

REIVINDICACIONES

Habiéndose descrito la invención como antecede, se reclama como propiedad lo contenido en las siguientes reivindicaciones:

- 5 1. Una variante de un polipéptido parental que tiene actividad alfa-amilasa, en donde dicha variante es un polipéptido de fusión que tiene un rendimiento de lavado mejorado a baja temperatura y en donde dicha variante tiene actividad alfa-amilasa.
- 10 2. La variante de acuerdo con la reivindicación 1, en donde dicha baja temperatura es de 5°C a 40°C, preferentemente de 10°C a 30°C, aún más preferentemente de 15°C a 20°C.
- 15 3. La variante de acuerdo con una cualquiera de las reivindicaciones anteriores, en donde dicho rendimiento de lavado mejorado tiene un factor de mejora (IF) de ≥ 1 cuando se compara con dicho polipéptido parental que tiene actividad alfa-amilasa.
- 20 4. La variante de acuerdo con una cualquiera de las reivindicaciones anteriores, en donde dicho polipéptido parental comprende un dominio A y B que comprende la secuencia de aminoácidos de la SEQ ID NO: 10 o un dominio A y B que tiene al menos un 80%, tal como un 85%, tal como un 90%, tal como un 95%, tal como un 97% de identidad de
25 secuencia con la SEQ ID NO: 10 y un dominio C de una alfa-amilasa de baja temperatura.
- 30 5. La variante de acuerdo con una cualquiera de las reivindicaciones anteriores, en donde dicho polipéptido parental comprende un dominio C que comprende la secuencia de aminoácidos de las SEQ ID NO: 11 o 12 o un dominio C que tiene al menos un 80%, tal como un 85%, tal como un 90%,

tal como un 95%, tal como un 97% de identidad de secuencia con las SEQ ID NO: 11 o 12.

6. La variante de acuerdo con una cualquiera de las reivindicaciones anteriores, en donde dicho polipéptido parental comprende la secuencia de aminoácidos de las SEQ ID NO: 13 o 14 o una secuencia que tiene al menos un 80%, tal como un 85%, tal como un 90%, tal como un 95%, tal como un 97% de identidad de secuencia con las SEQ ID NO: 13 o 14.

7. La variante de acuerdo con una cualquiera de las reivindicaciones anteriores, en donde dicha variante comprende una secuencia de aminoácidos que tiene al menos un 65%, tal como al menos un 70%, tal como al menos un 75%, tal como al menos un 80%, tal como al menos un 85%, tal como al menos un 90%, tal como al menos un 95%, tal como al menos un 97%, tal como al menos un 99% pero menos de un 100% de identidad de secuencia con una cualquiera de las SEQ ID NO: 4, 7, 13, 14 o 15.

8. La variante de acuerdo con una cualquiera de las reivindicaciones anteriores, en donde dichos dominios A y B comprenden una modificación en una o más de las siguientes posiciones correspondientes a las posiciones; H1, T5, G7, Q11, N16, V17, Q32, A37, T40, P45, W48, G50, T51, N54, V56, A60, K72, R87, Q98, M105, G109, F113, R116, Q118, Q125, G133, T134, W140, G142, G149, T165, W167, Q169, R171, Q172, L173, A174, G184, A186, E190, T193, N195, G196, A204, V206, P211, I214, V215, L217, L219, A225, L228, L235, V238, K242, S244, M246, M248, L250, G255, Q256, N260, A263, V264, A265, Y267, K269, N270, G273, S280, W284, T285, M286, F289, V291, Y295, Q299, S304, R320, H321, S323, H324, V326, F328, T334,

D337, Q345, G346, G348, T355, S376, D377, D379, Y382, S383, Q385, K391, K393, y Q395 de las SEQ ID NO: 7 o 10.

9. La variante de acuerdo con la reivindicación 7, en donde dicha modificación en una o más posiciones corresponden a las siguientes; H1*, T5K, G7K, G7A, Q11H, N16S, N16H, V17L, Q32S, A37H, A37M, A37V, A37S, A37Y, A37R, A37L, T40D, T40G, T40K, P45A, W48G, W48Y, W48F, G50A, T51K, T51E, T51G, T51A, T51S, T51G, T51D, N54S, V56T, A60V, K72R, K72H, K72S, K72Q, K72E, K72N, K72A, K72M, R87S, Q98S, Q98A, M105F, M105I, M105V, M105L, G109A, G109S, F113W, F113S, F113N, F113Y, F113R, F113L, F113Q, R116Q, R116V, R116K, R116W, R116L, R116A, R116H, R116M, R116E, R116S, R116I, R116G, Q118N, Q118K, Q118G, Q118S, Q118F, Q118R, Q125P, Q125K, Q125A, Q125T, N125D, G133S, F133Q, T134E, W140Y, G142T, G149Q, T165S, T165G, T165V, W167I, W167G, W167F, W167R, W167S, W167H, W167L, W167M, W167Y, Q169E, R171H, Q172G, Q172R, Q172N, Q172D, Q172Y, Q172M, Q172S, Q172T, Q172K, Q172H, Q172E, L173V, L173G, L173H, L173A, L173I, L173P, L173T, L173F, L173M, A174S, A174D, A174P, A174M, A174T, A174H, A174K, A174G, A174Q, A174N, A174V, A174L, G184T, A186D, A186N, A186E, A186Q, A186H, E190P, T193K, N195F, G196R, A204T, A204V, A204S, A204G, V206L, V206S, V206Y, P211D, I214G, I214H, I214S, I214T, I214L, I214E, I214W, V215T, L217T, L217Q, L219V, L219H, A225V, L228I, L235V, L235A, V238A, V238T, V238G, K242Q, S244Q, M246L, M246A, M246I, M246F, M246V, M246S, M248T, L250I, L250V, L250T, L250A, L250F, L250M, G255N, G255A, G255S, Q256A, N260G, A263G, V264I, V264T, A265G, Y267I, Y267M, Y267H, Y267L, K269Q, N270G, N270T, G273R, S280W, S280L, S280T, S280A, S280K, S280Q, W284H, T285L, T285Q, M286F, M286L, A288L, A288V, F289I, F289L, V291G, V291A, V291T, Y295N,

Y295F, Q299V, S304N, S304R, R320A, R320V, H321Y, S323N,
H324L, V326L, F328L, F328M, F328V, F328I, T334S, D337H,
Q345D, G346T, G346D, G346P, G348S, G348P, T355L, T355F,
S376H, S376T, S376V, D377H, D377S, D377A, D377Q, D379S,
5 D379G, D379R, D379A, Y382M, Y382I, Y382L, Y382F, S383G,
S383A, Q385L, K391A, K391Y, K391V, K391M, K391E, K391D,
K391R, K391H, K391W, K391I, K391Q, K391L, K393Y, K393R,
K393Q, K393S, y Q395P, en donde dichas posiciones
corresponden a posiciones de las SEQ ID NO: 7 o 10.

10 10. La variante de acuerdo con una cualquiera de las
reivindicaciones anteriores, en donde dicho dominio C
comprende una alteración en una o más de las siguientes
posiciones correspondientes a las posiciones; A420, G423,
T444, A445, Q449, T459, P473, C474, G476, G477, y K484 de
15 la SEQ ID NO: 13 o I405, A421, A422, A428, R439, G448,
W467, D476, y G477 de la SEQ ID NO: 14.

11. La variante de acuerdo con la reivindicación 9,
en donde dicha alteración en una o más posiciones
corresponde a las siguientes T400P, H402R, A420Q, A420S,
20 A420K, A420L, G423H, T444Q, T444S, T444D, T444Y, T444H,
T444V, T444R, T444A, A445Q, Q449T, T459N, P473R, P473A,
P473G, P473T, P473K, C474V, G476K, G477A, G477Q, K484A,
K484G, K484P, K484E, K484Q, y K484S, en donde dichas
posiciones corresponden a posiciones de la SEQ ID NO: 13; o
25 I405L, A421H, A422P, A428T, G448D, D476K, D476G, D476N,
D476Y, G477S, G477A, G477T y G477Q, en donde dichas
posiciones corresponden a posiciones de la SEQ ID NO: 14.

12. La variante de acuerdo con una cualquiera de las
reivindicaciones anteriores, en donde dicha variante
30 comprende

a) una eliminación y/o una sustitución en dos o más posiciones correspondientes a las posiciones R181, G182, D183 y G184 de la secuencia de aminoácidos expuesta en las SEQ ID NO: 7 o 10 y

5 b) una alteración en una o más posiciones correspondientes a las posiciones H1, T5, G7, Q11, N16, V17, Q32, A37, T40, P45, W48, G50, T51, N54, V56, K72, R87, Q98, M105, G109, F113, R116, Q118, Q125, G133, T134, W140, G142, G149, T165, W167, Q169, R171, Q172, L173, A174, G184,
10 A186, E190, T193, N195, A204, V206, P211, I214, V215, L217, L219, A225, L235, V238, K242, S244, M246, M248, L250, G255, Q256, N260, A263, V264, Y267, K269, N270, G273, S280, W284, T285, M286, F289, V291, Y295, Q299, R320, H321, S323, H324, V326, F328, T334, D337, Q345, G346, G348, T355, S376, D377,
15 D379, Y382, S383, Q385, K391, K393, Q395, A420, G423, T444, A445, Q449, T459, P473, C474, G476, G477, y K484 de la SEQ ID NO: 13; o H1, A37, T40, N54, V56, A60, K72, G109, F113, R116, N125, F133, T134, T165, Q169, Q172, L173, A174, G184, A186, N195, G196, A204, V206, A225, L228, K242, S244, G255,
20 N260, A265, K269, S280, W284, Y295, S304, R320, H321, S323, V326, K391, I405, A421, A422, A428, R439, G448, W467, D476, y G477 de la SEQ ID NO: 14.

13. La variante de acuerdo con la reivindicación 11, en donde la eliminación a) se selecciona del grupo que
25 consiste en R181+G182, R181+D183, R181+G184, G182+D183, G182+G184 o D183+G184.

14. La variante de acuerdo con una cualquiera de las reivindicaciones 11 o 12, en donde dicha variante comprende una o más de las siguientes alteraciones; H1*, T5K, G7K,
30 G7A, Q11H, N16S, N16H, V17L, Q32S, A37H, A37M, A37V, A37S, A37Y, A37R, A37L, T40G, T40K, P45A, W48G, W48Y, W48F, G50A,

T51K, T51E, T51G, T51A, T51S, T51G, T51D, N54S, V56T, K72R,
K72H, K72S, K72Q, K72E, K72N, K72A, K72M, R87S, Q98S, Q98A,
M105F, M105I, M105V, M105L, G109A, G109S, F113W, F113S,
F113N, F113Y, F113R, F113L, F113Q, R116Q, R116V, R116K,
5 R116W, R116L, R116A, R116H, R116M, R116E, R116S, R116I,
R116G, Q118N, Q118K, Q118G, Q118S, Q118F, Q118R, Q125P,
Q125K, Q125A, Q125T, G133S, T134E, W140Y, G142T, G149Q,
T165S, T165G, T165V, W167I, W167G, W167F, W167R, W167S,
W167H, W167L, W167M, W167Y, Q169E, R171H, Q172G, Q172R,
10 Q172N, Q172D, Q172Y, Q172M, Q172S, Q172T, Q172K, Q172H,
Q172E, L173V, L173G, L173H, L173A, L173I, L173P, L173T,
L173F, L173M, A174S, A174D, A174P, A174M, A174T, A174H,
A174K, A174G, A174Q, A174N, A174V, A174L, G184T, A186D,
A186N, A186E, A186Q, A186H, E190P, T193K, N195F, A204T,
15 A204V, A204S, A204G, V206L, V206S, V206Y, P211D, I214G,
I214H, I214S, I214T, I214L, I214E, I214W, V215T, L217T,
L217Q, L219V, L219H, A225V, L235V, L235A, V238A, V238T,
V238G, K242Q, S244Q, M246L, M246A, M246I, M246F, M246V,
M246S, M248T, L250I, L250V, L250T, L250A, L250F, L250M,
20 G255N, G255A, G255S, Q256A, N260G, A263G, V264I, V264T,
Y267I, Y267M, Y267H, Y267L, K269Q, N270G, N270T, G273R,
S280W, S280L, S280T, S280A, S280K, S280Q, W284H, T285L,
T285Q, M286F, M286L, A288L, A288V, F289I, F289L, V291G,
V291A, V291T, Y295N, Y295F, Q299V, S340R, S304N, R320A,
25 R320V, H321Y, S323N, H324L, V326L, F328L, F328M, F328V,
F328I, T334S, D337H, Q345D, G346T, G346D, G346P, G348S,
G348P, T355L, T355F, S376H, S376T, S376V, D377H, D377S,
D377A, D377Q, D379S, D379G, D379R, D379A, Y382M, Y382I,
Y382L, Y382F, S383G, S383A, Q385L, K391A, K391Y, K391V,
30 K391M, K391E, K391D, K391R, K391H, K391W, K391I, K391Q,
K391L, K393Y, K393R, K393Q, K393S, Q395P, T400P, H402R,

A420Q, A420S, A420K, A420L, G423H, T444Q, T444S, T444D, T444Y, T444H, T444V, T444R, T444A, A445Q, Q449T, T459N, P473R, P473A, P473G, P473T, P473K, C474V, G476K, G477A, G477Q, K484A, K484G, K484P, K484E, K484Q, y K484S de la SEQ ID NO: 13; o H1*, G7A, A37H, T40D, W48Y, W48F, N54S, V56T, A60V, K72R, Q98A, G109A, F113Q, R116H, R116V, R116Q, N125D, F133Q, T134E, T165G, Q169E, Q172D, Q172G, Q172N, L173V, A174S, G184T, A186D, A186N, A186E, A186Q, A186H, E190P, N195F, G196R, A204G, V206L, V206Y, A225V, L228I, K242Q. S244Q, G255A, G255S, N260G, A265G, K269Q, N270T, S280Q, W284H, A288L, A288V, F289L, Y295N, Y295F, S304N, S340R, S304N, R320A, H321Y, S323N, V326L, K391A, I405L, A421H, A422P, A428T, G448D, D476K, D476G, D476N, D476Y, G477S, G477A, G477T, y G477Q de la SEQ ID NO: 14.

15 15. La variante de acuerdo con una cualquiera de las reivindicaciones anteriores, en donde dicha variante tiene un IF de >1 cuando se compara con dicho polipéptido parental y en donde dicha variante se selecciona entre

G182*+D183*+N195F
20 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+G476K,
H1*+N54S+V56T+R87S+G109A+A174S+G182*+D183*+N195F+V206L+K391A+G476K,
H1*+T40G+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391
25 A+G476K,
H1*+T51K+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+G476K,
H1*+N54S+V56T+K72R+G109A+A174S+G182*+D183*+N195F+V206L+K391A+G476K,
30 H1*+N54S+V56T+K72H+G109A+A174S+G182*+D183*+N195F+V206L+K391A+G476K,

- H1*+A37H+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391
A+G476K,
- H1*+A37M+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391
A+G476K,
- 5 H1*+A37V+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391
A+G476K,
- H1*+A37S+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391
A+G476K,
- H1*+A37Y+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391
10 A+G476K,
- H1*+A37R+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391
A+G476K,
- H1*+N54S+V56T+G109A+F113W+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
- 15 H1*+N54S+V56T+G109A+F113S+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
- H1*+N54S+V56T+G109A+F113N+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
- H1*+N54S+V56T+G109A+F113Y+A174S+G182*+D183*+N195F+V206L+K39
20 1A+G476K,
- H1*+N54S+V56T+G109A+F113R+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
- H1*+N54S+V56T+G109A+Q118N+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
- 25 H1*+N54S+V56T+G109A+R116Q+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
- H1*+N54S+V56T+G109A+R116V+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
- H1*+N54S+V56T+G109A+R116K+A174S+G182*+D183*+N195F+V206L+K39
30 1A+G476K,
- H1*+N54S+V56T+G109A+R116W+A174S+G182*+D183*+N195F+V206L+K39

1A+G476K,
H1*+N54S+V56T+G109A+R116L+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
H1*+N54S+V56T+G109A+G142T+A174S+G182*+D183*+N195F+V206L+K39
5 1A+G476K,
H1*+N54S+V56T+G109A+Q125P+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
H1*+N54S+V56T+G109A+Q125K+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
10 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+S381G+K39
1A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+M246T+K39
1A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+V213T+K39
15 1A+G476K,
H1*+A37L+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391
A+G476K,
H1*+N54S+V56T+G109A+Q118K+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
20 H1*+N54S+V56T+G109A+R116A+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
H1*+N54S+V56T+G109A+R116H+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
H1*+N54S+V56T+G109A+Q125A+A174S+G182*+D183*+N195F+V206L+K39
25 1A+G476K,
H1*+N54S+V56T+G109A+Q172G+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
H1*+N54S+V56T+G109A+Q172R+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
30 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+D377S+K39
1A+G476K,

- H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+D377G+K39
1A+G476K,
- H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+D377R+K39
1A+G476K,
- 5 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+D377A+K39
1A+G476K,
- H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+I214G+K39
1A+G476K,
- H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+S381A+K39
10 1A+G476K,
- H1*+N54S+V56T+G109A+W167I+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
- H1*+N54S+V56T+G109A+W167G+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
- 15 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+G346S+K39
1A+G476K,
- H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+G346P+K39
1A+G476K,
- H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+I214H+K39
20 1A+G476K,
- H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+I214S+K39
1A+G476K,
- H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+I214T+K39
1A+G476K,
- 25 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+A42
0Q+G476K,
- H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+A42
0S+G476K,
- H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+A42
30 0K+G476K,
- H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+A42

0L+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+K39
1Y+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+K39
5 1R+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+P47
3R+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+P47
3A+G476K,
10 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+P47
3G+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+P47
3T+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+Q39
15 5P+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+T44
4Q+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+T44
4S+G476K,
20 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+T44
4D+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+T44
4Y+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+S280W+K39
25 1A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+S280L+K39
1A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+S280T+K39
1A+G476K,
30 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+S280A+K39
1A+G476K,

- H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+G255N+K391A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+T285L+K391A+G476K,
5 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+T285Q+K391A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+Q449T+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+P473K+G476K,
10 H1*+N54S+V56T+K72S+G109A+A174S+G182*+D183*+N195F+V206L+K391A+G476K,
H1*+T40K+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+G346T+K391A+G476K,
15 H1*+G50A+N54S+V56T+G109A++Q172N+A174S+G182*+D183*+N195F+V206L+K391A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+G476K+K484A,
20 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+G476K+K484G,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+G476K+K484P,
25 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+G476K+K484E,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+G476K+K484Q,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+G476K+K484S,
30 H1*K+G50A+N54S+V56T+G109A+W167F+A174S+G182*+D183*+N195F+V20

- 6L+K391A+
G476K,
H1*+N54S+V56T+G109A+L173V+A174S+G182*+D183*+N195F+A204T+V20
6L+K391A+
5 G476K,
H1*+N54S+V56T+G109A+W140Y+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
H1*+N54S+V56T+Q98S+G109A+A174S+G182*+D183*+N195F+V206L+R320
A+K391A+
10 G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+H324L+K39
1A+G476K,
H1*+N54S+V56T+G109A+G149Q+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
15 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+G346T+K39
1A+G476K+
G477A,
H1*+N54S+V56T+G109A+G255A+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
20 H1*+G50A+N54S+V56T+G109A+F113L+R116L+A174S+G182*+D183*+N195
F+V206L+
K391A+G476K,
H1*+N54S+V56T+G109A+W167F+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
25 H1*+N54S+V56T+G109A+L173V+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
H1*+N54S+V56T+K72R+G109A+W167F+A174S+G182*+D183*+N195F+V206
L+K391A+
G476K,
30 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+G47
6K+G477Q,

H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+Q345D+K39
1A+G476K+
G477Q,
H1*+G50A+N54S+V56T+G109A+Q172D+A174S+G182*+D183*+N195F+V206
5 L+K391A+
G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+V264I+K39
1A+G423H+
G476K,
10 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+R320V+K39
1A+G476Y,
H1*+T5K+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A
+G476K,
H1*+N54S+V56T+G109A+R116M+A174S+G182*+D183*+N195F+V206L+K39
15 1A+G476K,
H1*+N54S+V56T+G109A+Q172Y+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+I214L+K39
1A+G476K,
20 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+L217V+K39
1A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+L217H+K39
1A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+P211D+K39
25 1A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+K39
1Q+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+T44
4H+G476K,
30 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+T44
4V+G476K,

H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+T44
4R+G476K,
H1*+G50A+N54S+V56T+G109A+L173V+A174S+G182*+D183*+N195F+A204
V+V206L+
5 K391A+G476K,
H1*+G50A+N54S+V56T+G109A+F113L+W167F+A174S+G182*+D183*+N195
F+V206L+
K391A+G476K,
H1*+G7K+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+R320A
10 +K391A+G476K,
H1*+N54S+V56T+G109A+Q118G+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+S280K+K39
1A+G476K,
15 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+N270G+K39
1A+G476K,
H1*+N54S+V56T+G109A+Q172D+A174S+G182*+D183*+N195F+V206L+G34
6T+K391A+
G476K+G477A,
20 H1*+N54S+V56T+G109A+Q118S+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+R320A+K39
1A+G476K,
H1*+N54S+V56T+G109A+T134E+A174S+G182*+D183*+N195F+V206L+K39
25 1A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+G337H+Q38
5L+K391A+
G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+Y382M+K39
30 1A+G476K,
H1*+N54S+V56T+K72R+G109A+A174S+G182*+D183*+N195F+V206L+G255

A+D377H+
K391A+G476K,
H1*+N54S+V56T+K72R+G109A+T134E+A174S+G182*+D183*+N195F+V206
L+G255A+
5 K391A+G476K,
H1*+N54S+V56T+K72R+M105F+G109A+A174S+G182*+D183*+N195F+V206
L+G255A+
K391A+G476K,
H1*+N54S+V56T+M105F+G109A+T134E+A174S+G182*+D183*+N195F+V20
10 6L+K391A+
G476K,
H1*+N54S+V56T+M105F+G109A+Q118F+T134E+A174S+G182*+D183*+N19
5F+V206L+
K391A+G476K,
15 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+R320A+S32
3N+D377H+
K391A+G476K,
H1*+T51E+N54S+V56T+G109A+A174H+G182*+D183*+N195F+V206L+K391
A+G476K,
20 H1*+N54S+V56T+G109A+L173A+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+Q299V+K39
1A+G476K,
H1*+N54S+V56T+G109A+L173G+A174S+G182*+D183*+N195F+V206L+K39
25 1A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+T355L+K39
1A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+T355F+K39
1A+G476K,
30 H1*+G50A+N54S+V56T+G109A+A174S+G182*+D183*+N195F+A204T+V206
L+K391A+

- G476K,
H1*+G50A+N54S+V56T+G109A+A174E+G182*+D183*+N195F+A204T+V206
L+K391A+
G476K,
- 5 H1*+N54S+V56T+K72R+G109A+A174S+G182*+D183*+N195F+V206L+R320
A+S323N+
K391A+G476K,
H1*+N54S+V56T+M105I+G109A+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
- 10 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+M246L+K39
1A+G476K,
H1*+T51G+N54S+V56T+G109A+A174N+G182*+D183*+N195F+V206L+K391
A+G476K,
H1*+T51A+N54S+V56T+G109A+A174G+G182*+D183*+N195F+V206L+K391
15 A+G476K,
H1*+N54S+V56T+G109A+A174D+G182*+D183*+N195F+V206L+K391A+G47
6K,
H1*+T51S+N54S+V56T+G109A+A174P+G182*+D183*+N195F+V206L+K391
A+G476K,
- 20 H1*+T51G+N54S+V56T+G109A+A174M+G182*+D183*+N195F+V206L+K391
A+G476K,
H1*+N54S+V56T+K72A+G109A+W167S+A174S+G182*+D183*+N195F+V206
L+K391A+
G476K,
- 25 H1*+N54S+V56T+K72R+G109A+W167R+A174S+G182*+D183*+N195F+V206
L+K391A+
G476K,
H1*+N54S+V56T+K72Q+G109A+W167H+A174S+G182*+D183*+N195F+V206
L+K391A+
30 G476K,
H1*+N54S+V56T+G109A+Q118R+T134E+A174S+G182*+D183*+N195F+V20

- 6L+D377H+
K391A+G476K,
H1*+Q11H+N54S+V56T+G109A+Q118R+T134E+A174S+G184T+G182*+D183
*+N195F+
- 5 V206L+D377H+K391A+G476K,
H1*+N54S+V56T+K72R+G109A+T134E+A174S+G182*+D183*+N195F+V206
L+K391A+
G476K,
H1*+N54S+V56T+K72R+G109A+T134E+A174S+G182*+D183*+N195F+V206
- 10 L+D377H+
K391A+G476K,
H1*+N54S+V56T+K72R+G109A+T134E+A174S+G182*+D183*+G184T+N195
F+V206L+
K391A+G476K,
- 15 H1*+N54S+V56T+G109A+Q118R+T134E+A174S+G182*+D183*+N195F+V20
6L+G255A+
K391A+G476K,
H1*+N54S+V56T+G109A+Q118R+A174S+G182*+D183*+N195F+V206L+D37
7H+K391A+
- 20 G476K,
H1*+N54S+V56T+G109A+T134E+A174S+G182*+D183*+G184T+N195F+V20
6L+D377H+
K391A+G476K,
H1*+N54S+V56T+G109A+Q172D+A174Q+G182*+D183*+N195F+V206L+K39
- 25 1A+G476K+
G477A,
H1*+N54S+V56T+K72A+G109A+W167F+A174S+G182*+D183*+N195F+V206
L+K391A+
G476K,
- 30 H1*+N54S+V56T+G109A+W167S+G182*+D183*+N195F+A174S+V206L+K39
1A+G476K,

- H1*+N54S+V56T+K72H+G109A+W167S+A174S+G182*+D183*+N195F+V206
L+K391A+
G476K,
- 5 H1*+N54S+V56T+K72R+G109A+W167T+A174S+G182*+D183*+N195F+V206
L+K391A+
G476K,
- H1*+N54S+V56T+K72E+G109A+A174S+G182*+D183*+N195F+V206L+K391
A+G476K,
- 10 H1*+N54S+V56T+K72R+G109A+W167L+A174S+G182*+D183*+N195F+V206
L+K391A+
G476K,
- H1*+N54S+V56T+K72R+G109A+W167M+A174S+G182*+D183*+N195F+V206
L+K391A+
G476K,
- 15 H1*+N54S+V56T+K72R+G109A+W167H+A174S+G182*+D183*+N195F+V206
L+K391A+
G476K,
- H1*+N54S+V56T+K72R+G109A+A174S+G182*+D183*+G184T+N195F+V206
L+G255A+
- 20 K391A+G476K,
- H1*+N54S+V56T+G109A+A174S+G182*+D183*+G184T+N195F+V206L+D37
7H+K391A+
G476K,
- H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+G255A+D37
7H+K391A+
- 25 G476K,
- H1*+N54S+V56T+G109A+Q118R+A174S+G182*+D183*+N195F+V206L+G25
5A+D377H+
K391A+G476K,
- 30 H1*+N54S+V56T+G109A+A174S+G182*+D183*+G184A+T193K+N195F+V20
6L+K391A+

- G476K,
H1*+N54S+V56T+M105F+G109A+A174S+G182*+D183*+G184T+N195F+V20
6L+K391A+
G476K,
- 5 H1*+N54S+V56T+G109A+T134E+A174S+G182*+D183*+N195F+V206L+R32
0A+S323N+
K391A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+V291G+D37
7H+K391A+
- 10 G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+V291A+F32
8L+D377H+
K391A+G476K,
H1*+V56T+G109A+A174S+G182*+D183*+N195F+V206L+D377H+K391A+G4
- 15 76K,
H1*+N54S+V56T+G109A+T134E+A174S+G182*+D183*+G184T+N195F+V20
6L+K391A+
G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+V238A+D37
- 20 7H+K391A+
G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+V238T+D37
7H+K391A+
G476K,
- 25 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+V238G+D37
7H+K391A+
G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+F328M+D37
7H+K391A+
- 30 G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+F328L+D37

7H+K391A+
G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+F328V+D37
7H+K391A+
5 G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+F328I+D37
7H+K391A+
G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+V291T+D37
10 7H+K391A+
G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+V291A+D37
7H+K391A+
G476K,
15 H1*+N54S+V56T+K72R+G109A+T134E+A174S+G182*+D183*+G184T+N195
F+V206L+
G255A+K391A+G476K,
H1*+N54S+V56T+G109A+L173H+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
20 H1*+N54S+V56T+G109A+Q125T+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
H1*+N16S+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391
A+G476K,
H1*+N54S+V56T+K72N+G109A+A174S+G182*+D183*+N195F+V206L+K391
25 A+G476K,
H1*+N54S+V56T+K72N+G109A+W167L+A174S+G182*+D183*+N195F+V206
L+K391A+
G476K,
H1*+N54S+V56T+K72A+G109A+W167Y+A174S+G182*+D183*+N195F+V206
30 L+K391A+
G476K,

H1*+N54S+V56T+G109A+Q118R+T134E+A174S+G182*+D183*+N195F+V206L+G255A+
D377H+K391A+G476K,
H1*+N54S+V56T+K72R+G109A+A174S+G182*+D183*+N195F+G184T+V206L+K391A+
5 G476K,
H1*+N54S+V56T+K72R+G109A+Q118R+A174S+G182*+D183*+N195F+V206L+G255A+
D377H+K391A+G476K,
10 H1*+N54S+V56T+G109A+A174S+G182*+D183*+G184T+N195F+V206L+R320A+S323N+
K391A+G476K,
H1*+N54S+G109A+A174S+G182*+D183*+N195F+V206L+D377H+K391A+G476K,
15 H1*+N54S+V56T+A174S+G182*+D183*+N195F+V206L+D377H+K391A+G476K,
H1*+N54S+V56T+G109A+G182*+D183*+N195F+V206L+D377H+K391A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+D377H+K391A+G476K,
20 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+D377H+K391A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+D377H+G476K,
25 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+D377H+K391A,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+D377R+K391A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+L217T+K391A+G476K,
30 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+D377S+K391A+G476K,

1A+G476K,
H1*+N54S+V56T+G109A+R116E+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+L217Q+K39
5 1A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+G346D+K39
1A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+D377A+K39
1A+G476K,
10 H1*+N54S+V56T+G109A+T134E+A174S+G182*+D183*+N195F+V206L+D37
7H+K391A+
G476K,
H1*+N54S+V56T+G109A+Q118R+T134E+A174S+G182*+D183*+G184T+N19
5F+V206L+
15 K391A+G476K,
H1*+N54S+V56T+K72R+G109A+Q118R+T134E+A174S+G182*+D183*+N195
F+V206L+
K391A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+G346P+K39
20 1A+G476K,
H1*+N54S+V56T+G109A+R116S+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+D377Q+K39
1A+G476K,
25 H1*+N54S+V56T+G109A+R116I+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
H1*+N54S+V56T+G109A+A174F+G182*+D183*+N195F+V206L+K391A+G47
6K,
H1*+N54S+V56T+G109A+R116G+A174S+G182*+D183*+N195F+V206L+K39
30 1A+G476K,
H1*+N54S+V56T+G109A+A174T+G182*+D183*+N195F+V206L+K391A+G47

6K,
H1*+N54S+V56T+G109A+Q118R+T134E+A174S+G182*+D183*+G184T+N19
5F+V206L+
G255A+K391A+G476K,
5 H1*+N54S+V56T+K72R+G109A+Q118R+T134E+A174S+G182*+D183*+N195
F+V206L+
G255A+K391A+G476K,
H1*+T51G+N54S+V56T+G109A+Q172R+A174S+G182*+D183*+N195F+V206
L+K391A+
10 G476K,
H1*+T51A+N54S+V56T+G109A+Q172D+A174S+G182*+D183*+N195F+V206
L+K391A+
G476K,
H1*+T51S+N54S+V56T+G109A+Q172M+A174S+G182*+D183*+N195F+V206
15 L+K391A+
G476K,
H1*+T51A+N54S+V56T+G109A+Q172S+A174S+G182*+D183*+N195F+V206
L+K391A+
G476K,
20 H1*+T51E+N54S+V56T+G109A+Q172T+A174S+G182*+D183*+N195F+V206
L+K391A+
G476K,
H1*+T51A+N54S+V56T+G109A+Q172A+A174S+G182*+D183*+N195F+V206
L+K391A+
25 G476K,
H1*+T51S+N54S+V56T+G109A+Q172N+A174S+G182*+D183*+N195F+V206
L+K391A+
G476K,
H1*+T51G+N54S+V56T+G109A+Q172K+A174S+G182*+D183*+N195F+V206
30 L+K391A+
G476K,

- H1*+T51A+N54S+V56T+G109A+Q172G+A174S+G182*+D183*+N195F+V206
L+K391A+
G476K,
- 5 H1*+T51E+N54S+V56T+G109A+Q172L+A174S+G182*+D183*+N195F+V206
L+K391A+
G476K,
- H1*+T51E+N54S+V56T+G109A+Q172R+A174S+G182*+D183*+N195F+V206
L+K391A+
G476K,
- 10 H1*+N54S+V56T+G109A+Q172K+A174S+G182*+D183*+N195F+V206L+K391A+G476K,
- H1*+T51D+N54S+V56T+G109A+Q172N+A174S+G182*+D183*+N195F+V206
L+K391A+
G476K,
- 15 H1*+T51A+N54S+V56T+G109A+Q172K+A174S+G182*+D183*+N195F+V206
L+K391A+
G476K,
- H1*+N54S+V56T+K72R+G109A+Q172S+A174S+G182*+D183*+N195F+V206
L+K391A+
G476K,
- 20 H1*+N54S+V56T+K72H+G109A+Q172T+A174S+G182*+D183*+N195F+V206
L+K391A+
G476K,
- H1*+N54S+V56T+K72R+G109A+Q172R+A174S+K179E+G182*+D183*+N195
F+V206L+
K391A+G476K,
- 25 H1*+N54S+V56T+K72R+G109A+Q172M+A174S+G182*+D183*+N195F+V206
L+Y295N+
K391A+G476K,
- 30 H1*+N54S+V56T+K72R+G109A+Q172R+A174S+G182*+D183*+N195F+V206
L+K391A+

G476K,
H1*+N54S+V56T+K72Q+G109A+Q172R+A174S+G182*+D183*+N195F+V206
L+K391A+
G476K,
5 H1*+N54S+V56T+K72R+G109A+Q172T+A174S+G182*+D183*+N195F+V206
L+K391A+
G476K,
H1*+N54S+V56T+K72M+G109A+Q172S+A174S+G182*+D183*+N195F+V206
L+K391A+
10 G476K,
H1*+N54S+V56T+K72Q+G109A+Q172M+A174S+G182*+D183*+N195F+V206
L+K391A+
G476K,
H1*+N54S+V56T+G109A+Q172M+A174S+G182*+D183*+N195F+V206L+K39
15 1A+G476K,
H1*+N54S+V56T+K72S+G109A+A174H+G182*+D183*+N195F+V206L+K391
A+G476K,
H1*+N54S+V56T+K72Q+G109A+A174D+G182*+D183*+N195F+V206L+K391
A+G476K,
20 H1*+N54S+V56T+K72R+G109A+A174D+G182*+D183*+N195F+V206L+K391
A+G476K,
H1*+N54S+V56T+K72Q+G109A+A174K+G182*+D183*+N195F+V206L+K391
A+G476K,
H1*+N54S+V56T+G109A+A174G+G182*+D183*+N195F+V206L+K391A+G47
25 6K,
H1*+N54S+V56T+K72R+G109A+A174Q+G182*+D183*+N195F+V206L+K391
A+G476K,
H1*+N54S+V56T+K72Q+G109A+A174G+G182*+D183*+N195F+V206L+K391
A+G476K,
30 H1*+N54S+V56T+K72S+G109A+A174N+G182*+D183*+N195F+V206L+K391
A+G476K,

- H1*+N54S+V56T+K72R+G109A+A174H+G182*+D183*+N195F+V206L+K391A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+K391S+G476K,
5 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+T444A+G476K,
H1*+N54S+V56T+G109A+F113L+W167F+A174S+G182*+D183*+N195F+V206L+K391A+G476K,
10 H1*+G50A+N54S+V56T+G109A+A174E+G182*+D183*+N195F+A204T+V206L+S323N+K391A+G476K,
H1*+N54S+V56T+K72R+G109A+Q118R+A174S+G182*+D183*+G184T+N195F+V206L+G255A+K391A+G476K,
15 H1*+N54S+V56T+M105F+G109A+A174S+G182*+D183*+N195F+V206L+D377H+K391A+G476K,
H1*+N54S+V56T+K72R+G109A+Q118R+A174S+G182*+D183*+N195F+V206L+D377H+K391A+G476K,
20 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+A204G+V206L+K391A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+A225F+K391A+G476K,
25 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+M246A+K391A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+Y382I+K391A+G476K,
30 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+S376H+K391A+G476K,

- H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+I214E+K391A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+I214W+K391A+G476K,
5 H1*+N54S+V56T+K72R+G109A+Q172K+A174S+G182*+D183*+N195F+V206L+K391A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+A204T+V206L+D377H+K391A+G476K,
10 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+A204S+V206L+D377H+K391A+G476K,
H1*+N54S+V56T+G109A+T165S+A174S+G182*+D183*+N195F+V206L+D377H+K391A+G476K,
15 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+T334S+D377H+K391A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+A263G+D377H+K391A+G476K,
20 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+M286F+D377H+K391A+G476K,
25 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+Y267I+D377H+K391A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+L235V+D377H+K391A+G476K,
30

- H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+L235A+D37
7H+K391A+
G476K,
- 5 H1*+N54S+V56T+M105L+G109A+A174S+G182*+D183*+N195F+V206L+D37
7H+K391A+
G476K,
- 10 H1*+N54S+V56T+M105I+G109A+A174S+G182*+D183*+N195F+V206L+D37
7H+K391A+
G476K,
- 15 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+M246I+D37
7H+K391A+
G476K,
- 20 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+L250I+D37
7H+K391A+
G476K,
- 25 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391Y+G47
6K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391V+G47
6K,
- 30 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391M+G47
6K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391E+G47
6K,
- 30 H1*+N54S+V56T+G109A+T165G+A174S+G182*+D183*+N195F+V206L+D37
7H+K391A+

G476K,
H1*+N54R+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+G47
6K,
H1*+N54L+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+G47
5 6K,
H1*+N54S+V56T+G109S+A174S+G182*+D183*+N195F+V206L+K391A+G47
6K,
H1*+N54S+V56T+G109A+A174V+G182*+D183*+N195F+V206L+K391A+G47
6K,
10 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+M246F+D37
7H+K391A+
G476K,
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7H+K391A+
15 G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+M246S+D37
7H+K391A+
G476K,
H1*+N54S+V56T+G109A+A174R+G182*+D183*+N195F+V206L+K391A+G47
20 6K,
H1*+N54S+V56T+G109A+A174L+G182*+D183*+N195F+V206L+K391A+G47
6K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206S+K391A+G47
6K,
25 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391D+G47
6K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391R+G47
6K,
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30 6K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391W+G47

6K,
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6K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+L250T+D37
5 7H+K391A+
G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+L250A+D37
7H+K391A+
G476K,
10 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+L250F+D37
7H+K391A+
G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+L250M+D37
7H+K391A+
15 G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391Q+G47
6K,
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6L+K391A+
20 G476K,
H1*+N54S+V56T+G109A+Q172E+L173A+A174R+G182*+D183*+N195F+V20
6L+K391A+
G476K,
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25 L+K391A+
G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+G184T+N195F+V206L+G25
5A+K391A+
G476K,
30 H1*+N54S+V56T+K72R+G109A+A174S+G182*+D183*+G184T+N195F+V206
L+D377H+

K391A+G476K,
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5A+D377H+
K391A+G476K,
5 H1*+N54S+V56T+G109A+Q118R+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+S376T+K39
1A+G476K,
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10 1A+G476K,
H1*+N54S+V56T+G109A+Q172E+L173I+A174N+G182*+D183*+N195F+V20
6L+K391A+
G476K,
H1*+N54S+V56T+G109A+Q172D+L173A+A174T+G182*+D183*+N195F+V20
15 6L+K391A+
G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+Y267M+D37
7H+K391A+
G476K,
20 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+Y267H+D37
7H+K391A+
G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+V238A+K39
1A+G476K,
25 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+V238T+K39
1A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+V238G+K39
1A+G476K,
H1*+N54S+V56T+M105V+G109A+A174S+G182*+D183*+N195F+V206L+K39
30 1A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+V264T+K39

1A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+V264I+K39
1A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+L235V+K39
5 1A+G476K,
H1*+N54S+V56T+G109A+W167H+Q172N+L173A+A174S+G182*+D183*+N19
5F+V206L+
K391A+G476K,
H1*+N54S+V56T+G109A+W167F+Q172E+L173P+A174K+G182*+D183*+N19
10 5F+V206L+
K391A+G476K,
H1*+N54S+V56T+G109A+Q172N+L173T+A174S+G182*+D183*+N195F+V20
6L+K391A+
G476K,
15 H1*+N54S+V56T+G109A+Q172K+L173V+A174T+G182*+D183*+N195F+V20
6L+K391A+
G476K,
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6L+K391A+
20 G476K,
H1*+N54S+V56T+G109A+Q172E+L173T+A174R+G182*+D183*+N195F+V20
6L+K391A+
G476K,
H1*+N54S+V56T+G109A+Q172N+L173V+A174R+G182*+D183*+N195F+V20
25 6L+K391A+
G476K,
H1*+N54S+V56T+G109A+L173V+A174R+G182*+D183*+N195F+V206L+K39
1A+G476K,
H1*+N54S+V56T+G109A+Q172E+L173M+A174H+G182*+D183*+N195F+V20
30 6L+K391A+
G476K,

H1*+N54S+V56T+G109A+Q172E+L173F+A174P+G182*+D183*+N195F+V206L+K391A+
G476K,
H1*+N54S+V56T+G109A+W167Y+Q172E+L173V+A174H+G182*+D183*+N195F+V206L+
5 K391A+G476K,
H1*+N54S+V56T+G109A+L173A+A174T+G182*+D183*+N195F+V206L+K391A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+V291A+F328L+K391A+
10 G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+M246L+K391A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+M246S+K391A+G476K,
15 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+L250V+K391A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+L250F+K391A+G476K,
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H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+C474V+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+A204S+V206L+K391A+G476K,
25 H1*+N54S+V56T+G109A+T165G+A174S+G182*+D183*+N195F+V206L+K391A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+T334S+K391A+G476K,
30 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+A263G+M286F+K391A+

G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+A263G+M28
6L+K391A+
G476K,
5 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+Y267H
+K391A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+Y267L+K39
1A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+Y267I
10 +K391A+G476K,
H1*+T51A+N54S+V56T+G109A+Q172R+A174S+G182*+D183*+N195F+V206
L+K391A+
G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391L+G47
15 6K,
H1*+N54S+V56T+G109A+F113Q+R116H+Q172G+A174S+G182*+D183*+N19
5F+V206L+
K391A+G476K,
H1*+N54S+V56T+G109A+F113Q+Q172G+A174S+G182*+D183*+N195F+V20
20 6L+K391A+
G476K,
H1*+N54S+V56T+G109S+F113Q+R116Q+A174S+G182*+D183*+N195F+V20
6L+K391A+
G476K,
25 H1*+N54S+V56T+G109A+Q172D+A174S+G182*+D183*+N195F+A204G+V20
6L+K391A+
P473R+G476K,
H1*+N54S+V56T+K72R+G109A+T134E+A174S+G182*+D183*+N195F+A204
G+V206L+
30 G255A+K391A+P473R+G476K,
H1*+N54S+V56T+K72R+G109A+W167F+A174S+G182*+D183*+N195F+A204

G+V206L+
K391A+G476K,
H1*+N54S+V56T+K72R+G109A+A174S+G182*+D183*+G184T+N195F+A204
G+V206L+
5 K391A+P473R+G476K,
H1*+N54S+V56T+G109A+W167F+Q172N+A174S+G182*+D183*+N195F+V20
6L+K391A+
P473R+G476K,
H1*+N54S+V56T+G109A+W167F+Q172G+A174S+G182*+D183*+N195F+V20
10 6L+K391A+
P473G+G476K,
H1*+N54S+V56T+G109A+W167F+Q172G+A174S+G182*+D183*+N195F+V20
6L+K391A+
P473R+G476K,
15 H1*+N54S+V56T+K72R+G109A+W167F+Q172R+A174S+G182*+D183*+N195
F+V206L+
K391A+G476K,
H1*+N54S+V56T+K72R+G109A+R116H+W167F+Q172R+A174S+G182*+D183
*+N195F+
20 V206L+K391A+G476K,
H1*+N54S+V56T+M105F+G109A+A174S+G182*+D183*+N195F+V206L+R32
0A+S323N+
K391A+C474V+G476K,
H1*+N54S+V56T+K72R+G109A+A174S+G182*+D183*+N195F+V206L+G255
25 A+K391A+
C474V+G476K,
H1*+N54S+V56T+G109A+T134E+A174S+G182*+D183*+N195F+V206L+K39
1A+C474V+
G476K,
30 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+D377H+K39
1A+C474V+

G476K,
H1*+N54S+V56T+K72R+G109A+A174S+G182*+D183*+N195F+V206L+K391
A+C474V+
G476K,
5 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+A265G+K39
1A+T444Q+
G476K+G477A,
H1*+A37V+N54S+V56T+G109A+W167F+Q172G+A174S+G182*+D183*+N195
F+V206L+
10 K391A+G346T+G477A+G476K,
H1*+N54S+V56T+G109A+R116Q+Q172D+A174S+G182*+D183*+N195F+V20
6L+G346T+
K391A+T444Q+G477A+G476K,
H1*+N54S+V56T+G109A+R116Q+W167F+Q172N+A174S+G182*+D183*+N19
15 5F+V206L+
G346T+K391A+T444Q+G477A+G476K,
H1*+N54S+V56T+G109S+W167F+Q172R+A174S+G182*+D183*+N195F+V20
6L+K391A+
G476K,
20 H1*+N54S+V56T+G109S+R116Q+W167F+Q172N+A174S+G182*+D183*+N19
5F+V206L+
K391A+G476K,
H1*+N54S+V56T+G109S+W167F+Q172G+A174S+G182*+D183*+N195F+V20
6L+K391A+
25 G476K,
H1*+N54S+V56T+G109A+F113Q+Q172G+A174S+G182*+D183*+N195F+V20
6L+K391A+
T444Q+G476K,
H1*+N54S+V56T+G109A+F113Q+R116H+Q172G+A174S+G182*+D183*+N19
30 5F+V206L+
K391A+T444Q+G476K,

- H1*+N54S+V56T+G109A+F113Q+A174S+G182*+D183*+N195F+V206L+K391A+C474V+
G476K,
H1*+N54S+V56T+G109A+Q172N+A174S+G182*+D183*+N195F+V206L+V26
5 4I+K391A+
C474V+G476K,
H1*+N54S+V56T+G109A+Q172N+A174S+G182*+D183*+N195F+V206L+K391A+C474V+
G476K,
10 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+S280Q+H321Y+K391A+
C474V+G476K,
H1*+N54S+V56T+K72R+G109A+T134E+A174S+G182*+D183*+N195F+V206L+G255A+
15 K391A+C474V+G476K,
H1*+N54S+V56T+G109A+F113Q+R116H+Q172G+A174S+G182*+D183*+N195F+V206L+
K391A+T444Q+P473R+G476K,
H1*+N54S+V56T+G109A+F113Q+R116Q+Q172G+A174S+G182*+D183*+N195F+V206L+
20 K391A+T444Q+G476K,
H1*+N54S+V56T+G109A+R116H+W167F+Q172N+A174S+G182*+D183*+N195F+V206L+
K391A+G476K,
25 H1*+N54S+V56T+G109A+F113Q+R116H+T165G+Q172G+A174S+G182*+D183*+N195F+
V206L+K391A+T444Q+G476K,
H1*+N54S+V56T+G109A+F113Q+R116Q+T165G+Q172G+A174S+G182*+D183*+N195F+
30 V206L+K391A+T444Q+G476K,
H1*+N54S+V56T+G109A+F113Q+R116H+W167F+Q172R+A174S+G182*+D183*+N195F+V206L+K391A+T444Q+G476K,

3*+N195F+
V206L+F289I+K391A+G476K,
H1*+N54S+V56T+G109A+F113Q+Q172N+A174S+G182*+D183*+N195F+V20
6L+K391A+
5 T444Q+G476K,
H1*+N54S+V56T+G109A+F113Q+R116H+Q172N+A174S+G182*+D183*+N19
5F+V206L+
K391A+G476K,
H1*+N54S+V56T+G109A+F113Q+R116Q+Q172M+A174S+G182*+D183*+N19
10 5F+V206L+
K391A+T444Q+G476K,
H1*+N54S+V56T+G109A+F113Q+R116H+Q172M+A174S+G182*+D183*+N19
5F+V206L+
K391A+G476K,
15 H1*+N54S+V56T+G109A+R116H+Q172M+A174S+G182*+D183*+N195F+V20
6L+K391A+
G476K,
H1*+N54S+V56T+G109A+F113Q+R116H+T165G+Q172M+A174S+G182*+D18
3*+N195F+
20 V206L+K391A+Q395P+G476K,
H1*+N54S+V56T+G109A+F113Q+A174S+G182*+D183*+N195F+V206L+K39
1A+T444Q+
P473R+G476K,
H1*+N54S+V56T+G109A+R116Q+A174S+G182*+D183*+N195F+V206L+A26
25 5G+K391A+
T444Q+P473R+G476K,
H1*+N54S+V56T+G109A+R116Q+A174S+G182*+D183*+N195F+V206L+K39
1A+T444Q+
P473R+G476K,
30 H1*+N54S+V56T+K72R+G109A+T134E+T165G+A174S+G182*+D183*+N195
F+V206L+

- G255A+K391A+G476K,
H1*+N54S+V56T+G109A+F113Q+R116H+W167F+Q172R+A174S+G182*+D183*+N195F+
V206L+K391A+G476K,
- 5 H1*+N54S+V56T+G109A+R116Q+W167F+Q172R+A174S+G182*+D183*+N195F+V206L+
A265G+K391A+P473R+G476K,
H1*+N54S+V56T+G109A+F113Q+A174S+G182*+D183*+N195F+V206L+K391A+G476K,
- 10 H1*+N54S+V56T+G109A+Q172N+A174S+G182*+D183*+N195F+V206L+K391A+G476K,
H1*+T51V+N54S+V56T+G109A+Q172D+A174S+G182*+D183*+N195F+V206L+K391A+
G476K,
- 15 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+S280Q+H321Y+K391A+
G476K,
H1*+N54S+V56T+G109A+F113Q+R116H+Q172N+A174S+G182*+D183*+N195F+V206L+
K391A+G476K,
- 20 H1*+N54S+V56T+G109A+F113Q+R116H+Q172G+L173V+A174S+G182*+D183*+N195F+
V206L+K391A+T444Q+P473R+G476K,
H1*+N54S+V56T+G109A+R116Q+W167F+Q172N+L173V+A174S+G182*+D183*+N195F+
V206L+K391A+T444Q+G476K,
- 25 H1*+N54S+V56T+G109A+G133Q+W167F+Q172N+A174S+G182*+D183*+N195F+V206L+
Q395P+K391A+G476K,
- 30 H1*+N54S+V56T+G109A+F113Q+R116H+W167F+Q172N+L173V+A174S+G182*+D183*+

N195F+V206L+K391A+G476K,
H1*+A37V+N54S+V56T+K72R+G109A+R116H+W167F+Q172R+A174S+G182*
+D183*+
G184T+N195F+V206L+K391A+P473R+G476K,
5 H1*+N54S+V56T+K72R+G109A+F113Q+R116H+W167F+Q172G+L173V+A174
S+G182*+
D183*+G184T+N195F+V206L+K391A+T444Q+P473R+G476K,
H1*+N54S+V56T+G109S+R116Q+W167F+Q172R+A174S+G182*+D183*+N19
5F+V206L+
10 K391A+G476K,
H1*+N54S+V56T+G109S+R116Q+W167F+Q172G+A174S+G182*+D183*+N19
5F+V206L+
K391A+P473R+G476K,
H1*+N54S+V56T+G109S+F113Q+W167F+Q172N+A174S+G182*+D183*+N19
15 5F+V206L+
K391A+G476K,
H1*+A37V+N54S+V56T+G109S+F113Q+W167F+Q172R+A174S+G182*+D183
*+N195F+
V206L+K391A+G476K,
20 H1*+N54S+V56T+K72R+G109A+R116H+T134E+W167F+Q172G+L173V+A174
S+G182*+
D183*+N195F+V206L+G255A+K391A+G476K,
H1*+N54S+V56T+K72R+G109A+R116H+T134E+W167F+Q172G+L173V+A174
S+G182*+
25 D183*+N195F+V206L+G255A+K391A+Q395P+T444Q+P473R+G476K,
H1*+N54S+V56T+K72R+G109A+F113Q+R116Q+W167F+Q172G+A174S+G182
+D183+
G184T+N195F+V206L+K391A+P473R+G476K,
H1*+N54S+V56T+K72R+G109A+F113Q+R116Q+T134E+W167F+Q172R+A174
30 S+G182*+
D183*+N195F+V206L+G255A+K391A+T444Q+P473R+G476K,

H1*+N54S+V56T+K72R+G109A+F113Q+T134E+W167F+Q172R+A174S+G182*+D183*+
N195F+V206L+G255A+K391A+Q395P+A445Q+P473R+G476K,
H1*+N54S+V56T+K72R+G109A+F113Q+R116H+T134E+W167F+Q172R+A174
5 S+G182*+
D183*+N195F+V206L+G255A+K391A+Q395P+G476K,
H1*+N54S+V56T+K72R+G109A+T134E+W167F+Q172N+A174S+G182*+D183*+N195F+
V206L+G255A+A265G+K391A+T444Q+P473R+G476K,
10 H1*+N54S+V56T+K72R+G109A+G133Q+W167F+Q172R+A174S+G182*+D183*+N195F+
V206L+K391A+G476K,
H1*+N54S+V56T+K72R+G109A+F113Q+R116Q+W167F+Q172G+A174S+G182*+D183*+
15 N195F+A204G+V206L+K391A+G476K,
H1*+N54S+V56T+K72R+G109A+F113Q+R116Q+W167F+Q172N+L173V+A174S+G182*+
D183*+G184T+N195F+V206L+K391A+T444Q+P473R+G476K,
H1*+A37H+N54S+V56T+G109A+F113Q+W167F+Q172N+A174S+G182*+D183*+N195F+
20 *+N195F+
V206L+K391A+G476K,
H1*+A37H+N54S+V56T+G109A+F113Q+A174S+G182*+D183*+N195F+V206L+K391A+
G476K,
25 H1*+N54S+V56T+G109A+F113Q+W167F+Q172N+A174S+G182*+D183*+N195F+V206L+
K391A+T459N+G476K,
H1*+N54S+V56T+G109A+F113Q+Q172R+L173V+A174S+G182*+D183*+N195F+V206L+
30 K391A+T444Q+G476K,
H1*+N54S+V56T+G109A+F113Q+R116Q+A174S+G182*+D183*+N195F+V206L+

- 6L+K391A+
P473R+G476K,
H1*+N54S+V56T+A60V+G109A+R116Q+W167F+Q172N+A174S+G182*+D183
*+N195F+
- 5 V206L+K391A+G476K,
H1*+N54S+V56T+A60V+G109A+R116H+Q172R+L173V+A174S+G182*+D183
*+N195F+
- V206L+K391A+G476K,
H1*+A37V+N54S+V56T+A60V+G109A+R116Q+T165G+A174S+G182*+D183*
10 +N195F+V206+K391A+G476K,
H1*+A37H+N54S+V56T+A60V+G109A+R116Q+T165G+A174S+G182*+D183*
+N195F+V206+K391A+G476K,
H1*+N54S+V56T+A60V+G109A+R116Q+W167F+Q172G+L173V+A174S+G182
+D183+
- 15 N195F+V206L+K391A+G476K,
H1*+N54S+V56T+A60V+G109A+R116Q+A174S+G182*+D183*+N195F+V206
L+K391A+
G476K,
H1*+A37H+N54S+V56T+A60V+G109A+R116Q+W167F+Q172R+A174S+G182*
20 +D183*+
- N195F+V206L+K391A+G476K,
H1*+A37H+N54S+V56T+A60V+G109A+R116Q+W167F+Q172N+A174S+G182*
+D183*+
- N195F+V206L+K391A+G476K,
25 H1*+N54S+V56T+A60V+G109A+R116Q+T165G+A174S+G182*+D183*+N195
F+V206L+
- K391A+T444Q+P473R+G476K,
H1*+N54S+V56T+A60V+G109A+R116Q+A174S+G182*+D183*+N195F+V206
L+K391A+
- 30 T444Q+P473R+G476K,
H1*+N54S+V56T+A60V+G109A+R116Q+W167F+Q172N+L173V+A174S+G182

+D183+
N195F+V206L+K391A+G476K,
H1*+N54S+V56T+A60V+G109A+R116Q+W167F+Q172R+A174S+G182*+D183
*+N195F+
5 V206L+K391A+G476K,
H1*+N54S+V56T+G109A+R116A+W167F+Q172R+A174S+G182*+D183*+N19
5F+A204G+
V206L+K391A+P473R+G476K,
H1*+N54S+V56T+G109A+R116A+A174S+G182*+D183*+N195F+A204G+V20
10 6L+K391A+
P473R+G476K,
H1*+N54S+V56T+G109A+R116A+T165G+A174S+G182*+D183*+N195F+V20
6L+K391A+
T444Q+P473R+G476K,
15 H1*+N54S+V56T+G109A+G182*+D183*+N195F+K391A+G476K,
H1*+N54S+V56T+G109A+G182*+D183*+N195F+V206L,
N54S+V56T+G109A+G182*+D183*+N195F,
N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+G476K,
H1*+G109A+A174S+G182*+D183*+N195F+V206L+K391A+G476K,
20 H1*+N54S+V56T+G109A+G182*+D183*+N195F+V206L+K391A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+G476K,
H1*+N54S+V56T+A174S+G182*+D183*+N195F+V206L+G273R+K391A+G47
6K,
25 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L,
H1*+W48G+G109A+G182*+D183*+N195F+V206L+K391A+G476K,
N54S+V56T+G109A+A174S+G182*+D183*+N195F+K391A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+K391A,
H1*+N54S+V56T+G109A+F113Q+Q172M+A174S+G182*+D183*+N195F+V20
30 6L+K391A+
G476K,

- H1*+N54S+V56T+G109A+R116Q+A174S+G182*+D183*+N195F+A204G+V206L+K391A+
G476K,
H1*+N54S+V56T+K72R+G109A+F113Q+T134E+A174S+G182*+D183*+N195
5 F+V206L+
G255A+K391A+G476K,
H1*+N54S+V56T+K72R+G109A+F113Q+T134E+A174S+G182*+D183*+N195
F+V206L+
G255A+K391A+P473R+G476K,
10 H1*+N54S+V56T+K72R+G109A+R116Q+A174S+G182*+D183*+G184T+N195
F+V206L+
K391A+G476K,
H1*+A37V+N54S+V56T+G109A+R116A+T165G+A174S+G182*+D183*+N195
F+V206L+
15 K391A+G476K,
H1*+A37V+N54S+V56T+G109A+R116Q+T165G+A174S+G182*+D183*+N195
F+V206L+
M246F+K391A+G476K,
H1*+V56A+G109A+A174S+G182*+D183*+N195F+V206L+G476K,
20 H1*+N54S+V56T+G109A+G182*+D183*+N195F+V206L+K391A,
H1*+N54S+V56T+G109A+G182*+D183*+N195F+V206L+G476K,
G109A+A174S+G182*+D183*+N195F+V206L+K391A+G476K,
N54S+V56T+G109A+G182*+D183*+N195F+V206L+K391T+G476K,
H1*+N54S+V56T+K72R+G109A+F113Q+R116H+A174S+G182*+D183*+G184
25 T+N195F+
V206L+K391A+T444Q+G476K,
H1*+N54S+V56T+G109S+F113Q+A174S+G182*+D183*+N195F+V206L+K39
1A+T444Q+
G476K,
30 H1*+N54S+V56T+G109A+F113Q+R116H+W167F+Q172G+L173V+A174S+G18
2*+D183*+

- N195F+V206L+K391A+P473R+G476K,
H1*+N54S+V56T+G109A+F113Q+R116Q+Q172N+A174S+G182*+D183*+N19
5F+V206L+
A265G+K391A+P473R+G476K,
5 H1*+N54S+V56T+G109A+F113Q+W167F+Q172N+A174S+G182*+D183*+N19
5F+A204G+
V206L+K391A+P473R+G476K,
H1*+N54S+V56T+G109A+F113Q+R116H+W167F+Q172R+A174S+G182*+D18
3*+N195F+
10 A204G+V206L+K391A+P473R+G476K,
H1*+N54S+V56T+G109A+R116A+A174S+G182*+D183*+N195F+V206L+K39
1A+T444Q+
P473R+G476K,
H1*+N54S+V56T+G109A+R116H+Q172R+A174S+G182*+D183*+N195F+A20
15 4G+V206L+
K391A+P473R+G476K,
H1*+A37V+N54S+V56T+G109A+R116Q+T165G+A174S+G182*+D183*+N195
F+V206L+
K391A+G476K,
20 H1*+A37H+N54S+V56T+G109A+R116H+T165G+A174S+G182*+D183*+N195
F+V206L+
M246F+K391A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+K391A+G476K,
H1*+G109A+G182*+D183*+N195F+V206L+K391A+G476K,
25 G109A+G182*+D183*+N195F+V206L+G476K,
H1*+G109A+G182*+D183*+N195F+K391A,
H1*+N54S+V56T+G109A+G133S+A174S+G182*+D183*+N195F+K391A+G47
6H,
H1*+N54S+V56T+G109A+R116A+Q172N+L173V+A174S+G182*+D183*+N19
30 5F+V206L+
K391A+G476K,

H1*+A37V+N54S+V56T+G109A+R116H+T165G+A174S+G182*+D183*+N195
F+V206L+
K391A+G476K,
H1*+P45A+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391
5 A+C474V+
G476K,
H1*+N54S+V56T+G109A+P124A+A174S+G182*+D183*+N195F+V206L+K39
1A+C474V+
G476K,
10 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+P364A+K39
1A+C474V+
G476K,
H1*+N54S+V56T+G109A+Q118R+T134E+A174S+G182*+D183*+N195F+V20
6L+K391A+
15 G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+G184T+N195F+V206L+K39
1A+G476K,
H1*+G50A+T51A+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L
+K391A+G476K,
20 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+V264F+K39
1A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+Y382L+K39
1A+G476K,
H1*+G7K
25 +N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+G255A+Q25
6A+K391A+
G476K,
H1*+N54S+V56T+G109A+W167Y+A174S+G182*+D183*+N195F+V206L+K39
30 1A+G476K,
H1*+N54S+V56T+G109A+W167H

+A174S+G182*+D183*+N195F+V206L+K391A+G476K,
H1*+N54S+V56T+G109A+T165V+A174S+G182*+D183*+N195F+V206L+K391A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+G47
5 6K,
H1*+N54S+V56T+G109A+A174N+G182*+D183*+N195F+V206L+K391A+G47
6K,
H1*+N54S+V56T+G109A+A174Q+G182*+D183*+N195F+V206L+K391A+G47
6K,
10 H1*+N16H+V17L+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L
+Y382F+K391A+G476K,
H1*+Q32S+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+Q385
L+K391A+
G476K,
15 H1*+N54S+V56T+R87S+G109A+R171H+A174S+G182*+D183*+N195F+V206
L+K391A+
G476K,
H1*+N54S+V56T+G109A+R116H+Q169E+Q172K+A174*+G182*+D183*+N19
5F+V206L+
20 K391A+G476K,
H1*+N54S+V56T+G109A+A174*+G182*+D183*+N195F+V206L+K391A+G47
6K,
H1*+K72R+G109A+F113Q+R116Q+W167F+Q172G+A174S+G182*+D183*+G1
84T+N195F+
25 V206L+K391A+P473R+G476K,
H1*+N54S+V56T+K72R+G109A+F113Q+R116Q+W167F+Q172G+A174S+G182
+D183+
G184T+N195F+V206L+P473R+G476K,
H1*+N54S+V56T+G109A+Q169E+Q172G+A174*+G182*+D183*+N195F+V20
30 6L+K391A+
G476K,

H1*+N54S+V56T+K72R+G109A+F113Q+R116Q+W167F+Q172G+A174S+G182*+D183*+
G184T+N195F+K391A+P473R+G476K,
H1*+N54S+V56T+G109A+R116W+Q169E+Q172K+A174*+G182*+D183*+N19
5 5F+V206L+
K391A+G476K,
H1*+N54S+V56T+G109A+Q169E+Q172K+A174*+G182*+D183*+N195F+V20
6F+K391A+
G476K,
10 H1*+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+N260G+K39
1A+G476K,
H1*+N54S+V56T+K72R+G109A+A174S+G182*+D183*+N195F+V206L+K391
A+G476K,
15 H1*+N54S+V56T+G109A+Q169E+Q172K+A174*+G182*+D183*+G184T+N19
5F+V206L+
K391A+G476K,
H1*+N54S+V56T+G109A+Q169E+Q172K+A174*+G182*+D183*+N195F+V20
6L+Y295N+
20 K391A+G476K,
H1*+N54S+V56T+G109A+W167F+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
H1*+N54S+V56T+G109A+Q169E+Q172K+A174*+G182*+D183*+A186N+N19
5F+V206L+
25 K391A+G476K,
H1*+N54S+V56T+G109A+Q169E+Q172K+A174*+G182*+D183*+N195F+V20
6L+A288V+
K391A+G476K,
H1*+N54S+V56T+G109A+Q169E+Q172K+A174*+G182*+D183*+N195F+V20
30 6L+G255A+
K391A+G476K,

H1*+N54S+G109A+Q169E+Q172K+A174*+G182*+D183*+N195F+V206L+K3
91A+G476K,
H1*+W48F+N54S+V56T+G109A+Q169E+Q172K+A174*+G182*+D183*+N195
F+V206L+
5 K391A+G476K,
H1*+N54S+V56T+G109A+Q169E+Q172K+A174*+G182*+D183*+N195F+V20
6L+V291A+
K391A+G476K,
H1*+N54S+V56T+G109A+F113Q+A174S+G182*+D183*+N195F+V206L+K39
10 1A+G476K,
H1*+N54S+V56T+G109A+Q169E+Q172K+A174*+G182*+D183*+N195F+V20
6L+R320A+
S323N+K391A+G476K,
H1*+V56T+G109A+Q169E+Q172K+A174*+G182*+D183*+N195F+V206L+K3
15 91A+G476K,
H1*+N54S+V56T+K72R+G109A+F113Q+R116H+W167F+Q172G+A174S+G182
+D183+
G184T+N195F+V206L+K391A+P473R+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+N270T+K39
20 1A+G476K,
H1*+N54S+V56T+G109A+Q169E+Q172K+A174*+G182*+D183*+N195F+V20
6L+G476K,
H1*+N54S+V56T+G109A+Q169E+Q172K+A174*+G182*+D183*+N195F+V20
6L+N260G+
25 K391A+G476K,
H1*+N54S+V56T+G109A+F113Q+R116H+A174S+G182*+D183*+N195F+V20
6L+K391A+
G476K,
H1*+N54S+V56T+G109A+Q172G+A174S+G182*+D183*+N195F+V206L+K39
30 1A+G476K,
H1*+N54S+V56T+G109A+A174S+A186D+G182*+D183*+N195F+V206L+K39

- 1A+G476K,
H1*+N54S+V56T+G109A+Q169E+Q172K+A174*+G182*+D183*+N195F+V20
6L+A225V+
K391A+G476K,
- 5 H1*+G109A+Q169E+Q172K+A174*+G182*+D183*+N195F+V206L+K391A+G
476K,
H1*+N54S+V56T+G109A+Q169E+Q172K+A174*+G182*+D183*+N195F+V20
6L+G255S+
K391A+G476K,
- 10 H1*+N54S+V56T+G109A+Q169E+Q172K+A174*+G182*+D183*+N195F+V20
6L+K269Q+
K391A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+G255S+K39
1A+G476K,
- 15 H1*+N54S+V56T+G109A+Q169E+Q172K+A174S+G182*+D183*+N195F+V20
6L+K391A+
G476K,
G182*+D183*+N195F,
H1*+N54S+V56T+G109A+Q169E+A174S+G182*+D183*+N195F+V206L+K39
- 20 1A+G476K,
H1*+N54S+V56T+G109A+Q169E+Q172K+A174*+G182*+D183*+N195F+V20
6L+W284H+
K391A+G476K,
H1*+N54S+G109A+A174S+G182*+D183*+N195F+V206L+K391A+G476K,
- 25 H1*+N54S+V56T+G109A+Q169E+Q172K+A174*+G182*+D183*+N195F+V20
6L+S304R+
K391A+G476K,
H1*+N54S+V56T+K72R+G109A+F113Q+R116Q+W167F+Q172G+A174S+G182
+D183+
- 30 G184T+N195F+V206L+K391A+P473R,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+M246V+K39

- 1A+G476K,
H1*+N54S+V56T+G109A+Q169E+Q172K+A174*+G182*+D183*+N195F+V20
6L+K391A,
H1*+N54S+V56T+G109A+Q169E+Q172K+A174*+G182*+D183*+N195F+V20
5 6L+N270G+
K391A+G476K,
H1*+N54S+V56T+G109A+Q169E+Q172K+A174*+G182*+D183*+N195F+V20
6L+Y295F+
K391A+G476K,
10 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+R320A+K39
1A+G476K,
H1*+N54S+V56T+G109A+Q169E+Q172K+A174T+G182*+D183*+N195F+V20
6L+K391A+
G476K,
15 H1*+N54S+V56T+G109A+Q169E+Q172K+G182*+D183*+N195F+V206L+K39
1A+G476K,
H1*+N54S+V56T+G109A+W140Y+Q169E+Q172K+A174*+G182*+D183*+N19
5F+V206L+
K391A+G476K,
20 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A,
H1*+N54S+V56T+G109A+Q169E+Q172K+A174*+G182*+D183*+N195F+V20
6L+F328L+
K391A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+G476K,
25 F113Q+R116H+D183*+G182*+N195F,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+A288L+K39
1A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+N270G+K39
1A+G476K,
30 Q169E+Q172K+A174*+D183*+G182*+N195F,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K269Q+K39

- 1A+G476K,
H1*+W48F+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391
A+G476K,
F113Q+R116Q+D183*+G182*+N195F,
5 N54S+V56T+D183*+G182*+N195F,
H1*+N54S+V56T+G109A+A174T+G182*+D183*+N195F+V206L+K391A+G47
6K,
H1*+N54S+V56T+G109A+R116W+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
10 Q169E+Q172K+G182*+D183*+N195F,
G182*+D183*+A186D,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+V238A+K39
1A+G476K,
G182*+D183*+A186N,
15 H1*+N54S+V56T+G109A+A174S+V206L+G182*+D183*+K391A+G476K,
H1*+N54S+V56T+Q169E+Q172K+A174*+G182*+D183*+N195F+V206L+K39
1A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206F+K391A+G47
6K,
20 H1*+N54S+V56T+G109A+G182*+D183*+N195F+V206L+K391A+G476K,
H1*+N54S+V56T+G109A+Q172K+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
H1*+N54S+V56T+G109A+Q172K+A174*+G182*+D183*+N195F+V206L+K39
1A+G476K,
25 H1*+N54S+V56T+G109A+A174N+G182*+D183*+N195F+V206L+K391A+G47
6K,
H1*+N54S+V56T+G109A+A174S+A186N+G182*+D183*+N195F+V206L+K39
1A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+F289L+K39
30 1A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+Y295F+K39

1A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+V291A+K39
1A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+S244Q+K39
5 1A+G476K,
G182*+D183*+F328L,
G182*+D183*+N195F+A288V,
G182*+D183*+A186N+N195F,
G182*+D183*+E190P+N195F,
10 W140Y+G182*+D183*+N195F,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+A225V+K39
1A+G476K,
G182*+D183*+A186D+N195F,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+P47
15 3R+G476K,
H1*+W48Y+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391
A+G476K,
H1*+N54S+V56T+G109A+Q169E+Q172K+A174*+G182*+D183*+N195F+V20
6L+K391A+
20 G476K,
G182*+D183*+N195F+V238A,
G182*+D183*+Y295N,
Q172G+G182*+D183*,
F113Q+G182*+D183*+N195F,
25 H1*+N54S+V56T+Q98A+G109A+A174S+G182*+D183*+N195F+V206L+K391
A+G476K,
G182*+D183*+N195F+Y295F,
G182*+D183*+A186E,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206Y+K391A+G47
30 6K,
G182*+D183*+N195F+W284H,

G182*+D183*+A186Q+N195F,
K72R+G182*+D183*,
D183*+G182*+N195F+V326L,
D183*+G182*+A186E+N195F,
5 Q169E+G182*+D183*+N195F,
D183*+G182*+N195F+K242Q,
G7A+G182*+D183*+N195F,
D183*+G182*+N195F+N260G,
D183*+G182*+R321A+S323N,
10 D183*+G182*+W284H,
H1*+D183*+G182*,
D183*+G182*+A186H+N195F,
D183*+G182*+F289V,
D183*+G182*+K391A,
15 D183*+G182*+S304R,
W167F+G182*+D183*+N195F,
F113Q+R116H+D183*+G182*,
D183*+G182*+N270G,
D183*+G182*+S244Q,
20 H1*+N54S+V56T+G109A+A174S+G182*+D183*+G184T+N195F+V206L+K39
1A+G476K,
D183*+G182*+N195F+Y295N,
W48F+D183*+G182*,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+G255A+K39
25 1A+G476K,
D183*+G182*+A186Q,
W140Y+D183*+G182*,
D183*+G182*+K242Q,
D183*+G182*+V206L,
30 D183*+G182*+N195F+V206F,
Q169E+D183*+G182*,

D183*+G182*+N195F+R320A,
G182*+D183*+G184T+N195F,
D183*+G182*+G184T,
N54S+V56T+D183*+G182*,
5 D183*+G182*+P473R,
W48Y+D183*+G182*,
D183*+G182*+R323A,
G7A+D183*+G182*,
G109A+D183*+G182*,
10 W167F+D183*+G182*,
H1*+N54S+V56T+G109A+Q169E+Q172K+A174S+G182*+D183*+N195F+V20
6L+K391A+
G476K,
A174S+D183*+G182*,
15 R116Q+D183*+G182*,
D183*+G182*+N195F+V291A,
Q172K+D183*+G182*,
N54S+D183*+G182*,
D183*+G182*+N195F+S323N,
20 D183*+G182*+N195F+M246V,
W48Y+D183*+G182*+N195F,
D183*+G182*+N195F+S304R,
V56T+D183*+G182*,
en donde la numeración es acorde con la SEQ ID NO: 13; y
25 N54S+G182*+D183*+N195F,
G109A+G182*+D183*+N195F,
G182*+D183*+N195F+K391A,
G182*+D183*+N195F+G476K,
H1*+G182*+D183*+N195F,
30 N54S+G182*+D183*+N195F,
V56T+G182*+D183*+N195F,

G182*+D183*+N195F+I405L,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+I405L+A42
1H+A422P+
A428T+D476K,
5 A174S+G182*+D183*+N195F,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+I405L+A42
1H+A422P+
A428T,
H1*+N54S+V56T+G109A+A174S+D183*+N195F+V206L+K391A+I405L+A42
10 1H+A422P+
A428T,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+I40
5L+A421H+
A422P+A428T+D476K,
15 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+I40
5L+A421H+
A422P+A428T+D476G,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+I40
5L+A421H+
20 A422P+A428T+D476K+G477S,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+I40
5L+A421H+
A422P+A428T+D476K,
H1*+N54S+V56T+K72R+G109A+W167F+A174S+G182*+D183*+N195F+V206
25 L+I405L+A421H+A422P+A428T,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+S304N+I40
5L+A421H+
A422P+A428T+D476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+I40
30 5L+A421H+
A422P+A428T+D476K+G477A,

H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+I40
5L+A421H+
A422P+A428T+D476G+G477T,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+I40
5 5L+A421H+
A422P+A428T+G477Q,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+I40
5L+A421H+
A422P+A428T+G477A,
10 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+I40
5L+A421H+
A422P+A428T+D476K+G477Q,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+I40
5L+A421H+
15 A422P+A428T+D476N,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+I40
5L+A421H+
A422P+A428T+D476Y,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206I+I405L+A42
20 1H+A422P+A428T,
H1*+N54S+V56T+G109A+Q172D+A174S+G182*+D183*+N195F+A204G+V20
6L+I405L+
A421H+A422P+A428T,
H1*+N54S+V56T+K72R+G109A+T134E+A174S+G182*+D183*+N195F+A204
25 G+V206L+
G255A+I405L+A421H+A422P+A428T,
H1*+N54S+V56T+G109A+F113Q+R116H+T165G+Q172G+A174S+G182*+D18
3*+N195F+
V206L+I405L+A421H+A422P+A428T,
30 H1*+N54S+V56T+G109A+F113Q+Q172N+A174S+G182*+D183*+N195F+V20
6L+I405L+

- A421H+A422P+A428T,
H1*+N54S+V56T+K72R+G109A+T134E+A174S+G182*+D183*+N195F+G196
R+V206L+
G255A+I405L+A421H+A422P+A428T+N475S,
- 5 H1*+N54S+V56T+G109A+T134E+A174S+G182*+D183*+N195F+V206L+I40
5L+A421H+
A422P+A428T,
H1*+T40D+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+I405
L+A421H+A422P+A428T,
- 10 H1*+N54S+V56T+G109A+F113Q+N125D+A174S+G182*+D183*+N195F+V20
6L+I405L+
A421H+A422P+A428T,
H1*+N54S+V56T+A60V+G109A+R116Q+A174S+G182*+D183*+N195F+V206
L+I405L+A421H+A422P+A428T,
- 15 H1*+N54S+V56T+G109A+R116V+A174S+G182*+D183*+N195F+V206L+I40
5L+A421H+
A422P+A428T,
H1*+N54S+V56T+G109A+R116Q+G133Q+T165G+Q172G+A174S+G182*+D18
3*+N195F+
- 20 V206L+I405L+A421H+A422P+A428T,
H1*+N54S+V56T+G109A+F113Q+R116H+Q172G+A174S+G182*+D183*+N19
5F+V206L+
I405L+A421H+A422P+A428T,
H1*+N54S+V56T+G109A+F113Q+R116Q+Q172G+A174S+G182*+D183*+N19
- 25 5F+V206L+
I405L+A421H+A422P+A428T+G448D,
H1*+N54S+V56T+G109A+F113Q+R116H+Q172N+A174S+G182*+D183*+N19
5F+V206L+
I405L+A421H+A422P+A428T,
- 30 H1*+N54S+V56T+K72R+G109A+T134E+W167F+Q172N+A174S+G182*+D183
*+N195F+

V206L+G255A+A265G+I405L+A421H+A422P+A428T,
H1*+N54S+V56T+K72R+G109A+R116Q+W167F+Q172R+L173V+A174S+G182
+D183+
N195F+V206L+A265G+I405L+A421H+A422P+A428T,
5 H1*+N54S+V56T+K72R+G109A+R116Q+W167F+Q172R+A174S+G182*+D183
*+N195F+
V206L+I405L+A421H+A422P+A428T,
H1*+N54S+V56T+K72R+G109A+F113Q+T134E+W167F+Q172G+A174S+G182
+D183+
10 N195F+V206L+G255A+I405L+A421H+A422P+A428T,
H1*+N54S+V56T+K72R+G109A+F113Q+R116H+W167F+Q172G+L173V+A174
S+G182*+
D183*+G184T+N195F+V206L+I405L+A421H+A422P+A428T,
H1*+N54S+V56T+G109A+F113Q+W167F+Q172G+A174S+G182*+D183*+N19
15 5F+V206L+
I405L+A421H+A422P+A428T,
H1*+N54S+V56T+K72R+G109A+A174S+G182*+D183*+N195F+V206L+G255
A+I405L+A421H+A422P+A428T,
H1*+N54S+V56T+G109A+F113Q+R116Q+A174S+G182*+D183*+N195F+V20
20 6L+I405L+
A421H+A422P+A428T,
H1*+N54S+V56T+K72R+G109A+F113Q+F116H+W167F+Q172G+L173V+A174
S+G182*+
D183*+N195F+V206L+I405L+A421H+A422P+A428T,
25 H1*+N54S+V56T+K72R+G109A+F113Q+R116Q+W167F+Q172G+A174S+G182
+D183+
G184T+N195F+V206L+I405L+A421H+A422P+A428T,
H1*+N54S+V56T+G109A+F113Q+R116Q+W167F+Q172G+A174S+G182*+D18
3*+N195F+
30 A204G+V206L+I405L+A421H+A422P+A428T,
H1*+N54S+V56T+G109A+F113Q+R116H+W167F+Q172G+A174S+G182*+D18

3*+N195F+
V206L+A265G+I405L+A421H+A422P+A428T,
H1*+N54S+V56T+G109A+R116Q+A174S+G182*+D183*+N195F+V206L+I40
5L+A421H+
5 A422P+A428T,
H1*+N54S+V56T+A60V+G109A+R116Q+W167F+Q172N+L173V+A174S+G182
+D183+
N195F+V206L+I405L+A421H+A422P+A428T,
H1*+A37H+N54S+V56T+A60V+G109A+R116Q+T165G+A174S+G182*+D183*
10 +N195F+V206L+I405L+A421H+A422P+A428T,
H1*+N54S+V56T+G109A+A174S+M105F+G182*+D183*+N195F+V206L+L22
8I+R320A+
S323N+I405L+A421H+A422P+A428T,
H1*+N54S+V56T+K72R+G109A+F113Q+T134E+A174S+G182*+D183*+N195
15 F+V206L+
G255A+I405L+A421H+A422P+A428T,
H1*+N54S+V56T+K72R+G109A+R116Q+V120L+A174S+G182*+D183*+G184
T+N195F+
V206L+I405L+A421H+A422P+A428T,
20 H1*+N54S+V56T+G109A+F113Q+R116H+W167F+Q172G+L173V+A174S+G18
2*+D183*+
N195F+V206L+I405L+A421H+A422P+A428T,
H1*+N54S+V56T+G109A+F113Q+R116Q+Q172N+A174S+G182*+D183*+N19
5F+V206L+
25 A265G+I405L+A421H+A422P+A428T
H1*+A37H+N54S+V56T+A60V+G109A+R116Q+W167F+Q172R+A174S+G182*
+D183*+
N195F+V206L+I405L+A421H+A422P+A428T, en donde la numeración
es acorde con la SEQ ID NO: 14.

16. La variante de acuerdo con una cualquiera de las reivindicaciones anteriores, en donde dicha variante se selecciona entre el grupo que consiste en;

5 G182*+D183*+N195F+V206F+N260P+L312I+L313I+R320A+T355L+
L389I+T400P

H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391
A+G476K

H1*+G50A+T51A+V56T+G109A+A174S+G182*
+D183*+N195F+V206L+G476K

10 H1*+N54S+V56T+M105F+G109A+A174S+G182*+D183*+N195F+V206
L+R320A+S323N+

K391A+G476K

H1*+T40K+N54S+V56T+G109A+G149H+A174S+G182*+D183*+N195F
+V206L+K391A+

15 G476K

H1*+N54S+V56T+K72R+G109A+A174S+G182*+D183*+N195F+V206L
+G255A+K391A+

G476K

20 H1*+N16H+V17L+N54S+V56T+G109A+A174S+G182*+D183*+N195F+
V206L+K391A+G476K

H1*+Q22N+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L
+K391A+G476K

H1*+Q32S+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L
+K391A+G476K

25 H1*+H28N+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L
+K391A+G476K

H1*+N29S+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L
+K391A+G476K

30 H1*+H28N+N29S+N54S+V56T+G109A+A174S+G182*+D183*+N195F+
V206L+K391A+G476K

- H1*+N54S+V56T+G109A+A174S+R176K+G182*+D183*+N195F+V206
L+K391A+G476K
- H1*+N54S+V56T+G109A+Q169E+Q172K+A174*+R176K+G182*+D183
*+N195F+V206L+
- 5 K391A+G476K
- H1*+N54S+V56T+G109A+A174S+N175G+G182*+D183*+N195F+V206
L+K391A+G476K
- H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+V291
A+Y295N+Q299T+
- 10 K391A+G476K
- H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K269
S+A274K+K391A+
- G476K
- H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+L235
- 15 I+K391A+G476K
- H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+L235
V+V238A+K391A+
- G476K
- H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+Q365
- 20 S+K391A+G476K
- H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391
A+H402R+G476K
- H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+R320
S+H321N+K391A+
- 25 G476K
- H1*+N54S+V56T+G109A+Q169E+Q172K+A174*+G182*+D183*+N195
F+V206L+K391A+
- G476K
- H1*+N54S+V56T+G109A+Q125S+A174S+G182*+D183*+N195F+V206
- 30 L+K391A+G476K

- H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+L235
V+K391A+G476K
- H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+A265
G+K391A+G476K
- 5 H1*+T51Q+N54S+V56T+G109A+A174S+G182*+D183*+N195F+Y203F
+V206L+K391A+
G476K
- H1*+N54S+V56T+G109A+Q169E+Q172K+A174*+N175Q+G182*+D183
*+N195F+V206L+
- 10 K391A+G476K
- H1*+H28N+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L
+K391A+G476K
- H1*+N54S+V56T+G109A+T134E+A174S+G182*+D183*+N195F+V206
L+K391A+G476K
- 15 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+D377
H+K391A+G476K
- H1*+G50A+T51A+N54S+V56T+G109A+A174S+G182*+D183*+N195F+
V206L+K391A+G476K
- H1*+G7K+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+
20 K391A+G476K
- H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+M202V+V206
L+K391A+G476K
- H1*+N54S+V56T+M105F+G109A+A174S+G182*+D183*+N195F+V206
L+M246F+K391A+
- 25 G476K
- H1*+N16H+V17L+N54S+V56T+G109A+A174S+G182*+D183*+N195F+
V206L+D377H+K391A+G476K
- H1*+T51G+N54S+V56T+G109A+A174S+G182*+D183*+N195F+Y203G
+V206L+K391A+
- 30 G476K

H1*+T51G+N54S+V56T+G109A+G110N+A174S+G182*+D183*+N195F
+V206L+K391A+

G476K

5 H1*+N54S+V56T+G109A+Q125S+A174S+N175G+G182*+D183*+N195
F+V206L+K391A+

G476K

H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+A265
G+V291A+F328L+

K391A+G476K

10 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+M246
F+A265G+V291A+

F328L+Q365S+K391A+G476K

H1*+N16Y+N54S+V56T+G109A+R116H+A174S+G182*+D183*+N195F
+V206L+G337E+

15 D377H+K391A+G476K

H1*+I9L+N54S+V56T+G109A+Q125S+V131T+A174*+G182*+D183*+
V206L+Y267F+F289H+Q361E+K391A+G476K,

20 en donde la numeración es acorde con la SEQ ID
NO: 13 y en donde dicho IF se determina mediante el uso del
detergente modelo A.

17. La variante de acuerdo con una cualquiera de las
reivindicaciones anteriores, en donde dicha variante tiene
un IF de al menos >1.5 cuando se compara con dicho
polipéptido parental y en donde dicha variante se
25 selecciona entre

H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+G47
6K,

H1*+N54S+V56T+R87S+G109A+A174S+G182*+D183*+N195F+V206L+K391
A+G476K,

30 H1*+T40G+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391
A+G476K,

- H1*+T51K+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391
A+G476K,
- H1*+N54S+V56T+K72R+G109A+A174S+G182*+D183*+N195F+V206L+K391
A+G476K,
- 5 H1*+N54S+V56T+K72H+G109A+A174S+G182*+D183*+N195F+V206L+K391
A+G476K,
- H1*+A37H+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391
A+G476K,
- H1*+A37M+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391
10 A+G476K,
- H1*+A37V+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391
A+G476K,
- H1*+A37S+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391
A+G476K,
- 15 H1*+A37Y+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391
A+G476K,
- H1*+A37R+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391
A+G476K,
- H1*+N54S+V56T+G109A+F113W+A174S+G182*+D183*+N195F+V206L+K39
20 1A+G476K,
- H1*+N54S+V56T+G109A+F113S+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
- H1*+N54S+V56T+G109A+F113N+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
- 25 H1*+N54S+V56T+G109A+F113Y+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
- H1*+N54S+V56T+G109A+Q118N+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
- H1*+N54S+V56T+G109A+R116Q+A174S+G182*+D183*+N195F+V206L+K39
30 1A+G476K,
- H1*+N54S+V56T+G109A+R116V+A174S+G182*+D183*+N195F+V206L+K39

- 1A+G476K,
H1*+N54S+V56T+G109A+R116K+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
H1*+N54S+V56T+G109A+R116W+A174S+G182*+D183*+N195F+V206L+K39
5 1A+G476K,
H1*+N54S+V56T+G109A+R116L+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
H1*+N54S+V56T+G109A+G142T+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
10 H1*+N54S+V56T+G109A+Q125P+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
H1*+N54S+V56T+G109A+Q125K+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+S381G+K39
15 1A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+M246T+K39
1A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+V213T+K39
1A+G476K,
20 H1*+A37L+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391
A+G476K,
H1*+N54S+V56T+G109A+Q118K+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
H1*+N54S+V56T+G109A+R116A+A174S+G182*+D183*+N195F+V206L+K39
25 1A+G476K,
H1*+N54S+V56T+G109A+R116H+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
H1*+N54S+V56T+G109A+Q125A+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
30 H1*+N54S+V56T+G109A+Q172G+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,

- H1*+N54S+V56T+G109A+Q172R+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
- H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+D377S+K39
1A+G476K,
- 5 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+D377G+K39
1A+G476K,
- H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+D377R+K39
1A+G476K,
- H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+D377A+K39
10 1A+G476K,
- H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+I214G+K39
1A+G476K,
- H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+S381A+K39
1A+G476K,
- 15 H1*+N54S+V56T+G109A+W167I+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
- H1*+N54S+V56T+G109A+W167G+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
- H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+G346S+K39
20 1A+G476K,
- H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+G346P+K39
1A+G476K,
- H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+I214H+K39
1A+G476K,
- 25 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+I214S+K39
1A+G476K,
- H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+I214T+K39
1A+G476K,
- H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+A42
30 0Q+G476K,
- H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+A42

0S+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+A42
0K+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+A42
5 0L+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+K39
1Y+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+K39
1R+G476K,
10 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+P47
3R+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+P47
3A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+P47
15 3G+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+P47
3T+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+Q39
5P+G476K,
20 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+T44
4Q+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+T44
4S+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+T44
25 4D+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+T44
4Y+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+S280W+K39
1A+G476K,
30 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+S280L+K39
1A+G476K,

- H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+S280T+K391A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+S280A+K391A+G476K,
5 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+G255N+K391A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+T285L+K391A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+T285Q+K391A+G476K,
10 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+Q449T+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+P473K+G476K,
15 H1*+N54S+V56T+K72S+G109A+A174S+G182*+D183*+N195F+V206L+K391A+G476K,
H1*+T40K+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+G346T+K391A+G476K,
20 H1*+G50A+N54S+V56T+G109A++Q172N+A174S+G182*+D183*+N195F+V206L+K391A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+G476K+K484A,
25 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+G476K+K484G,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+G476K+K484P,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+G476K+K484E,
30 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+G47

6K+K484Q,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+G47
6K+K484S,
H1*K+G50A+N54S+V56T+G109A+W167F+A174S+G182*+D183*+N195F+V20
5 6L+K391A+
G476K,
H1*+N54S+V56T+G109A+L173V+A174S+G182*+D183*+N195F+A204T+V20
6L+K391A+
G476K,
10 H1*+N54S+V56T+G109A+W140Y+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
H1*+N54S+V56T+Q98S+G109A+A174S+G182*+D183*+N195F+V206L+R320
A+K391A+
G476K,
15 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+H324L+K39
1A+G476K,
H1*+N54S+V56T+G109A+G149Q+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+G346T+K39
20 1A+G476K+
G477A,
H1*+N54S+V56T+G109AG255A++A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
H1*+G50A+N54S+V56T+G109A+F113L+R116L+A174S+G182*+D183*+N195
25 F+V206L+
K391A+G476K,
H1*+N54S+V56T+G109A+W167F+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
H1*+N54S+V56T+G109A+L173V+A174S+G182*+D183*+N195F+V206L+K39
30 1A+G476K,
H1*+N54S+V56T+K72R+G109A+W167F+A174S+G182*+D183*+N195F+V206

- L+K391A+
G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+G47
6K+G477Q,
5 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+Q345D+K39
1A+G476K+
G477Q,
H1*+G50A+N54S+V56T+G109A+Q172D+A174S+G182*+D183*+N195F+V206
L+K391A+
10 G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+V264I+K39
1A+G423H+
G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+R320V+K39
15 1A+G476Y,
H1*+T5K+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A
+G476K,
H1*+N54S+V56T+G109A+R116M+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
20 H1*+N54S+V56T+G109A+Q172Y+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+I214L+K39
1A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+L217V+K39
25 1A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+L217H+K39
1A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+P211D+K39
1A+G476K,
30 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+K39
1Q+G476K,

- H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+T44
4H+G476K,
- H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+T44
4V+G476K,
- 5 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+T44
4R+G476K,
- H1*+G50A+N54S+V56T+G109A+L173V+A174S+G182*+D183*+N195F+A204
V+V206L+
K391A+G476K,
- 10 H1*+G50A+N54S+V56T+G109A+F113L+W167F+A174S+G182*+D183*+N195
F+V206L+
K391A+G476K,
- H1*+G7K+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+R320A
+K391A+G476K,
- 15 H1*+N54S+V56T+G109A+Q118G+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
- H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+S280K+K39
1A+G476K,
- H1*+N54S+V56T+G109A+Q172D+A174S+G182*+D183*+N195F+V206L+G34
6T+K391A+
G476K+G477A,
- 20 H1*+N54S+V56T+G109A+Q118S+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
- H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+R320A+K39
1A+G476K,
- 25 H1*+N54S+V56T+G109A+T134E+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
- H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+G337H+Q38
5L+K391A+
G476K,
- 30 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+Y382M+K39

- 1A+G476K,
H1*+N54S+V56T+K72R+G109A+A174S+G182*+D183*+N195F+V206L+G255
A+D377H+
K391A+G476K,
- 5 H1*+N54S+V56T+K72R+G109A+T134E+A174S+G182*+D183*+N195F+V206
L+G255A+
K391A+G476K,
H1*+N54S+V56T+K72R+M105F+G109A+A174S+G182*+D183*+N195F+V206
L+G255A+
- 10 K391A+G476K,
H1*+N54S+V56T+M105F+G109A+T134E+A174S+G182*+D183*+N195F+V20
6L+K391A+
G476K,
H1*+N54S+V56T+M105F+G109A+Q118F+T134E+A174S+G182*+D183*+N19
- 15 5F+V206L+
K391A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+R320A+S32
3N+D377H+
K391A+G476K,
- 20 H1*+T51E+N54S+V56T+G109A+A174H+G182*+D183*+N195F+V206L+K391
A+G476K,
H1*+N54S+V56T+G109A+L173A+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+Q299V+K39
- 25 1A+G476K,
H1*+N54S+V56T+G109A+L173G+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+T355L+K39
1A+G476K,
- 30 H1*+G50A+N54S+V56T+G109A+A174S+G182*+D183*+N195F+A204T+V206
L+K391A+

G476K,
H1*+G50A+N54S+V56T+G109A+A174E+G182*+D183*+N195F+A204T+V206
L+K391A+
G476K,
5 H1*+N54S+V56T+K72R+G109A+A174S+G182*+D183*+N195F+V206L+R320
A+S323N+
K391A+G476K,
H1*+N54S+V56T+M105I+G109A+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
10 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+M246L+K39
1A+G476K,
H1*+T51G+N54S+V56T+G109A+A174N+G182*+D183*+N195F+V206L+K391
A+G476K,
H1*+N54S+V56T+G109A+A174D+G182*+D183*+N195F+V206L+K391A+G47
15 6K,
H1*+T51S+N54S+V56T+G109A+A174P+G182*+D183*+N195F+V206L+K391
A+G476K,
H1*+N54S+V56T+K72A+G109A+W167S+A174S+G182*+D183*+N195F+V206
L+K391A+
20 G476K,
H1*+N54S+V56T+K72Q+G109A+W167H+A174S+G182*+D183*+N195F+V206
L+K391A+
G476K,
H1*+N54S+V56T+G109A+Q118R+T134E+A174S+G182*+D183*+N195F+V20
25 6L+D377H+
K391A+G476K,
H1*+Q11H+N54S+V56T+G109A+Q118R+T134E+A174S+G184T+G182*+D183
*+N195F+
V206L+D377H+K391A+G476K,
30 H1*+N54S+V56T+K72R+G109A+T134E+A174S+G182*+D183*+N195F+V206
L+K391A+

G476K,
H1*+N54S+V56T+K72R+G109A+T134E+A174S+G182*+D183*+N195F+V206
L+D377H+
K391A+G476K,
5 H1*+N54S+V56T+K72R+G109A+T134E+A174S+G182*+D183*+G184T+N195
F+V206L+
K391A+G476K,
H1*+N54S+V56T+G109A+Q118R+T134E+A174S+G182*+D183*+N195F+V20
6L+G255A+
10 K391A+G476K,
H1*+N54S+V56T+G109A+Q118R+A174S+G182*+D183*+N195F+V206L+D37
7H+K391A+
G476K,
H1*+N54S+V56T+G109A+T134E+A174S+G182*+D183*+G184T+N195F+V20
15 6L+D377H+
K391A+G476K,
H1*+N54S+V56T+G109A+Q172D+A174Q+G182*+D183*+N195F+V206L+K39
1A+G476K+
G477A,
20 H1*+N54S+V56T+K72R+G109A+W167L+A174S+G182*+D183*+N195F+V206
L+K391A+
G476K,
H1*+N54S+V56T+K72R+G109A+W167M+A174S+G182*+D183*+N195F+V206
L+K391A+
25 G476K,
H1*+N54S+V56T+K72R+G109A+A174S+G182*+D183*+G184T+N195F+V206
L+G255A+
K391A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+G184T+N195F+V206L+D37
30 7H+K391A+
G476K,

- H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+G255A+D37
7H+K391A+
G476K,
- 5 H1*+N54S+V56T+M105F+G109A+A174S+G182*+D183*+G184T+N195F+V20
6L+K391A+
G476K,
- H1*+N54S+V56T+G109A+T134E+A174S+G182*+D183*+N195F+V206L+R32
0A+S323N+
K391A+G476K,
- 10 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+V291G+D37
7H+K391A+
G476K,
- H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+V291A+F32
8L+D377H+
- 15 K391A+G476K,
- H1*+N54S+V56T+G109A+T134E+A174S+G182*+D183*+G184T+N195F+V20
6L+K391A+
G476K,
- H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+V238A+D37
- 20 7H+K391A+
G476K,
- H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+V238T+D37
7H+K391A+
G476K,
- 25 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+V238G+D37
7H+K391A+
G476K,
- H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+F328M+D37
7H+K391A+
G476K,
- 30 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+F328L+D37

7H+K391A+
G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+F328V+D37
7H+K391A+
5 G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+F328I+D37
7H+K391A+
G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+V291T+D37
10 7H+K391A+
G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+V291A+D37
7H+K391A+
G476K,
15 H1*+N54S+V56T+K72R+G109A+T134E+A174S+G182*+D183*+G184T+N195
F+V206L+
G255A+K391A+G476K,
H1*+N54S+V56T+G109A+L173H+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
20 H1*+N16S+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391
A+G476K,
H1*+N54S+V56T+K72N+G109A+A174S+G182*+D183*+N195F+V206L+K391
A+G476K,
H1*+N54S+V56T+K72N+G109A+W167L+A174S+G182*+D183*+N195F+V206
25 L+K391A+
G476K,
H1*+N54S+V56T+K72A+G109A+W167Y+A174S+G182*+D183*+N195F+V206
L+K391A+
G476K,
30 H1*+N54S+V56T+G109A+Q118R+T134E+A174S+G182*+D183*+N195F+V20
6L+G255A+

D377H+K391A+G476K,
H1*+N54S+V56T+K72R+G109A+A174S+G182*+D183*+N195F+G184T+V206
L+K391A+
G476K,
5 H1*+N54S+V56T+K72R+G109A+Q118R+A174S+G182*+D183*+N195F+V206
L+G255A+
D377H+K391A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+G184T+N195F+V206L+R32
0A+S323N+
10 K391A+G476K,
H1*+N54S+G109A+A174S+G182*+D183*+N195F+V206L+D377H+K391A+G4
76K,
H1*+N54S+V56T+A174S+G182*+D183*+N195F+V206L+D377H+K391A+G47
6K,
15 H1*+N54S+V56T+G109A+G182*+D183*+N195F+V206L+D377H+K391A+G47
6K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+D377H+K391A+G47
6K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+D377H+K391A+G47
20 6K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+D377H+G47
6K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+D377H+K39
1A,
25 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+L217T+K39
1A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+D377S+K39
1A+G476K,
H1*+N54S+V56T+G109A+R116E+A174S+G182*+D183*+N195F+V206L+K39
30 1A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+L217Q+K39

- 1A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+D377A+K39
1A+G476K,
H1*+N54S+V56T+G109A+T134E+A174S+G182*+D183*+N195F+V206L+D37
5 7H+K391A+
G476K,
H1*+N54S+V56T+G109A+Q118R+T134E+A174S+G182*+D183*+G184T+N19
5F+V206L+
K391A+G476K,
10 H1*+N54S+V56T+K72R+G109A+Q118R+T134E+A174S+G182*+D183*+N195
F+V206L+
K391A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+G346P+K39
1A+G476K,
15 H1*+N54S+V56T+G109A+R116S+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+D377Q+K39
1A+G476K,
H1*+N54S+V56T+G109A+R116I+A174S+G182*+D183*+N195F+V206L+K39
20 1A+G476K,
H1*+N54S+V56T+G109A+A174F+G182*+D183*+N195F+V206L+K391A+G47
6K,
H1*+N54S+V56T+G109A+R116G+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
25 H1*+N54S+V56T+G109A+A174T+G182*+D183*+N195F+V206L+K391A+G47
6K,
H1*+N54S+V56T+G109A+Q118R+T134E+A174S+G182*+D183*+G184T+N19
5F+V206L+
G255A+K391A+G476K,
30 H1*+N54S+V56T+K72R+G109A+Q118R+T134E+A174S+G182*+D183*+N195
F+V206L+

G255A+K391A+G476K,
H1*+T51A+N54S+V56T+G109A+Q172D+A174S+G182*+D183*+N195F+V206
L+K391A+
G476K,
5 H1*+T51S+N54S+V56T+G109A+Q172M+A174S+G182*+D183*+N195F+V206
L+K391A+
G476K,
H1*+T51A+N54S+V56T+G109A+Q172S+A174S+G182*+D183*+N195F+V206
L+K391A+
10 G476K,
H1*+T51E+N54S+V56T+G109A+Q172T+A174S+G182*+D183*+N195F+V206
L+K391A+
G476K,
H1*+T51A+N54S+V56T+G109A+Q172A+A174S+G182*+D183*+N195F+V206
15 L+K391A+
G476K,
H1*+T51S+N54S+V56T+G109A+Q172N+A174S+G182*+D183*+N195F+V206
L+K391A+
G476K,
20 H1*+T51A+N54S+V56T+G109A+Q172G+A174S+G182*+D183*+N195F+V206
L+K391A+
G476K,
H1*+T51E+N54S+V56T+G109A+Q172L+A174S+G182*+D183*+N195F+V206
L+K391A+
25 G476K,
H1*+T51E+N54S+V56T+G109A+Q172R+A174S+G182*+D183*+N195F+V206
L+K391A+
G476K,
H1*+N54S+V56T+G109A+Q172K+A174S+G182*+D183*+N195F+V206L+K39
30 1A+G476K,
H1*+T51D+N54S+V56T+G109A+Q172N+A174S+G182*+D183*+N195F+V206

L+K391A+
G476K,
H1*+T51A+N54S+V56T+G109A+Q172K+A174S+G182*+D183*+N195F+V206
L+K391A+
5 G476K,
H1*+N54S+V56T+K72R+G109A+Q172S+A174S+G182*+D183*+N195F+V206
L+K391A+
G476K,
H1*+N54S+V56T+K72H+G109A+Q172T+A174S+G182*+D183*+N195F+V206
10 L+K391A+
G476K,
H1*+N54S+V56T+K72R+G109A+Q172R+A174S+K179E+G182*+D183*+N195
F+V206L+
K391A+G476K,
15 H1*+N54S+V56T+K72R+G109A+Q172M+A174S+G182*+D183*+N195F+V206
L+Y295N+
K391A+G476K,
H1*+N54S+V56T+K72Q+G109A+Q172R+A174S+G182*+D183*+N195F+V206
L+K391A+
20 G476K,
H1*+N54S+V56T+K72R+G109A+Q172T+A174S+G182*+D183*+N195F+V206
L+K391A+
G476K,
H1*+N54S+V56T+K72M+G109A+Q172S+A174S+G182*+D183*+N195F+V206
25 L+K391A+
G476K,
H1*+N54S+V56T+K72Q+G109A+Q172M+A174S+G182*+D183*+N195F+V206
L+K391A+
G476K,
30 H1*+N54S+V56T+G109A+Q172M+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,

H1*+N54S+V56T+K72S+G109A+A174H+G182*+D183*+N195F+V206L+K391
A+G476K,
H1*+N54S+V56T+K72Q+G109A+A174D+G182*+D183*+N195F+V206L+K391
A+G476K,
5 H1*+N54S+V56T+K72R+G109A+A174D+G182*+D183*+N195F+V206L+K391
A+G476K,
H1*+N54S+V56T+K72Q+G109A+A174K+G182*+D183*+N195F+V206L+K391
A+G476K,
H1*+N54S+V56T+G109A+A174G+G182*+D183*+N195F+V206L+K391A+G47
10 6K,
H1*+N54S+V56T+K72R+G109A+A174Q+G182*+D183*+N195F+V206L+K391
A+G476K,
H1*+N54S+V56T+K72Q+G109A+A174G+G182*+D183*+N195F+V206L+K391
A+G476K,
15 H1*+N54S+V56T+K72S+G109A+A174N+G182*+D183*+N195F+V206L+K391
A+G476K,
H1*+N54S+V56T+K72R+G109A+A174H+G182*+D183*+N195F+V206L+K391
A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+K39
20 1S+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+T44
4A+G476K,
H1*+N54S+V56T+G109A+F113L+W167F+A174S+G182*+D183*+N195F+V20
6L+K391A+
25 G476K,
H1*+G50A+N54S+V56T+G109A+A174E+G182*+D183*+N195F+A204T+V206
L+S323N+
K391A+G476K,
H1*+N54S+V56T+K72R+G109A+Q118R+A174S+G182*+D183*+G184T+N195
30 F+V206L+
G255A+K391A+G476K,

H1*+N54S+V56T+M105F+G109A+A174S+G182*+D183*+N195F+V206L+D37
7H+K391A+
G476K,
H1*+N54S+V56T+K72R+G109A+Q118R+A174S+G182*+D183*+N195F+V206
5 L+D377H+
K391A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+A204G+V206L+K39
1A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+A225F+K39
10 1A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+M246A+K39
1A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+Y382I+K39
1A+G476K,
15 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+S376H+K39
1A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+I214E+K39
1A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+I214W+K39
20 1A+G476K,
H1*+N54S+V56T+K72R+G109A+Q172K+A174S+G182*+D183*+N195F+V206
L+K391A+
G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+A204T+V206L+D37
25 7H+K391A+
G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+A204S+V206L+D37
7H+K391A+
G476K,
30 H1*+N54S+V56T+G109A+T165S+A174S+G182*+D183*+N195F+V206L+D37
7H+K391A+

- G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+T334S+D37
7H+K391A+
G476K,
- 5 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+A263G+D37
7H+K391A+
G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+M286F+D37
7H+K391A+
- 10 G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+Y267I+D37
7H+K391A+
G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+L235V+D37
- 15 7H+K391A+
G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+L235A+D37
7H+K391A+
G476K,
- 20 H1*+N54S+V56T+M105L+G109A+A174S+G182*+D183*+N195F+V206L+D37
7H+K391A+
G476K,
H1*+N54S+V56T+M105I+G109A+A174S+G182*+D183*+N195F+V206L+D37
7H+K391A+
- 25 G476K,
H1*+N54S+V56T+M105V+G109A+A174S+G182*+D183*+N195F+V206L+D37
7H+K391A+
G476K,
- 30 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+M246I+D37
7H+K391A+
G476K,

H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+L250I+D37
7H+K391A+
G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+L250V+D37
5 7H+K391A+
G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391Y+G47
6K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391V+G47
10 6K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391M+G47
6K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391E+G47
6K,
15 H1*+N54S+V56T+G109A+T165G+A174S+G182*+D183*+N195F+V206L+D37
7H+K391A+
G476K,
H1*+N54L+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+G47
6K,
20 H1*+N54S+V56T+G109S+A174S+G182*+D183*+N195F+V206L+K391A+G47
6K,
H1*+N54S+V56T+G109A+A174V+G182*+D183*+N195F+V206L+K391A+G47
6K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+M246F+D37
25 7H+K391A+
G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+M246V+D37
7H+K391A+
G476K,
30 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+M246S+D37
7H+K391A+

G476K,
H1*+N54S+V56T+G109A+A174R+G182*+D183*+N195F+V206L+K391A+G47
6K,
H1*+N54S+V56T+G109A+A174L+G182*+D183*+N195F+V206L+K391A+G47
5 6K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206S+K391A+G47
6K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391D+G47
6K,
10 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391R+G47
6K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391H+G47
6K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391W+G47
15 6K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391I+G47
6K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+L250T+D37
7H+K391A+
20 G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+L250A+D37
7H+K391A+
G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+L250F+D37
25 7H+K391A+
G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+L250M+D37
7H+K391A+
G476K,
30 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391Q+G47
6K,

- H1*+N54S+V56T+G109A+Q172H+L173A+A174P+G182*+D183*+N195F+V206L+K391A+
G476K,
H1*+N54S+V56T+K72Q+G109A+W167R+A174S+G182*+D183*+N195F+V206L+K391A+
5 G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+G184T+N195F+V206L+G255A+K391A+
G476K,
10 H1*+N54S+V56T+K72R+G109A+A174S+G182*+D183*+G184T+N195F+V206L+D377H+
K391A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+G184T+N195F+V206L+G255A+D377H+
15 K391A+G476K,
H1*+N54S+V56T+G109A+Q118R+A174S+G182*+D183*+N195F+V206L+K391A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+S376T+K391A+G476K,
20 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+S376V+K391A+G476K,
H1*+N54S+V56T+G109A+Q172E+L173I+A174N+G182*+D183*+N195F+V206L+K391A+
G476K,
25 H1*+N54S+V56T+G109A+Q172D+L173A+A174T+G182*+D183*+N195F+V206L+K391A+
G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+Y267M+D377H+K391A+
30 G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+Y267H+D37

7H+K391A+
G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+V238A+K39
1A+G476K,
5 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+V238T+K39
1A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+V238G+K39
1A+G476K,
H1*+N54S+V56T+M105V+G109A+A174S+G182*+D183*+N195F+V206L+K39
10 1A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+V264T+K39
1A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+V264I+K39
1A+G476K,
15 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+L235V+K39
1A+G476K,
H1*+N54S+V56T+G109A+W167H+Q172N+L173A+A174S+G182*+D183*+N19
5F+V206L+
K391A+G476K,
20 H1*+N54S+V56T+G109A+W167F+Q172E+L173P+A174K+G182*+D183*+N19
5F+V206L+
K391A+G476K,
H1*+N54S+V56T+G109A+Q172N+L173T+A174S+G182*+D183*+N195F+V20
6L+K391A+
25 G476K,
H1*+N54S+V56T+G109A+Q172K+L173V+A174T+G182*+D183*+N195F+V20
6L+K391A+
G476K,
H1*+N54S+V56T+G109A+Q172E+L173F+A174R+G182*+D183*+N195F+V20
30 6L+K391A+
G476K,

H1*+N54S+V56T+G109A+Q172E+L173T+A174R+G182*+D183*+N195F+V20
6L+K391A+
G476K,
H1*+N54S+V56T+G109A+Q172N+L173V+A174R+G182*+D183*+N195F+V20
5 6L+K391A+
G476K,
H1*+N54S+V56T+G109A+L173V+A174R+G182*+D183*+N195F+V206L+K39
1A+G476K,
H1*+N54S+V56T+G109A+Q172E+L173M+A174H+G182*+D183*+N195F+V20
10 6L+K391A+
G476K,
H1*+N54S+V56T+G109A+Q172E+L173F+A174P+G182*+D183*+N195F+V20
6L+K391A+
G476K,
15 H1*+N54S+V56T+G109A+W167Y+Q172E+L173V+A174H+G182*+D183*+N19
5F+V206L+
K391A+G476K,
H1*+N54S+V56T+G109A+L173A+A174T+G182*+D183*+N195F+V206L+K39
1A+G476K,
20 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+V291A+F32
8L+K391A+
G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+M246L+K39
1A+G476K,
25 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+M246S
+K391A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+L250V
+K391A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+L250F
30 +K391A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+L250M+K39

- 1A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+C47
4V+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+A204S+V206L+K39
5 1A+G476K,
H1*+N54S+V56T+G109A+T165G+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+T334S
+K391A+G476K,
10 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+A263G+M28
6L+K391A+
G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+Y267H+K39
1A+G476K,
15 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+Y267L+K39
1A+G476K,
H1*+T51A+N54S+V56T+G109A+Q172R+A174S+G182*+D183*+N195F+V206
L+K391A+
G476K,
20 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391L+G47
6K,
H1*+N54S+V56T+G109A+F113Q+R116H+Q172G+A174S+G182*+D183*+N19
5F+V206L+
K391A+G476K,
25 H1*+N54S+V56T+G109A+F113Q+Q172G+A174S+G182*+D183*+N195F+V20
6L+K391A+
G476K,
H1*+N54S+V56T+G109S+F113Q+R116Q+A174S+G182*+D183*+N195F+V20
6L+K391A+
30 G476K,
H1*+N54S+V56T+G109A+Q172D+A174S+G182*+D183*+N195F+A204G+V20

6L+K391A+
P473R+G476K,
H1*+N54S+V56T+K72R+G109A+T134E+A174S+G182*+D183*+N195F+A204
G+V206L+
5 G255A+K391A+P473R+G476K,
H1*+N54S+V56T+K72R+G109A+W167F+A174S+G182*+D183*+N195F+A204
G+V206L+
K391A+G476K,
H1*+N54S+V56T+K72R+G109A+A174S+G182*+D183*+G184T+N195F+A204
10 G+V206L+
K391A+P473R+G476K,
H1*+N54S+V56T+G109A+W167F+Q172N+A174S+G182*+D183*+N195F+V20
6L+K391A+
P473R+G476K,
15 H1*+N54S+V56T+G109A+W167F+Q172G+A174S+G182*+D183*+N195F+V20
6L+K391A+
P473G+G476K,
H1*+N54S+V56T+G109A+W167F+Q172G+A174S+G182*+D183*+N195F+V20
6L+K391A+
20 P473R+G476K,
H1*+N54S+V56T+K72R+G109A+W167F+Q172R+A174S+G182*+D183*+N195
F+V206L+
K391A+G476K,
H1*+N54S+V56T+K72R+G109A+R116H+W167F+Q172R+A174S+G182*+D183
25 *+N195F+
V206L+K391A+G476K,
H1*+N54S+V56T+M105F+G109A+A174S+G182*+D183*+N195F+V206L+R32
0A+S323N+
K391A+C474V+G476K,
30 H1*+N54S+V56T+K72R+G109A+A174S+G182*+D183*+N195F+V206L+G255
A+K391A+

C474V+G476K,
H1*+N54S+V56T+G109A+T134E+A174S+G182*+D183*+N195F+V206L+K39
1A+C474V+
G476K,
5 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+D377H+K39
1A+C474V+
G476K,
H1*+N54S+V56T+K72R+G109A+A174S+G182*+D183*+N195F+V206L+K391
A+C474V+
10 G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+A265G+K39
1A+T444Q+
G476K+G477A,
H1*+A37V+N54S+V56T+G109A+W167F+Q172G+A174S+G182*+D183*+N195
15 F+V206L+
K391A+G346T+G477A+G476K,
H1*+N54S+V56T+G109A+R116Q+Q172D+A174S+G182*+D183*+N195F+V20
6L+G346T+
K391A+T444Q+G477A+G476K,
20 H1*+N54S+V56T+G109A+R116Q+W167F+Q172N+A174S+G182*+D183*+N19
5F+V206L+
G346T+K391A+T444Q+G477A+G476K,
H1*+N54S+V56T+G109S+W167F+Q172R+A174S+G182*+D183*+N195F+V20
6L+K391A+
25 G476K,
H1*+N54S+V56T+G109S+R116Q+W167F+Q172N+A174S+G182*+D183*+N19
5F+V206L+
K391A+G476K,
H1*+N54S+V56T+G109S+W167F+Q172G+A174S+G182*+D183*+N195F+V20
30 6L+K391A+
G476K,

H1*+N54S+V56T+G109A+F113Q+Q172G+A174S+G182*+D183*+N195F+V206L+K391A+
T444Q+G476K,
H1*+N54S+V56T+G109A+F113Q+R116H+Q172G+A174S+G182*+D183*+N195F+V206L+
5 K391A+T444Q+G476K,
H1*+N54S+V56T+G109A+F113Q+A174S+G182*+D183*+N195F+V206L+K391A+C474V+
G476K,
10 H1*+N54S+V56T+G109A+Q172N+A174S+G182*+D183*+N195F+V206L+V264I+K391A+
C474V+G476K,
H1*+N54S+V56T+G109A+Q172N+A174S+G182*+D183*+N195F+V206L+K391A+C474V+
15 G476K,
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C474V+G476K,
H1*+N54S+V56T+K72R+G109A+T134E+A174S+G182*+D183*+N195F+V206L+G255A+
20 K391A+C474V+G476K,
H1*+N54S+V56T+G109A+F113Q+R116H+Q172G+A174S+G182*+D183*+N195F+V206L+
K391A+T444Q+P473R+G476K,
25 H1*+N54S+V56T+G109A+F113Q+R116Q+Q172G+A174S+G182*+D183*+N195F+V206L+
K391A+T444Q+G476K,
H1*+N54S+V56T+G109A+R116H+W167F+Q172N+A174S+G182*+D183*+N195F+V206L+
30 K391A+G476K,
H1*+N54S+V56T+G109A+F113Q+R116H+T165G+Q172G+A174S+G182*+D18

3*+N195F+
V206L+K391A+T444Q+G476K,
H1*+N54S+V56T+G109A+F113Q+R116Q+T165G+Q172G+A174S+G182*+D18
3*+N195F+
5 V206L+K391A+T444Q+G476K,
H1*+N54S+V56T+G109A+F113Q+R116H+W167F+Q172R+A174S+G182*+D18
3*+N195F+
V206L+F289I+K391A+G476K,
H1*+N54S+V56T+G109A+F113Q+Q172N+A174S+G182*+D183*+N195F+V20
10 6L+K391A+
T444Q+G476K,
H1*+N54S+V56T+G109A+F113Q+R116H+Q172N+A174S+G182*+D183*+N19
5F+V206L+
K391A+G476K,
15 H1*+N54S+V56T+G109A+F113Q+R116Q+Q172M+A174S+G182*+D183*+N19
5F+V206L+
K391A+T444Q+G476K,
H1*+N54S+V56T+G109A+F113Q+R116H+Q172M+A174S+G182*+D183*+N19
5F+V206L+
20 K391A+G476K,
H1*+N54S+V56T+G109A+R116H+Q172M+A174S+G182*+D183*+N195F+V20
6L+K391A+
G476K,
H1*+N54S+V56T+G109A+F113Q+R116H+T165G+Q172M+A174S+G182*+D18
25 3*+N195F+
V206L+K391A+Q395P+G476K,
H1*+N54S+V56T+G109A+F113Q+A174S+G182*+D183*+N195F+V206L+K39
1A+T444Q+
P473R+G476K,
30 H1*+N54S+V56T+G109A+R116Q+A174S+G182*+D183*+N195F+V206L+A26
5G+K391A+

T444Q+P473R+G476K,
H1*+N54S+V56T+G109A+R116Q+A174S+G182*+D183*+N195F+V206L+K39
1A+T444Q+
P473R+G476K,
5 H1*+N54S+V56T+K72R+G109A+T134E+T165G+A174S+G182*+D183*+N195
F+V206L+
G255A+K391A+G476K,
H1*+N54S+V56T+G109A+F113Q+R116H+W167F+Q172R+A174S+G182*+D18
3*+N195F+
10 V206L+K391A+G476K,
H1*+N54S+V56T+G109A+R116Q+W167F+Q172R+A174S+G182*+D183*+N19
5F+V206L+
A265G+K391A+P473R+G476K,
H1*+N54S+V56T+G109A+F113Q+A174S+G182*+D183*+N195F+V206L+K39
15 1A+G476K,
H1*+N54S+V56T+G109A+Q172N+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
H1*+T51V+N54S+V56T+G109A+Q172D+A174S+G182*+D183*+N195F+V206
L+K391A+
20 G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+S280Q+H32
1Y+K391A+
G476K,
H1*+N54S+V56T+G109A+F113Q+R116H+Q172N+A174S+G182*+D183*+N19
25 5F+V206L+
K391A+G476K,
H1*+N54S+V56T+G109A+F113Q+R116H+Q172G+L173V+A174S+G182*+D18
3*+N195F+
V206L+K391A+T444Q+P473R+G476K,
30 H1*+N54S+V56T+G109A+R116Q+W167F+Q172N+L173V+A174S+G182*+D18
3*+N195F+

- V206L+K391A+T444Q+G476K,
H1*+N54S+V56T+G109A+G133Q+W167F+Q172N+A174S+G182*+D183*+N19
5F+V206L+
Q395P+K391A+G476K,
- 5 H1*+N54S+V56T+G109A+F113Q+R116H+W167F+Q172N+L173V+A174S+G18
2*+D183*+
N195F+V206L+K391A+G476K,
H1*+A37V+N54S+V56T+K72R+G109A+R116H+W167F+Q172R+A174S+G182*
+D183*+
- 10 G184T+N195F+V206L+K391A+P473R+G476K,
H1*+N54S+V56T+K72R+G109A+F113Q+R116H+W167F+Q172G+L173V+A174
S+G182*+
D183*+G184T+N195F+V206L+K391A+T444Q+P473R+G476K,
H1*+N54S+V56T+G109S+R116Q+W167F+Q172R+A174S+G182*+D183*+N19
15 5F+V206L+
K391A+G476K,
H1*+N54S+V56T+G109S+R116Q+W167F+Q172G+A174S+G182*+D183*+N19
5F+V206L+
K391A+P473R+G476K,
- 20 H1*+N54S+V56T+G109S+F113Q+W167F+Q172N+A174S+G182*+D183*+N19
5F+V206L+
K391A+G476K,
H1*+A37V+N54S+V56T+G109S+F113Q+W167F+Q172R+A174S+G182*+D183
*+N195F+
- 25 V206L+K391A+G476K,
H1*+N54S+V56T+K72R+G109A+R116H+T134E+W167F+Q172G+L173V+A174
S+G182*+
D183*+N195F+V206L+G255A+K391A+G476K,
H1*+N54S+V56T+K72R+G109A+R116H+T134E+W167F+Q172G+L173V+A174
30 S+G182*+
D183*+N195F+V206L+G255A+K391A+Q395P+T444Q+P473R+G476K,

H1*+N54S+V56T+K72R+G109A+F113Q+R116Q+W167F+Q172G+A174S+G182*+D183*+
G184T+N195F+V206L+K391A+P473R+G476K,
H1*+N54S+V56T+K72R+G109A+F113Q+R116Q+T134E+W167F+Q172R+A174
5 S+G182*+
D183*+N195F+V206L+G255A+K391A+T444Q+P473R+G476K,
H1*+N54S+V56T+K72R+G109A+F113Q+T134E+W167F+Q172R+A174S+G182*+D183*+
N195F+V206L+G255A+K391A+Q395P+A445Q+P473R+G476K,
10 H1*+N54S+V56T+K72R+G109A+F113Q+R116H+T134E+W167F+Q172R+A174S+G182*+
D183*+N195F+V206L+G255A+K391A+Q395P+G476K,
H1*+N54S+V56T+K72R+G109A+T134E+W167F+Q172N+A174S+G182*+D183*+N195F+
15 V206L+G255A+A265G+K391A+T444Q+P473R+G476K,
H1*+N54S+V56T+K72R+G109A+G133Q+W167F+Q172R+A174S+G182*+D183*+N195F+
V206L+K391A+G476K,
H1*+N54S+V56T+K72R+G109A+F113Q+R116Q+W167F+Q172G+A174S+G182*+D183*+
20 *+D183*+
N195F+A204G+V206L+K391A+G476K,
H1*+N54S+V56T+K72R+G109A+F113Q+R116Q+W167F+Q172N+L173V+A174S+G182*+
D183*+G184T+N195F+V206L+K391A+T444Q+P473R+G476K,
25 H1*+A37H+N54S+V56T+G109A+F113Q+W167F+Q172N+A174S+G182*+D183*+N195F+
V206L+K391A+G476K,
H1*+A37H+N54S+V56T+G109A+F113Q+A174S+G182*+D183*+N195F+V206L+K391A+
30 G476K,
H1*+N54S+V56T+G109A+F113Q+W167F+Q172N+A174S+G182*+D183*+N19

5F+V206L+
K391A+T459N+G476K,
H1*+N54S+V56T+G109A+F113Q+Q172R+L173V+A174S+G182*+D183*+N19
5F+V206L+
5 K391A+T444Q+G476K,
H1*+N54S+V56T+G109A+F113Q+R116Q+A174S+G182*+D183*+N195F+V20
6L+K391A+
P473R+G476K,
H1*+N54S+V56T+A60V+G109A+R116Q+W167F+Q172N+A174S+G182*+D183
10 *+N195F+
V206L+K391A+G476K,
H1*+N54S+V56T+A60V+G109A+R116H+Q172R+L173V+A174S+G182*+D183
*+N195F+
V206L+K391A+G476K,
15 H1*+A37V+N54S+V56T+A60V+G109A+R116Q+T165G+A174S+G182*+D183*
+N195F+V206L+K391A+G476K,
H1*+A37H+N54S+V56T+A60V+G109A+R116Q+T165G+A174S+G182*+D183*
+N195F+V206L+K391A+G476K,
H1*+N54S+V56T+A60V+G109A+R116Q+W167F+Q172G+L173V+A174S+G182
20 *+D183*+
N195F+V206L+K391A+G476K,
H1*+N54S+V56T+A60V+G109A+R116Q+A174S+G182*+D183*+N195F+V206
L+K391A+
G476K,
25 H1*+A37H+N54S+V56T+A60V+G109A+R116Q+W167F+Q172R+A174S+G182*
+D183*+
N195F+V206L+K391A+G476K,
H1*+A37H+N54S+V56T+A60V+G109A+R116Q+W167F+Q172N+A174S+G182*
+D183*+
30 N195F+V206L+K391A+G476K,
H1*+N54S+V56T+A60V+G109A+R116Q+T165G+A174S+G182*+D183*+N195

F+V206L+
K391A+T444Q+P473R+G476K,
H1*+N54S+V56T+A60V+G109A+R116Q+A174S+G182*+D183*+N195F+V206
L+K391A+
5 T444Q+P473R+G476K,
H1*+N54S+V56T+A60V+G109A+R116Q+W167F+Q172N+L173V+A174S+G182
+D183+
N195F+V206L+K391A+G476K,
H1*+N54S+V56T+A60V+G109A+R116Q+W167F+Q172R+A174S+G182*+D183
10 *+N195F+
V206L+K391A+G476K,
H1*+N54S+V56T+G109A+R116A+W167F+Q172R+A174S+G182*+D183*+N19
5F+A204G+
V206L+K391A+P473R+G476K,
15 H1*+N54S+V56T+G109A+R116A+A174S+G182*+D183*+N195F+A204G+V20
6L+K391A+
P473R+G476K,
H1*+N54S+V56T+G109A+R116A+T165G+A174S+G182*+D183*+N195F+V20
6L+K391A+
20 T444Q+P473R+G476K,
H1*+N54S+V56T+G109A+G182*+D183*+N195F+K391A+G476K,
H1*+N54S+V56T+G109A+G182*+D183*+N195F+V206L,
N54S+V56T+G109A+G182*+D183*+N195F,
N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+G476K,
25 H1*+G109A+A174S+G182*+D183*+N195F+V206L+K391A+G476K,
H1*+N54S+V56T+G109A+G182*+D183*+N195F+V206L+K391A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+G476K,
H1*+N54S+V56T+A174S+G182*+D183*+N195F+V206L+G273R+K391A+G47
30 6K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L,

H1*+W48G+G109A+G182*+D183*+N195F+V206L+K391A+G476K,
N54S+V56T+G109A+A174S+G182*+D183*+N195F+K391A+G476K,
H1*+N54S+V56T+G109A+F113Q+Q172M+A174S+G182*+D183*+N195F+V20
6L+K391A+
5 G476K,
H1*+N54S+V56T+G109A+R116Q+A174S+G182*+D183*+N195F+A204G+V20
6L+K391A+
G476K,
H1*+N54S+V56T+K72R+G109A+F113Q+T134E+A174S+G182*+D183*+N195
10 F+V206L+
G255A+K391A+G476K,
H1*+N54S+V56T+K72R+G109A+F113Q+T134E+A174S+G182*+D183*+N195
F+V206L+
G255A+K391A+P473R+G476K,
15 H1*+N54S+V56T+K72R+G109A+R116Q+A174S+G182*+D183*+G184T+N195
F+V206L+
K391A+G476K,
H1*+A37V+N54S+V56T+G109A+R116A+T165G+A174S+G182*+D183*+N195
F+V206L+
20 K391A+G476K,
H1*+A37V+N54S+V56T+G109A+R116Q+T165G+A174S+G182*+D183*+N195
F+V206L+
M246F+K391A+G476K,
H1*+V56A+G109A+A174S+G182*+D183*+N195F+V206L+G476K,
25 H1*+N54S+V56T+G109A+G182*+D183*+N195F+V206L+K391A,
H1*+N54S+V56T+G109A+G182*+D183*+N195F+V206L+G476K,
G109A+A174S+G182*+D183*+N195F+V206L+K391A+G476K,
N54S+V56T+G109A+G182*+D183*+N195F+V206L+K391T+G476K,
H1*+N54S+V56T+K72R+G109A+F113Q+R116H+A174S+G182*+D183*+G184
30 T+N195F+
V206L+K391A+T444Q+G476K,

H1*+N54S+V56T+G109S+F113Q+A174S+G182*+D183*+N195F+V206L+K391A+T444Q+
G476K,
H1*+N54S+V56T+G109A+F113Q+R116H+W167F+Q172G+L173V+A174S+G182*+D183*+
5 N195F+V206L+K391A+P473R+G476K,
H1*+N54S+V56T+G109A+F113Q+R116Q+Q172N+A174S+G182*+D183*+N195F+V206L+
A265G+K391A+P473R+G476K,
10 H1*+N54S+V56T+G109A+F113Q+W167F+Q172N+A174S+G182*+D183*+N195F+A204G+
V206L+K391A+P473R+G476K,
H1*+N54S+V56T+G109A+F113Q+R116H+W167F+Q172R+A174S+G182*+D183*+N195F+
15 A204G+V206L+K391A+P473R+G476K,
H1*+N54S+V56T+G109A+R116A+A174S+G182*+D183*+N195F+V206L+K391A+T444Q+
P473R+G476K,
H1*+N54S+V56T+G109A+R116H+Q172R+A174S+G182*+D183*+N195F+A204G+V206L+
20 K391A+P473R+G476K,
H1*+A37V+N54S+V56T+G109A+R116Q+T165G+A174S+G182*+D183*+N195F+V206L+
K391A+G476K,
25 H1*+A37H+N54S+V56T+G109A+R116H+T165G+A174S+G182*+D183*+N195F+V206L+
M246F+K391A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+K391A+G476K,
H1*+G109A+G182*+D183*+N195F+V206L+K391A+G476K,
30 G109A+G182*+D183*+N195F+V206L+G476K,
H1*+G109A+G182*+D183*+N195F+K391A,

H1*+N54S+V56T+G109A+G133S+A174S+G182*+D183*+N195F+K391A+G476H,
H1*+N54S+V56T+G109A+R116A+Q172N+L173V+A174S+G182*+D183*+N195F+V206L+
5 K391A+G476K,
H1*+A37V+N54S+V56T+G109A+R116H+T165G+A174S+G182*+D183*+N195F+V206L+
K391A+G476K,
H1*+P45A+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391
10 A+C474V+
G476K,
H1*+N54S+V56T+G109A+P124A+A174S+G182*+D183*+N195F+V206L+K391A+C474V+
G476K,
15 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+P364A+K391A+C474V+
G476K,
H1*+N54S+V56T+G109A+Q118R+T134E+A174S+G182*+D183*+N195F+V206L+K391A+
20 G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+G184T+N195F+V206L+K391A+G476K,
H1*+G50A+T51A+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+G476K,
25 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+V264F+K391A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+Y382L+K391A+G476K,
H1*+G7K
30 +N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+G255A+Q25

- 6A+K391A+
G476K,
H1*+N54S+V56T+G109A+W167Y+A174S+G182*+D183*+N195F+V206L+K391A+G476K,
5 H1*+N54S+V56T+G109A+W167H
+A174S+G182*+D183*+N195F+V206L+K391A+G476K,
H1*+N54S+V56T+G109A+T165V+A174S+G182*+D183*+N195F+V206L+K391A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+G47
10 6K,
H1*+N54S+V56T+G109A+A174N+G182*+D183*+N195F+V206L+K391A+G476K,
H1*+N54S+V56T+G109A+A174Q+G182*+D183*+N195F+V206L+K391A+G476K,
15 H1*+N16H+V17L+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L
+Y382F+K391A+G476K,
H1*+Q32S+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+Q385L+K391A+
G476K,
20 H1*+N54S+V56T+R87S+G109A+R171H+A174S+G182*+D183*+N195F+V206L+K391A+
G476K,
G109A+G182*+D183*+N195F,
G182*+D183*+N195F+K391A,
25 H1*+N54S+V56T+G109A+R116H+Q169E+Q172K+A174*+G182*+D183*+N195F+V206L+
K391A+G476K,
H1*+N54S+V56T+G109A+A174*+G182*+D183*+N195F+V206L+K391A+G476K,
30 H1*+K72R+G109A+F113Q+R116Q+W167F+Q172G+A174S+G182*+D183*+G184T+N195F+

- V206L+K391A+P473R+G476K,
H1*+N54S+V56T+K72R+G109A+F113Q+R116Q+W167F+Q172G+A174S+G182*+D183*+
G184T+N195F+V206L+P473R+G476K,
- 5 H1*+N54S+V56T+G109A+Q169E+Q172G+A174*+G182*+D183*+N195F+V206L+K391A+
G476K,
H1*+N54S+V56T+K72R+G109A+F113Q+R116Q+W167F+Q172G+A174S+G182*+D183*+
- 10 G184T+N195F+K391A+P473R+G476K,
H1*+N54S+V56T+G109A+R116W+Q169E+Q172K+A174*+G182*+D183*+N195F+V206L+
K391A+G476K,
H1*+N54S+V56T+G109A+Q169E+Q172K+A174*+G182*+D183*+N195F+V206F+K391A+
- 15 G476K,
H1*+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+N260G+K391A+G476K,
- 20 H1*+N54S+V56T+K72R+G109A+A174S+G182*+D183*+N195F+V206L+K391A+G476K,
H1*+N54S+V56T+G109A+Q169E+Q172K+A174*+G182*+D183*+G184T+N195F+V206L+
K391A+G476K,
- 25 H1*+N54S+V56T+G109A+Q169E+Q172K+A174*+G182*+D183*+N195F+V206L+Y295N+
K391A+G476K,
H1*+N54S+V56T+G109A+W167F+A174S+G182*+D183*+N195F+V206L+K391A+G476K,
- 30 H1*+N54S+V56T+G109A+Q169E+Q172K+A174*+G182*+D183*+A186N+N195F+V206L+

- K391A+G476K,
H1*+N54S+V56T+G109A+Q169E+Q172K+A174*+G182*+D183*+N195F+V20
6L+A288V+
K391A+G476K,
- 5 H1*+N54S+V56T+G109A+Q169E+Q172K+A174*+G182*+D183*+N195F+V20
6L+G255A+
K391A+G476K,
H1*+N54S+G109A+Q169E+Q172K+A174*+G182*+D183*+N195F+V206L+K3
91A+G476K,
- 10 H1*+W48F+N54S+V56T+G109A+Q169E+Q172K+A174*+G182*+D183*+N195
F+V206L+
K391A+G476K,
H1*+N54S+V56T+G109A+Q169E+Q172K+A174*+G182*+D183*+N195F+V20
6L+V291A+
- 15 K391A+G476K,
H1*+N54S+V56T+G109A+F113Q+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
H1*+N54S+V56T+G109A+Q169E+Q172K+A174*+G182*+D183*+N195F+V20
6L+R320A+
- 20 S323N+K391A+G476K,
H1*+V56T+G109A+Q169E+Q172K+A174*+G182*+D183*+N195F+V206L+K3
91A+G476K,
H1*+N54S+V56T+K72R+G109A+F113Q+R116H+W167F+Q172G+A174S+G182
+D183+
- 25 G184T+N195F+V206L+K391A+P473R+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+N270T+K39
1A+G476K,
H1*+N54S+V56T+G109A+Q169E+Q172K+A174*+G182*+D183*+N195F+V20
6L+G476K,
- 30 H1*+N54S+V56T+G109A+Q169E+Q172K+A174*+G182*+D183*+N195F+V20
6L+N260G+

K391A+G476K,
H1*+N54S+V56T+G109A+F113Q+R116H+A174S+G182*+D183*+N195F+V20
6L+K391A+
G476K,
5 H1*+N54S+V56T+G109A+Q172G+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
H1*+N54S+V56T+G109A+A174S+A186D+G182*+D183*+N195F+V206L+K39
1A+G476K,
H1*+N54S+V56T+G109A+Q169E+Q172K+A174*+G182*+D183*+N195F+V20
10 6L+A225V+
K391A+G476K,
H1*+G109A+Q169E+Q172K+A174*+G182*+D183*+N195F+V206L+K391A+G
476K,
H1*+N54S+V56T+G109A+Q169E+Q172K+A174*+G182*+D183*+N195F+V20
15 6L+G255S+
K391A+G476K,
H1*+N54S+V56T+G109A+Q169E+Q172K+A174*+G182*+D183*+N195F+V20
6L+K269Q+
K391A+G476K,
20 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+G255S+K39
1A+G476K,
H1*+N54S+V56T+G109A+Q169E+Q172K+A174S+G182*+D183*+N195F+V20
6L+K391A+
G476K,
25 G182*+D183*+N195F,
H1*+N54S+V56T+G109A+Q169E+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
H1*+N54S+V56T+G109A+Q169E+Q172K+A174*+G182*+D183*+N195F+V20
6L+W284H+
30 K391A+G476K,
H1*+N54S+G109A+A174S+G182*+D183*+N195F+V206L+K391A+G476K,

H1*+N54S+V56T+G109A+Q169E+Q172K+A174*+G182*+D183*+N195F+V20
6L+S304R+
K391A+G476K,
H1*+N54S+V56T+K72R+G109A+F113Q+R116Q+W167F+Q172G+A174S+G182
5 *+D183*+
G184T+N195F+V206L+K391A+P473R,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+M246V+K39
1A+G476K,
H1*+N54S+V56T+G109A+Q169E+Q172K+A174*+G182*+D183*+N195F+V20
10 6L+K391A,
H1*+N54S+V56T+G109A+Q169E+Q172K+A174*+G182*+D183*+N195F+V20
6L+N270G+
K391A+G476K,
H1*+N54S+V56T+G109A+Q169E+Q172K+A174*+G182*+D183*+N195F+V20
15 6L+Y295F+
K391A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+R320A+K39
1A+G476K,
H1*+N54S+V56T+G109A+Q169E+Q172K+A174T+G182*+D183*+N195F+V20
20 6L+K391A+
G476K,
H1*+N54S+V56T+G109A+Q169E+Q172K+G182*+D183*+N195F+V206L+K39
1A+G476K,
H1*+N54S+V56T+G109A+W140Y+Q169E+Q172K+A174*+G182*+D183*+N19
25 5F+V206L+
K391A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A,
H1*+N54S+V56T+G109A+Q169E+Q172K+A174*+G182*+D183*+N195F+V20
6L+F328L+
30 K391A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+G476K,

F113Q+R116H+D183*+G182*+N195F,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+A288L+K39
1A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+N270G+K39
5 1A+G476K,
Q169E+Q172K+A174*+D183*+G182*+N195F,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K269Q+K39
1A+G476K,
H1*+W48F+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391
10 A+G476K,
F113Q+R116Q+D183*+G182*+N195F,
N54S+V56T+D183*+G182*+N195F,
H1*+N54S+V56T+G109A+A174T+G182*+D183*+N195F+V206L+K391A+G47
6K,
15 H1*+N54S+V56T+G109A+R116W+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
Q169E+Q172K+G182*+D183*+N195F,
G182*+D183*+A186D,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+V238A+K39
20 1A+G476K,
G182*+D183*+A186N,
H1*+N54S+V56T+G109A+A174S+V206L+G182*+D183*+K391A+G476K,
H1*+N54S+V56T+Q169E+Q172K+A174*+G182*+D183*+N195F+V206L+K39
1A+G476K,
25 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206F+K391A+G47
6K,
H1*+N54S+V56T+G109A+G182*+D183*+N195F+V206L+K391A+G476K,
H1*+N54S+V56T+G109A+Q172K+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
30 H1*+N54S+V56T+G109A+Q172K+A174*+G182*+D183*+N195F+V206L+K39
1A+G476K,

- H1*+N54S+V56T+G109A+A174N+G182*+D183*+N195F+V206L+K391A+G476K,
H1*+N54S+V56T+G109A+A174S+A186N+G182*+D183*+N195F+V206L+K391A+G476K,
5 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+F289L+K391A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+Y295F+K391A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+V291A+K391A+G476K,
10 G182*+D183*+A186N+N195F,
G182*+D183*+A186D+N195F,
G182*+D183*+N195F+W284H,
D183*+G182*+N195F+V326L,
15 en donde la numeración es acorde con la SEQ ID NO: 13, y
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+I405L+A421H+
A422P+A428T+D476G+G477T,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+I405L+A421H+
20 A422P+A428T+G477Q,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+I405L+A421H+
A422P+A428T+G477A,
25 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+I405L+A421H+
A422P+A428T+D476N,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+I405L+A421H+
30 A422P+A428T+D476Y,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206I+I405L+A42

- 1H+A422P+A428T,
H1*+N54S+V56T+G109A+T134E+A174S+G182*+D183*+N195F+V206L+I405L+A421H+A422P+A428T,
- 5 H1*+T40D+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+I405L+A421H+A422P+A428T,
H1*+N54S+V56T+G109A+F113Q+N125D+A174S+G182*+D183*+N195F+V206L+I405L+A421H+A422P+A428T,
- 10 H1*+N54S+V56T+A60V+G109A+R116Q+A174S+G182*+D183*+N195F+V206L+I405L+A421H+A422P+A428T,
H1*+N54S+V56T+G109A+F113Q+R116H+Q172G+A174S+G182*+D183*+N195F+V206L+I405L+A421H+A422P+A428T,
- 15 I405L+A421H+A422P+A428T,
H1*+N54S+V56T+G109A+F113Q+R116H+Q172N+A174S+G182*+D183*+N195F+V206L+I405L+A421H+A422P+A428T,
H1*+N54S+V56T+K72R+G109A+T134E+W167F+Q172N+A174S+G182*+D183*+N195F+V206L+G255A+A265G+I405L+A421H+A422P+A428T,
- 20 H1*+N54S+V56T+K72R+G109A+R116Q+W167F+Q172R+L173V+A174S+G182*+D183*+N195F+V206L+A265G+I405L+A421H+A422P+A428T,
H1*+N54S+V56T+K72R+G109A+R116Q+W167F+Q172R+A174S+G182*+D183*+N195F+V206L+I405L+A421H+A422P+A428T,
- 25 H1*+N54S+V56T+K72R+G109A+R116Q+W167F+Q172R+A174S+G182*+D183*+N195F+V206L+I405L+A421H+A422P+A428T,
H1*+N54S+V56T+K72R+G109A+F113Q+T134E+W167F+Q172G+A174S+G182*+D183*+N195F+V206L+G255A+I405L+A421H+A422P+A428T,
- 30 H1*+N54S+V56T+K72R+G109A+F113Q+R116H+W167F+Q172G+L173V+A174

S+G182*+
D183*+G184T+N195F+V206L+I405L+A421H+A422P+A428T,
H1*+N54S+V56T+K72R+G109A+A174S+G182*+D183*+N195F+V206L+G255
A+I405L+A421H+A422P+A428T,
5 H1*+N54S+V56T+G109A+F113Q+R116Q+A174S+G182*+D183*+N195F+V20
6L+I405L+
A421H+A422P+A428T,
H1*+N54S+V56T+K72R+G109A+F113Q+F116H+W167F+Q172G+L173V+A174
S+G182*+
10 D183*+N195F+V206L+I405L+A421H+A422P+A428T,
H1*+N54S+V56T+K72R+G109A+F113Q+R116Q+W167F+Q172G+A174S+G182
+D183+
G184T+N195F+V206L+I405L+A421H+A422P+A428T,
H1*+N54S+V56T+G109A+F113Q+R116Q+W167F+Q172G+A174S+G182*+D18
15 3*+N195F+
A204G+V206L+I405L+A421H+A422P+A428T,
H1*+N54S+V56T+G109A+F113Q+R116H+W167F+Q172G+A174S+G182*+D18
3*+N195F+
V206L+A265G+I405L+A421H+A422P+A428T,
20 H1*+N54S+V56T+G109A+R116Q+A174S+G182*+D183*+N195F+V206L+I40
5L+A421H+
A422P+A428T,
H1*+A37H+N54S+V56T+A60V+G109A+R116Q+T165G+A174S+G182*+D183*
+N195F+V206L+I405L+A421H+A422P+A428T,
25 H1*+N54S+V56T+K72R+G109A+F113Q+T134E+A174S+G182*+D183*+N195
F+V206L+
G255A+I405L+A421H+A422P+A428T,
H1*+N54S+V56T+K72R+G109A+R116Q+V120L+A174S+G182*+D183*+G184
T+N195F+
30 V206L+I405L+A421H+A422P+A428T,
H1*+N54S+V56T+G109A+F113Q+R116H+W167F+Q172G+L173V+A174S+G18

2*+D183*+

N195F+V206L+I405L+A421H+A422P+A428T,

H1*+N54S+V56T+G109A+F113Q+R116Q+Q172N+A174S+G182*+D183*+N195F+V206L+

5 A265G+I405L+A421H+A422P+A428T,

H1*+A37H+N54S+V56T+A60V+G109A+R116Q+W167F+Q172R+A174S+G182*+D183*+

N195F+V206L+I405L+A421H+A422P+A428T, en donde la numeración es acorde con la SEQ ID NO: 14 y en donde dicho IF se determina mediante el uso del detergente modelo A.

10 18. La variante de acuerdo con una cualquiera de las reivindicaciones anteriores, en donde dicha variante tiene un IF de al menos >2.0 cuando se compara con dicho polipéptido parental y en donde dicha variante se selecciona entre

H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+G476K,

H1*+N54S+V56T+R87S+G109A+A174S+G182*+D183*+N195F+V206L+K391A+G476K,

20 H1*+T40G+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+G476K,

H1*+T51K+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+G476K,

25 H1*+N54S+V56T+K72R+G109A+A174S+G182*+D183*+N195F+V206L+K391A+G476K,

H1*+N54S+V56T+K72H+G109A+A174S+G182*+D183*+N195F+V206L+K391A+G476K,

H1*+A37H+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+G476K,

30 H1*+A37M+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+G476K,

- H1*+A37V+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391
A+G476K,
- H1*+A37S+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391
A+G476K,
- 5 H1*+A37Y+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391
A+G476K,
- H1*+A37R+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391
A+G476K,
- H1*+N54S+V56T+G109A+F113W+A174S+G182*+D183*+N195F+V206L+K39
10 1A+G476K,
- H1*+N54S+V56T+G109A+F113S+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
- H1*+N54S+V56T+G109A+F113N+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
- 15 H1*+N54S+V56T+G109A+R116Q+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
- H1*+N54S+V56T+G109A+R116V+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
- H1*+N54S+V56T+G109A+R116K+A174S+G182*+D183*+N195F+V206L+K39
20 1A+G476K,
- H1*+N54S+V56T+G109A+Q125P+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
- H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+S381G+K39
1A+G476K,
- 25 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+M246T+K39
1A+G476K,
- H1*+A37L+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391
A+G476K,
- H1*+N54S+V56T+G109A+R116A+A174S+G182*+D183*+N195F+V206L+K39
30 1A+G476K,
- H1*+N54S+V56T+G109A+R116H+A174S+G182*+D183*+N195F+V206L+K39

1A+G476K,
H1*+N54S+V56T+G109A+Q125A+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
H1*+N54S+V56T+G109A+Q172G+A174S+G182*+D183*+N195F+V206L+K39
5 1A+G476K,
H1*+N54S+V56T+G109A+Q172R+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+D377S+K39
1A+G476K,
10 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+D377A+K39
1A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+S381A+K39
1A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+G346P+K39
15 1A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+I214H+K39
1A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+I214S+K39
1A+G476K,
20 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+A42
0Q+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+A42
0S+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+A42
25 0K+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+A42
0L+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+K39
1Y+G476K,
30 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+P47
3R+G476K,

- H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+P47
3A+G476K,
- H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+P47
3G+G476K,
- 5 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+T44
4D+G476K,
- H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+T44
4Y+G476K,
- H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+S280W+K39
10 1A+G476K,
- H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+S280L+K39
1A+G476K,
- H1*+N54S+V56T+K72S+G109A+A174S+G182*+D183*+N195F+V206L+K391
A+G476K,
- 15 H1*+T40K+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+G346
T+K391A+
G476K,
- H1*+G50A+N54S+V56T+G109A++Q172N+A174S+G182*+D183*+N195F+V20
6L+K391A+
- 20 G476K,
- H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+G47
6K+K484S,
- H1*K+G50A+N54S+V56T+G109A+W167F+A174S+G182*+D183*+N195F+V20
6L+K391A+
- 25 G476K,
- H1*+N54S+V56T+G109A+L173V+A174S+G182*+D183*+N195F+A204T+V20
6L+K391A+
- G476K,
- H1*+N54S+V56T+G109A+W140Y+A174S+G182*+D183*+N195F+V206L+K39
30 1A+G476K,
- H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+G346T+K39

- 1A+G476K+
G477A,
H1*+N54S+V56T+G109AG255A++A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
- 5 H1*+G50A+N54S+V56T+G109A+F113L+R116L+A174S+G182*+D183*+N195
F+V206L+
K391A+G476K,
H1*+N54S+V56T+G109A+W167F+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
- 10 H1*+N54S+V56T+K72R+G109A+W167F+A174S+G182*+D183*+N195F+V206
L+K391A+
G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+R320V+K39
1A+G476Y,
- 15 H1*+N54S+V56T+G109A+R116M+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
H1*+N54S+V56T+G109A+Q172Y+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+I214L+K39
20 1A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+L217V+K39
1A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+L217H+K39
1A+G476K,
- 25 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+P211D+K39
1A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+K39
1Q+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+T44
30 4H+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+T44

4V+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+T44
4R+G476K,
H1*+G50A+N54S+V56T+G109A+L173V+A174S+G182*+D183*+N195F+A204
5 V+V206L+
K391A+G476K,
H1*+G7K+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+R320A
+K391A+G476K,
H1*+N54S+V56T+G109A+Q172D+A174S+G182*+D183*+N195F+V206L+G34
10 6T+K391A+
G476K+G477A,
H1*+N54S+V56T+G109A+Q118S+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+R320A+K39
15 1A+G476K,
H1*+N54S+V56T+G109A+T134E+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+Y382M+K39
1A+G476K,
20 H1*+N54S+V56T+K72R+G109A+T134E+A174S+G182*+D183*+N195F+V206
L+G255A+
K391A+G476K,
H1*+N54S+V56T+K72R+M105F+G109A+A174S+G182*+D183*+N195F+V206
L+G255A+
25 K391A+G476K,
H1*+N54S+V56T+M105F+G109A+T134E+A174S+G182*+D183*+N195F+V20
6L+K391A+
G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+R320A+S32
30 3N+D377H+
K391A+G476K,

H1*+T51E+N54S+V56T+G109A+A174H+G182*+D183*+N195F+V206L+K391
A+G476K,
H1*+N54S+V56T+G109A+L173A+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
5 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+Q299V+K39
1A+G476K,
H1*+N54S+V56T+G109A+L173G+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+T355L+K39
10 1A+G476K,
H1*+G50A+N54S+V56T+G109A+A174S+G182*+D183*+N195F+A204T+V206
L+K391A+
G476K,
H1*+N54S+V56T+K72R+G109A+A174S+G182*+D183*+N195F+V206L+R320
15 A+S323N+
K391A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+M246L+K39
1A+G476K,
H1*+N54S+V56T+K72Q+G109A+W167H+A174S+G182*+D183*+N195F+V206
20 L+K391A+
G476K,
H1*+N54S+V56T+K72R+G109A+T134E+A174S+G182*+D183*+N195F+V206
L+K391A+
G476K,
25 H1*+N54S+V56T+K72R+G109A+T134E+A174S+G182*+D183*+N195F+V206
L+D377H+
K391A+G476K,
H1*+N54S+V56T+K72R+G109A+T134E+A174S+G182*+D183*+G184T+N195
F+V206L+
30 K391A+G476K,
H1*+N54S+V56T+G109A+Q118R+T134E+A174S+G182*+D183*+N195F+V20

6L+G255A+
K391A+G476K,
H1*+N54S+V56T+G109A+Q118R+A174S+G182*+D183*+N195F+V206L+D37
7H+K391A+
5 G476K,
H1*+N54S+V56T+G109A+T134E+A174S+G182*+D183*+G184T+N195F+V20
6L+D377H+
K391A+G476K,
H1*+N54S+V56T+G109A+Q172D+A174Q+G182*+D183*+N195F+V206L+K39
10 1A+G476K+
G477A,
H1*+N54S+V56T+K72R+G109A+A174S+G182*+D183*+G184T+N195F+V206
L+G255A+
K391A+G476K,
15 H1*+N54S+V56T+G109A+A174S+G182*+D183*+G184T+N195F+V206L+D37
7H+K391A+
G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+G255A+D37
7H+K391A+
20 G476K,
H1*+N54S+V56T+G109A+T134E+A174S+G182*+D183*+G184T+N195F+V20
6L+K391A+
G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+V238T+D37
25 7H+K391A+
G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+V291A+D37
7H+K391A+
G476K,
30 H1*+N54S+V56T+K72R+G109A+T134E+A174S+G182*+D183*+G184T+N195
F+V206L+

G255A+K391A+G476K,
H1*+N54S+V56T+G109A+L173H+A174S+G182*+D183*+N195F+V206L+K391A+G476K,
H1*+N54S+V56T+K72N+G109A+A174S+G182*+D183*+N195F+V206L+K391A+G476K,
5 A+G476K,
H1*+N54S+V56T+K72N+G109A+W167L+A174S+G182*+D183*+N195F+V206L+K391A+G476K,
H1*+N54S+V56T+G109A+Q118R+T134E+A174S+G182*+D183*+N195F+V206L+G255A+
10 D377H+K391A+G476K,
H1*+N54S+V56T+K72R+G109A+A174S+G182*+D183*+N195F+G184T+V206L+K391A+G476K,
H1*+N54S+V56T+K72R+G109A+Q118R+A174S+G182*+D183*+N195F+V206L+G255A+
15 D377H+K391A+G476K,
H1*+N54S+V56T+G109A+G182*+D183*+N195F+V206L+D377H+K391A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+D377H+K391A+G476K,
20 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+D377H+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+D377H+K391A,
25 1A,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+D377S+K391A+G476K,
H1*+N54S+V56T+G109A+R116E+A174S+G182*+D183*+N195F+V206L+K391A+G476K,
30 H1*+N54S+V56T+G109A+T134E+A174S+G182*+D183*+N195F+V206L+D377H+K391A+

G476K,
H1*+N54S+V56T+G109A+R116S+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
H1*+N54S+V56T+G109A+R116I+A174S+G182*+D183*+N195F+V206L+K39
5 1A+G476K,
H1*+N54S+V56T+G109A+R116G+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
H1*+T51A+N54S+V56T+G109A+Q172S+A174S+G182*+D183*+N195F+V206
L+K391A+
10 G476K,
H1*+T51E+N54S+V56T+G109A+Q172T+A174S+G182*+D183*+N195F+V206
L+K391A+
G476K,
H1*+T51S+N54S+V56T+G109A+Q172N+A174S+G182*+D183*+N195F+V206
15 L+K391A+
G476K,
H1*+T51E+N54S+V56T+G109A+Q172L+A174S+G182*+D183*+N195F+V206
L+K391A+
G476K,
20 H1*+T51E+N54S+V56T+G109A+Q172R+A174S+G182*+D183*+N195F+V206
L+K391A+
G476K,
H1*+N54S+V56T+G109A+Q172K+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
25 H1*+N54S+V56T+K72R+G109A+Q172S+A174S+G182*+D183*+N195F+V206
L+K391A+
G476K,
H1*+N54S+V56T+K72H+G109A+Q172T+A174S+G182*+D183*+N195F+V206
L+K391A+
30 G476K,
H1*+N54S+V56T+K72Q+G109A+Q172R+A174S+G182*+D183*+N195F+V206

L+K391A+
G476K,
H1*+N54S+V56T+K72R+G109A+Q172T+A174S+G182*+D183*+N195F+V206
L+K391A+
5 G476K,
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L+K391A+
G476K,
H1*+N54S+V56T+K72Q+G109A+Q172M+A174S+G182*+D183*+N195F+V206
10 L+K391A+
G476K
H1*+N54S+V56T+K72S+G109A+A174H+G182*+D183*+N195F+V206L+K391
A+G476K,
H1*+N54S+V56T+K72Q+G109A+A174D+G182*+D183*+N195F+V206L+K391
15 A+G476K,
H1*+N54S+V56T+K72R+G109A+A174D+G182*+D183*+N195F+V206L+K391
A+G476K,
H1*+N54S+V56T+K72Q+G109A+A174K+G182*+D183*+N195F+V206L+K391
A+G476K,
20 H1*+N54S+V56T+G109A+A174G+G182*+D183*+N195F+V206L+K391A+G47
6K,
H1*+N54S+V56T+K72R+G109A+A174Q+G182*+D183*+N195F+V206L+K391
A+G476K,
H1*+N54S+V56T+K72Q+G109A+A174G+G182*+D183*+N195F+V206L+K391
25 A+G476K,
H1*+N54S+V56T+K72S+G109A+A174N+G182*+D183*+N195F+V206L+K391
A+G476K,
H1*+N54S+V56T+K72R+G109A+A174H+G182*+D183*+N195F+V206L+K391
A+G476K,
30 H1*+G50A+N54S+V56T+G109A+A174E+G182*+D183*+N195F+A204T+V206
L+S323N+

K391A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+A204G+V206L+K39
1A+G476K,
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5 1A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+I214W+K39
1A+G476K,
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7H+K391A+
10 G476K,
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7H+K391A+
G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+A263G+D37
15 7H+K391A+
G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+M286F+D37
7H+K391A+
G476K,
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7H+K391A+
G476K,
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7H+K391A+
25 G476K,
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G476K,
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30 7H+K391A+
G476K,

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7H+K391A+
G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+L250I+D37
5 7H+K391A+
G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+L250V+D37
7H+K391A+
G476K,
10 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391Y+G47
6K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391V+G47
6K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391M+G47
15 6K,
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7H+K391A+
G476K,
H1*+N54S+V56T+G109S+A174S+G182*+D183*+N195F+V206L+K391A+G47
20 6K,
H1*+N54S+V56T+G109A+A174V+G182*+D183*+N195F+V206L+K391A+G47
6K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+M246F+D37
7H+K391A+
25 G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+M246V+D37
7H+K391A+
G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+M246S+D37
30 7H+K391A+
G476K,

- H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391R+G476K,
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5 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391W+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391I+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+L250T+D37
10 7H+K391A+
G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+L250A+D37
7H+K391A+
G476K,
15 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+L250F+D37
7H+K391A+
G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+L250M+D37
7H+K391A+
20 G476K,
H1*+N54S+V56T+G109A+Q172H+L173A+A174P+G182*+D183*+N195F+V206L+K391A+
G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+G184T+N195F+V206L+G25
25 5A+D377H+
K391A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+S376T+K391A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+S376V+K391A+G476K,
30 1A+G476K,
H1*+N54S+V56T+G109A+Q172E+L173I+A174N+G182*+D183*+N195F+V20

- 6L+K391A+
G476K,
H1*+N54S+V56T+G109A+Q172D+L173A+A174T+G182*+D183*+N195F+V20
6L+K391A+
5 G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+Y267M+D37
7H+K391A+
G476K,
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10 1A+G476K,
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1A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+V264T+K39
1A+G476K,
15 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+V264I+K39
1A+G476K,
H1*+N54S+V56T+G109A+W167H+Q172N+L173A+A174S+G182*+D183*+N19
5F+V206L+
K391A+G476K,
20 H1*+N54S+V56T+G109A+Q172N+L173T+A174S+G182*+D183*+N195F+V20
6L+K391A+
G476K,
H1*+N54S+V56T+G109A+Q172E+L173M+A174H+G182*+D183*+N195F+V20
6L+K391A+
25 G476K,
H1*+N54S+V56T+G109A+W167Y+Q172E+L173V+A174H+G182*+D183*+N19
5F+V206L+
K391A+G476K,
H1*+N54S+V56T+G109A+L173A+A174T+G182*+D183*+N195F+V206L+K39
30 1A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+V291A+F32

8L+K391A+
G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+M246L+K39
1A+G476K,
5 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+L250V
+K391A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+L250F
+K391A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+L250M+K39
10 1A+G476K,
H1*+N54S+V56T+G109A+T165G+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
H1*+T51A+N54S+V56T+G109A+Q172R+A174S+G182*+D183*+N195F+V206
L+K391A+
15 G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391L+G47
6K,
H1*+N54S+V56T+G109A+F113Q+R116H+Q172G+A174S+G182*+D183*+N19
5F+V206L+
20 K391A+G476K,
H1*+N54S+V56T+G109S+F113Q+R116Q+A174S+G182*+D183*+N195F+V20
6L+K391A+
G476K,
H1*+N54S+V56T+G109A+Q172D+A174S+G182*+D183*+N195F+A204G+V20
25 6L+K391A+
P473R+G476K,
H1*+N54S+V56T+K72R+G109A+T134E+A174S+G182*+D183*+N195F+A204
G+V206L+
G255A+K391A+P473R+G476K,
30 H1*+N54S+V56T+K72R+G109A+W167F+A174S+G182*+D183*+N195F+A204
G+V206L+

K391A+G476K,
H1*+N54S+V56T+K72R+G109A+A174S+G182*+D183*+G184T+N195F+A204
G+V206L+
K391A+P473R+G476K,
5 H1*+N54S+V56T+G109A+W167F+Q172N+A174S+G182*+D183*+N195F+V20
6L+K391A+
P473R+G476K,
H1*+N54S+V56T+G109A+W167F+Q172G+A174S+G182*+D183*+N195F+V20
6L+K391A+
10 P473G+G476K,
H1*+N54S+V56T+G109A+W167F+Q172G+A174S+G182*+D183*+N195F+V20
6L+K391A+
P473R+G476K,
H1*+N54S+V56T+K72R+G109A+W167F+Q172R+A174S+G182*+D183*+N195
15 F+V206L+
K391A+G476K,
H1*+N54S+V56T+K72R+G109A+R116H+W167F+Q172R+A174S+G182*+D183
*+N195F+
V206L+K391A+G476K,
20 H1*+N54S+V56T+M105F+G109A+A174S+G182*+D183*+N195F+V206L+R32
0A+S323N+
K391A+C474V+G476K,
H1*+N54S+V56T+K72R+G109A+A174S+G182*+D183*+N195F+V206L+G255
A+K391A+
25 C474V+G476K,
H1*+N54S+V56T+G109A+T134E+A174S+G182*+D183*+N195F+V206L+K39
1A+C474V+
G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+D377H+K39
30 1A+C474V+
G476K,

H1*+N54S+V56T+K72R+G109A+A174S+G182*+D183*+N195F+V206L+K391
A+C474V+
G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+A265G+K39
5 1A+T444Q+
G476K+G477A,
H1*+A37V+N54S+V56T+G109A+W167F+Q172G+A174S+G182*+D183*+N195
F+V206L+
K391A+G346T+G477A+G476K,
10 H1*+N54S+V56T+G109A+R116Q+Q172D+A174S+G182*+D183*+N195F+V20
6L+G346T+
K391A+T444Q+G477A+G476K,
H1*+N54S+V56T+G109A+R116Q+W167F+Q172N+A174S+G182*+D183*+N19
5F+V206L+
15 G346T+K391A+T444Q+G477A+G476K,
H1*+N54S+V56T+G109S+R116Q+W167F+Q172N+A174S+G182*+D183*+N19
5F+V206L+
K391A+G476K,
H1*+N54S+V56T+G109S+W167F+Q172G+A174S+G182*+D183*+N195F+V20
20 6L+K391A+
G476K,
H1*+N54S+V56T+G109A+F113Q+Q172G+A174S+G182*+D183*+N195F+V20
6L+K391A+
T444Q+G476K
25 H1*+N54S+V56T+G109A+F113Q+R116H+Q172G+A174S+G182*+D183*+N19
5F+V206L+
K391A+T444Q+G476K,
H1*+N54S+V56T+G109A+F113Q+A174S+G182*+D183*+N195F+V206L+K39
1A+C474V+
30 G476K,
H1*+N54S+V56T+G109A+Q172N+A174S+G182*+D183*+N195F+V206L+V26

4I+K391A+
C474V+G476K,
H1*+N54S+V56T+G109A+Q172N+A174S+G182*+D183*+N195F+V206L+K391A+C474V+
5 G476K,
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C474V+G476K,
H1*+N54S+V56T+K72R+G109A+T134E+A174S+G182*+D183*+N195F+V206L+G255A+
10 K391A+C474V+G476K,
H1*+N54S+V56T+G109A+F113Q+R116H+Q172G+A174S+G182*+D183*+N195F+V206L+
K391A+T444Q+P473R+G476K,
15 H1*+N54S+V56T+G109A+F113Q+R116Q+Q172G+A174S+G182*+D183*+N195F+V206L+
K391A+T444Q+G476K,
H1*+N54S+V56T+G109A+R116H+W167F+Q172N+A174S+G182*+D183*+N195F+V206L+
20 K391A+G476K,
H1*+N54S+V56T+G109A+F113Q+R116H+T165G+Q172G+A174S+G182*+D183*+N195F+
V206L+K391A+T444Q+G476K,
H1*+N54S+V56T+G109A+F113Q+R116Q+T165G+Q172G+A174S+G182*+D183*+N195F+
25 V206L+K391A+T444Q+G476K,
H1*+N54S+V56T+G109A+F113Q+R116H+W167F+Q172R+A174S+G182*+D183*+N195F+
V206L+F289I+K391A+G476K,
30 H1*+N54S+V56T+G109A+F113Q+Q172N+A174S+G182*+D183*+N195F+V206L+K391A+

T444Q+G476K,
H1*+N54S+V56T+G109A+F113Q+R116H+Q172N+A174S+G182*+D183*+N19
5F+V206L+
K391A+G476K,
5 H1*+N54S+V56T+G109A+F113Q+R116Q+Q172M+A174S+G182*+D183*+N19
5F+V206L+
K391A+T444Q+G476K,
H1*+N54S+V56T+G109A+F113Q+R116H+Q172M+A174S+G182*+D183*+N19
5F+V206L+
10 K391A+G476K,
H1*+N54S+V56T+G109A+R116H+Q172M+A174S+G182*+D183*+N195F+V20
6L+K391A+
G476K,
H1*+N54S+V56T+G109A+R116Q+A174S+G182*+D183*+N195F+V206L+A26
15 5G+K391A+
T444Q+P473R+G476K,
H1*+N54S+V56T+G109A+R116Q+A174S+G182*+D183*+N195F+V206L+K39
1A+T444Q+
P473R+G476K,
20 H1*+N54S+V56T+K72R+G109A+T134E+T165G+A174S+G182*+D183*+N195
F+V206L+
G255A+K391A+G476K,
H1*+N54S+V56T+G109A+F113Q+R116H+W167F+Q172R+A174S+G182*+D18
3*+N195F+
25 V206L+K391A+G476K,
H1*+N54S+V56T+G109A+R116Q+W167F+Q172R+A174S+G182*+D183*+N19
5F+V206L+
A265G+K391A+P473R+G476K,
H1*+N54S+V56T+G109A+F113Q+A174S+G182*+D183*+N195F+V206L+K39
30 1A+G476K,
H1*+N54S+V56T+G109A+Q172N+A174S+G182*+D183*+N195F+V206L+K39

- 1A+G476K,
H1*+T51V+N54S+V56T+G109A+Q172D+A174S+G182*+D183*+N195F+V206
L+K391A+
G476K,
- 5 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+S280Q+H32
1Y+K391A+
G476K,
H1*+N54S+V56T+G109A+F113Q+R116H+Q172N+A174S+G182*+D183*+N19
5F+V206L+
- 10 K391A+G476K,
H1*+N54S+V56T+G109A+F113Q+R116H+Q172G+L173V+A174S+G182*+D18
3*+N195F+
V206L+K391A+T444Q+P473R+G476K,
H1*+N54S+V56T+G109A+R116Q+W167F+Q172N+L173V+A174S+G182*+D18
- 15 3*+N195F+
V206L+K391A+T444Q+G476K,
H1*+N54S+V56T+G109A+G133Q+W167F+Q172N+A174S+G182*+D183*+N19
5F+V206L+
Q395P+K391A+G476K,
- 20 H1*+N54S+V56T+G109A+F113Q+R116H+W167F+Q172N+L173V+A174S+G18
2*+D183*+
N195F+V206L+K391A+G476K,
H1*+A37V+N54S+V56T+K72R+G109A+R116H+W167F+Q172R+A174S+G182*
+D183*+
- 25 G184T+N195F+V206L+K391A+P473R+G476K,
H1*+N54S+V56T+K72R+G109A+F113Q+R116H+W167F+Q172G+L173V+A174
S+G182*+
D183*+G184T+N195F+V206L+K391A+T444Q+P473R+G476K,
H1*+N54S+V56T+G109S+R116Q+W167F+Q172R+A174S+G182*+D183*+N19
- 30 5F+V206L+
K391A+G476K,

- H1*+N54S+V56T+G109S+R116Q+W167F+Q172G+A174S+G182*+D183*+N195F+V206L+
K391A+P473R+G476K,
H1*+N54S+V56T+G109S+F113Q+W167F+Q172N+A174S+G182*+D183*+N195F+V206L+
K391A+G476K,
H1*+A37V+N54S+V56T+G109S+F113Q+W167F+Q172R+A174S+G182*+D183*+N195F+V206L+K391A+G476K,
10 H1*+N54S+V56T+K72R+G109A+R116H+T134E+W167F+Q172G+L173V+A174S+G182*+D183*+N195F+V206L+G255A+K391A+G476K,
H1*+N54S+V56T+K72R+G109A+R116H+T134E+W167F+Q172G+L173V+A174S+G182*+D183*+N195F+V206L+G255A+K391A+Q395P+T444Q+P473R+G476K,
15 H1*+N54S+V56T+K72R+G109A+F113Q+R116Q+W167F+Q172G+A174S+G182*+D183*+G184T+N195F+V206L+K391A+P473R+G476K,
H1*+N54S+V56T+K72R+G109A+F113Q+R116Q+T134E+W167F+Q172R+A174S+G182*+D183*+N195F+V206L+G255A+K391A+T444Q+P473R+G476K,
20 H1*+N54S+V56T+K72R+G109A+F113Q+R116H+T134E+W167F+Q172R+A174S+G182*+D183*+N195F+V206L+G255A+K391A+Q395P+G476K,
25 H1*+N54S+V56T+K72R+G109A+T134E+W167F+Q172N+A174S+G182*+D183*+N195F+V206L+G255A+A265G+K391A+T444Q+P473R+G476K,
H1*+N54S+V56T+K72R+G109A+G133Q+W167F+Q172R+A174S+G182*+D183*+N195F+V206L+K391A+G476K,
30 H1*+N54S+V56T+K72R+G109A+F113Q+R116Q+W167F+Q172G+A174S+G182

- *+D183*+
N195F+A204G+V206L+K391A+G476K,
H1*+N54S+V56T+K72R+G109A+F113Q+R116Q+W167F+Q172N+L173V+A174
S+G182*+
5 D183*+G184T+N195F+V206L+K391A+T444Q+P473R+G476K,
H1*+A37H+N54S+V56T+G109A+F113Q+W167F+Q172N+A174S+G182*+D183
*+N195F+
V206L+K391A+G476K,
H1*+N54S+V56T+G109A+F113Q+W167F+Q172N+A174S+G182*+D183*+N19
10 5F+V206L+
K391A+T459N+G476K,
H1*+N54S+V56T+G109A+F113Q+R116Q+A174S+G182*+D183*+N195F+V20
6L+K391A+
P473R+G476K,
15 H1*+N54S+V56T+A60V+G109A+R116Q+W167F+Q172N+A174S+G182*+D183
*+N195F+
V206L+K391A+G476K,
H1*+N54S+V56T+A60V+G109A+R116H+Q172R+L173V+A174S+G182*+D183
*+N195F+
20 V206L+K391A+G476K,
H1*+A37V+N54S+V56T+A60V+G109A+R116Q+T165G+A174S+G182*+D183*
+N195F+V206L+K391A+G476K,
H1*+A37H+N54S+V56T+A60V+G109A+R116Q+T165G+A174S+G182*+D183*
+N195F+V206L+K391A+G476K,
25 H1*+N54S+V56T+A60V+G109A+R116Q+W167F+Q172G+L173V+A174S+G182
+D183+
N195F+V206L+K391A+G476K,
H1*+N54S+V56T+A60V+G109A+R116Q+A174S+G182*+D183*+N195F+V206
L+K391A+
30 G476K,
H1*+A37H+N54S+V56T+A60V+G109A+R116Q+W167F+Q172R+A174S+G182*

+D183*+
N195F+V206L+K391A+G476K,
H1*+A37H+N54S+V56T+A60V+G109A+R116Q+W167F+Q172N+A174S+G182*
+D183*+
5 N195F+V206L+K391A+G476K,
H1*+N54S+V56T+A60V+G109A+R116Q+T165G+A174S+G182*+D183*+N195
F+V206L+
K391A+T444Q+P473R+G476K,
H1*+N54S+V56T+A60V+G109A+R116Q+A174S+G182*+D183*+N195F+V206
10 L+K391A+
T444Q+P473R+G476K,
H1*+N54S+V56T+A60V+G109A+R116Q+W167F+Q172N+L173V+A174S+G182
+D183+
N195F+V206L+K391A+G476K,
15 H1*+N54S+V56T+A60V+G109A+R116Q+W167F+Q172R+A174S+G182*+D183
*+N195F+
V206L+K391A+G476K,
H1*+N54S+V56T+G109A+R116A+W167F+Q172R+A174S+G182*+D183*+N19
5F+A204G+
20 V206L+K391A+P473R+G476K,
H1*+N54S+V56T+G109A+R116A+A174S+G182*+D183*+N195F+A204G+V20
6L+K391A+
P473R+G476K,
H1*+N54S+V56T+G109A+R116A+T165G+A174S+G182*+D183*+N195F+V20
25 6L+K391A+
T444Q+P473R+G476K,
H1*+N54S+V56T+G109A+G182*+D183*+N195F+K391A+G476K,
H1*+N54S+V56T+G109A+G182*+D183*+N195F+V206L,
N54S+V56T+G109A+G182*+D183*+N195F,
30 N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+G476K,
H1*+N54S+V56T+G109A+G182*+D183*+N195F+V206L+K391A+G476K,

- H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+G476K,
H1*+N54S+V56T+A174S+G182*+D183*+N195F+V206L+G273R+K391A+G47
6K,
- 5 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L,
N54S+V56T+G109A+A174S+G182*+D183*+N195F+K391A+G476K,
H1*+N54S+V56T+G109A+F113Q+Q172M+A174S+G182*+D183*+N195F+V20
6L+K391A+
G476K,
- 10 H1*+N54S+V56T+K72R+G109A+F113Q+T134E+A174S+G182*+D183*+N195
F+V206L+
G255A+K391A+G476K,
H1*+N54S+V56T+K72R+G109A+F113Q+T134E+A174S+G182*+D183*+N195
F+V206L+
- 15 G255A+K391A+P473R+G476K,
H1*+N54S+V56T+K72R+G109A+R116Q+A174S+G182*+D183*+G184T+N195
F+V206L+
K391A+G476K,
H1*+A37V+N54S+V56T+G109A+R116A+T165G+A174S+G182*+D183*+N195
- 20 F+V206L+
K391A+G476K,
H1*+A37V+N54S+V56T+G109A+R116Q+T165G+A174S+G182*+D183*+N195
F+V206L+
M246F+K391A+G476K,
- 25 H1*+V56A+G109A+A174S+G182*+D183*+N195F+V206L+G476K,
H1*+N54S+V56T+K72R+G109A+F113Q+R116H+A174S+G182*+D183*+G184
T+N195F+
V206L+K391A+T444Q+G476K,
- 30 H1*+N54S+V56T+G109S+F113Q+A174S+G182*+D183*+N195F+V206L+K39
1A+T444Q+
G476K,

H1*+N54S+V56T+G109A+F113Q+R116H+W167F+Q172G+L173V+A174S+G182*+D183*+
N195F+V206L+K391A+P473R+G476K,
H1*+N54S+V56T+G109A+F113Q+R116Q+Q172N+A174S+G182*+D183*+N195F+V206L+
A265G+K391A+P473R+G476K,
H1*+N54S+V56T+G109A+F113Q+W167F+Q172N+A174S+G182*+D183*+N195F+A204G+
V206L+K391A+P473R+G476K,
10 H1*+N54S+V56T+G109A+F113Q+R116H+W167F+Q172R+A174S+G182*+D183*+N195F+
A204G+V206L+K391A+P473R+G476K,
H1*+N54S+V56T+G109A+R116A+A174S+G182*+D183*+N195F+V206L+K391A+T444Q+
15 P473R+G476K,
H1*+N54S+V56T+G109A+R116H+Q172R+A174S+G182*+D183*+N195F+A204G+V206L+
K391A+P473R+G476K,
H1*+A37V+N54S+V56T+G109A+R116Q+T165G+A174S+G182*+D183*+N195F+V206L+
20 K391A+G476K,
H1*+A37H+N54S+V56T+G109A+R116H+T165G+A174S+G182*+D183*+N195F+V206L+
M246F+K391A+G476K,
25 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+K391A+G476K,
H1*+N54S+V56T+G109A+G133S+A174S+G182*+D183*+N195F+K391A+G476H,
H1*+N54S+V56T+G109A+R116A+Q172N+L173V+A174S+G182*+D183*+N195F+V206L+
30 K391A+G476K,
H1*+A37V+N54S+V56T+G109A+R116H+T165G+A174S+G182*+D183*+N195

F+V206L+
K391A+G476K,
H1*+P45A+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391
A+C474V+
5 G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+P364A+K39
1A+C474V+
G476K,
H1*+N54S+V56T+G109A+Q118R+T134E+A174S+G182*+D183*+N195F+V20
10 6L+K391A+
G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+G184T+N195F+V206L+K39
1A+G476K,
H1*+G50A+T51A+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L
15 +K391A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+V264F+K39
1A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+Y382L+K39
1A+G476K,
20 H1*+G7K
+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+G255A+Q25
6A+K391A+
G476K,
25 H1*+N54S+V56T+G109A+W167Y+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
H1*+N54S+V56T+G109A+W167H+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
H1*+N54S+V56T+G109A+T165V+A174S+G182*+D183*+N195F+V206L+K39
30 1A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+G47

6K,
H1*+N54S+V56T+G109A+A174N+G182*+D183*+N195F+V206L+K391A+G47
6K,
H1*+N54S+V56T+G109A+A174Q+G182*+D183*+N195F+V206L+K391A+G47
5 6K,
H1*+N16H+V17L+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L
+Y382F+K391A+G476K,
H1*+Q32S+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+Q385
L+K391A+
10 G476K,
H1*+N54S+V56T+R87S+G109A+R171H+A174S+G182*+D183*+N195F+V206
L+K391A+
G476K,
H1*+N54S+V56T+G109A+R116H+Q169E+Q172K+A174*+G182*+D183*+N19
15 5F+V206L+
K391A+G476K,
H1*+N54S+V56T+G109A+A174*+G182*+D183*+N195F+V206L+K391A+G47
6K,
H1*+K72R+G109A+F113Q+R116Q+W167F+Q172G+A174S+G182*+D183*+G1
20 84T+N195F+
V206L+K391A+P473R+G476K,
H1*+N54S+V56T+K72R+G109A+F113Q+R116Q+W167F+Q172G+A174S+G182
+D183+
G184T+N195F+V206L+P473R+G476K,
25 H1*+N54S+V56T+G109A+Q169E+Q172G+A174*+G182*+D183*+N195F+V20
6L+K391A+
G476K,
H1*+N54S+V56T+K72R+G109A+F113Q+R116Q+W167F+Q172G+A174S+G182
+D183+
30 G184T+N195F+K391A+P473R+G476K,
H1*+N54S+V56T+G109A+R116W+Q169E+Q172K+A174*+G182*+D183*+N19

5F+V206L+
K391A+G476K,
H1*+N54S+V56T+G109A+Q169E+Q172K+A174*+G182*+D183*+N195F+V20
6F+K391A+
5 G476K,
H1*+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+N260G+K39
1A+G476K,
H1*+N54S+V56T+K72R+G109A+A174S+G182*+D183*+N195F+V206L+K391
10 A+G476K,
H1*+N54S+V56T+G109A+Q169E+Q172K+A174*+G182*+D183*+G184T+N19
5F+V206L+
K391A+G476K,
H1*+N54S+V56T+G109A+Q169E+Q172K+A174*+G182*+D183*+N195F+V20
15 6L+Y295N+
K391A+G476K,
H1*+N54S+V56T+G109A+W167F+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
H1*+N54S+V56T+G109A+Q169E+Q172K+A174*+G182*+D183*+A186N+N19
20 5F+V206L+
K391A+G476K,
H1*+N54S+V56T+G109A+Q169E+Q172K+A174*+G182*+D183*+N195F+V20
6L+A288V+
K391A+G476K,
25 H1*+N54S+V56T+G109A+Q169E+Q172K+A174*+G182*+D183*+N195F+V20
6L+G255A+
K391A+G476K,
H1*+N54S+G109A+Q169E+Q172K+A174*+G182*+D183*+N195F+V206L+K3
91A+G476K,
30 H1*+W48F+N54S+V56T+G109A+Q169E+Q172K+A174*+G182*+D183*+N195
F+V206L+

- K391A+G476K,
H1*+N54S+V56T+G109A+Q169E+Q172K+A174*+G182*+D183*+N195F+V20
6L+V291A+
K391A+G476K,
- 5 H1*+N54S+V56T+G109A+F113Q+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
H1*+N54S+V56T+G109A+Q169E+Q172K+A174*+G182*+D183*+N195F+V20
6L+R320A+
S323N+K391A+G476K,
- 10 H1*+V56T+G109A+Q169E+Q172K+A174*+G182*+D183*+N195F+V206L+K3
91A+G476K,
H1*+N54S+V56T+K72R+G109A+F113Q+R116H+W167F+Q172G+A174S+G182
+D183+
G184T+N195F+V206L+K391A+P473R+G476K,
- 15 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+N270T+K39
1A+G476K,
H1*+N54S+V56T+G109A+Q169E+Q172K+A174*+G182*+D183*+N195F+V20
6L+G476K,
H1*+N54S+V56T+G109A+Q169E+Q172K+A174*+G182*+D183*+N195F+V20
6L+N260G+
- 20 K391A+G476K,
H1*+N54S+V56T+G109A+F113Q+R116H+A174S+G182*+D183*+N195F+V20
6L+K391A+
G476K,
- 25 H1*+N54S+V56T+G109A+Q172G+A174S+G182*+D183*+N195F+V206L+K39
1A+G476K,
H1*+N54S+V56T+G109A+A174S+A186D+G182*+D183*+N195F+V206L+K39
1A+G476K,
H1*+N54S+V56T+G109A+Q169E+Q172K+A174*+G182*+D183*+N195F+V20
6L+A225V+
- 30 K391A+G476K,

H1*+G109A+Q169E+Q172K+A174*+G182*+D183*+N195F+V206L+K391A+G476K,
H1*+N54S+V56T+G109A+Q169E+Q172K+A174*+G182*+D183*+N195F+V206L+G255S+
5 K391A+G476K,
H1*+N54S+V56T+G109A+Q169E+Q172K+A174*+G182*+D183*+N195F+V206L+K269Q+
K391A+G476K,
H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+G255S+K391A+G476K,
10 1A+G476K,
H1*+N54S+V56T+G109A+Q169E+Q172K+A174S+G182*+D183*+N195F+V206L+K391A+
G476K,; en donde la numeración es acorde con la SEQ ID NO: 13, y
15 H1*+T40D+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+I405L+A421H+A422P+A428T
H1*+N54S+V56T+G109A+F113Q+N125D+A174S+G182*+D183*+N195F+V206L+I405L+
A421H+A422P+A428T
20 H1*+N54S+V56T+G109A+F113Q+R116H+Q172N+A174S+G182*+D183*+N195F+V206L+
I405L+A421H+A422P+A428T
H1*+N54S+V56T+K72R+G109A+T134E+W167F+Q172N+A174S+G182*+D183*+N195F+
25 V206L+G255A+A265G+I405L+A421H+A422P+A428T
H1*+N54S+V56T+K72R+G109A+R116Q+W167F+Q172R+L173V+A174S+G182*+D183*+
N195F+V206L+A265G+I405L+A421H+A422P+A428T
H1*+N54S+V56T+K72R+G109A+R116Q+W167F+Q172R+A174S+G182*+D183*+N195F+
30 V206L+I405L+A421H+A422P+A428T

H1*+N54S+V56T+K72R+G109A+F113Q+T134E+W167F+Q172G+A174S+G182*+D183*+

N195F+V206L+G255A+I405L+A421H+A422P+A428T

5 H1*+N54S+V56T+G109A+F113Q+R116Q+W167F+Q172G+A174S+G182*+D183*+N195F+

A204G+V206L+I405L+A421H+A422P+A428T

H1*+N54S+V56T+K72R+G109A+R116Q+V120L+A174S+G182*+D183*+G184T+N195F+

V206L+I405L+A421H+A422P+A428T

10 H1*+N54S+V56T+G109A+F113Q+R116H+W167F+Q172G+L173V+A174S+G182*+D183*+

N195F+V206L+I405L+A421H+A422P+A428T

H1*+N54S+V56T+G109A+F113Q+R116Q+Q172N+A174S+G182*+D183*+N195F+V206L+

15 A265G+I405L+A421H+A422P+A428T

H1*+A37H+N54S+V56T+A60V+G109A+R116Q+W167F+Q172R+A174S+G182*+D183*+

N195F+V206L+I405L+A421H+A422P+A428T, en donde la numeración es acorde con la SEQ ID NO: 14 y en donde dicho IF se determina mediante el uso del detergente modelo A.

19. La variante de acuerdo con una cualquiera de las reivindicaciones anteriores, en donde dicha variante se selecciona entre un grupo que consiste en:

-

25 H1*+N54S+V56T+G109A+A174S+G182*+D183*+N195F+V206L+K391A+G476K

-

H1*+N54S+V56T+G109A+Q169E+Q172K+A174*+G182*+D183*+N195F+V206L+ K391A+G476K

30 -

H1*+N54S+V56T+G109A+R116H+A174S+G182*+D183*+N195F+V206L+K39

1A+G476K

-

H1*+N54S+V56T+G109A+R116Q+W167F+A174S+G182*+D183*+G184T+N19
5F+V206L+ K391A+G476K

5

-

H1*+N54S+V56T+K72R+G109A+F113Q+R116Q+W167F+Q172G+A174S+G182
+D183+ N195F+V206L+K391A+G476K

-

10 H1*+N54S+V56T+K72R+G109A+F113Q+R116Q+W167F+Q172G+A174S+G182
+D183+

G184T+N195F+V206L+K391A+P473R+G476K

-

H1*+N54S+V56T+G109A+F113Q+R116Q+Q172N+A174S+G182*+D183*+N19
5F+V206L+

15

A265G+K391A+P473R+G476K

-

H1*+N54S+V56T+K72R+G109A+G133Q+W167F+Q172R+A174S+G182*+D183
*+N195F+

V206L+K391A+G476K

20

-

H1*+N54S+V56T+K72R+G109A+R116H+T134E+W167F+Q172G+L173V+A174
S+G182*+

D183*+N195F+V206L+G255A+K391A+G476K, y

-

25

H1*+N54S+V56T+K72R+G109A+R116H+T134E+W167F+Q172G+L173V+A174
S+G182*+

D183*+N195F+V206L+G255A+K391A+Q395P+T444Q+P473R+G476K

en donde la numeración es acorde con la SEQ ID NO: 13.

30

20. Una composición que comprende una variante de
acuerdo con una cualquiera de las reivindicaciones
anteriores.

21. La composición de acuerdo con la reivindicación 20, en donde dicha composición comprende además al menos un componente activo adicional.

5 22. La composición de acuerdo con una cualquiera de las reivindicaciones 20 y 21, en donde dicho componente activo adicional es una enzima, tal como una proteasa, lipasa, celulasa, pectato liasa y mananasa.

10 23. La composición de acuerdo con una cualquiera de las reivindicaciones 20 a 22, que es una composición líquida para el lavado de ropa o para el lavado de vajilla, tal como una composición de detergente líquido para lavavajillas automático (ADW) o un detergente en polvo para ropa, tal como una pastilla de jabón o una composición de lavavajillas en polvo, tal como una composición de
15 detergente en dosis unitaria para ADW y tal como una composición de detergente para el lavado a mano de vajilla (HDW).

20 24. La composición de acuerdo con una cualquiera de las reivindicaciones 20 a 23, en donde dicha composición comprende además un tensioactivo, adyuvante, blanqueante, polímero o en donde dicha composición está libre de fosfatos.

25 25. Un polinucleótido que codifica la variante de acuerdo con una cualquiera de las reivindicaciones 1 a 19.

26. Una construcción de ácido nucleico que comprende el polinucleótido de acuerdo con la reivindicación 25.

27. Un vector de expresión que comprende el polinucleótido de acuerdo con la reivindicación 25.

30 28. Una célula hospedadora que comprende el polinucleótido de acuerdo con la reivindicación 25, la construcción de ácido nucleico de acuerdo con la

reivindicación 26 o el vector de expresión de acuerdo con la reivindicación 27.

29. Un método para producir una variante de alfa-amilasa que comprende:

- 5 a. cultivar la célula hospedadora de la reivindicación 28 en condiciones adecuadas para la expresión de dicha variante; y
- b. recuperar dicha variante.

30. Un método para mejorar el rendimiento de lavado
10 de un polipéptido parental que tiene la secuencia de aminoácidos de SEQ ID NO: 13 o 14 o que tiene al menos un 80% de identidad de secuencia con los mismos, comprendiendo dicho método las etapas de:

- a) una sustitución y/o eliminación de dos, tres o
15 cuatro posiciones en la alfa-amilasa parental, correspondiendo dichas posiciones a las posiciones 181, G182, D183 y G184 del polipéptido maduro de SEQ ID NO: 4; y
- b) una alteración en una o más posiciones correspondientes a las posiciones H1, T5, G7, Q11, N16,
20 V17, Q32, A37, T40, P45, W48, G50, T51, N54, V56, K72, R87, Q98, M105, G109, F113, R116, Q118, Q125, G133, T134, W140, G142, G149, T165, W167, Q169, R171, Q172, L173, A174, G184, A186, E190, T193, N195, A204, V206, P211, I214, V215, L217, L219, A225, L235, V238, K242, S244, M246, M248, L250, G255,
25 Q256, N260, A263, V264, Y267, K269, N270, G273, S280, W284, T285, M286, F289, V291, N295, Q299, R320, H321, S323, H324, V326, F328, T334, D337, Q345, G346, G348, T355, S376, D377, D379, Y382, S383, Q385, K391, K393, Q395, A420, G423, T444, A445, Q449, T459, P473, C474, G476, G477, y K484 de la SEQ
30 ID NO: 13; o H1, A37, T40, N54, V56, A60, K72, G109, F113, R116, N125, F133, T134, T165, Q169, Q172, L173, A174, G184,

A186, E190, N195, G196, A204, V206, A225, L228, K242, S244, G255, N260, A265, K269, S280, W284, N295, S304, R320, H321, S323, V326, K391, I405, A421, A422, A428, G448, D476, y G477 de la SEQ ID NO: 14,

5 en donde la variante tiene al menos un 80%, al menos un 85%, al menos un 90%, al menos un 95%, al menos un 97%, al menos un 98%, al menos un 99% pero menos de un 100% de identidad de secuencia con el polipéptido de SEQ ID NO: 4 o 7 y en donde dicha variante tiene actividad alfa-amilasa y
10 un rendimiento de lavado mejorado en comparación con dicho polipéptido parental.

31. El método de acuerdo con la reivindicación 30, en donde dicha variante tiene al menos un 50%, tal como al menos un 60%, o al menos un 70%, o al menos un 80%, o al
15 menos un 90%, o al menos un 100% de la actividad de dicho polipéptido parental que tiene la secuencia de aminoácidos de la SEQ ID NO: 7.

32. El método de acuerdo con una cualquiera de las reivindicaciones 30 y 31, en donde dicha actividad se
20 determina de acuerdo con un ensayo de Phadebas.

33. Uso de una variante de acuerdo con una cualquiera de las reivindicaciones 1 a 19 en un proceso de limpieza, tal como el lavado de ropa o el lavado de superficies duras, incluyendo el lavado de vajilla y la limpieza
25 industrial.