descripción de Secuencia Artificial:
polipéptido sintético

<400> 180
Val Glu Glu Ala Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys Ser
1 5 10 15

Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile Pro
20 25 30

Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr Ile
35 40 45

Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser Ile
50 55 60

Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr Val
65 70 75 80

Asn Gln Asp Ala Pro Phe Gly Val Ile His Leu Asp Ile Thr Thr Glu
85 90 95

Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe Ala
100 105 110

Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile Lys
115 120 125

```
Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val Pro
    130                 135                 140

Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp Lys
145                 150                 155                 160

Thr Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His Asn Ile
                165                 170                 175

Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys Glu Gly
            180                 185                 190

Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala Leu Cys
        195                 200                 205

Trp Leu Val Pro Met Asp Ala Ile Tyr Asn Tyr Ile Thr Gln Gln Asn
    210                 215                 220

Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr Val Ala
225                 230                 235                 240

Gly Thr Pro Lys Val Ile Thr Val Lys Gln Gly Ile Glu Gln Lys Pro
                245                 250                 255

Val Glu Gln Arg Ile His Phe Ser Lys Gly Asn Ala Met Ser Ala Leu
            260                 265                 270

Ala Ala His Arg Val Cys Gly Val Pro Leu Glu Thr Leu Ala Arg Ser
        275                 280                 285

Arg Lys Pro Arg Asp Leu Thr Asp Asp Leu Ser Cys Ala Tyr Gln Ala
    290                 295                 300

Gln Asn Ile Val Ser Leu Phe Val Ala Thr Arg Ile Leu Phe Ser His
305                 310                 315                 320

Leu Asp Ser Val Phe Thr Leu Asn Leu Asp Glu Gln Glu Pro Glu Val
                325                 330                 335
```

Ala Glu Arg Leu Ser Asp Leu Arg Arg Ile Asn Glu Asn Asn Pro Gly
340 345 350

Met Val Thr Gln Val Leu Thr Val Ala Arg Gln Ile Tyr Asn Asp Tyr
355 360 365

Val Thr His His Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala Gly Ala
370 375 380

Gln Ala
385

<210> 181
<211> 266
<212> PRT
<213> Secuencia Artificial

<220>
<223> Descripción de Secuencia Artificial:
polipéptido sintético

<400> 181
Val Glu Glu Ala Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys Ser
1 5 10 15

Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile Pro
20 25 30

Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr Ile
35 40 45

Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser Ile
50 55 60

Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr Val
65 70 75 80

Asn Gln Asp Ala Pro Phe Gly Val Ile His Leu Asp Ile Thr Thr Glu
85 90 95

Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe Ala
100 105 110

```
Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile Lys
        115                 120                 125

Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val Pro
    130                 135                 140

Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp Lys
145                 150                 155                 160

Thr Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His Asn Ile
                165                 170                 175

Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys Glu Gly
            180                 185                 190

Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala Leu Cys
        195                 200                 205

Trp Leu Val Pro Met Asp Ala Ile Tyr Asn Tyr Ile Thr Gln Gln Asn
    210                 215                 220

Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr Val Ala
225                 230                 235                 240

Gly Thr Pro Lys Val Ile Thr Val Lys Gln Gly Ile Glu Gln Lys Pro
                245                 250                 255

Val Glu Gln Arg Ile His Phe Ser Lys Gly
            260                 265
```

<210> 182
<211> 251
<212> PRT
<213> Secuencia Artificial

<220>
<223> Descripción de Secuencia Artificial:
polipéptido sintético

<400> 182

```
Val Glu Glu Ala Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys Ser
1               5                   10                  15
```

```
Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile Pro
            20                  25                  30

Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr Ile
        35                  40                  45

Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser Ile
    50                  55                  60

Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr Val
65                  70                  75                  80

Asn Gln Asp Ala Pro Phe Gly Val Ile His Leu Asp Ile Thr Thr Glu
                85                  90                  95

Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe Ala
            100                 105                 110

Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile Lys
        115                 120                 125

Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val Pro
    130                 135                 140

Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp Lys
145                 150                 155                 160

Thr Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His Asn Ile
                165                 170                 175

Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys Glu Gly
            180                 185                 190

Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala Leu Cys
        195                 200                 205

Trp Leu Val Pro Met Asp Ala Ile Tyr Asn Tyr Ile Thr Gln Gln Asn
    210                 215                 220

Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr Val Ala
225                 230                 235                 240
```

Gly Thr Pro Lys Val Ile Thr Val Lys Gln Gly
245 250

<210> 183
<211> 245
<212> PRT
<213> Secuencia Artificial

<220>
<223> Descripción de Secuencia Artificial:
polipéptido sintético

<400> 183
Val Glu Glu Ala Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys Ser
1 5 10 15

Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile Pro
20 25 30

Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr Ile
35 40 45

Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser Ile
50 55 60

Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr Val
65 70 75 80

Asn Gln Asp Ala Pro Phe Gly Val Ile His Leu Asp Ile Thr Thr Glu
85 90 95

Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe Ala
100 105 110

Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile Lys
115 120 125

Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val Pro
130 135 140

Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp Lys
145 150 155 160

Thr Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His Asn Ile
165 170 175

Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys Glu Gly
180 185 190

Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala Leu Cys
195 200 205

Trp Leu Val Pro Met Asp Ala Ile Tyr Asn Tyr Ile Thr Gln Gln Asn
210 215 220

Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr Val Ala
225 230 235 240

Gly Thr Pro Lys Val
245

<210> 184
<211> 206
<212> PRT
<213> Secuencia Artificial

<220>
<223> Descripción de Secuencia Artificial:
polipéptido sintético

<400> 184
Val Glu Glu Ala Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys Ser
1 5 10 15

Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile Pro
20 25 30

Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr Ile
35 40 45

Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser Ile
50 55 60

Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr Val
65 70 75 80

Asn Gln Asp Ala Pro Phe Gly Val Ile His Leu Asp Ile Thr Thr Glu
85 90 95

Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe Ala
100 105 110

Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile Lys
115 120 125

Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val Pro
130 135 140

Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp Lys
145 150 155 160

Thr Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His Asn Ile
165 170 175

Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys Glu Gly
180 185 190

Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala
195 200 205

<210> 185
<211> 4
<212> PRT
<213> Secuencia Artificial

<220>
<223> Descripción de Secuencia Artificial:
péptido sintético

<400> 185
Val Glu Glu Ala
1

<210> 186
<211> 4
<212> PRT
<213> Secuencia Artificial

<220>

<223> Descripción de Secuencia Artificial:
péptido sintético

<400> 186
Val Leu Tyr Tyr
1

<210> 187
<211> 5
<212> PRT
<213> Secuencia Artificial

<220>
<223> Descripción de Secuencia Artificial:
péptido sintético

<400> 187
Gly Val Leu Tyr Tyr
1 5

<210> 188
<211> 428
<212> PRT
<213> Secuencia Artificial

<220>
<223> Descripción de Secuencia Artificial:
polipéptido sintético

<400> 188
Met Leu Glu Glu Ala Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys
1 5 10 15

Ser Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile
20 25 30

Pro Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr
35 40 45

Ile Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser
50 55 60

Ile Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr
65 70 75 80

Val Asn Gln Asp Ala Pro Phe Gly Val Ile His Leu Asp Ile Thr Thr
85 90 95

```
Glu Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe
            100                 105                 110

Ala Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile
        115                 120                 125

Lys Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val
    130                 135                 140

Pro Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp
145                 150                 155                 160

Lys Thr Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His Asn
                165                 170                 175

Ile Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys Glu
            180                 185                 190

Gly Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala Leu
        195                 200                 205

Cys Trp Leu Val Pro Met Asp Ala Ile Tyr Asn Tyr Ile Thr Gln Gln
    210                 215                 220

Asn Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr Val
225                 230                 235                 240

Ala Gly Thr Pro Lys Val Ile Thr Val Lys Gln Gly Ile Glu Gln Lys
                245                 250                 255

Pro Val Glu Gln Arg Ile His Phe Ser Lys Gly Gly Gly Gly Gly Ser
            260                 265                 270

Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Ala Pro Ile Ser Ser His
        275                 280                 285

Cys Arg Leu Asp Lys Ser Asn Phe Gln Gln Pro Tyr Ile Thr Asn Arg
    290                 295                 300
```

Thr Phe Met Leu Ala Lys Glu Ala Ser Leu Ala Asp Asn Asn Thr Asp
305 310 315 320

Val Arg Leu Ile Gly Glu Lys Leu Phe His Gly Val Ser Met Ser Glu
325 330 335

Arg Cys Tyr Leu Met Lys Gln Val Leu Asn Phe Thr Leu Glu Glu Val
340 345 350

Leu Phe Pro Gln Ser Asp Arg Phe Gln Pro Tyr Met Gln Glu Val Val
355 360 365

Pro Phe Leu Ala Arg Leu Ser Asn Arg Leu Ser Thr Cys His Ile Glu
370 375 380

Gly Asp Asp Leu His Ile Gln Arg Asn Val Gln Lys Leu Lys Asp Thr
385 390 395 400

Val Lys Lys Leu Gly Glu Ser Gly Glu Ile Lys Ala Ile Gly Glu Leu
405 410 415

Asp Leu Leu Phe Met Ser Leu Arg Asn Ala Cys Ile
420 425

<210> 189
<211> 633
<212> PRT
<213> Secuencia Artificial

<220>
<223> Descripción de Secuencia Artificial:
polipéptido sintético

<400> 189
Val Glu Glu Ala Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys Ser
1 5 10 15

Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile Pro
20 25 30

Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr Ile
35 40 45

```
Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser Ile
    50                  55                  60

Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr Val
65                  70                  75                  80

Asn Gln Asp Ala Pro Phe Gly Val Ile His Leu Asp Ile Thr Thr Glu
                85                  90                  95

Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe Ala
            100                 105                 110

Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile Lys
        115                 120                 125

Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val Pro
    130                 135                 140

Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp Lys
145                 150                 155                 160

Thr Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His Asn Ile
                165                 170                 175

Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys Glu Gly
            180                 185                 190

Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala Leu Cys
        195                 200                 205

Trp Leu Val Pro Met Asp Ala Ile Tyr Asn Tyr Ile Thr Gln Gln Asn
    210                 215                 220

Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr Val Ala
225                 230                 235                 240

Gly Thr Pro Lys Val Ile Thr Val Lys Gln Gly Ile Glu Gln Lys Pro
                245                 250                 255

Val Glu Gln Arg Ile His Phe Ser Lys Gly Asn Ala Met Ser Ala Leu
            260                 265                 270
```

```
Ala Ala His Arg Val Cys Gly Val Pro Leu Glu Thr Leu Ala Arg Ser
        275                 280                 285

Arg Lys Pro Arg Asp Leu Thr Asp Asp Leu Ser Cys Ala Tyr Gln Ala
    290                 295                 300

Gln Asn Ile Val Ser Leu Phe Val Ala Thr Arg Ile Leu Phe Ser His
305                 310                 315                 320

Leu Asp Ser Val Phe Thr Leu Asn Leu Asp Glu Gln Glu Pro Glu Val
                325                 330                 335

Ala Glu Arg Leu Ser Asp Leu Arg Arg Ile Asn Glu Asn Asn Pro Gly
            340                 345                 350

Met Val Thr Gln Val Leu Thr Val Ala Arg Gln Ile Tyr Asn Asp Tyr
        355                 360                 365

Val Thr His His Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala Gly Ala
    370                 375                 380

Gln Ala Ala Asp Ile Leu Ser Leu Phe Cys Pro Asp Ala Asp Lys Ser
385                 390                 395                 400

Cys Val Ala Ser Asn Asn Asp Gln Ala Asn Ile Asn Ile Glu Ser Arg
                405                 410                 415

Ser Gly Arg Ser Tyr Leu Pro Glu Asn Arg Ala Val Ile Thr Pro Gln
            420                 425                 430

Gly Val Thr Asn Trp Thr Tyr Gln Glu Leu Glu Ala Thr His Gln Ala
        435                 440                 445

Leu Thr Arg Glu Gly Tyr Val Phe Val Gly Tyr His Gly Thr Asn His
    450                 455                 460

Val Ala Ala Gln Thr Ile Val Asn Arg Ile Ala Pro Val Pro Arg Gly
465                 470                 475                 480
```

```
Asn Asn Thr Glu Asn Glu Glu Lys Trp Gly Gly Leu Tyr Val Ala Thr
                485                 490                 495

His Ala Glu Val Ala His Gly Tyr Ala Arg Ile Lys Glu Gly Thr Gly
            500                 505                 510

Glu Tyr Gly Leu Pro Thr Arg Ala Glu Arg Asp Ala Arg Gly Val Met
        515                 520                 525

Leu Arg Val Tyr Ile Pro Arg Ala Ser Leu Glu Arg Phe Tyr Arg Thr
    530                 535                 540

Asn Thr Pro Leu Glu Asn Ala Glu Glu His Ile Thr Gln Val Ile Gly
545                 550                 555                 560

His Ser Leu Pro Leu Arg Asn Glu Ala Phe Thr Gly Pro Glu Ser Ala
                565                 570                 575

Gly Gly Glu Asp Thr Val Ile Gly Trp Asp Met Ala Ile His Ala Val
            580                 585                 590

Ala Ile Pro Ser Thr Ile Pro Gly Asn Ala Tyr Glu Glu Leu Ala Ile
        595                 600                 605

Asp Glu Glu Ala Val Ala Lys Glu Gln Ser Ile Ser Thr Lys Pro Pro
    610                 615                 620

Tyr Lys Glu Arg Lys Asp Glu Leu Lys
625                 630
```

<210> 190
<211> 192
<212> PRT
<213> Secuencia Artificial

<220>
<223> Descripción de Secuencia Artificial:
polipéptido sintético

<400> 190

```
Met Phe Pro Thr Ile Pro Leu Ser Arg Leu Phe Asp Asn Ala Met Leu
1               5                  10                  15
```

```
Arg Ala His Arg Leu His Gln Leu Ala Phe Asp Thr Tyr Gln Glu Phe
            20                  25                  30

Glu Glu Ala Tyr Ile Pro Lys Glu Gln Lys Tyr Ser Phe Leu Gln Asn
        35                  40                  45

Pro Gln Thr Ser Leu Cys Phe Ser Glu Ser Ile Pro Thr Pro Ser Asn
    50                  55                  60

Arg Glu Glu Thr Gln Gln Lys Ser Asn Leu Glu Leu Leu Arg Ile Ser
65                  70                  75                  80

Leu Leu Leu Ile Gln Ser Trp Leu Glu Pro Val Gln Phe Leu Arg Ser
                85                  90                  95

Val Phe Ala Asn Ser Leu Val Tyr Gly Ala Ser Asp Ser Asn Val Tyr
            100                 105                 110

Asp Leu Leu Lys Asp Leu Glu Glu Gly Ile Gln Thr Leu Met Gly Arg
        115                 120                 125

Leu Glu Asp Gly Ser Pro Arg Thr Gly Gln Ile Phe Lys Gln Thr Tyr
    130                 135                 140

Ser Lys Phe Asp Thr Asn Ser His Asn Asp Asp Ala Leu Leu Lys Asn
145                 150                 155                 160

Tyr Gly Leu Leu Tyr Cys Phe Arg Lys Asp Met Asp Lys Val Glu Thr
                165                 170                 175

Phe Leu Arg Ile Val Gln Cys Arg Ser Val Glu Gly Ser Cys Gly Phe
            180                 185                 190
```

<210> 191
<211> 422
<212> PRT
<213> Secuencia Artificial

<220>
<223> Descripción de Secuencia Artificial:
polipéptido sintético

<400> 191

```
Met Val Glu Glu Ala Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys
1               5                  10                  15

Ser Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile
            20                  25                  30

Pro Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr
        35                  40                  45

Ile Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser
    50                  55                  60

Ile Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr
65                  70                  75                  80

Val Asn Gln Asp Ala Pro Phe Gly Val Ile His Leu Asp Ile Thr Thr
                85                  90                  95

Glu Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe
            100                 105                 110

Ala Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile
        115                 120                 125

Lys Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val
    130                 135                 140

Pro Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp
145                 150                 155                 160

Lys Thr Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His Asn
                165                 170                 175

Ile Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys Glu
            180                 185                 190

Gly Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala Leu
        195                 200                 205

Cys Trp Leu Val Pro Met Asp Ala Ile Tyr Asn Tyr Ile Thr Gln Gln
    210                 215                 220
```

```
Asn Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr Val
225                 230                 235                 240

Ala Gly Thr Pro Lys Val Ile Thr Val Lys Gln Gly Ile Glu Gln Lys
                245                 250                 255

Pro Val Glu Gln Arg Ile His Phe Ser Lys Gly Asn Ala Met Ser Ala
            260                 265                 270

Leu Ala Ala His Arg Val Cys Gly Val Pro Leu Glu Thr Leu Ala Arg
        275                 280                 285

Ser Arg Lys Pro Arg Asp Leu Thr Asp Asp Leu Ser Cys Ala Tyr Gln
    290                 295                 300

Ala Gln Asn Ile Val Ser Leu Phe Val Ala Thr Arg Ile Leu Phe Ser
305                 310                 315                 320

His Leu Asp Ser Val Phe Thr Leu Asn Leu Asp Glu Gln Glu Pro Glu
                325                 330                 335

Val Ala Glu Arg Leu Ser Asp Leu Arg Arg Ile Asn Glu Asn Asn Pro
            340                 345                 350

Gly Met Val Thr Gln Val Leu Thr Val Ala Arg Gln Ile Tyr Asn Asp
        355                 360                 365

Tyr Val Thr His His Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala Gly
    370                 375                 380

Ala Gln Ala Ala Asp Ile Leu Ser Leu Phe Cys Pro Asp Ala Asp Lys
385                 390                 395                 400

Ser Cys Val Ala Ser Asn Asn Asp Gln Ala Asn Ile Asn Ile Glu Ser
                405                 410                 415

Cys Glu Asn Leu Phe Gln
            420
```

<210> 192
<211> 393
<212> PRT
<213> Secuencia Artificial

<220>
<223> Descripción de Secuencia Artificial:
polipéptido sintético

<400> 192
Met Val Glu Glu Ala Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys
1 5 10 15

Ser Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile
20 25 30

Pro Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr
35 40 45

Ile Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser
50 55 60

Ile Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr
65 70 75 80

Val Asn Gln Asp Ala Pro Phe Gly Val Ile His Leu Asp Ile Thr Thr
85 90 95

Glu Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe
100 105 110

Ala Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile
115 120 125

Lys Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val
130 135 140

Pro Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp
145 150 155 160

Lys Thr Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His Asn
165 170 175

```
Ile Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys Glu
            180                 185                 190

Gly Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala Leu
        195                 200                 205

Cys Trp Leu Val Pro Met Asp Ala Ile Tyr Asn Tyr Ile Thr Gln Gln
    210                 215                 220

Asn Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr Val
225                 230                 235                 240

Ala Gly Thr Pro Lys Val Ile Thr Val Lys Gln Gly Ile Glu Gln Lys
                245                 250                 255

Pro Val Glu Gln Arg Ile His Phe Ser Lys Gly Asn Ala Met Ser Ala
            260                 265                 270

Leu Ala Ala His Arg Val Cys Gly Val Pro Leu Glu Thr Leu Ala Arg
        275                 280                 285

Ser Arg Lys Pro Arg Asp Leu Thr Asp Asp Leu Ser Cys Ala Tyr Gln
    290                 295                 300

Ala Gln Asn Ile Val Ser Leu Phe Val Ala Thr Arg Ile Leu Phe Ser
305                 310                 315                 320

His Leu Asp Ser Val Phe Thr Leu Asn Leu Asp Glu Gln Glu Pro Glu
                325                 330                 335

Val Ala Glu Arg Leu Ser Asp Leu Arg Arg Ile Asn Glu Asn Asn Pro
            340                 345                 350

Gly Met Val Thr Gln Val Leu Thr Val Ala Arg Gln Ile Tyr Asn Asp
        355                 360                 365

Tyr Val Thr His His Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala Gly
    370                 375                 380

Ala Gln Ala Cys Glu Asn Leu Phe Gln
385                 390
```

<210> 193
<211> 432
<212> PRT
<213> Secuencia Artificial

<220>
<223> Descripción de Secuencia Artificial:
polipéptido sintético

<400> 193

```
Met Val Glu Glu Ala Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys
1               5                  10                  15

Ser Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile
            20                  25                  30

Pro Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr
        35                  40                  45

Ile Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser
    50                  55                  60

Ile Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr
65                  70                  75                  80

Val Asn Gln Asp Ala Pro Phe Gly Val Ile His Leu Asp Ile Thr Thr
                85                  90                  95

Glu Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe
            100                 105                 110

Ala Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile
        115                 120                 125

Lys Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val
    130                 135                 140

Pro Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp
145                 150                 155                 160

Lys Thr Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His Asn
                165                 170                 175
```

```
Ile Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys Glu
            180                 185                 190

Gly Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala Leu
        195                 200                 205

Cys Trp Leu Val Pro Met Asp Ala Ile Tyr Asn Tyr Ile Thr Gln Gln
    210                 215                 220

Asn Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr Val
225                 230                 235                 240

Ala Gly Thr Pro Lys Val Ile Thr Val Lys Gln Gly Ile Glu Gln Lys
                245                 250                 255

Pro Val Glu Gln Arg Ile His Phe Ser Lys Gly Asn Ala Met Ser Ala
            260                 265                 270

Leu Ala Ala His Arg Val Cys Gly Val Pro Leu Glu Thr Leu Ala Arg
        275                 280                 285

Ser Arg Lys Pro Arg Asp Leu Thr Asp Asp Leu Ser Cys Ala Tyr Gln
    290                 295                 300

Ala Gln Asn Ile Val Ser Leu Phe Val Ala Thr Arg Ile Leu Phe Ser
305                 310                 315                 320

His Leu Asp Ser Val Phe Thr Leu Asn Leu Asp Glu Gln Glu Pro Glu
                325                 330                 335

Val Ala Glu Arg Leu Ser Asp Leu Arg Arg Ile Asn Glu Asn Asn Pro
            340                 345                 350

Gly Met Val Thr Gln Val Leu Thr Val Ala Arg Gln Ile Tyr Asn Asp
        355                 360                 365

Tyr Val Thr His His Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala Gly
    370                 375                 380
```

Ala Gln Ala Ala Asp Ile Leu Ser Leu Phe Cys Pro Asp Ala Asp Lys
385 390 395 400

Ser Cys Val Ala Ser Asn Asn Asp Gln Ala Asn Ile Asn Ile Glu Ser
405 410 415

Cys Glu Asn Leu Phe Gln Ser Gly Thr Cys His His His His His His
420 425 430

<210> 194
<211> 403
<212> PRT
<213> Secuencia Artificial

<220>
<223> Descripción de Secuencia Artificial:
polipéptido sintético

<400> 194
Met Val Glu Glu Ala Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys
1 5 10 15

Ser Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile
20 25 30

Pro Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr
35 40 45

Ile Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser
50 55 60

Ile Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr
65 70 75 80

Val Asn Gln Asp Ala Pro Phe Gly Val Ile His Leu Asp Ile Thr Thr
85 90 95

Glu Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe
100 105 110

Ala Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile
115 120 125

```
Lys Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val
    130                 135                 140

Pro Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp
145                 150                 155                 160

Lys Thr Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His Asn
                165                 170                 175

Ile Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys Glu
            180                 185                 190

Gly Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala Leu
        195                 200                 205

Cys Trp Leu Val Pro Met Asp Ala Ile Tyr Asn Tyr Ile Thr Gln Gln
    210                 215                 220

Asn Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr Val
225                 230                 235                 240

Ala Gly Thr Pro Lys Val Ile Thr Val Lys Gln Gly Ile Glu Gln Lys
                245                 250                 255

Pro Val Glu Gln Arg Ile His Phe Ser Lys Gly Asn Ala Met Ser Ala
            260                 265                 270

Leu Ala Ala His Arg Val Cys Gly Val Pro Leu Glu Thr Leu Ala Arg
        275                 280                 285

Ser Arg Lys Pro Arg Asp Leu Thr Asp Asp Leu Ser Cys Ala Tyr Gln
    290                 295                 300

Ala Gln Asn Ile Val Ser Leu Phe Val Ala Thr Arg Ile Leu Phe Ser
305                 310                 315                 320

His Leu Asp Ser Val Phe Thr Leu Asn Leu Asp Glu Gln Glu Pro Glu
                325                 330                 335

Val Ala Glu Arg Leu Ser Asp Leu Arg Arg Ile Asn Glu Asn Asn Pro
            340                 345                 350
```

Gly Met Val Thr Gln Val Leu Thr Val Ala Arg Gln Ile Tyr Asn Asp
        355   360   365

Tyr Val Thr His His Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala Gly
    370   375   380

Ala Gln Ala Cys Glu Asn Leu Phe Gln Ser Gly Thr Cys His His His
385   390   395   400

His His His

<210> 195
<211> 39
<212> PRT
<213> Secuencia Artificial

<220>
<223> Descripción de Secuencia Artificial:
      polipéptido sintético

<400> 195
His Gly Glu Gly Thr Phe Thr Ser Asp Leu Ser Lys Gln Met Glu Glu
1   5   10   15

Glu Ala Val Arg Leu Phe Ile Glu Trp Leu Lys Asn Gly Gly Pro Ser
            20   25   30

Ser Gly Ala Pro Pro Pro Ser
        35

<210> 196
<211> 5
<212> PRT
<213> Secuencia Artificial

<220>
<223> Descripción de Secuencia Artificial:
      péptido sintético

<400> 196
Gly Gly Gly Gly Ser
1   5

<210> 197
<211> 25
<212> PRT
<213> Secuencia Artificial

<220>
<223> Descripción de Secuencia Artificial:
péptido sintético

<400> 197
Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly
1 5 10 15

Gly Gly Gly Ser Gly Gly Gly Gly Ser
20 25

<210> 198
<211> 418
<212> PRT
<213> Secuencia Artificial

<220>
<223> Descripción de Secuencia Artificial:
polipéptido sintético

<400> 198
Met Val Glu Glu Ala Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys
1 5 10 15

Ser Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile
20 25 30

Pro Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr
35 40 45

Ile Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser
50 55 60

Ile Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr
65 70 75 80

Val Asn Gln Asp Ala Pro Phe Gly Val Ile His Leu Asp Ile Thr Thr
85 90 95

Glu Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe
100 105 110

```
Ala Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile
        115                 120                 125

Lys Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val
    130                 135                 140

Pro Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp
145                 150                 155                 160

Lys Thr Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His Asn
                165                 170                 175

Ile Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys Glu
            180                 185                 190

Gly Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala Leu
        195                 200                 205

Cys Trp Leu Val Pro Met Asp Ala Ile Tyr Asn Tyr Ile Thr Gln Gln
    210                 215                 220

Asn Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr Val
225                 230                 235                 240

Ala Gly Thr Pro Lys Val Ile Thr Val Lys Gln Gly Ile Glu Gln Lys
                245                 250                 255

Pro Val Glu Gln Arg Ile His Phe Ser Lys Gly Gly Gly Gly Gly Ser
            260                 265                 270

Ala Pro Ile Ser Ser His Cys Arg Leu Asp Lys Ser Asn Phe Gln Gln
        275                 280                 285

Pro Tyr Ile Thr Asn Arg Thr Phe Met Leu Ala Lys Glu Ala Ser Leu
    290                 295                 300

Ala Asp Asn Asn Thr Asp Val Arg Leu Ile Gly Glu Lys Leu Phe His
305                 310                 315                 320
```

Gly Val Ser Met Ser Glu Arg Cys Tyr Leu Met Lys Gln Val Leu Asn
325 330 335

Phe Thr Leu Glu Glu Val Leu Phe Pro Gln Ser Asp Arg Phe Gln Pro
340 345 350

Tyr Met Gln Glu Val Val Pro Phe Leu Ala Arg Leu Ser Asn Arg Leu
355 360 365

Ser Thr Cys His Ile Glu Gly Asp Asp Leu His Ile Gln Arg Asn Val
370 375 380

Gln Lys Leu Lys Asp Thr Val Lys Lys Leu Gly Glu Ser Gly Glu Ile
385 390 395 400

Lys Ala Ile Gly Glu Leu Asp Leu Leu Phe Met Ser Leu Arg Asn Ala
405 410 415

Cys Ile

<210> 199
<211> 438
<212> PRT
<213> Secuencia Artificial

<220>
<223> Descripción de Secuencia Artificial:
polipéptido sintético

<400> 199
Met Val Glu Glu Ala Leu Asn Ile Phe Asp Glu Cys Arg Ser Pro Cys
1 5 10 15

Ser Leu Thr Pro Glu Pro Gly Lys Pro Ile Gln Ser Lys Leu Ser Ile
20 25 30

Pro Ser Asp Val Val Leu Asp Glu Gly Val Leu Tyr Tyr Ser Met Thr
35 40 45

Ile Asn Asp Glu Gln Asn Asp Ile Lys Asp Glu Asp Lys Gly Glu Ser
50 55 60

```
Ile Ile Thr Ile Gly Glu Phe Ala Thr Val Arg Ala Thr Arg His Tyr
65                  70                  75                  80

Val Asn Gln Asp Ala Pro Phe Gly Val Ile His Leu Asp Ile Thr Thr
                85                  90                  95

Glu Asn Gly Thr Lys Thr Tyr Ser Tyr Asn Arg Lys Glu Gly Glu Phe
            100                 105                 110

Ala Ile Asn Trp Leu Val Pro Ile Gly Glu Asp Ser Pro Ala Ser Ile
        115                 120                 125

Lys Ile Ser Val Asp Glu Leu Asp Gln Gln Arg Asn Ile Ile Glu Val
    130                 135                 140

Pro Lys Leu Tyr Ser Ile Asp Leu Asp Asn Gln Thr Leu Glu Gln Trp
145                 150                 155                 160

Lys Thr Gln Gly Asn Val Ser Phe Ser Val Thr Arg Pro Glu His Asn
                165                 170                 175

Ile Ala Ile Ser Trp Pro Ser Val Ser Tyr Lys Ala Ala Gln Lys Glu
            180                 185                 190

Gly Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala Leu
        195                 200                 205

Cys Trp Leu Val Pro Met Asp Ala Ile Tyr Asn Tyr Ile Thr Gln Gln
    210                 215                 220

Asn Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr Val
225                 230                 235                 240

Ala Gly Thr Pro Lys Val Ile Thr Val Lys Gln Gly Ile Glu Gln Lys
                245                 250                 255

Pro Val Glu Gln Arg Ile His Phe Ser Lys Gly Gly Gly Gly Gly Ser
            260                 265                 270

Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly
        275                 280                 285
```

Gly Gly Gly Ser Ala Pro Ile Ser Ser His Cys Arg Leu Asp Lys Ser
290 295 300

Asn Phe Gln Gln Pro Tyr Ile Thr Asn Arg Thr Phe Met Leu Ala Lys
305 310 315 320

Glu Ala Ser Leu Ala Asp Asn Asn Thr Asp Val Arg Leu Ile Gly Glu
325 330 335

Lys Leu Phe His Gly Val Ser Met Ser Glu Arg Cys Tyr Leu Met Lys
340 345 350

Gln Val Leu Asn Phe Thr Leu Glu Glu Val Leu Phe Pro Gln Ser Asp
355 360 365

Arg Phe Gln Pro Tyr Met Gln Glu Val Val Pro Phe Leu Ala Arg Leu
370 375 380

Ser Asn Arg Leu Ser Thr Cys His Ile Glu Gly Asp Asp Leu His Ile
385 390 395 400

Gln Arg Asn Val Gln Lys Leu Lys Asp Thr Val Lys Lys Leu Gly Glu
405 410 415

Ser Gly Glu Ile Lys Ala Ile Gly Glu Leu Asp Leu Leu Phe Met Ser
420 425 430

Leu Arg Asn Ala Cys Ile
435

<210> 200
<211> 418
<212> PRT
<213> Secuencia Artificial

<220>
<223> Descripción de Secuencia Artificial:
polipéptido sintético

<400> 200
Met Ala Pro Ile Ser Ser His Cys Arg Leu Asp Lys Ser Asn Phe Gln
1 5 10 15

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Gln Pro Tyr Ile Thr Asn Arg Thr Phe Met Leu Ala Lys Glu Ala Ser
            20                  25                  30

Leu Ala Asp Asn Asn Thr Asp Val Arg Leu Ile Gly Glu Lys Leu Phe
        35                  40                  45

His Gly Val Ser Met Ser Glu Arg Cys Tyr Leu Met Lys Gln Val Leu
    50                  55                  60

Asn Phe Thr Leu Glu Glu Val Leu Phe Pro Gln Ser Asp Arg Phe Gln
65                  70                  75                  80

Pro Tyr Met Gln Glu Val Val Pro Phe Leu Ala Arg Leu Ser Asn Arg
                85                  90                  95

Leu Ser Thr Cys His Ile Glu Gly Asp Asp Leu His Ile Gln Arg Asn
            100                 105                 110

Val Gln Lys Leu Lys Asp Thr Val Lys Lys Leu Gly Glu Ser Gly Glu
        115                 120                 125

Ile Lys Ala Ile Gly Glu Leu Asp Leu Leu Phe Met Ser Leu Arg Asn
    130                 135                 140

Ala Cys Ile Gly Gly Gly Gly Ser Val Glu Glu Ala Leu Asn Ile Phe
145                 150                 155                 160

Asp Glu Cys Arg Ser Pro Cys Ser Leu Thr Pro Glu Pro Gly Lys Pro
                165                 170                 175

Ile Gln Ser Lys Leu Ser Ile Pro Ser Asp Val Val Leu Asp Glu Gly
            180                 185                 190

Val Leu Tyr Tyr Ser Met Thr Ile Asn Asp Glu Gln Asn Asp Ile Lys
        195                 200                 205

Asp Glu Asp Lys Gly Glu Ser Ile Ile Thr Ile Gly Glu Phe Ala Thr
    210                 215                 220
```

```
Val Arg Ala Thr Arg His Tyr Val Asn Gln Asp Ala Pro Phe Gly Val
225                 230                 235                 240

Ile His Leu Asp Ile Thr Thr Glu Asn Gly Thr Lys Thr Tyr Ser Tyr
                245                 250                 255

Asn Arg Lys Glu Gly Glu Phe Ala Ile Asn Trp Leu Val Pro Ile Gly
            260                 265                 270

Glu Asp Ser Pro Ala Ser Ile Lys Ile Ser Val Asp Glu Leu Asp Gln
        275                 280                 285

Gln Arg Asn Ile Ile Glu Val Pro Lys Leu Tyr Ser Ile Asp Leu Asp
    290                 295                 300

Asn Gln Thr Leu Glu Gln Trp Lys Thr Gln Gly Asn Val Ser Phe Ser
305                 310                 315                 320

Val Thr Arg Pro Glu His Asn Ile Ala Ile Ser Trp Pro Ser Val Ser
                325                 330                 335

Tyr Lys Ala Ala Gln Lys Glu Gly Ser Arg His Lys Arg Trp Ala His
            340                 345                 350

Trp His Thr Gly Leu Ala Leu Cys Trp Leu Val Pro Met Asp Ala Ile
        355                 360                 365

Tyr Asn Tyr Ile Thr Gln Gln Asn Cys Thr Leu Gly Asp Asn Trp Phe
    370                 375                 380

Gly Gly Ser Tyr Glu Thr Val Ala Gly Thr Pro Lys Val Ile Thr Val
385                 390                 395                 400

Lys Gln Gly Ile Glu Gln Lys Pro Val Glu Gln Arg Ile His Phe Ser
                405                 410                 415

Lys Gly
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<210> 201
<211> 538

<212> PRT
<213> Secuencia Artificial

<220>
<223> Descripción de Secuencia Artificial:
polipéptido sintético

<400> 201

Met	Val	Glu	Glu	Ala	Leu	Asn	Ile	Phe	Asp	Glu	Cys	Arg	Ser	Pro	Cys
1				5				10						15	
Ser	Leu	Thr	Pro	Glu	Pro	Gly	Lys	Pro	Ile	Gln	Ser	Lys	Leu	Ser	Ile
			20					25					30		
Pro	Ser	Asp	Val	Val	Leu	Asp	Glu	Gly	Val	Leu	Tyr	Tyr	Ser	Met	Thr
		35					40					45			
Ile	Asn	Asp	Glu	Gln	Asn	Asp	Ile	Lys	Asp	Glu	Asp	Lys	Gly	Glu	Ser
	50					55					60				
Ile	Ile	Thr	Ile	Gly	Glu	Phe	Ala	Thr	Val	Arg	Ala	Thr	Arg	His	Tyr
65					70					75					80
Val	Asn	Gln	Asp	Ala	Pro	Phe	Gly	Val	Ile	His	Leu	Asp	Ile	Thr	Thr
				85					90					95	
Glu	Asn	Gly	Thr	Lys	Thr	Tyr	Ser	Tyr	Asn	Arg	Lys	Glu	Gly	Glu	Phe
			100					105					110		
Ala	Ile	Asn	Trp	Leu	Val	Pro	Ile	Gly	Glu	Asp	Ser	Pro	Ala	Ser	Ile
		115					120					125			
Lys	Ile	Ser	Val	Asp	Glu	Leu	Asp	Gln	Gln	Arg	Asn	Ile	Ile	Glu	Val
	130					135					140				
Pro	Lys	Leu	Tyr	Ser	Ile	Asp	Leu	Asp	Asn	Gln	Thr	Leu	Glu	Gln	Trp
145					150					155					160
Lys	Thr	Gln	Gly	Asn	Val	Ser	Phe	Ser	Val	Thr	Arg	Pro	Glu	His	Asn
				165					170					175	
Ile	Ala	Ile	Ser	Trp	Pro	Ser	Val	Ser	Tyr	Lys	Ala	Ala	Gln	Lys	Glu
			180					185					190		

```
Gly Ser Arg His Lys Arg Trp Ala His Trp His Thr Gly Leu Ala Leu
        195                 200                 205

Cys Trp Leu Val Pro Met Asp Ala Ile Tyr Asn Tyr Ile Thr Gln Gln
    210                 215                 220

Asn Cys Thr Leu Gly Asp Asn Trp Phe Gly Gly Ser Tyr Glu Thr Val
225                 230                 235                 240

Ala Gly Thr Pro Lys Val Ile Thr Val Lys Gln Gly Ile Glu Gln Lys
                245                 250                 255

Pro Val Glu Gln Arg Ile His Phe Ser Lys Gly Asn Ala Met Ser Ala
            260                 265                 270

Leu Ala Ala His Arg Val Cys Gly Val Pro Leu Glu Thr Leu Ala Arg
        275                 280                 285

Ser Arg Lys Pro Arg Asp Leu Thr Asp Asp Leu Ser Cys Ala Tyr Gln
    290                 295                 300

Ala Gln Asn Ile Val Ser Leu Phe Val Ala Thr Arg Ile Leu Phe Ser
305                 310                 315                 320

His Leu Asp Ser Val Phe Thr Leu Asn Leu Asp Glu Gln Glu Pro Glu
                325                 330                 335

Val Ala Glu Arg Leu Ser Asp Leu Arg Arg Ile Asn Glu Asn Asn Pro
            340                 345                 350

Gly Met Val Thr Gln Val Leu Thr Val Ala Arg Gln Ile Tyr Asn Asp
        355                 360                 365

Tyr Val Thr His His Pro Gly Leu Thr Pro Glu Gln Thr Ser Ala Gly
    370                 375                 380

Ala Gln Ala Gly Gly Gly Gly Ser Ala Pro Ile Ser Ser His Cys Arg
385                 390                 395                 400
```

Leu Asp Lys Ser Asn Phe Gln Gln Pro Tyr Ile Thr Asn Arg Thr Phe
405 410 415

Met Leu Ala Lys Glu Ala Ser Leu Ala Asp Asn Asn Thr Asp Val Arg
420 425 430

Leu Ile Gly Glu Lys Leu Phe His Gly Val Ser Met Ser Glu Arg Cys
435 440 445

Tyr Leu Met Lys Gln Val Leu Asn Phe Thr Leu Glu Glu Val Leu Phe
450 455 460

Pro Gln Ser Asp Arg Phe Gln Pro Tyr Met Gln Glu Val Val Pro Phe
465 470 475 480

Leu Ala Arg Leu Ser Asn Arg Leu Ser Thr Cys His Ile Glu Gly Asp
485 490 495

Asp Leu His Ile Gln Arg Asn Val Gln Lys Leu Lys Asp Thr Val Lys
500 505 510

Lys Leu Gly Glu Ser Gly Glu Ile Lys Ala Ile Gly Glu Leu Asp Leu
515 520 525

Leu Phe Met Ser Leu Arg Asn Ala Cys Ile
530 535

<210> 202
<211> 6
<212> PRT
<213> Secuencia Artificial

<220>
<223> Descripción de Secuencia Artificial:
péptido sintético

<400> 202
Ser Ile Ala Lys Gln Ser
1 5

<210> 203
<211> 11
<212> PRT
<213> Secuencia Artificial

<220>
<223> Descripción de Secuencia Artificial:
péptido sintético

<400> 203
Ser Ile Ala Lys Gln Ser Ile Ala Lys Gln Ser
1 5 10

<210> 204
<211> 6
<212> PRT
<213> Secuencia Artificial

<220>
<223> Descripción de Secuencia Artificial:
péptido sintético

<400> 204
Val Val Lys Glu Ala Ile
1 5

<210> 205
<211> 6
<212> PRT
<213> Secuencia Artificial

<220>
<223> Descripción de Secuencia Artificial:
Etiqueta 6xHis

<400> 205
His His His His His His
1 5