



T547K (2430)
2401 AAATGCGTGAACCTTTAACTTTAACGGACTC**AAAG**GGAACCGCGTATTGACGGAGAGTAACAAGAAGTTCCTGCCATTCCAGCAGTTCGGTCGCGATATTG
534▶ K C V N F N F N G L K G T G V L T E S N K K F L P F Q Q F G R D I

2501 CCGACACTACCGACGCTGTCGAGATCCCCAGACATTGGAGATTCTTGATATCACACCCTGTAGTTTCGGCGGAGTGAGCGTGATTACGCCCGGAACCAA
567▶ A D T T D A V R D P Q T L E I L D I T P C S F G G V S V I T P G T N

D614G (2631)
2601 TACCAGCAATCAGGTTGCCGTCTGTATCAG**GGC**GTGAATTGCACCGAGGTACCTGTCCCATCCACGCTGACCAACTTACACCCACATGGCGAGTATAT
600▶ T S N Q V A V L Y Q G V N C T E V P V A I H A D Q L T P T W R V Y

H655Y (2754)
2701 TCCACCGGCTCCAACGCTTTTCAGACACGTGCTGGATGCTGTATCGGTGCAGAA**TAI**GTTAATAATAGCTACGAGTGTGATATCCCATCGGTGCTGGAA
634▶ S T G S N V F Q T R A G C L I G A E Y V N N S Y E C D I P I G A G

P681H (2832)
N679K (2826) **Furin cleavage site**
2801 TATGCGCCTTTATCAAACCTCAAAC**AAA**TCT**CAC**AGCGGGCA**CGTAGT**GTAGCATCCCAAAGTATCATTGCCTACACAATGAGCCTCGGTGCTGAGAA
667▶ I C A S Y Q T Q T K S H R R A R S V A S Q S I I A Y T M S L G A E N
2901 TTCTGTCGCTACAGCAACAACCTCATTGCTATCCCTACTA**ACTT**CACAATCAGTGTGACA**ACT**GAAATTCTGCCGTATCTATGACCAAAA**CA**AGCGTT
700▶ S V A Y S N N S I A I P T N F T I S V T T E I L P V S M T K T S V

N764K (3081)
3001 GACTGCACCATGTACATCTGTGGCGATTCTACCGAATGTAGCAATCTCCTCCTGCAATACGGATCATTCTGCACTCAGT**GAA**CGTGGCCTCACAGGTA
734▶ D C T M Y I C G D S T E C S N L L L Q Y G S F C T Q L K R A L T G

D796Y (3177)
3101 TTGCGATTGAGCAGGACAAGAATACGCAGGAAGTGTGGCCAGGTGAAGCAAATCTACAAA**ACT**CCACCCATA**AAA****TAC**TTTGGCGATTCAATTTCTC
767▶ I A V E Q D K N T Q E V F A Q V K Q I Y K T P P I K Y F G G F N F S
3201 ACAGATCTGCCCGATCCCTCAAACCTCAAAGCGTAGCTTTATCGAGGATCTGCTCTTCAA**CA**AGTAACCTCGCAGATGCCGTTTCA**CA**AGCAG
800▶ Q I L P D P S K P S K R S F I E D L L F N K V T L A D A G F I K Q

N856K (3357)
3301 TATGGCGATTGTCTGGGAGACATCGCCGCTCGGGACCTGATCTGTGCACAGAAGTTC**AAA**GGACTGACCGTCTGCCCTCCCTTGTGACCGACGAGATGA
834▶ Y G D C L G D I A A R D L I C A Q K F K G L T V L P P L L T D E M
3401 TAGCCCAATACACTAGCGCCCTGCTGGCCGGCACCATCACTTCTGGTGGACATTCGGAGCTGGCGTCCCTT**CAG**ATTCTTTTGTATG**CAG**ATGGC
867▶ I A Q Y T S A L L A G T I T S G W T F G A G A A L Q I P F A M Q M A
3501 CTACCGCTTTAA**CG**GCATCGGTGTGACACAAA**CG**TTCTGTATGAAA**ACC**GAGAA**ACT**CATCGCA**ACC**AGT**CA**ACAGTGTATCGGTAAGATACAGGAT
900▶ Y R F N G I G V T Q N V L Y E N Q K L I A N Q F N S A I G K I Q D

Q954H (3651) **N969K (3696)**
3601 AGCCTGTCCACTGCCAGCGCATTGGGAAAGTTCAGGATGTAGTGAAC**CACA**ATGCCAGGC**ACT**TAACACCCTGGTGA**AA**CAGCTCTCTT**CAAA**GT
934▶ S L S S T A S A L G K L Q D V V N H N A Q A L N T L V K Q L S S K

L981F (3732)
3701 TTGGTGCCATTTCTAGCGTCTGAATGACATA**TTT**AGCCGGTTGGACAAGGTGGAGGCTGAAGTGCAGATTGATAGGCTGATA**ACT**GGGGCCCTCAGTC
967▶ F G A I S S V L N D I F S R L D K V E A E V Q I D R L I T G R L Q S
3801 TCTTCAGACCTATGTGACCCAGCAGCTCATCCGCGCTGTCAA**AA**TTCCGCATCCGCTAACTGGCAGCA**AAA**AAATGTCGGAGTGTGTGCTGGGTCAG
1000▶ L Q T Y V T Q Q L I R A A E I R A S A N L A A T K M S E C V L G Q
3901 TCTAAGAGAGTGGACTTTTGGCGGAAGGGTATCACCTGATGTCTTTTCTCAGTCTGCACCCATGGTGTGGTCTTTCTGCACGTGACTTATGTCCAG
1034▶ S K R V D F C G K G Y H L M S F P Q S A P H G V V F L H V T Y V P
4001 CTACGAAAAGAACTTACTACAGCC**AG**CCATCTGCCAGATGGGAAAGCCACTTTCCAGGGAAAGCGTATTGCTGCAATGGTACTCATTGGTT
1067▶ A Q E K N F T T A P A I C H D G K A H F P R E G V F V S N G T H W F
4101 CGTCACTCAGAGAAATTTCTACGAGCC**AG**ATTATA**ACC**ACTGACAATACATTTGTATCCGGCAATTGTGATGTGGTTATCGGGATTGTGAATA**ACT**
1100▶ V T Q R N F Y E P Q I I T T D N T F V S N G C D V V I G I V N N T
4201 GTTACGATCCTTTGCAGCCAGAGCTGGACTCCTTCAAGGAGGAGCTTGACA**AA**ATTTTAA**GA**ATCACACATCACTGACGTCCAGCTCGGAGATATTT
1134▶ V Y D P L Q P E L D S F K E E L D K Y F K N H T S P D V D L G D I
4301 CAGGAATCAATGCTTCCGTGGTCAATATT**CAGA**AGGAGATAGACAGGCTGAATGAGGTTGCCAAGAA**CC**TCAACGAGTCTCTGATCGATCTGCAGGAGTT
1167▶ S G I N A S V V N I Q K E I D R L N E V A K N L N E S L I D L Q E L
4401 GGGCAAGTACGAACAGTATATCAAATGGCC**TT**GGTACATTTGGCTTGGGTT**CATT**GTCTGGGCTGATAGCTATCGTCATGGTGA**CA**ATTATGTTGTGTTGC
1200▶ G K Y E Q Y I K W P W Y I W L G F I A G L I A I V M V T I M L C C

Nhel (4558)
4501 ATGACATCCTGTGTAGTTGTCTGAAGGGCTGTGCTCATGGCGAGCTGTTGCTAAAG**CTAGCTGGCCAGACATGATAAGATACATTGATGAGTTTGG**A
1234▶ M T S C C S C L K G C C S C G S C C •

4601 CAAACCACA**ACT**AGAATGCAGTGA**AAAA**AATGCTTTATTTGT**GAA**ATTTGTGATGCTATTGCTTTATTTGTAACCATTATAAGCTGCAATA**AA**CAAGTTA

4701 ACAACA**CA**ATTGCATTCATTTATGTTTCAGTTCAGGGGAGGTGTGGGAGTTTTTAAAGCAAGTAA**AA**CTCTACA**AA**TGTGGTATGGA**AT**CTA

4801 AAATACAGCATAGCA**AA**ACTTTAACCTCAAATCAAGCCTCTACTTGAATCCTTTTCTGAGGGATGAATAAGGCATAGGCATCAGGGGCTGTTGCCA**AT**G

4901 TGCATTAGCTGTTTGCAGCCTCACCTCTTTTATGAGTAAAGATATAGTGTATTTTCCAAGGTTTGA**ACT**AGCTTCTCATTCTTTATGTTTT**AA**AT

5001 GC**ACT**GACCTCCACATTCCTTTTTAGTAA**AA**ATTCAGAA**AA**ATTTAAATACATCATTGCAATGAA**AA**ATAATGTTTTTATTAGGCAG**AA**TCCAG**A**

5101 TGCTCAAGGCCCTCATAATATCC**CC**AGTTT**AG**TAGTTGGACTTAGG**AA**CA**AA**GGAA**CC**TTAATAGAA**AT**TGGACAGCA**AA**GG**AA**GGCAGCTTCTAG**C**

5201 TTTAGTTCCTGGTGTACTT**GAG**GGGATGAGTTCCTCAATGGTGGTTTTGACCAGCTTGCATT**CAT**CTCAATGAGCACA**AA**GGCAGT**CAG**GAGCATAGT**C**
141▶ • N R T Y K L P I L E E I T T K V L K G N M E I L V F C D P A Y D

5301 AGAGATGAGCTCTCTGCACATGCCACAGGGGCTGACCACCCTGATGGATCTGTCCACCTCATCAGAGTAGGGTGCCTGACAGCCACAATGGTGTCAAAG
108 S I L E R C M G C P S V V R I S R D V E D S Y P H R V A V I T D F
5401 TCCTTCTGCCGTTGCTCACAGCAGACCCAATGGCAATGGCTTCAGCACAGACAGTGACCCTGCCAATGTAGGCCTCAATGTGGACAGCAGAGATGATCT
74 D K Q G N S V A S G I A I A E A C V T V R G I Y A E I H V A S I I E
5501 CCCAGTCTTGGTCTGTATGGCCGCCCGACATGGTGCTTGTTCCTCATAGAGCATGGTGATCTTCTCAGTGGCGACCTCCACCAGCTCCAGATCCTG
41 G T K T R I A A G V H H K N D E Y L M T I K E T A V E V L E L D Q
5601 CTGAGAGATGTTGAAGGTCCTCATGATGGCCCTCTATAGTGAGTCGTATTATACTATGCCGATATACTATGCCGATGATTAATTGTCAAACAGCGTGG
8 Q S I N F T K M
5701 ATGGCGTCTCCAGCTTATCTGACGGTCACTAAACGAGCTCTGCTTATATAGACCTCCACCGTACACGCCTACCGCCATTTGCGTCAATGGGGCGGAG
5801 TTGTTACGACATTTTGGAAAGTCCCCTTGTATTACTAGTCAAACAACTCCATTGACGTCAATGGGGTGGAGACTTGGAAATCCCCGTGAGTCAAAC
5901 GCTATCCACGCCATTGATGTACTGCCAAAACCGCATCATCATGGTAATAGCGATGACTAATACGTAGATGTACTGCCAAGTAGGAAAGTCCATAAGGT
6001 CATGTACTGGGCATAATGCCAGGCGGGCCATTTACCCTCATTGACGTCAATAGGGGGCTACTTGGCATATGATACACTTGTACTGCCAAGTGGGCA
6101 GTTTACCGTAAATACTCCACCATTGACGTCAATGGAAAGTCCCTATTGGCGTACTATGGGAACATACGTCAATTATTGACGTCAATGGGCGGGGTCGT
6201 TGGGCGTTCAGCCAGGCGGGCCATTTACCGTAAGTTATGTAACGCCTGCAGGTTAATTAAGAACATGTGAGCAAAGGCCAGCAAAGGCCAGGAACCGT
BspLU111 (6262)
6301 AAAAAGGCCGCGTTGCTGGCGTTTTTCCATAGGCTCCGCCCCCTGACGAGCATCACAAAATCGACGCTCAAGTCAGAGGTGGCGAAACCCGACAGGAC
6401 TATAAAGATAACAGGCGTTTTCCCTGGAAGCTCCCTCGTGCCTCTCTGTTCGACCCTGCCGCTTACCGGATACCTGTCCGCCTTCTCCCTTCGGG
6501 AAGCGTGGCGCTTCTCATAGCTCACGCTGTAGGTATCTCAGTTCGGTGTAGGTCGTTTCGCTCCAAGCTGGGCTGTGTGCACGAACCCCGTTAGCCC
6601 GACCGTGCCTTATCCGTAAGTATCGTCTTGTAGTCCAACCCGTAAGACAGACTTATCGCCACTGGCAGCAGCCACTGGTAACAGGATTAGCAGAG
6701 CGAGGTATGTAGGCGGTGCTACAGAGTCTTGAAGTGGTGGCCTAACTACGGCTACACTAGAAGAACAGTATTTGGTATCTGCGCTCTGCTGAAGCCAGT
6801 TACCTTCGAAAAAGAGTTGGTAGCTTTGATCCGGCAAACAAACCACCGCTGGTAGCGGTGGTTTTTTTGTGTTGCAAGCAGCAGATTACGCGCAGAAAA
6901 AAAGGATCTCAAGAAGATCCTTTGATCTTTTACGGGGTCTGACGCTCAGTGAACGAAAACCTCACGTTAAGGGATTTTGGTCATGGCTAGTTAATTAA
7001 CATTTAAATCAGCGGCCCAATAAAATATCTTTATTTTATTACATCTGTGTGTTGGTTTTTTGTGTGAATCGTAACATAACGCTCTCCATCAAAC
7101 AAAACGAAACAAACAACTAGCAAATAGGCTGTCCCAGTGCAAGTGCAGGTGCCAGAACATTTCTATCGAA