

SEQUENCE LISTING

<110> THE CHILDREN'S HOSPITAL OF PHILADELPHIA
HIGH, Katherine A.
ANGUELA, Xavier

<120> Modified Factor IX, and Compositions, Methods and Uses for Gene
Transfer to Cells, Organs and Tissues

<130> 074659-0447746

<140> To Be Assigned
<141> 2016-06-23

<150> 62/183,599
<151> 2015-06-23

<150> 62/315,453
<151> 2016-03-30

<150> 62/338,315
<151> 2016-05-18

<150> 62/348,781
<151> 2016-06-10

<150> 62/349,572
<151> 2016-06-13

<160> 27

<170> PatentIn version 3.5

<210> 1
<211> 738
<212> PRT
<213> Adeno-associated Virus

<400> 1

Met Ala Ala Asp Gly Tyr Leu Pro Asp Trp Leu Glu Asp Asn Leu Ser
1 5 10 15

Glu Gly Ile Arg Glu Trp Trp Asp Leu Lys Pro Gly Ala Pro Lys Pro
20 25 30

Lys Ala Asn Gln Gln Lys Gln Asp Asn Gly Arg Gly Leu Val Leu Pro
35 40 45

Gly Tyr Lys Tyr Leu Gly Pro Phe Asn Gly Leu Asp Lys Gly Glu Pro
50 55 60

Val Asn Ala Ala Asp Ala Ala Ala Leu Glu His Asp Lys Ala Tyr Asp
65 70 75 80

Gln Gln Leu Gln Ala Gly Asp Asn Pro Tyr Leu Arg Tyr Asn His Ala
 85 90 95

Asp Ala Glu Phe Gln Glu Arg Leu Gln Glu Asp Thr Ser Phe Gly Gly
 100 105 110

Asn Leu Gly Arg Ala Val Phe Gln Ala Lys Lys Arg Val Leu Glu Pro
 115 120 125

Leu Gly Leu Val Glu Ser Pro Val Lys Thr Ala Pro Gly Lys Lys Arg
 130 135 140

Pro Val Glu Pro Ser Pro Gln Arg Ser Pro Asp Ser Ser Thr Gly Ile
 145 150 155 160

Gly Lys Lys Gly Gln Gln Pro Ala Lys Lys Arg Leu Asn Phe Gly Gln
 165 170 175

Thr Gly Asp Ser Glu Ser Val Pro Asp Pro Gln Pro Ile Gly Glu Pro
 180 185 190

Pro Ala Gly Pro Ser Gly Leu Gly Ser Gly Thr Met Ala Ala Gly Gly
 195 200 205

Gly Ala Pro Met Ala Asp Asn Asn Glu Gly Ala Asp Gly Val Gly Ser
 210 215 220

Ser Ser Gly Asn Trp His Cys Asp Ser Thr Trp Leu Gly Asp Arg Val
 225 230 235 240

Ile Thr Thr Ser Thr Arg Thr Trp Ala Leu Pro Thr Tyr Asn Asn His
 245 250 255

Leu Tyr Lys Gln Ile Ser Asn Gly Thr Ser Gly Gly Ser Thr Asn Asp
 260 265 270

Asn Thr Tyr Phe Gly Tyr Ser Thr Pro Trp Gly Tyr Phe Asp Phe Asn
 275 280 285

Arg Phe His Cys His Phe Ser Pro Arg Asp Trp Gln Arg Leu Ile Asn
 290 295 300

Asn Asn Trp Gly Phe Arg Pro Lys Arg Leu Asn Phe Lys Leu Phe Asn
 305 310 315 320

Ile Gln Val Lys Glu Val Thr Gln Asn Glu Gly Thr Lys Thr Ile Ala
 325 330 335

Asn Asn Leu Thr Ser Thr Ile Gln Val Phe Thr Asp Ser Glu Tyr Gln
 340 345 350

Leu Pro Tyr Val Leu Gly Ser Ala His Gln Gly Cys Leu Pro Pro Phe
 355 360 365

Pro Ala Asp Val Phe Met Ile Pro Gln Tyr Gly Tyr Leu Thr Leu Asn
 370 375 380

Asn Gly Ser Gln Ala Val Gly Arg Ser Ser Phe Tyr Cys Leu Glu Tyr
 385 390 395 400

Phe Pro Ser Gln Met Leu Arg Thr Gly Asn Asn Phe Glu Phe Ser Tyr
 405 410 415

Asn Phe Glu Asp Val Pro Phe His Ser Ser Tyr Ala His Ser Gln Ser
 420 425 430

Leu Asp Arg Leu Met Asn Pro Leu Ile Asp Gln Tyr Leu Tyr Tyr Leu
 435 440 445

Ser Arg Thr Gln Ser Thr Gly Gly Thr Ala Gly Thr Gln Gln Leu Leu
 450 455 460

Phe Ser Gln Ala Gly Pro Asn Asn Met Ser Ala Gln Ala Lys Asn Trp
 465 470 475 480

Leu Pro Gly Pro Cys Tyr Arg Gln Gln Arg Val Ser Thr Thr Leu Ser
 485 490 495

Gln Asn Asn Asn Ser Asn Phe Ala Trp Thr Gly Ala Thr Lys Tyr His
 500 505 510

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

His Lys Asp Asp Glu Glu Arg Phe Phe Pro Ser Ser Gly Val Leu Met
 530 535 540

Phe Gly Lys Gln Gly Ala Gly Lys Asp Asn Val Asp Tyr Ser Ser Val
 545 550 555 560

Met Leu Thr Ser Glu Glu Glu Ile Lys Thr Thr Asn Pro Val Ala Thr
 565 570 575
 Glu Gln Tyr Gly Val Val Ala Asp Asn Leu Gln Gln Gln Asn Ala Ala
 580 585 590
 Pro Ile Val Gly Ala Val Asn Ser Gln Gly Ala Leu Pro Gly Met Val
 595 600 605
 Trp Gln Asn Arg Asp Val Tyr Leu Gln Gly Pro Ile Trp Ala Lys Ile
 610 615 620
 Pro His Thr Asp Gly Asn Phe His Pro Ser Pro Leu Met Gly Gly Phe
 625 630 635 640
 Gly Leu Lys His Pro Pro Pro Gln Ile Leu Ile Lys Asn Thr Pro Val
 645 650 655
 Pro Ala Asp Pro Pro Thr Thr Phe Asn Gln Ala Lys Leu Ala Ser Phe
 660 665 670
 Ile Thr Gln Tyr Ser Thr Gly Gln Val Ser Val Glu Ile Glu Trp Glu
 675 680 685
 Leu Gln Lys Glu Asn Ser Lys Arg Trp Asn Pro Glu Ile Gln Tyr Thr
 690 695 700
 Ser Asn Tyr Tyr Lys Ser Thr Asn Val Asp Phe Ala Val Asn Thr Glu
 705 710 715 720
 Gly Thr Tyr Ser Glu Pro Arg Pro Ile Gly Thr Arg Tyr Leu Thr Arg
 725 730 735
 Asn Leu
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 <211> 601
 <212> PRT
 <213> Adeno-associated Virus
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 Thr Ala Pro Gly Lys Lys Arg Pro Val Glu Pro Ser Pro Gln Arg Ser
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 Pro Asp Ser Ser Thr Gly Ile Gly Lys Lys Gly Gln Gln Pro Ala Lys

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Pro	Gln 50	Pro	Ile	Gly	Glu	Pro 55	Pro	Ala	Gly	Pro	Ser 60	Gly	Leu	Gly	Ser	
Gly 65	Thr	Met	Ala	Ala	Gly 70	Gly	Gly	Ala	Pro	Met 75	Ala	Asp	Asn	Asn	Glu 80	
Gly	Ala	Asp	Gly	Val 85	Gly	Ser	Ser	Ser	Gly 90	Asn	Trp	His	Cys	Asp 95	Ser	
Thr	Trp	Leu	Gly 100	Asp	Arg	Val	Ile	Thr 105	Thr	Ser	Thr	Arg	Thr 110	Trp	Ala	
Leu	Pro	Thr 115	Tyr	Asn	Asn	His	Leu 120	Tyr	Lys	Gln	Ile	Ser 125	Asn	Gly	Thr	
Ser	Gly 130	Gly	Ser	Thr	Asn	Asp 135	Asn	Thr	Tyr	Phe	Gly 140	Tyr	Ser	Thr	Pro	
Trp 145	Gly	Tyr	Phe	Asp	Phe 150	Asn	Arg	Phe	His	Cys 155	His	Phe	Ser	Pro	Arg 160	
Asp	Trp	Gln	Arg	Leu 165	Ile	Asn	Asn	Asn	Trp 170	Gly	Phe	Arg	Pro	Lys 175	Arg	
Leu	Asn	Phe	Lys 180	Leu	Phe	Asn	Ile	Gln 185	Val	Lys	Glu	Val	Thr 190	Gln	Asn	
Glu	Gly	Thr 195	Lys	Thr	Ile	Ala	Asn 200	Asn	Leu	Thr	Ser	Thr 205	Ile	Gln	Val	
Phe	Thr 210	Asp	Ser	Glu	Tyr	Gln 215	Leu	Pro	Tyr	Val	Leu 220	Gly	Ser	Ala	His	
Gln 225	Gly	Cys	Leu	Pro	Pro 230	Phe	Pro	Ala	Asp	Val	Phe	Met	Ile	Pro	Gln 240	
Tyr	Gly	Tyr	Leu	Thr 245	Leu	Asn	Asn	Gly	Ser 250	Gln	Ala	Val	Gly	Arg 255	Ser	
Ser	Phe	Tyr	Cys	Leu	Glu	Tyr	Phe	Pro	Ser	Gln	Met	Leu	Arg	Thr	Glu	

260								265								270
Asn	Asn	Phe	Glu	Phe	Ser	Tyr	Asn	Phe	Glu	Asp	Val	Pro	Phe	His	Ser	
	275						280					285				
Ser	Tyr	Ala	His	Ser	Gln	Ser	Leu	Asp	Arg	Leu	Met	Asn	Pro	Leu	Ile	
	290					295					300					
Asp	Gln	Tyr	Leu	Tyr	Tyr	Leu	Ser	Arg	Thr	Gln	Ser	Thr	Gly	Gly	Thr	
305					310					315					320	
Ala	Gly	Thr	Gln	Gln	Leu	Leu	Phe	Ser	Gln	Ala	Gly	Pro	Asn	Asn	Met	
				325					330					335		
Ser	Ala	Gln	Ala	Lys	Asn	Trp	Leu	Pro	Gly	Pro	Cys	Tyr	Arg	Gln	Gln	
			340					345					350			
Arg	Val	Ser	Thr	Thr	Leu	Ser	Gln	Asn	Asn	Asn	Ser	Asn	Phe	Ala	Trp	
		355					360					365				
Thr	Gly	Ala	Thr	Lys	Tyr	His	Leu	Asn	Gly	Arg	Asp	Ser	Leu	Val	Asn	
	370					375					380					
Pro	Gly	Val	Ala	Met	Ala	Thr	His	Lys	Asp	Asp	Glu	Glu	Arg	Phe	Phe	
385					390					395					400	
Pro	Ser	Ser	Gly	Val	Leu	Met	Phe	Gly	Lys	Gln	Gly	Ala	Gly	Lys	Asp	
				405					410					415		
Asn	Val	Asp	Tyr	Ser	Ser	Val	Met	Leu	Thr	Ser	Glu	Glu	Glu	Ile	Lys	
			420					425						430		
Thr	Thr	Asn	Pro	Val	Ala	Thr	Glu	Gln	Tyr	Gly	Val	Val	Ala	Asp	Asn	
		435					440					445				
Leu	Gln	Gln	Gln	Asn	Ala	Ala	Pro	Ile	Val	Gly	Ala	Val	Asn	Ser	Gln	
	450					455					460					
Gly	Ala	Leu	Pro	Gly	Met	Val	Trp	Gln	Asn	Arg	Asp	Val	Tyr	Leu	Gln	
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Gly	Pro	Ile	Trp	Ala	Lys	Ile	Pro	His	Thr	Asp	Gly	Asn	Phe	His	Pro	
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Ser	Pro	Leu	Met	Gly	Gly	Phe	Gly	Leu	Lys	His	Pro	Pro	Pro	Gln	Ile	

500 505 510
 Leu Ile Lys Asn Thr Pro Val Pro Ala Asp Pro Pro Thr Thr Phe Asn
 515 520 525
 Gln Ala Lys Leu Ala Ser Phe Ile Thr Gln Tyr Ser Thr Gly Gln Val
 530 535 540
 Ser Val Glu Ile Glu Trp Glu Leu Gln Lys Glu Asn Ser Lys Arg Trp
 545 550 555 560
 Asn Pro Glu Ile Gln Tyr Thr Ser Asn Tyr Tyr Lys Ser Thr Asn Val
 565 570 575
 Asp Phe Ala Val Asn Thr Glu Gly Thr Tyr Ser Glu Pro Arg Pro Ile
 580 585 590
 Gly Thr Arg Tyr Leu Thr Arg Asn Leu
 595 600

 <210> 3
 <211> 535
 <212> PRT
 <213> Adeno-associated Virus

 <400> 3
 Met Ala Ala Gly Gly Gly Ala Pro Met Ala Asp Asn Asn Glu Gly Ala
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 Asp Gly Val Gly Ser Ser Ser Gly Asn Trp His Cys Asp Ser Thr Trp
 20 25 30
 Leu Gly Asp Arg Val Ile Thr Thr Ser Thr Arg Thr Trp Ala Leu Pro
 35 40 45
 Thr Tyr Asn Asn His Leu Tyr Lys Gln Ile Ser Asn Gly Thr Ser Gly
 50 55 60
 Gly Ser Thr Asn Asp Asn Thr Tyr Phe Gly Tyr Ser Thr Pro Trp Gly
 65 70 75 80
 Tyr Phe Asp Phe Asn Arg Phe His Cys His Phe Ser Pro Arg Asp Trp
 85 90 95
 Gln Arg Leu Ile Asn Asn Asn Trp Gly Phe Arg Pro Lys Arg Leu Asn
 100 105 110

Phe Lys Leu Phe Asn Ile Gln Val Lys Glu Val Thr Gln Asn Glu Gly
 115 120 125
 Thr Lys Thr Ile Ala Asn Asn Leu Thr Ser Thr Ile Gln Val Phe Thr
 130 135 140
 Asp Ser Glu Tyr Gln Leu Pro Tyr Val Leu Gly Ser Ala His Gln Gly
 145 150 155 160
 Cys Leu Pro Pro Phe Pro Ala Asp Val Phe Met Ile Pro Gln Tyr Gly
 165 170 175
 Tyr Leu Thr Leu Asn Asn Gly Ser Gln Ala Val Gly Arg Ser Ser Phe
 180 185 190
 Tyr Cys Leu Glu Tyr Phe Pro Ser Gln Met Leu Arg Thr Gly Asn Asn
 195 200 205
 Phe Glu Phe Ser Tyr Asn Phe Glu Asp Val Pro Phe His Ser Ser Tyr
 210 215 220
 Ala His Ser Gln Ser Leu Asp Arg Leu Met Asn Pro Leu Ile Asp Gln
 225 230 235 240
 Tyr Leu Tyr Tyr Leu Ser Arg Thr Gln Ser Thr Gly Gly Thr Ala Gly
 245 250 255
 Thr Gln Gln Leu Leu Phe Ser Gln Ala Gly Pro Asn Asn Met Ser Ala
 260 265 270
 Gln Ala Lys Asn Trp Leu Pro Gly Pro Cys Tyr Arg Gln Gln Arg Val
 275 280 285
 Ser Thr Thr Leu Ser Gln Asn Asn Asn Ser Asn Phe Ala Trp Thr Gly
 290 295 300
 Ala Thr Lys Tyr His Leu Asn Gly Arg Asp Ser Leu Val Asn Pro Gly
 305 310 315 320
 Val Ala Met Ala Thr His Lys Asp Asp Glu Glu Arg Phe Phe Pro Ser
 325 330 335
 Ser Gly Val Leu Met Phe Gly Lys Gln Gly Ala Gly Lys Asp Asn Val
 340 345 350

Asp Tyr Ser Ser Val Met Leu Thr Ser Glu Glu Glu Ile Lys Thr Thr
 355 360 365

Asn Pro Val Ala Thr Glu Gln Tyr Gly Val Val Ala Asp Asn Leu Gln
 370 375 380

Gln Gln Asn Ala Ala Pro Ile Val Gly Ala Val Asn Ser Gln Gly Ala
 385 390 395 400

Leu Pro Gly Met Val Trp Gln Asn Arg Asp Val Tyr Leu Gln Gly Pro
 405 410 415

Ile Trp Ala Lys Ile Pro His Thr Asp Gly Asn Phe His Pro Ser Pro
 420 425 430

Leu Met Gly Gly Phe Gly Leu Lys His Pro Pro Pro Gln Ile Leu Ile
 435 440 445

Lys Asn Thr Pro Val Pro Ala Asp Pro Pro Thr Thr Phe Asn Gln Ala
 450 455 460

Lys Leu Ala Ser Phe Ile Thr Gln Tyr Ser Thr Gly Gln Val Ser Val
 465 470 475 480

Glu Ile Glu Trp Glu Leu Gln Lys Glu Asn Ser Lys Arg Trp Asn Pro
 485 490 495

Glu Ile Gln Tyr Thr Ser Asn Tyr Tyr Lys Ser Thr Asn Val Asp Phe
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Ala Val Asn Thr Glu Gly Thr Tyr Ser Glu Pro Arg Pro Ile Gly Thr
 515 520 525

Arg Tyr Leu Thr Arg Asn Leu
 530 535

<210> 4
 <211> 738
 <212> PRT
 <213> Adeno-associated Virus

<400> 4

Met Ala Ala Asp Gly Tyr Leu Pro Asp Trp Leu Glu Asp Asn Leu Ser
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Glu Gly Ile Arg Glu Trp Trp Asp Leu Lys Pro Gly Ala Pro Lys Pro
 20 25 30
 Lys Ala Asn Gln Gln Lys Gln Asp Asn Gly Arg Gly Leu Val Leu Pro
 35 40 45
 Gly Tyr Lys Tyr Leu Gly Pro Phe Asn Gly Leu Asp Lys Gly Glu Pro
 50 55 60
 Val Asn Ala Ala Asp Ala Ala Ala Leu Glu His Asp Lys Ala Tyr Asp
 65 70 75 80
 Gln Gln Leu Gln Ala Gly Asp Asn Pro Tyr Leu Arg Tyr Asn His Ala
 85 90 95
 Asp Ala Glu Phe Gln Glu Arg Leu Gln Glu Asp Thr Ser Phe Gly Gly
 100 105 110
 Asn Leu Gly Arg Ala Val Phe Gln Ala Lys Lys Arg Val Leu Glu Pro
 115 120 125
 Leu Gly Leu Val Glu Ser Pro Val Lys Thr Ala Pro Gly Lys Lys Arg
 130 135 140
 Pro Val Glu Pro Ser Pro Gln Arg Ser Pro Asp Ser Ser Thr Gly Ile
 145 150 155 160
 Gly Lys Lys Gly Gln Gln Pro Ala Lys Lys Arg Leu Asn Phe Gly Gln
 165 170 175
 Thr Gly Asp Ser Glu Ser Val Pro Asp Pro Gln Pro Ile Gly Glu Pro
 180 185 190
 Pro Ala Ala Pro Ser Gly Val Gly Pro Asn Thr Met Ala Ala Gly Gly
 195 200 205
 Gly Ala Pro Met Ala Asp Asn Asn Glu Gly Ala Asp Gly Val Gly Ser
 210 215 220
 Ser Ser Gly Asn Trp His Cys Asp Ser Thr Trp Leu Gly Asp Arg Val
 225 230 235 240
 Ile Thr Thr Ser Thr Arg Thr Trp Ala Leu Pro Thr Tyr Asn Asn His
 245 250 255

Leu Tyr Lys Gln Ile Ser Asn Gly Thr Ser Gly Gly Ser Thr Asn Asp
 260 265 270

Asn Thr Tyr Phe Gly Tyr Ser Thr Pro Trp Gly Tyr Phe Asp Phe Asn
 275 280 285

Arg Phe His Cys His Phe Ser Pro Arg Asp Trp Gln Arg Leu Ile Asn
 290 295 300

Asn Asn Trp Gly Phe Arg Pro Lys Arg Leu Asn Phe Lys Leu Phe Asn
 305 310 315 320

Ile Gln Val Lys Glu Val Thr Gln Asn Glu Gly Thr Lys Thr Ile Ala
 325 330 335

Asn Asn Leu Thr Ser Thr Ile Gln Val Phe Thr Asp Ser Glu Tyr Gln
 340 345 350

Leu Pro Tyr Val Leu Gly Ser Ala His Gln Gly Cys Leu Pro Pro Phe
 355 360 365

Pro Ala Asp Val Phe Met Ile Pro Gln Tyr Gly Tyr Leu Thr Leu Asn
 370 375 380

Asn Gly Ser Gln Ala Val Gly Arg Ser Ser Phe Tyr Cys Leu Glu Tyr
 385 390 395 400

Phe Pro Ser Gln Met Leu Arg Thr Gly Asn Asn Phe Glu Phe Ser Tyr
 405 410 415

Asn Phe Glu Asp Val Pro Phe His Ser Ser Tyr Ala His Ser Gln Ser
 420 425 430

Leu Asp Arg Leu Met Asn Pro Leu Ile Asp Gln Tyr Leu Tyr Tyr Leu
 435 440 445

Ser Arg Thr Gln Ser Thr Gly Gly Thr Ala Gly Thr Gln Gln Leu Leu
 450 455 460

Phe Ser Gln Ala Gly Pro Asn Asn Met Ser Ala Gln Ala Lys Asn Trp
 465 470 475 480

Leu Pro Gly Pro Cys Tyr Arg Gln Gln Arg Val Ser Thr Thr Leu Ser
 485 490 495

Gln Asn Asn Asn Ser Asn Phe Ala Trp Thr Gly Ala Thr Lys Tyr His
 500 505 510

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

His Lys Asp Asp Glu Glu Arg Phe Phe Pro Ser Ser Gly Val Leu Met
 530 535 540

Phe Gly Lys Gln Gly Ala Gly Lys Asp Asn Val Asp Tyr Ser Ser Val
 545 550 555 560

Met Leu Thr Ser Glu Glu Glu Ile Lys Thr Thr Asn Pro Val Ala Thr
 565 570 575

Glu Gln Tyr Gly Val Val Ala Asp Asn Leu Gln Gln Gln Asn Ala Ala
 580 585 590

Pro Ile Val Gly Ala Val Asn Ser Gln Gly Ala Leu Pro Gly Met Val
 595 600 605

Trp Gln Asn Arg Asp Val Tyr Leu Gln Gly Pro Ile Trp Ala Lys Ile
 610 615 620

Pro His Thr Asp Gly Asn Phe His Pro Ser Pro Leu Met Gly Gly Phe
 625 630 635 640

Gly Leu Lys His Pro Pro Pro Gln Ile Leu Ile Lys Asn Thr Pro Val
 645 650 655

Pro Ala Asp Pro Pro Thr Thr Phe Asn Gln Ala Lys Leu Ala Ser Phe
 660 665 670

Ile Thr Gln Tyr Ser Thr Gly Gln Val Ser Val Glu Ile Glu Trp Glu
 675 680 685

Leu Gln Lys Glu Asn Ser Lys Arg Trp Asn Pro Glu Ile Gln Tyr Thr
 690 695 700

Ser Asn Tyr Tyr Lys Ser Thr Asn Val Asp Phe Ala Val Asn Thr Glu
 705 710 715 720

Gly Thr Tyr Ser Glu Pro Arg Pro Ile Gly Thr Arg Tyr Leu Thr Arg
 725 730 735

Asn Leu

<210> 5
 <211> 738
 <212> PRT
 <213> Adeno-associated Virus

<400> 5

Met Ala Ala Asp Gly Tyr Leu Pro Asp Trp Leu Glu Asp Asn Leu Ser
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Glu Gly Ile Arg Glu Trp Trp Asp Leu Lys Pro Gly Ala Pro Lys Pro
 20 25 30

Lys Ala Asn Gln Gln Arg Gln Asp Asn Gly Arg Gly Leu Val Leu Pro
 35 40 45

Gly Tyr Arg Tyr Leu Gly Pro Phe Asn Gly Leu Asp Lys Gly Glu Pro
 50 55 60

Val Asn Ala Ala Asp Ala Ala Ala Leu Glu His Asp Arg Ala Tyr Asp
 65 70 75 80

Gln Gln Leu Gln Ala Gly Asp Asn Pro Tyr Leu Arg Tyr Asn His Ala
 85 90 95

Asp Ala Glu Phe Gln Glu Arg Leu Gln Glu Asp Thr Ser Phe Gly Gly
 100 105 110

Asn Leu Gly Arg Ala Val Phe Gln Ala Lys Lys Arg Val Leu Glu Pro
 115 120 125

Leu Gly Leu Val Glu Ser Pro Val Arg Thr Ala Pro Gly Lys Lys Arg
 130 135 140

Pro Val Glu Pro Ser Pro Gln Arg Ser Pro Asp Ser Ser Thr Gly Ile
 145 150 155 160

Gly Lys Lys Gly Gln Gln Pro Ala Arg Lys Arg Leu Asn Phe Gly Gln
 165 170 175

Thr Gly Asp Ser Glu Ser Val Pro Asp Pro Gln Pro Ile Gly Glu Pro
 180 185 190

Pro Ala Ala Pro Ser Gly Val Gly Pro Asn Thr Met Ala Ala Gly Gly
 195 200 205
 Gly Ala Pro Met Ala Asp Asn Asn Glu Gly Ala Asp Gly Val Gly Ser
 210 215 220
 Ser Ser Gly Asn Trp His Cys Asp Ser Thr Trp Leu Gly Asp Arg Val
 225 230 235 240
 Ile Thr Thr Ser Thr Arg Thr Trp Ala Leu Pro Thr Tyr Asn Asn His
 245 250 255
 Leu Tyr Arg Gln Ile Ser Asn Gly Thr Ser Gly Gly Ser Thr Asn Asp
 260 265 270
 Asn Thr Tyr Phe Gly Tyr Ser Thr Pro Trp Gly Tyr Phe Asp Phe Asn
 275 280 285
 Arg Phe His Cys His Phe Ser Pro Arg Asp Trp Gln Arg Leu Ile Asn
 290 295 300
 Asn Asn Trp Gly Phe Arg Pro Lys Arg Leu Asn Phe Lys Leu Phe Asn
 305 310 315 320
 Ile Gln Val Lys Glu Val Thr Gln Asn Glu Gly Thr Arg Thr Ile Ala
 325 330 335
 Asn Asn Leu Thr Ser Thr Ile Gln Val Phe Thr Asp Ser Glu Tyr Gln
 340 345 350
 Leu Pro Tyr Val Leu Gly Ser Ala His Gln Gly Cys Leu Pro Pro Phe
 355 360 365
 Pro Ala Asp Val Phe Met Ile Pro Gln Tyr Gly Tyr Leu Thr Leu Asn
 370 375 380
 Asn Gly Ser Gln Ala Val Gly Arg Ser Ser Phe Tyr Cys Leu Glu Tyr
 385 390 395 400
 Phe Pro Ser Gln Met Leu Arg Thr Gly Asn Asn Phe Glu Phe Ser Tyr
 405 410 415
 Asn Phe Glu Asp Val Pro Phe His Ser Ser Tyr Ala His Ser Gln Ser
 420 425 430

Leu Asp Arg Leu Met Asn Pro Leu Ile Asp Gln Tyr Leu Tyr Tyr Leu
 435 440 445

Ser Arg Thr Gln Ser Thr Gly Gly Thr Ala Gly Thr Gln Gln Leu Leu
 450 455 460

Phe Ser Gln Ala Gly Pro Asn Asn Met Ser Ala Gln Ala Lys Asn Trp
 465 470 475 480

Leu Pro Gly Pro Cys Tyr Arg Gln Gln Arg Val Ser Thr Thr Leu Ser
 485 490 495

Gln Asn Asn Asn Ser Asn Phe Ala Trp Thr Gly Ala Thr Lys Tyr His
 500 505 510

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

His Arg Asp Asp Glu Glu Arg Phe Phe Pro Ser Ser Gly Val Leu Met
 530 535 540

Phe Gly Arg Gln Gly Ala Gly Arg Asp Asn Val Asp Tyr Ser Ser Val
 545 550 555 560

Met Leu Thr Ser Glu Glu Glu Ile Arg Thr Thr Asn Pro Val Ala Thr
 565 570 575

Glu Gln Tyr Gly Val Val Ala Asp Asn Leu Gln Gln Gln Asn Ala Ala
 580 585 590

Pro Ile Val Gly Ala Val Asn Ser Gln Gly Ala Leu Pro Gly Met Val
 595 600 605

Trp Gln Asn Arg Asp Val Tyr Leu Gln Gly Pro Ile Trp Ala Lys Ile
 610 615 620

Pro His Thr Asp Gly Asn Phe His Pro Ser Pro Leu Met Gly Gly Phe
 625 630 635 640

Gly Leu Lys His Pro Pro Pro Gln Ile Leu Ile Lys Asn Thr Pro Val
 645 650 655

Pro Ala Asp Pro Pro Thr Thr Phe Asn Gln Ala Lys Leu Ala Ser Phe
 660 665 670

Ile Thr Gln Tyr Ser Thr Gly Gln Val Ser Val Glu Ile Glu Trp Glu
 675 680 685

Leu Gln Lys Glu Asn Ser Lys Arg Trp Asn Pro Glu Ile Gln Tyr Thr
 690 695 700

Ser Asn Tyr Tyr Lys Ser Thr Asn Val Asp Phe Ala Val Asn Thr Glu
 705 710 715 720

Gly Thr Tyr Ser Glu Pro Arg Pro Ile Gly Thr Arg Tyr Leu Thr Arg
 725 730 735

Asn Leu

<210> 6
 <211> 738
 <212> PRT
 <213> Adeno-associated Virus

<400> 6

Met Ala Ala Asp Gly Tyr Leu Pro Asp Trp Leu Glu Asp Asn Leu Ser
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Glu Gly Ile Arg Glu Trp Trp Asp Leu Lys Pro Gly Ala Pro Lys Pro
 20 25 30

Lys Ala Asn Gln Gln Arg Gln Asp Asn Gly Arg Gly Leu Val Leu Pro
 35 40 45

Gly Tyr Arg Tyr Leu Gly Pro Phe Asn Gly Leu Asp Lys Gly Glu Pro
 50 55 60

Val Asn Ala Ala Asp Ala Ala Ala Leu Glu His Asp Arg Ala Tyr Asp
 65 70 75 80

Gln Gln Leu Gln Ala Gly Asp Asn Pro Tyr Leu Arg Tyr Asn His Ala
 85 90 95

Asp Ala Glu Phe Gln Glu Arg Leu Gln Glu Asp Thr Ser Phe Gly Gly
 100 105 110

Asn Leu Gly Arg Ala Val Phe Gln Ala Lys Lys Arg Val Leu Glu Pro
 115 120 125

Leu Gly Leu Val Glu Ser Pro Val Arg Thr Ala Pro Gly Lys Lys Arg

130						135										140
Pro	Val	Glu	Pro	Ser	Pro	Gln	Arg	Ser	Pro	Asp	Ser	Ser	Thr	Gly	Ile	
145					150					155					160	
Gly	Lys	Arg	Gly	Gln	Gln	Pro	Ala	Arg	Lys	Arg	Leu	Asn	Phe	Gly	Gln	
				165					170					175		
Thr	Gly	Asp	Ser	Glu	Ser	Val	Pro	Asp	Pro	Gln	Pro	Ile	Gly	Glu	Pro	
			180					185					190			
Pro	Ala	Ala	Pro	Ser	Gly	Val	Gly	Pro	Asn	Thr	Met	Ala	Ala	Gly	Gly	
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Gly	Ala	Pro	Met	Ala	Asp	Asn	Asn	Glu	Gly	Ala	Asp	Gly	Val	Gly	Ser	
	210					215					220					
Ser	Ser	Gly	Asn	Trp	His	Cys	Asp	Ser	Thr	Trp	Leu	Gly	Asp	Arg	Val	
225					230					235					240	
Ile	Thr	Thr	Ser	Thr	Arg	Thr	Trp	Ala	Leu	Pro	Thr	Tyr	Asn	Asn	His	
				245					250					255		
Leu	Tyr	Arg	Gln	Ile	Ser	Asn	Gly	Thr	Ser	Gly	Gly	Ser	Thr	Asn	Asp	
			260					265					270			
Asn	Thr	Tyr	Phe	Gly	Tyr	Ser	Thr	Pro	Trp	Gly	Tyr	Phe	Asp	Phe	Asn	
		275					280					285				
Arg	Phe	His	Cys	His	Phe	Ser	Pro	Arg	Asp	Trp	Gln	Arg	Leu	Ile	Asn	
	290					295					300					
Asn	Asn	Trp	Gly	Phe	Arg	Pro	Lys	Arg	Leu	Asn	Phe	Lys	Leu	Phe	Asn	
305					310					315					320	
Ile	Gln	Val	Lys	Glu	Val	Thr	Gln	Asn	Glu	Gly	Thr	Arg	Thr	Ile	Ala	
				325					330					335		
Asn	Asn	Leu	Thr	Ser	Thr	Ile	Gln	Val	Phe	Thr	Asp	Ser	Glu	Tyr	Gln	
			340					345					350			
Leu	Pro	Tyr	Val	Leu	Gly	Ser	Ala	His	Gln	Gly	Cys	Leu	Pro	Pro	Phe	
		355					360					365				
Pro	Ala	Asp	Val	Phe	Met	Ile	Pro	Gln	Tyr	Gly	Tyr	Leu	Thr	Leu	Asn	

370						375										380
Asn	Gly	Ser	Gln	Ala	Val	Gly	Arg	Ser	Ser	Phe	Tyr	Cys	Leu	Glu	Tyr	
385					390					395					400	
Phe	Pro	Ser	Gln	Met	Leu	Arg	Thr	Gly	Asn	Asn	Phe	Glu	Phe	Ser	Tyr	
				405					410					415		
Asn	Phe	Glu	Asp	Val	Pro	Phe	His	Ser	Ser	Tyr	Ala	His	Ser	Gln	Ser	
			420					425					430			
Leu	Asp	Arg	Leu	Met	Asn	Pro	Leu	Ile	Asp	Gln	Tyr	Leu	Tyr	Tyr	Leu	
		435					440					445				
Ser	Arg	Thr	Gln	Ser	Thr	Gly	Gly	Thr	Ala	Gly	Thr	Gln	Gln	Leu	Leu	
	450					455					460					
Phe	Ser	Gln	Ala	Gly	Pro	Asn	Asn	Met	Ser	Ala	Gln	Ala	Lys	Asn	Trp	
465					470					475					480	
Leu	Pro	Gly	Pro	Cys	Tyr	Arg	Gln	Gln	Arg	Val	Ser	Thr	Thr	Leu	Ser	
				485					490					495		
Gln	Asn	Asn	Asn	Ser	Asn	Phe	Ala	Trp	Thr	Gly	Ala	Thr	Lys	Tyr	His	
			500					505					510			
Leu	Asn	Gly	Arg	Asp	Ser	Leu	Val	Asn	Pro	Gly	Val	Ala	Met	Ala	Thr	
		515					520					525				
His	Arg	Asp	Asp	Glu	Glu	Arg	Phe	Phe	Pro	Ser	Ser	Gly	Val	Leu	Met	
	530					535					540					
Phe	Gly	Lys	Gln	Gly	Ala	Gly	Arg	Asp	Asn	Val	Asp	Tyr	Ser	Ser	Val	
545					550					555					560	
Met	Leu	Thr	Ser	Glu	Glu	Glu	Ile	Arg	Thr	Thr	Asn	Pro	Val	Ala	Thr	
				565					570					575		
Glu	Gln	Tyr	Gly	Val	Val	Ala	Asp	Asn	Leu	Gln	Gln	Gln	Asn	Ala	Ala	
			580					585					590			
Pro	Ile	Val	Gly	Ala	Val	Asn	Ser	Gln	Gly	Ala	Leu	Pro	Gly	Met	Val	
		595					600					605				
Trp	Gln	Asn	Arg	Asp	Val	Tyr	Leu	Gln	Gly	Pro	Ile	Trp	Ala	Lys	Ile	

610

615

620

Pro His Thr Asp Gly Asn Phe His Pro Ser Pro Leu Met Gly Gly Phe
 625 630 635 640

Gly Leu Lys His Pro Pro Pro Gln Ile Leu Ile Lys Asn Thr Pro Val
 645 650 655

Pro Ala Asp Pro Pro Thr Thr Phe Asn Gln Ala Lys Leu Ala Ser Phe
 660 665 670

Ile Thr Gln Tyr Ser Thr Gly Gln Val Ser Val Glu Ile Glu Trp Glu
 675 680 685

Leu Gln Lys Glu Asn Ser Lys Arg Trp Asn Pro Glu Ile Gln Tyr Thr
 690 695 700

Ser Asn Tyr Tyr Lys Ser Thr Asn Val Asp Phe Ala Val Asn Thr Glu
 705 710 715 720

Gly Thr Tyr Ser Glu Pro Arg Pro Ile Gly Thr Arg Tyr Leu Thr Arg
 725 730 735

Asn Leu

<210> 7

<211> 738

<212> PRT

<213> Adeno-associated Virus

<400> 7

Met Ala Ala Asp Gly Tyr Leu Pro Asp Trp Leu Glu Asp Asn Leu Ser
 1 5 10 15

Glu Gly Ile Arg Glu Trp Trp Asp Leu Lys Pro Gly Ala Pro Lys Pro
 20 25 30

Lys Ala Asn Gln Gln Arg Gln Asp Asn Gly Arg Gly Leu Val Leu Pro
 35 40 45

Gly Tyr Arg Tyr Leu Gly Pro Phe Asn Gly Leu Asp Lys Gly Glu Pro
 50 55 60

Val Asn Ala Ala Asp Ala Ala Ala Leu Glu His Asp Arg Ala Tyr Asp
 65 70 75 80

Gln Gln Leu Gln Ala Gly Asp Asn Pro Tyr Leu Arg Tyr Asn His Ala
 85 90 95

Asp Ala Glu Phe Gln Glu Arg Leu Gln Glu Asp Thr Ser Phe Gly Gly
 100 105 110

Asn Leu Gly Arg Ala Val Phe Gln Ala Lys Lys Arg Val Leu Glu Pro
 115 120 125

Leu Gly Leu Val Glu Ser Pro Val Arg Thr Ala Pro Gly Lys Lys Arg
 130 135 140

Pro Val Glu Pro Ser Pro Gln Arg Ser Pro Asp Ser Ser Thr Gly Ile
 145 150 155 160

Gly Lys Arg Gly Gln Gln Pro Ala Lys Lys Arg Leu Asn Phe Gly Gln
 165 170 175

Thr Gly Asp Ser Glu Ser Val Pro Asp Pro Gln Pro Ile Gly Glu Pro
 180 185 190

Pro Ala Ala Pro Ser Gly Val Gly Pro Asn Thr Met Ala Ala Gly Gly
 195 200 205

Gly Ala Pro Met Ala Asp Asn Asn Glu Gly Ala Asp Gly Val Gly Ser
 210 215 220

Ser Ser Gly Asn Trp His Cys Asp Ser Thr Trp Leu Gly Asp Arg Val
 225 230 235 240

Ile Thr Thr Ser Thr Arg Thr Trp Ala Leu Pro Thr Tyr Asn Asn His
 245 250 255

Leu Tyr Arg Gln Ile Ser Asn Gly Thr Ser Gly Gly Ser Thr Asn Asp
 260 265 270

Asn Thr Tyr Phe Gly Tyr Ser Thr Pro Trp Gly Tyr Phe Asp Phe Asn
 275 280 285

Arg Phe His Cys His Phe Ser Pro Arg Asp Trp Gln Arg Leu Ile Asn
 290 295 300

Asn Asn Trp Gly Phe Arg Pro Lys Arg Leu Asn Phe Lys Leu Phe Asn
 305 310 315 320

Ile Gln Val Lys Glu Val Thr Gln Asn Glu Gly Thr Arg Thr Ile Ala
 325 330 335

Asn Asn Leu Thr Ser Thr Ile Gln Val Phe Thr Asp Ser Glu Tyr Gln
 340 345 350

Leu Pro Tyr Val Leu Gly Ser Ala His Gln Gly Cys Leu Pro Pro Phe
 355 360 365

Pro Ala Asp Val Phe Met Ile Pro Gln Tyr Gly Tyr Leu Thr Leu Asn
 370 375 380

Asn Gly Ser Gln Ala Val Gly Arg Ser Ser Phe Tyr Cys Leu Glu Tyr
 385 390 395 400

Phe Pro Ser Gln Met Leu Arg Thr Gly Asn Asn Phe Glu Phe Ser Tyr
 405 410 415

Asn Phe Glu Asp Val Pro Phe His Ser Ser Tyr Ala His Ser Gln Ser
 420 425 430

Leu Asp Arg Leu Met Asn Pro Leu Ile Asp Gln Tyr Leu Tyr Tyr Leu
 435 440 445

Ser Arg Thr Gln Ser Thr Gly Gly Thr Ala Gly Thr Gln Gln Leu Leu
 450 455 460

Phe Ser Gln Ala Gly Pro Asn Asn Met Ser Ala Gln Ala Lys Asn Trp
 465 470 475 480

Leu Pro Gly Pro Cys Tyr Arg Gln Gln Arg Val Ser Thr Thr Leu Ser
 485 490 495

Gln Asn Asn Asn Ser Asn Phe Ala Trp Thr Gly Ala Thr Lys Tyr His
 500 505 510

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

His Arg Asp Asp Glu Glu Arg Phe Phe Pro Ser Ser Gly Val Leu Met
 530 535 540

Phe Gly Arg Gln Gly Ala Gly Arg Asp Asn Val Asp Tyr Ser Ser Val
 545 550 555 560

Met Leu Thr Ser Glu Glu Glu Ile Arg Thr Thr Asn Pro Val Ala Thr
 565 570 575

Glu Gln Tyr Gly Val Val Ala Asp Asn Leu Gln Gln Gln Asn Ala Ala
 580 585 590

Pro Ile Val Gly Ala Val Asn Ser Gln Gly Ala Leu Pro Gly Met Val
 595 600 605

Trp Gln Asn Arg Asp Val Tyr Leu Gln Gly Pro Ile Trp Ala Lys Ile
 610 615 620

Pro His Thr Asp Gly Asn Phe His Pro Ser Pro Leu Met Gly Gly Phe
 625 630 635 640

Gly Leu Lys His Pro Pro Pro Gln Ile Leu Ile Lys Asn Thr Pro Val
 645 650 655

Pro Ala Asp Pro Pro Thr Thr Phe Asn Gln Ala Lys Leu Ala Ser Phe
 660 665 670

Ile Thr Gln Tyr Ser Thr Gly Gln Val Ser Val Glu Ile Glu Trp Glu
 675 680 685

Leu Gln Lys Glu Asn Ser Lys Arg Trp Asn Pro Glu Ile Gln Tyr Thr
 690 695 700

Ser Asn Tyr Tyr Lys Ser Thr Asn Val Asp Phe Ala Val Asn Thr Glu
 705 710 715 720

Gly Thr Tyr Ser Glu Pro Arg Pro Ile Gly Thr Arg Tyr Leu Thr Arg
 725 730 735

Asn Leu

<210> 8
 <211> 738
 <212> PRT
 <213> Adeno-associated Virus

<400> 8

Met Ala Ala Asp Gly Tyr Leu Pro Asp Trp Leu Glu Asp Asn Leu Ser
 1 5 10 15

Glu Gly Ile Arg Glu Trp Trp Asp Leu Lys Pro Gly Ala Pro Lys Pro
 20 25 30
 Lys Ala Asn Gln Gln Arg Gln Asp Asn Gly Arg Gly Leu Val Leu Pro
 35 40 45
 Gly Tyr Arg Tyr Leu Gly Pro Phe Asn Gly Leu Asp Lys Gly Glu Pro
 50 55 60
 Val Asn Ala Ala Asp Ala Ala Ala Leu Glu His Asp Arg Ala Tyr Asp
 65 70 75 80
 Gln Gln Leu Gln Ala Gly Asp Asn Pro Tyr Leu Arg Tyr Asn His Ala
 85 90 95
 Asp Ala Glu Phe Gln Glu Arg Leu Gln Glu Asp Thr Ser Phe Gly Gly
 100 105 110
 Asn Leu Gly Arg Ala Val Phe Gln Ala Lys Lys Arg Val Leu Glu Pro
 115 120 125
 Leu Gly Leu Val Glu Ser Pro Val Arg Thr Ala Pro Gly Lys Lys Arg
 130 135 140
 Pro Val Glu Pro Ser Pro Gln Arg Ser Pro Asp Ser Ser Thr Gly Ile
 145 150 155 160
 Gly Lys Arg Gly Gln Gln Pro Ala Lys Lys Arg Leu Asn Phe Gly Gln
 165 170 175
 Thr Gly Asp Ser Glu Ser Val Pro Asp Pro Gln Pro Ile Gly Glu Pro
 180 185 190
 Pro Ala Ala Pro Ser Gly Val Gly Pro Asn Thr Met Ala Ala Gly Gly
 195 200 205
 Gly Ala Pro Met Ala Asp Asn Asn Glu Gly Ala Asp Gly Val Gly Ser
 210 215 220
 Ser Ser Gly Asn Trp His Cys Asp Ser Thr Trp Leu Gly Asp Arg Val
 225 230 235 240
 Ile Thr Thr Ser Thr Arg Thr Trp Ala Leu Pro Thr Tyr Asn Asn His
 245 250 255

Leu Tyr Arg Gln Ile Ser Asn Gly Thr Ser Gly Gly Ser Thr Asn Asp
 260 265 270

Asn Thr Tyr Phe Gly Tyr Ser Thr Pro Trp Gly Tyr Phe Asp Phe Asn
 275 280 285

Arg Phe His Cys His Phe Ser Pro Arg Asp Trp Gln Arg Leu Ile Asn
 290 295 300

Asn Asn Trp Gly Phe Arg Pro Lys Arg Leu Asn Phe Lys Leu Phe Asn
 305 310 315 320

Ile Gln Val Lys Glu Val Thr Gln Asn Glu Gly Thr Arg Thr Ile Ala
 325 330 335

Asn Asn Leu Thr Ser Thr Ile Gln Val Phe Thr Asp Ser Glu Tyr Gln
 340 345 350

Leu Pro Tyr Val Leu Gly Ser Ala His Gln Gly Cys Leu Pro Pro Phe
 355 360 365

Pro Ala Asp Val Phe Met Ile Pro Gln Tyr Gly Tyr Leu Thr Leu Asn
 370 375 380

Asn Gly Ser Gln Ala Val Gly Arg Ser Ser Phe Tyr Cys Leu Glu Tyr
 385 390 395 400

Phe Pro Ser Gln Met Leu Arg Thr Gly Asn Asn Phe Glu Phe Ser Tyr
 405 410 415

Asn Phe Glu Asp Val Pro Phe His Ser Ser Tyr Ala His Ser Gln Ser
 420 425 430

Leu Asp Arg Leu Met Asn Pro Leu Ile Asp Gln Tyr Leu Tyr Tyr Leu
 435 440 445

Ser Arg Thr Gln Ser Thr Gly Gly Thr Ala Gly Thr Gln Gln Leu Leu
 450 455 460

Phe Ser Gln Ala Gly Pro Asn Asn Met Ser Ala Gln Ala Lys Asn Trp
 465 470 475 480

Leu Pro Gly Pro Cys Tyr Arg Gln Gln Arg Val Ser Thr Thr Leu Ser
 485 490 495

Gln Asn Asn Asn Ser Asn Phe Ala Trp Thr Gly Ala Thr Lys Tyr His
 500 505 510

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

His Arg Asp Asp Glu Glu Arg Phe Phe Pro Ser Ser Gly Val Leu Met
 530 535 540

Phe Gly Lys Gln Gly Ala Gly Arg Asp Asn Val Asp Tyr Ser Ser Val
 545 550 555 560

Met Leu Thr Ser Glu Glu Glu Ile Arg Thr Thr Asn Pro Val Ala Thr
 565 570 575

Glu Gln Tyr Gly Val Val Ala Asp Asn Leu Gln Gln Gln Asn Ala Ala
 580 585 590

Pro Ile Val Gly Ala Val Asn Ser Gln Gly Ala Leu Pro Gly Met Val
 595 600 605

Trp Gln Asn Arg Asp Val Tyr Leu Gln Gly Pro Ile Trp Ala Lys Ile
 610 615 620

Pro His Thr Asp Gly Asn Phe His Pro Ser Pro Leu Met Gly Gly Phe
 625 630 635 640

Gly Leu Lys His Pro Pro Pro Gln Ile Leu Ile Lys Asn Thr Pro Val
 645 650 655

Pro Ala Asp Pro Pro Thr Thr Phe Asn Gln Ala Arg Leu Ala Ser Phe
 660 665 670

Ile Thr Gln Tyr Ser Thr Gly Gln Val Ser Val Glu Ile Glu Trp Glu
 675 680 685

Leu Gln Lys Glu Asn Ser Lys Arg Trp Asn Pro Glu Ile Gln Tyr Thr
 690 695 700

Ser Asn Tyr Tyr Lys Ser Thr Asn Val Asp Phe Ala Val Asn Thr Glu
 705 710 715 720

Gly Thr Tyr Ser Glu Pro Arg Pro Ile Gly Thr Arg Tyr Leu Thr Arg
 725 730 735

Asn Leu

<210> 9
 <211> 738
 <212> PRT
 <213> Adeno-associated Virus

<400> 9

Met Ala Ala Asp Gly Tyr Leu Pro Asp Trp Leu Glu Asp Asn Leu Ser
 1 5 10 15

Glu Gly Ile Arg Glu Trp Trp Asp Leu Lys Pro Gly Ala Pro Lys Pro
 20 25 30

Lys Ala Asn Gln Gln Arg Gln Asp Asn Gly Arg Gly Leu Val Leu Pro
 35 40 45

Gly Tyr Arg Tyr Leu Gly Pro Phe Asn Gly Leu Asp Lys Gly Glu Pro
 50 55 60

Val Asn Ala Ala Asp Ala Ala Ala Leu Glu His Asp Arg Ala Tyr Asp
 65 70 75 80

Gln Gln Leu Gln Ala Gly Asp Asn Pro Tyr Leu Arg Tyr Asn His Ala
 85 90 95

Asp Ala Glu Phe Gln Glu Arg Leu Gln Glu Asp Thr Ser Phe Gly Gly
 100 105 110

Asn Leu Gly Arg Ala Val Phe Gln Ala Lys Lys Arg Val Leu Glu Pro
 115 120 125

Leu Gly Leu Val Glu Ser Pro Val Arg Thr Ala Pro Gly Lys Lys Arg
 130 135 140

Pro Val Glu Pro Ser Pro Gln Arg Ser Pro Asp Ser Ser Thr Gly Ile
 145 150 155 160

Gly Lys Lys Gly Gln Gln Pro Ala Lys Lys Arg Leu Asn Phe Gly Gln
 165 170 175

Thr Gly Asp Ser Glu Ser Val Pro Asp Pro Gln Pro Ile Gly Glu Pro
 180 185 190

Pro Ala Ala Pro Ser Gly Val Gly Pro Asn Thr Met Ala Ala Gly Gly
 195 200 205
 Gly Ala Pro Met Ala Asp Asn Asn Glu Gly Ala Asp Gly Val Gly Ser
 210 215 220
 Ser Ser Gly Asn Trp His Cys Asp Ser Thr Trp Leu Gly Asp Arg Val
 225 230 235 240
 Ile Thr Thr Ser Thr Arg Thr Trp Ala Leu Pro Thr Tyr Asn Asn His
 245 250 255
 Leu Tyr Arg Gln Ile Ser Asn Gly Thr Ser Gly Gly Ser Thr Asn Asp
 260 265 270
 Asn Thr Tyr Phe Gly Tyr Ser Thr Pro Trp Gly Tyr Phe Asp Phe Asn
 275 280 285
 Arg Phe His Cys His Phe Ser Pro Arg Asp Trp Gln Arg Leu Ile Asn
 290 295 300
 Asn Asn Trp Gly Phe Arg Pro Lys Arg Leu Asn Phe Lys Leu Phe Asn
 305 310 315 320
 Ile Gln Val Lys Glu Val Thr Gln Asn Glu Gly Thr Arg Thr Ile Ala
 325 330 335
 Asn Asn Leu Thr Ser Thr Ile Gln Val Phe Thr Asp Ser Glu Tyr Gln
 340 345 350
 Leu Pro Tyr Val Leu Gly Ser Ala His Gln Gly Cys Leu Pro Pro Phe
 355 360 365
 Pro Ala Asp Val Phe Met Ile Pro Gln Tyr Gly Tyr Leu Thr Leu Asn
 370 375 380
 Asn Gly Ser Gln Ala Val Gly Arg Ser Ser Phe Tyr Cys Leu Glu Tyr
 385 390 395 400
 Phe Pro Ser Gln Met Leu Arg Thr Gly Asn Asn Phe Glu Phe Ser Tyr
 405 410 415
 Asn Phe Glu Asp Val Pro Phe His Ser Ser Tyr Ala His Ser Gln Ser
 420 425 430

Leu Asp Arg Leu Met Asn Pro Leu Ile Asp Gln Tyr Leu Tyr Tyr Leu
 435 440 445

Ser Arg Thr Gln Ser Thr Gly Gly Thr Ala Gly Thr Gln Gln Leu Leu
 450 455 460

Phe Ser Gln Ala Gly Pro Asn Asn Met Ser Ala Gln Ala Lys Asn Trp
 465 470 475 480

Leu Pro Gly Pro Cys Tyr Arg Gln Gln Arg Val Ser Thr Thr Leu Ser
 485 490 495

Gln Asn Asn Asn Ser Asn Phe Ala Trp Thr Gly Ala Thr Lys Tyr His
 500 505 510

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

His Arg Asp Asp Glu Glu Arg Phe Phe Pro Ser Ser Gly Val Leu Met
 530 535 540

Phe Gly Arg Gln Gly Ala Gly Arg Asp Asn Val Asp Tyr Ser Ser Val
 545 550 555 560

Met Leu Thr Ser Glu Glu Glu Ile Arg Thr Thr Asn Pro Val Ala Thr
 565 570 575

Glu Gln Tyr Gly Val Val Ala Asp Asn Leu Gln Gln Gln Asn Ala Ala
 580 585 590

Pro Ile Val Gly Ala Val Asn Ser Gln Gly Ala Leu Pro Gly Met Val
 595 600 605

Trp Gln Asn Arg Asp Val Tyr Leu Gln Gly Pro Ile Trp Ala Lys Ile
 610 615 620

Pro His Thr Asp Gly Asn Phe His Pro Ser Pro Leu Met Gly Gly Phe
 625 630 635 640

Gly Leu Lys His Pro Pro Pro Gln Ile Leu Ile Lys Asn Thr Pro Val
 645 650 655

Pro Ala Asp Pro Pro Thr Thr Phe Asn Gln Ala Arg Leu Ala Ser Phe
 660 665 670

Ile Thr Gln Tyr Ser Thr Gly Gln Val Ser Val Glu Ile Glu Trp Glu
 675 680 685

Leu Gln Lys Glu Asn Ser Lys Arg Trp Asn Pro Glu Ile Gln Tyr Thr
 690 695 700

Ser Asn Tyr Tyr Lys Ser Thr Asn Val Asp Phe Ala Val Asn Thr Glu
 705 710 715 720

Gly Thr Tyr Ser Glu Pro Arg Pro Ile Gly Thr Arg Tyr Leu Thr Arg
 725 730 735

Asn Leu

<210> 10
 <211> 1386
 <212> DNA
 <213> Adeno-associated Virus

<400> 10
 atgcagaggg tgaacatgat catggctgag agccctggcc tgatcaccat ctgcctgctg 60
 ggctacctgc tgtctgctga atgtacagtt tttcttgatc atgaaaatgc caacaaaatt 120
 ctgaatagac caaagaggta taactctggc aagcttgaag agtttgtaca ggggaatctg 180
 gagagagagt gtatggaaga gaagtgcagc tttgaggaag ccagagaagt gtttgaaaat 240
 acagagagaa caactgaatt ttggaagcag tatgtggatg gtgatcaatg tgagagcaat 300
 ccctgcttga atgggggggag ctgtaaagat gatatcaaca gctatgaatg ttggtgtccc 360
 tttggatttg aggggaaaaa ctgtgagctt gatgtgacct gtaatatcaa gaatggcagg 420
 tgtgagcaat tttgcaagaa ttctgctgat aacaaagtgg tctgtagctg cactgaggga 480
 tataggctgg ctgaaaacca gaagagctgt gaacctgcag tgccttttcc ctgtgggaga 540
 gtgtctgtga gccaaaccag caagctgact agggctgaag cagtctttcc tgatgtagat 600
 tatgtgaata gcactgaggc tgagacaatc cttgacaata tcaactcagag cacacagagc 660
 ttcaatgact tcaccagggt ggtaggaggg gaggatgcca agcctgggca gttcccctgg 720
 caggtagtgc tcaatggaaa agtggatgcc ttttgtggag gttcaattgt aaatgagaag 780
 tggattgtga ctgcagccca ctgtgtggaa actggagtca agattactgt ggtggctgga 840
 gagcacaata ttgaggaaac tgagcacact gagcagaaga ggaatgtgat caggattatc 900
 ccccaccaca actacaatgc tgctatcaac aagtacaacc atgacattgc cctcctggaa 960
 ctggatgaac ccctggtctt gaacagctat gtgacacca tctgtattgc tgataaagag 1020

tacaccaaca tcttcttgaa atttgggtct ggatatgtgt ctggctgggg caggggtgttc	1080
cataaaggca ggtctgccct ggtattgcag tatttgaggg tgcctctggt ggatagagca	1140
acctgcttgc tgagcaccaa gtttacaatc tacaacaata tgttctgtgc agggttccat	1200
gaaggtggta gagacagctg ccaggagat tctgggggtc cccatgtgac tgaggtggag	1260
ggaaccagct tctgactgg gattatcagc tggggtgagg agtgtgctat gaagggaaag	1320
tatgggatct acacaaaagt atccagatat gtgaactgga ttaaggagaa aaccaagctg	1380
acttga	1386

<210> 11
 <211> 1386
 <212> DNA
 <213> Adeno-associated Virus

<400> 11	
atgcagcgcg tgaacatgat catggccgag agccctggcc tgattacat ctgcctgtta	60
ggatatctac tcagtgtga atgtacagtt tttcttgatc atgaaaacgc caacaaaatc	120
ctgaaccggc ccaagcggta caactcaggc aagctggaag agttcgtgca gggcaacctg	180
gaacgggagt gcatggaaga gaagtgcagc ttcgaggaag cccgggaggt gttcgagaac	240
accgagcgga ccaccgagtt ctggaagcag tacgtggacg gcgaccagtg cgagtcaaac	300
ccctgcctga acggcggcag ctgcaaggac gatataca gctacgagtg ctggtgcccc	360
ttcggcttcg agggcaagaa ctgcgagctg gacgtgacct gcaacatcaa gaacggccgc	420
tgcgagcagt tctgcaagaa cagcgccgac aacaaggtgg tgtgctcatg cactgagggc	480
taccggctgg ccgagaacca gaagagctgc gagcccgccg tgcccttccc ctgcggcaga	540
gtgtccgtga gccagaccag caagctgacc agggccgagg ccgtgttccc tgacgtggac	600
tacgtgaact caaccgaggc cgagacaatc ctggacaaca tcaaccagag caccagttcc	660
ttcaacgact tcacccgggt ggtggggcgc gaggacgcca agcccgcca gttcccttgg	720
caggtggtgc tgaacggcaa ggtggacgcc ttctgcggcg gctcaatcgt gaacgagaag	780
tggtatcgtga cagccgcca ctgcgtggag acaggcgtga agatcacctg ggtggccggc	840
gaacacaata tcgaggaaac cgagcacacc gagcagaaac ggaacgtgat ccggattatc	900
ccccaccaca actacaacgc cgccatcaac aagtacaacc acgatatcgc cctgctggaa	960
ctggacgagc ctctggtgct gaattcatac gtgaccccca tctgtatcgc cgacaaagag	1020
tacaccaaca tctttctgaa gttcggcagc ggctacgtgt ccggctgggg caggggtgttc	1080
cacaagggcc gcagcgccct ggtgctgcag tacctgcggg tgcccctggt ggacagagcc	1140
acctgcctgc ggtcaaccaa gttcaccatc tacaacaaca tgttctgcgc cggcttccac	1200

gagggcgggca gggacagctg ccagggcgac agcggcgagc cccacgtgac cgaggtggag	1260
ggcaccagct ttctgaccgg catcatctca tggggcgagg aatgcgcat gaagggcaag	1320
tacggaatct acactaaggt gtcaagatac gtgaactgga tcaaagagaa aaccaagctg	1380
acctga	1386

<210> 12
 <211> 11125
 <212> DNA
 <213> Adeno-associated Virus

<400> 12	
cctgcaggca gctgcgcgct cgctcgctca ctgaggccgc cggggcaaag cccgggcgtc	60
gggcgacctt tggtcgcccg gcctcagtga gcgagcgagc ggcagagag ggagtggcca	120
actccatcac taggggttcc tgcggcctag taggctcaga ggcacacagg agtttctggg	180
ctcacctgc ccccttccaa cccctcagtt cccatcctcc agcagctggt tgtgtgctgc	240
ctctgaagtc cacactgaac aaacttcagc ctactcatgt ccctaaaatg ggcaaacatt	300
gcaagcagca aacagcaaac acacagccct ccttgctgc tgaccttgga gctggggcag	360
aggtcagaga cctctctggg cccatgccac ctccaacatc cactcgaccc cttggaattt	420
cggtggagag gagcagaggt tgtcctggcg tggtttaggt agtgtgagag gggtagccgg	480
ggatcttgct accagtggaa cagccactaa ggattctgca gtgagagcag agggccagct	540
aagtgggtact ctcccagaga ctgtctgact cacgccaccc cctccacctt ggacacagga	600
cgctgtgggt tctgagccag gtacaatgac tcctttcggg aagtgcagtg gaagctgtac	660
actgcccagg caaagcgtcc gggcagcgta ggcgggcgac tcagatcca gccagtggac	720
ttagcccctg tttgctctc cgataactgg ggtgacctg gttaatatc accagcagcc	780
tccccggtt cccctctgga tccactgctt aaatacggac gaggacaggg cctgtctctc	840
tcagcttcag gcaccaccac tgacctggga cagtgaatac cactttcaca atctgctagc	900
aaaggttatg cagaggggtga acatgatcat ggctgagagc cctggcctga tcaccatctg	960
cctgctgggc tacctgctgt ctgctgaatg tacaggtttg tttccttttt tataatacat	1020
tgagtatgct tgccttttag atatagaaat atctgattct gtcttcttca ctaaattttg	1080
attacatgat ttgacagcaa tattgaagag tctaacagcc agcaccaggg ttggttaagta	1140
ctggttcttt gttagctagg ttttcttctt cttcactttt aaaactaaat agatggacaa	1200
tgcttatgat gcaataaggt ttaataaaca ctgttcagtt cagtatttgg tcatgtaatt	1260
cctgttaaaa aacagtcatc tccttggttt aaaaaaatta aaagtgggaa aacaaagaaa	1320

tagcagaata tagtgaaaaa aaataaccac agtattttttg tttggactta ccactttgaa	1380
atcaaattgg gaaacaaaag cacaacacgt ggccttattt acacaaaaag tctgatttta	1440
agatatgtga caattcaagg tttcagaagt atgtaaggag gtgtgtctct aatttttttaa	1500
attatatatc ttcaatttaa agtttttagtt aaaacataaa gattaacctt tcattagcaa	1560
gctgttagtt atcaccaaag cttttcatgg attaggaaaa aatcattttg tctctatctc	1620
aaacatcttg gagttgatat ttggggaaac acaatactca gttgagttcc ctaggggaga	1680
aaagcaagct taagaattga cacaagagt aggaagttag ctattgcaac atatatcact	1740
ttgttttttc acaactacag tgactttatt tatttcccag aggaaggcat acagggaaga	1800
aattatccca tttggacaaa cagcatgttc tcacagtaag cacttatcac acttacttgt	1860
caactttcta gaatcaaac tagtagctga cagtaccagg atcaggggtg ccaaccctaa	1920
gcacccccag aaagctgact ggccctgtgg ttcccactcc agacatgatg tcagctgtga	1980
aatccacctc cctggaccat aattaggctt ctgttcttca ggagacattt gttcaaagtc	2040
atttgggcaa ccatattctg aaaacagccc agccaggggtg atggatcact ttgcaaagat	2100
cctcaatgag ctattttcaa gtgatgacaa agtgtgaagt taagggctca tttgagaact	2160
ttctttttca tccaaagtaa attcaaatat gattagaaat ctgacctttt attactggaa	2220
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<210> 13
<211> 141
<212> DNA
<213> Adeno-associated Virus

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actccatcac taggggttcc t 141

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<210> 14
<211> 321
<212> DNA
<213> Adeno-associated Virus

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<400> 14
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 <211> 397
 <212> DNA
 <213> Adeno-associated Virus

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<210> 16
 <211> 29
 <212> DNA
 <213> Adeno-associated Virus

<400> 16
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<210> 17
 <211> 1438
 <212> DNA
 <213> Adeno-associated Virus

<400> 17
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<210> 18
<211> 48
<212> DNA
<213> Adeno-associated Virus

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<400> 18
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<210> 19
<211> 228
<212> DNA
<213> Adeno-associated Virus

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<400> 19
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<210> 20
<211> 108
<212> DNA
<213> Adeno-associated Virus

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<400> 20
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<210> 21
 <211> 3631
 <212> DNA
 <213> Adeno-associated Virus

<400> 21
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 <211> 307
 <212> DNA
 <213> Adeno-associated Virus

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 <211> 813
 <212> DNA
 <213> Adeno-associated Virus

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 <213> Adeno-associated Virus

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<210> 25
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 <212> DNA
 <213> Adeno-associated Virus

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 <211> 10659
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<212> PRT
<213> Adeno-associated Virus

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<400> 27
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```

```

Pro Asp Ser Ser Thr Gly Ile Gly Lys Lys Gly Gln Gln Pro Ala Lys
          20          25          30

```

```

Lys Arg Leu Asn Phe Gly Gln Thr Gly Asp Ser Glu Ser Val Pro Asp
          35          40          45

```

```

Pro Gln Pro Ile Gly Glu Pro Pro Ala Ala Pro Ser Gly Val Gly Pro
          50          55          60

```

```

Asn Thr Met Ala Ala Gly Gly Gly Ala Pro Met Ala Asp Asn Asn Glu
65          70          75          80

```

```

Gly Ala Asp Gly Val Gly Ser Ser Ser Gly Asn Trp His Cys Asp Ser
          85          90          95

```

```

Thr Trp Leu Gly Asp Arg Val Ile Thr Thr Ser Thr Arg Thr Trp Ala
          100          105          110

```

```

Leu Pro Thr Tyr Asn Asn His Leu Tyr Lys Gln Ile Ser Asn Gly Thr
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Trp Gly Tyr Phe Asp Phe Asn Arg Phe His Cys His Phe Ser Pro Arg
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Asp Trp Gln Arg Leu Ile Asn Asn Asn Trp Gly Phe Arg Pro Lys Arg
 165 170 175

Leu Asn Phe Lys Leu Phe Asn Ile Gln Val Lys Glu Val Thr Gln Asn
 180 185 190

Glu Gly Thr Lys Thr Ile Ala Asn Asn Leu Thr Ser Thr Ile Gln Val
 195 200 205

Phe Thr Asp Ser Glu Tyr Gln Leu Pro Tyr Val Leu Gly Ser Ala His
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Gln Gly Cys Leu Pro Pro Phe Pro Ala Asp Val Phe Met Ile Pro Gln
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Tyr Gly Tyr Leu Thr Leu Asn Asn Gly Ser Gln Ala Val Gly Arg Ser
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Ser Phe Tyr Cys Leu Glu Tyr Phe Pro Ser Gln Met Leu Arg Thr Gly
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Asn Asn Phe Glu Phe Ser Tyr Asn Phe Glu Asp Val Pro Phe His Ser
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Ser Tyr Ala His Ser Gln Ser Leu Asp Arg Leu Met Asn Pro Leu Ile
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Asp Gln Tyr Leu Tyr Tyr Leu Ser Arg Thr Gln Ser Thr Gly Gly Thr
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Ser Ala Gln Ala Lys Asn Trp Leu Pro Gly Pro Cys Tyr Arg Gln Gln
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