Sequences:

SEQ ID NO 1 hemagglutinin A/CA/07/09 (V5) amino acid sequence

dtl cigyhannst dtvdtvlekn vtvthsvnll
edkhngklck lrgvaplhlg kcniagwilg npeceslsta sswsyivetp
ssdngtcypg dfidyeelre qlssvssfer feifpktssw pnhdsnkgvt
aacphagaks fyknliwlvk kgnsypklsk syindkgkev lvlwgihhps
tsadqqslyq nadayvfvgs sryskkfkpe iairpkvrgq egrmnyywtl
vepgdkitfe atgnlvvpry afamernags giiisdtpvh dcnttcqtpk
gaintslpfq nihpitigkc pkyvkstklr latglrnips iqsrglfgai
agfieggwtg mvdgwygyhh qneqgsgyaa dlkstqnaid eitnkvnsvi
ekmntqftav gkefnhlekr ienlnkkvdd gfldiwtyna ellvllener
tldyhdsnvk nlyekvrsql knnakeigng cfefyhkcdn tcmesvkngt
ydypkyseea klnreeidgv klestriyqi laiystvass lvlvvslgai
sfwmcsngsl qcrici

SEQ ID NO 2 hemagglutinin A/CA/07/09 (V5) nt sequence

1 agcaaaagca ggggaaaaca aaagcaacaa aaatgaaggc aatactagta
51 gttctgctat atacatttgc aaccgcaaat gcagacacat tatgtatagg
101 ttatcatgcg aacaattcaa cagacactgt agacacagta ctagaaaaga
151 atgtaacagt aacacactct gttaaccttc tagaagacaa gcataacggg
201 aaactatgca aactaagagg ggtagcccca ttgcatttgg gtaaatgtaa
251 cattgctggc tggatcctgg gaaatccaga gtgtgaatca ctctccacag
301 caagctcatg gtcctacatt gtggaaacac ctagttcaga caatggaacg
351 tgttacccag gagatttcat cgattatgag gagctaagag agcaattgag
401 ctcagtgtca tcatttgaaa ggtttgagat attccccaag acaagttcat
451 ggcccaatca tgactcgaac aaaggtgtaa cggcagcatg tcctcatgct
501 ggagcaaaaa gcttctacaa aaatttaata tggctagtta aaaaaggaaa
551 ttcataccca aagctcagca aatcctacat taatgataaa gggaaagaag
601 tcctcgtgct atggggcatt caccatccat ctactagtgc tgaccaacaa
651 agtctctatc agaatgcaga tgcatatgtt tttgtggggt catcaagata
701 cagcaagaag ttcaagccgg aaatagcaat aagacccaaa gtgaggggtc
751 aagaagggag aatgaactat tactggacac tagtagagcc gggagacaaa

801 ataacattcg aagcaactgg aaatctagtg gtaccgagat atgcattcgc
851 aatggaaaga aatgctggat ctggtattat catttcagat acaccagtcc
901 acgattgcaa tacaacttgt caaacaccca agggtgctat aaacaccagc
951 ctcccatttc agaatataca tccgatcaca attggaaaat gtccaaaata
1001 tgtaaaaagc acaaaattga gactggccac aggattgagg aatatcccgt
1051 ctattcaatc tagaggccta tttggggcca ttgccggttt cattgaaggg
1101 gggtggacag ggatggtaga tggatggtac ggttatcacc atcaaaatga
1151 gcaggggtca ggatatgcag ccgacctgaa gagcacacag aatgccattg
1201 acgagattac taacaaagta aattctgtta ttgaaaagat gaatacacag
1251 ttcacagcag taggtaaaga gttcaaccac ctggaaaaaa gaatagagaa
1301 tttaaataaa aaagttgatg atggtttcct ggacatttgg acttacaatg
1351 ccgaactgtt ggttctattg gaaaatgaaa gaactttgga ctaccacgat
1401 tcaaatgtga agaacttata tgaaaaggta agaagccagc taaaaaacaa
1451 tgccaaggaa attggaaacg gctgctttga attttaccac aaatgcgata
1501 acacgtgcat ggaaagtgtc aaaaatggga cttatgacta cccaaaatac
1551 tcagaggaag caaaattaaa cagagaagaa atagatgggg taaagctgga
1601 atcaacaagg atttaccaga ttttggcgat ctattcaact gtcgccagtt
1651 cattggtact ggtagtctcc ctgggggcaa tcagtttctg gatgtgctct
1701 aatgggtctc tacagtgtag aatatgtatt taacattagg atttcagaag
1751 catgagaaaa acacccttgt ttctact

SEQ ID NO 3 hemagglutinin A/CA/07/09 variant V5-186D nt sequence

1 agcaaaagca ggggaaaaca aaagcaacaa aaatgaaggc aatactagta
51 gttctgctat atacatttgc aaccgcaaat gcagacacat tatgtatagg
101 ttatcatgcg aacaattcaa cagacactgt agacacagta ctagaaaaga

151 atgtaacagt aacacactct gttaaccttc tagaagacaa gcataacggg
201 aaactatgca aactaagagg ggtagcccca ttgcatttgg gtaaatgtaa
251 cattgctggc tggatcctgg gaaatccaga gtgtgaatca ctctccacag
301 caagctcatg gtcctacatt gtggaaacac ctagttcaga caatggaacg
351 tgttacccag gagatttcat cgattatgag gagctaagag agcaattgag
401 ctcagtgtca tcatttgaaa ggtttgagat attccccgag acaagttcat
451 ggcccaatca tgactcgaac aaaggtgtaa cggcagcatg tcctcatgct
501 ggagcaaaaa gcttctacaa aaatttaata tggctagtta aaaaaggaaa
551 ttcataccca aagctcagca aatcctacat taatgataaa gggaaagaag
601 tcctcgtgct atggggcatt caccatccat ctactagtga tgaccaacaa
651 agtctctatc agaatgcaga tgcatatgtt tttgtggggt catcaagata
701 cagcaagaag ttcaagccgg aaatagcaat aagacccaaa gtgaggggtc
751 aagaagggag aatgaactat tactggacac tagtagagcc gggagacaaa
801 ataacattcg aagcaactgg aaatctagtg gtaccgagat atgcattcgc
851 aatggaaaga aatgctggat ctggtattat catttcagat acaccagtcc
901 acgattgcaa tacaacttgt caaacaccca agggtgctat aaacaccagc
951 ctcccatttc agaatataca tccgatcaca attggaaaat gtccaaaata
1001 tgtaaaaagc acaaaattga gactggccac aggattgagg aatatcccgt
1051 ctattcaatc tagaggccta tttggggcca ttgccggttt cattgaaggg
1101 gggtggacag ggatggtaga tggatggtac ggttatcacc atcaaaatga
1151 gcaggggtca ggatatgcag ccgacctgaa gagcacacag aatgccattg
1201 acgagattac taacaaagta aattctgtta ttgaaaagat gaatacacag
1251 ttcacagcag taggtaaaga gttcaaccac ctggaaaaaa gaatagagaa
1301 tttaaataaa aaagttgatg atggtttcct ggacatttgg acttacaatg
1351 ccgaactgtt ggttctattg gaaaatgaaa gaactttgga ctaccacgat

1401 tcaaatgtga agaacttata tgaaaaggta agaagccagc taaaaaacaa
1451 tgccaaggaa attggaaacg gctgctttga attttaccac aaatgcgata
1501 acacgtgcat ggaaagtgtc aaaaatggga cttatgacta cccaaaatac
1551 tcagaggaag caaaattaaa cagagaagaa atagatgggg taaagctgga
1601 atcaacaagg atttaccaga ttttggcgat ctattcaact gtcgccagtt
1651 cattggtact ggtagtctcc ctgggggcaa tcagtttctg gatgtgctct
1701 aatgggtctc tacagtgtag aatatgtatt taacattagg atttcagaag
1751 catgagaaaa acacccttgt ttctact

SEQ ID NO 4 NA (neuraminidase) A/CA/07/09 amino acid sequence

1 mnpnqkiiti gsvcmtigma nlilqignii siwishsiql gnqnqietcn
51 qsvityennt wvnqtyvnis ntnfaagqsv vsvklagnss lcpvsgwaiy
101 skdnsvrigs kgdvfvirep fiscsplecr tffltqgall ndkhsngtik
151 drspyrtlms cpigevpspy nsrfesvaws asachdginw ltigisgpdn
201 gavavlkyng iitdtikswr nnilrtqese cacvngscft vmtdgpsngq
251 asykifriek gkivksvemn apnyhyeecs cypdsseitc vcrdnwhgsn
301 rpwvsfnqnl eyqigyicsg ifgdnprpnd ktgscgpvss ngangvkgfs
351 fkygngvwig rtksissrng femiwdpngw tgtdnnfsik qdivginews
401 gysgsfvqhp eltgldcirp cfwvelirgr pkentiwtsg ssisfcgvns
451 dtvgwswpdg aelpftidk

SEQ ID NO 5 NA (neuraminidase) A/CA/07/09 nt sequence

1 agcaaaagca ggagtttaaa atgaatccaa accaaaagat aataaccatt
51 ggttcggtct gtatgacaat tggaatggct aacttaatat tacaaattgg
101 aaacataatc tcaatatgga ttagccactc aattcaactt gggaatcaaa
151 atcagattga aacatgcaat caaagcgtca ttacttatga aaacaacact
201 tgggtaaatc agacatatgt taacatcagc aacaccaact ttgctgctgg
251 acagtcagtg gtttccgtga aattagcggg caattcctct ctctgccctg

301 ttagtggatg ggctatatac agtaaagaca acagtgtaag aatcggttcc
351 aaggggggatg tgtttgtcat aagggaacca ttcatatcat gctccccctt
401 ggaatgcaga accttcttct tgactcaagg ggccttgcta aatgacaaac
451 attccaatgg aaccattaaa gacaggagcc catatcgaac cctaatgagc
501 tgtcctattg gtgaagttcc ctctccatac aactcaagat ttgagtcagt
551 cgcttggtca gcaagtgctt gtcatgatgg catcaattgg ctaacaattg
601 gaatttctgg cccagacaat ggggcagtgg ctgtgttaaa gtacaacggc
651 ataataacag acactatcaa gagttggaga aacaatatat tgagaacaca
701 agagtctgaa tgtgcatgtg taaatggttc ttgctttact gtaatgaccg
751 atggaccaag taatggacag gcctcataca agatcttcag aatagaaaag
801 ggaaagatag tcaaatcagt cgaaatgaat gcccctaatt atcactatga
851 ggaatgctcc tgttatcctg attctagtga aatcacatgt gtgtgcaggg
901 ataactggca tggctcgaat cgaccgtggg tgtctttcaa ccagaatctg
951 gaatatcaga taggatacat atgcagtggg attttcggag acaatccacg
1001 ccctaatgat aagacaggca gttgtggtcc agtatcgtct aatggagcaa
1051 atggagtaaa agggttttca ttcaaatacg gcaatggtgt ttggataggg
1101 agaactaaaa gcattagttc aagaaacggt tttgagatga tttgggatcc
1151 gaacggatgg actgggacag acaataactt ctcaataaag caagatatcg
1201 taggaataaa tgagtggtca ggatatagcg ggagttttgt tcagcatcca
1251 gaactaacag ggctggattg tataagacct tgcttctggg ttgaactaat
1301 cagagggcga cccaaagaga acacaatctg gactagcggg agcagcatat
1351 ccttttgtgg tgtaaacagt gacactgtgg gttggtcttg gccagacggt
1401 gctgagttgc catttaccat tgacaagtaa tttgttcaaa aaactccttg
1451 tttctact

SEQ ID NO 6 V5-119E/186D HA AA

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  1 DTLCIGYHAN NSTDTVDTVL EKNVTVTHSV NLLEDKHNGK LCKLRGVAPL
HLGKCNIAGW
 61 ILGNPECESL STASSWSYIV ETPSSDNGTC YPGDFIDYEE LREQLSSVSS
FERFEIFPET
121 SSWPNHDSNK GVTAACPHAG AKSFYKNLIW LVKKGNSYPK LSKSYINDKG
KEVLVLWGIH
181 HPSTSDDQQS LYQNADAYVF VGSSRYSKKF KPEIAIRPKV RGQEGRMNYY
WTLVEPGDKI
241 TFEATGNLVV PRYAFAMERN AGSGIIISDT PVHDCNTTCQ TPKGAINTSL
PFQNIHPITI
301 GKCPKYVKST KLRLATGLRN IPSIQSRGLF GAIAGFIEGG WTGMVDGWYG
YHHQNEQGSG
361 YAADLKSTQN AIDEITNKVN SVIEKMNTQF TAVGKEFNHL EKRIENLNKK
VDDGFLDIWT
421 YNAELLVLLE NERTLDYHDS NVKNLYEKVR SQLKNNAKEI GNGCFEFYHK
CDNTCMESVK
481 NGTYDYPKYS EEAKLNREEI DGVKLESTRI YQILAIYSTV ASSLVLVVSL
GAISFWMCSN
541 GSLQCRICI
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SEQ ID NO 7 V5-119E/186D HA nucleotide

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   1 agcaaaagca ggggaaaaca aaagcaacaa aaatgaaggc aatactagta
gttctgctat
  61 atacatttgc aaccgcaaat gcagacacat tatgtatagg ttatcatgcg
aacaattcaa
 121 cagacactgt agacacagta ctagaaaaga atgtaacagt aacacactct
gttaaccttc
 181 tagaagacaa gcataacggg aaactatgca aactaagagg ggtagcccca
ttgcatttgg
 241 gtaaatgtaa cattgctggc tggatcctgg gaaatccaga gtgtgaatca
ctctccacag
 301 caagctcatg gtcctacatt gtggaaacac ctagttcaga caatggaacg
tgttacccag
 361 gagatttcat cgattatgag gagctaagag agcaattgag ctcagtgtca
tcatttgaaa
 421 ggtttgagat attccccgag acaagttcat ggcccaatca tgactcgaac
aaaggtgtaa
 481 cggcagcatg tcctcatgct ggagcaaaaa gcttctacaa aaatttaata
tggctagtta
 541 aaaaaggaaa ttcataccca aagctcagca aatcctacat taatgataaa
gggaaagaag
 601 tcctcgtgct atggggcatt caccatccat ctactagtga tgaccaacaa
agtctctatc
 661 agaatgcaga tgcatatgtt tttgtggggt catcaagata cagcaagaag
ttcaagccgg
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721 aaatagcaat aagacccaaa gtgaggggtc aagaagggag aatgaactat tactggacac
781 tagtagagcc gggagacaaa ataacattcg aagcaactgg aaatctagtg gtaccgagat
841 atgcattcgc aatggaaaga aatgctggat ctggtattat catttcagat acaccagtcc
901 acgattgcaa tacaacttgt caaacaccca agggtgctat aaacaccagc ctcccatttc
961 agaatataca tccgatcaca attggaaaat gtccaaaata tgtaaaaagc acaaaattga
1021 gactggccac aggattgagg aatatcccgt ctattcaatc tagaggccta tttggggcca
1081 ttgccggttt cattgaaggg gggtggacag ggatggtaga tggatggtac ggttatcacc
1141 atcaaaatga gcaggggtca ggatatgcag ccgacctgaa gagcacacag aatgccattg
1201 acgagattac taacaaagta aattctgtta ttgaaaagat gaatacacag ttcacagcag
1261 taggtaaaga gttcaaccac ctggaaaaaa gaatagagaa tttaaataaa aaagttgatg
1321 atggtttcct ggacatttgg acttacaatg ccgaactgtt ggttctattg gaaaatgaaa
1381 gaactttgga ctaccacgat tcaaatgtga agaacttata tgaaaaggta agaagccagc
1441 taaaaaacaa tgccaaggaa attggaaacg gctgctttga attttaccac aaatgcgata
1501 acacgtgcat ggaaagtgtc aaaaatggga cttatgacta cccaaaatac tcagaggaag
1561 caaaattaaa cagagaagaa atagatgggg taaagctgga atcaacaagg atttaccaga
1621 ttttggcgat ctattcaact gtcgccagtt cattggtact ggtagtctcc ctgggggcaa
1681 tcagtttctg gatgtgctct aatgggtctc tacagtgtag aatatgtatt taacattagg
1741 atttcagaag catgagaaaa acacccttgt ttctact

SEQ ID NO 8 V6-186D/273Y HA AA

1 DTLCIGYHAN NSTDTVDTVL EKNVTVTHSV NLLEDKHNGK LCKLRGVAPL HLGKCNIAGW
61 ILGNPECESL STASSWSYIV ETPSSDNGTC YPGDFIDYEE LREQLSSVSS FERFEIFPKT
121 SSWPNHDSNK GVTAACPHAG AKSFYKNLIW LVKKGNSYPK LSKSYINDKG KEVLVLWGIH
181 HPSTSDDQQS LYQNADAYVF VGSSRYSKKF KPEIAIRPKV RDREGRMNYY WTLVEPGDKI
241 TFEATGNLVV PRYAFAMERN AGSGIIISDT PVYDCNTTCQ TPKGAINTSL PFQNIHPITI

301 GKCPKYVKST KLRLATGLRN IPSIQSRGLF GAIAGFIEGG WTGMVDGWYG YHHQNEQGSG
361 YAADLKSTQN AIDEITNKVN SVIEKMNTQF TAVGKEFNHL EKRIENLNKK VDDGFLDIWT
421 YNAELLVLLE NERTLDYHDS NVKNLYEKVR SQLKNNAKEI GNGCFEFYHK CDNTCMESVK
481 NGTYDYPKYS EEAKLNREEI DGVKLESTRI YQILAIYSTV ASSLVLVVSL GAISFWMCSN
541 GSLQCRICI

SEQ ID NO 9 V6-186D/273Y HA nucleotide

1 agcaaaagca ggggaaaaca aaagcaacaa aaatgaaggc aatactagta gttctgctat
61 atacatttgc aaccgcaaat gcagacacat tatgtatagg ttatcatgcg aacaattcaa
121 cagacactgt agacacagta ctagaaaaga atgtaacagt aacacactct gttaaccttc
181 tagaagacaa gcataacggg aaactatgca aactaagagg ggtagcccca ttgcatttgg
241 gtaaatgtaa cattgctggc tggatcctgg gaaatccaga gtgtgaatca ctctccacag
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361 gagatttcat cgattatgag gagctaagag agcaattgag ctcagtgtca tcatttgaaa
421 ggtttgagat attccccaag acaagttcat ggcccaatca tgactcgaac aaaggtgtaa
481 cggcagcatg tcctcatgct ggagcaaaaa gcttctacaa aaatttaata tggctagtta
541 aaaaaggaaa ttcataccca aagctcagca aatcctacat taatgataaa gggaaagaag
601 tcctcgtgct atggggcatt caccatccat ctactagtga tgatcaacaa agtctctatc
661 agaatgcaga tgcatatgtt tttgtggggt catcaagata cagcaagaag ttcaagccgg
721 aaatagcaat aagacccaaa gtgagggatc gagaagggag aatgaactat tactggacac
781 tagtagagcc gggagacaaa ataacattcg aagcaactgg aaatctagtg gtaccgagat
841 atgcattcgc aatggaaaga aatgctggat ctggtattat catttcagat acaccagtct
901 acgattgcaa tacaacttgt caaacaccca agggtgctat aaacaccagc ctcccatttc
961 agaatataca tccgatcaca attggaaaat gtccaaaata tgtaaaaagc acaaaattga
1021 gactggccac aggattgagg aatatcccgt ctattcaatc tagaggccta tttggggcca

1081 ttgccggttt cattgaaggg gggtggacag ggatggtaga tggatggtac ggttatcacc
1141 atcaaaatga gcaggggtca ggatatgcag ccgacctgaa gagcacacag aatgccattg
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1741 atttcagaag catgagaaaa acacccttgt ttctact