Figure 1A

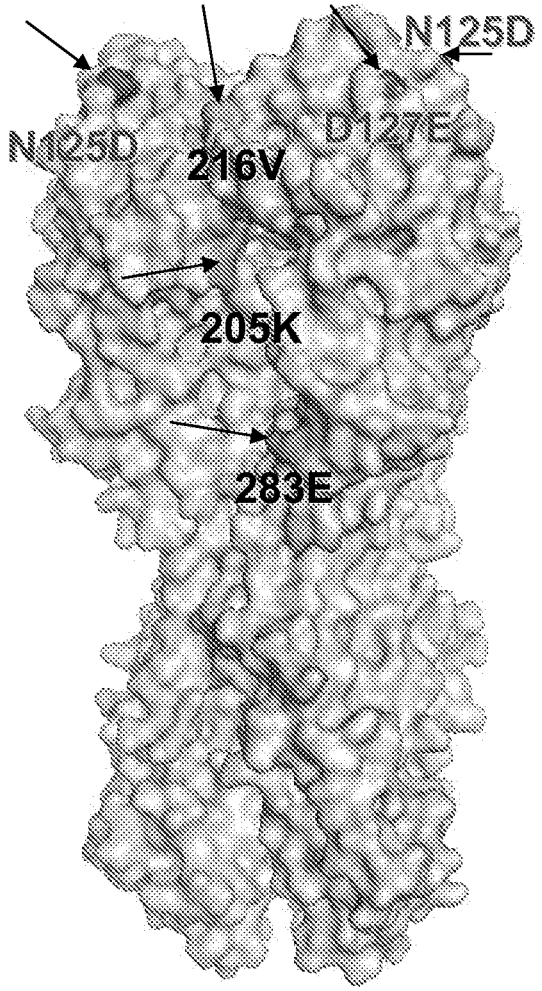
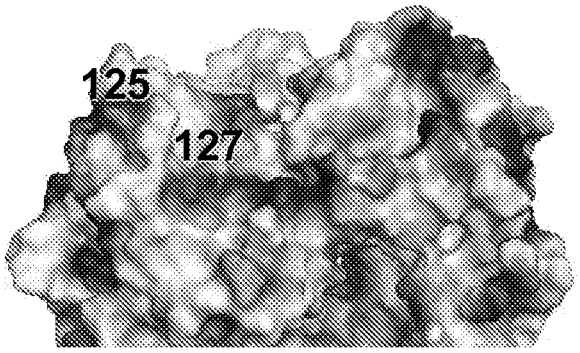
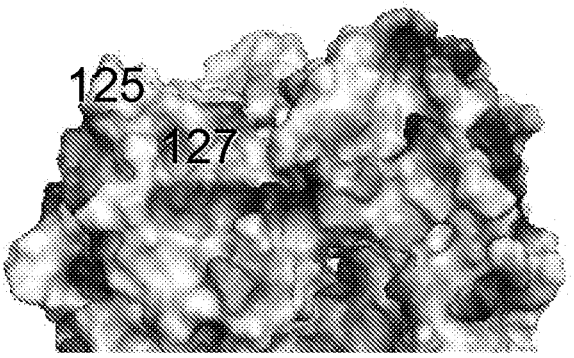


Figure 1B



125N/127D



125D/127E

Figure 2A

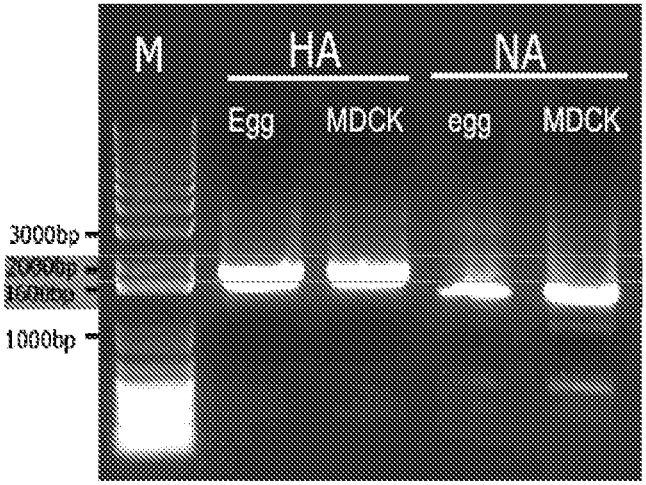


Figure 2B

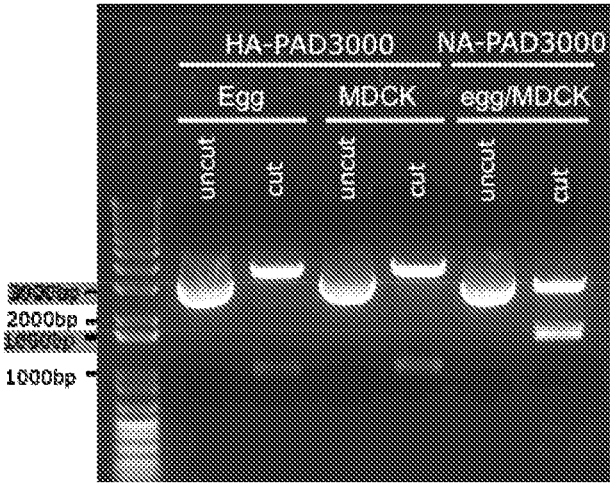


Figure 3A

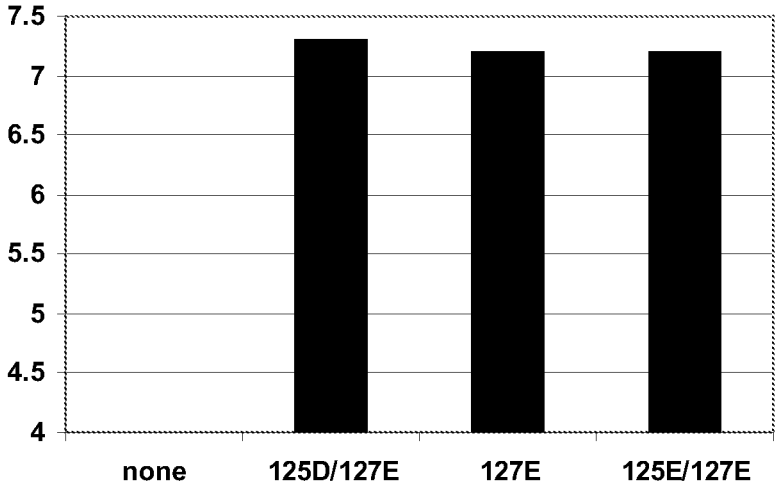


Figure 3B

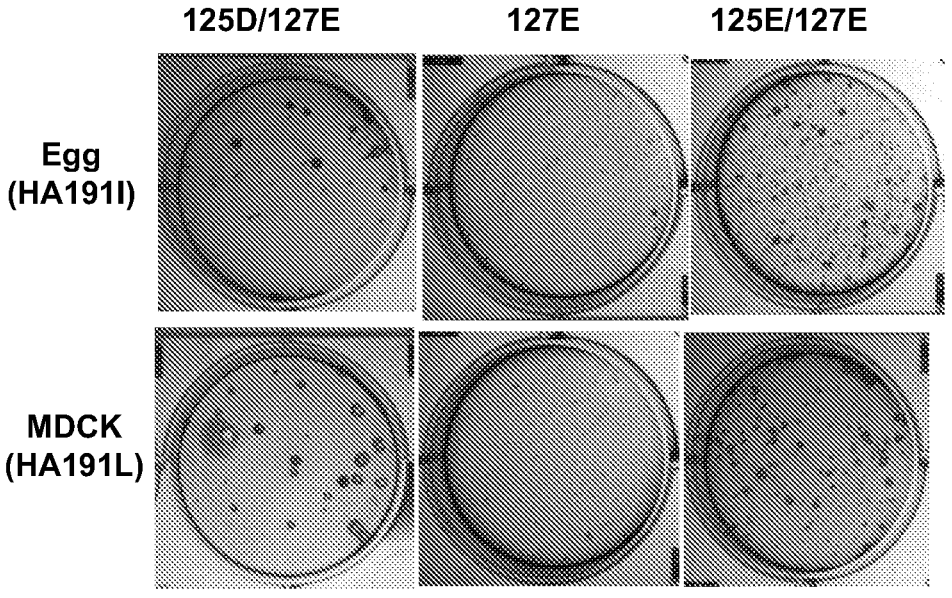


Figure 4

A/Gilroy/231/2011 HA amino acid sequence (SEQ ID NO:28)

mkailvvllytfaianadtlcigyhannstdtvdtvleknvtvthsvnlledkhngklcklr
gvaplhlgkcniagwilgnpeceslstasswsyivetsssdngtcypgdfinyeelreqlss
vssferfeifpktsswpnhdsnkgvtaacphagaksfyknliwlvkkgnsypklsksyindk
gkevlvlwgihhpstsadqqslyqnadayvfvgtskyskkfkpeiavrpkvrdqegrmnyyw
tlvepgdkitfeatgnllvpryafamernagsgiiisdtpvhdcnttcqtpegaintslpfq
nihpitlgkcpkyvkstklrlatglrnvpsiqsrglfgaiagfieggwtgmvdgwygyhhqn
eqgsgyaadlkstqnaidkitnkvnsviekmntqftavgkefnhlekrienlnkkvddgfld
iwtynaellvllenertldyhdsnvknlyekvrsqlknnakeigngcfefyhkcdntcmesv
kngtydypkyseeaklnreeidgvklestriyqilaiystvasslvlvvslgaisfwmcsng
slqcrici

Figure 5

A/Gilroy/231/2011 HA nucleotide sequence (SEQ ID NO:2)

gtgaaggcaatactagtagttctgctatatacatttgcaaccgcaaatgcagacacattatg
tataggttatcatgcgaacaattcaacagacactgtagacacagtactagaaaagaatgtaa
cagtaacacactctgttaaccttctagaagacaagcataacgggaaattatgcaaactaaga
ggggtagccccattgcatttgggtaaatgtaacattgctggctggatcctgggaaatccaga
gtgtgaatcactctccacagcaagctcatggtcctacattgtggaaacatctagttcagaca
atggaacgtgttacccaggagatttcatcgattatgaggagctaagagaacaattgagctca
gtgtcatcatttgaaaggtttgagatattccccaagacaagttcatggcccgatcatgamtc
gaacaaaggtgtaacggcagcatgtcctcatgctggagcaaaaagcttctacaaaaatttaa
tatggctagttaaaaaaggaaattcatacccaaagctcagcaaatcctacattaatgataaa
gggaaagaagtcctcgtgctatggggcattcaccatccatctactagtgctgaccaacaaag
tctctatcagaatgcagatgcatatgtttttgtggggacatcaagatacagcaagaagttca
agccggaaatagcaataagacccaaagtgagggatcaagaagggagaatgaactattactgg
acactagtagagccgggagacaaaataacattcgaagcaactggaaatctagtggtaccgag
atatgcattcgcaatggaaagaaatgctggatctggtattatcatttcagatacaccagtcc
acgattgcaatacaacttgtcagacacccaagggtgctataaacaccagcctcccatttcag
aatatacatccgatcacaattggaaaatgtccaaaatatgtaaaaagcacaaaattgagact
ggccacaggattgaggaatgtcccgtctattcaatctagaggcctatttggggccattgccg
gtttcattgaaggggggtggacagggatggtagatggatggtacggttatcaccatcaaaat
gagcaggggtcaggatatgcagccgacctgaagagcacacagaatgccattgacaagattac
taacaaagtaaattctgttattgaaaagatgaatacacagttcacagcagtaggtaaagagt
tcaaccacctggaaaaaagaatagagaatttaaataaaaaagttgatgatggtttcctggac
atttggacttacaatgccgaactgttggttctattggaaaatgaaagaactttggactacca
cgattcaaatgtgaagaacttatatgaaaaggtaagaagccagttaaaaaacaatgccaagg
aaattggaaacggctgctttgaattttaccacaaatgcgataacacgtgcatggaaagtgtc
aaaaatgggacttatgactacccaaaatactcagaggaagcaaaattaaacagagaagaaat
agatggggtaaagctggaatcaacaaggatttaccagattttggcgatctattcaactgtcg
ccagttcattggtactggtagtctccctgggggcaatcagtttctggatgtgctctaatggg
tctctacagtgtagaatatgtatttaa

Figure 6

A/Gilroy/231/2011 NA Amino Acid Sequence (SEQ ID NO:3)

mnpnqkiitigsvcmtigmanlilqigniisiwishsiqlgnqsqietcnqsvityenntwvnq
tyvnisntnfaagqsvvsvklagnsslcpvsgwaiyskdnsirigskgdvfvirepfiscsple
crtffltqgallndkhsngtikdrspyrtlmscpigevpspynsrfesvawsasachdginwlt
igisgpdngavavlkyngiitdtikswrnsilrtqesecacvngscftimtdgpsdgqasykif
riekgkivksvemnapnyhyeecscypdsseitcvcrdnwhgsnrpwvsfnqnleyqigyicsg
ifgdnprpndktgscgpvssngangvkgfsfkygngvwigrtksissrkgfemiwdpngwtgtd
nnfsikqdivginewsgysgsfvqhpeltgldcirpcfwvelirgrpkentiwtsgssmsfcgv
nsdtvgwswpdgaelpftidk

Figure 7

A/Gilroy/231/2011 NA nucleotide sequence (SEQ ID NO:4)

atgaatccaaaccaaaagataataaccattggttcggtctgtataacaattggaatggctaact
taatattacaaattggaaacataatctcaatatggattagccactcaattcaacttgggaatca
aaatcagattgaaacatgcaatcaaagcgtcattacttatgaaaacaacacttgggtaaatcag
acatatgttaacatcagcaacaccaactttgctgctggacagtcagtggtttccgtgaaattag
cgggcaattcctctctctgccctgttagtggatgggctatatacagtaaagacaacagtataag
aatcggttccaaggggatgtgtttgtcataagggaaccattcatatcatgctccccccttggaa
tgcagaaccttcttcttgactcaaggggccttgctaaatgacaaacattccaatggaaccatta
aagacaggagcccatatcgaaccctaatgagctgtcctattggtgaagttccctctccatacaa
ctcaagatttgagtcagtcgcttggtcagcaagtgcttgtcatgatggcatcagttggctaaca
attggaatttctggcccagacaatggggcagtggctgtgttaaagtacaacggcataataacag
acactatcaagagttggagaaacaatatattgagaacacaagagtctgaatgtgcatgtgtaaa
tggttcttgttttactgtaatgaccgatggaccaagtgatggacaggcctcatacaagatcttc
agaatagaaaagggaaagatagtcaaatcagtcgaaatgaatgcccctaattatcactatgagg
aatgctcctgttatcctgattctagtgaaatcacatgtgtgtgcagggataactggcatggctc
gaatcgaccgtgggtgtctttcaaccagaatctggaatatcagataggatacatatgcagtggg
attttcggagacaatccacgccctaatgataagacaggcagttgtggtccagtatcgtctaatg
gagcaaatggagtaaaaggattttcattcaaatacggcaatggtgtttggatagggagaactaa
aagcattagttcaagaaacggttttgagatgatttgggatccgaacggatggactgggacagac
aataacttctcaataaagcaagatatcgtaggaataaatgagtggtcaggatatagcgggagtt
ttgttcagcatccagaactaacagggctggattgtataaaaccttgcttctgggttgaactaat
cagagggcgacccaaagagaacacaatctggactagcgggagcagcatatccttttgtggtgta
aacagtgacactgtgggttggtcttggccagacggtgctgagttgccatttaccattgacaagt
aa

Figure 8

```
                    1                                                  50
  A/Brisbane/10/10_HA  MKAILVVLLY TFATANADTL CIGYHANNST DTVDTVLEKN VTVTHSVNLL
A/California/04/09_HA  MKAILVVLLY TFATANADTL CIGYHANNST DTVDTVLEKN VTVTHSVNLL
   A/Gilroy/231/11_HA  MKAILVVLLY TFAIANADTL CIGYHANNST DTVDTVLEKN VTVTHSVNLL
                   51                                                 100
  A/Brisbane/10/10_HA  EDKHNGKLCK LRGVAPLHLG KCNIAGWILG NPECESLSTA SSWSYIVETS
A/California/04/09_HA  EDKHNGKLCK LRGVAPLHLG KCNIAGWILG NPECESLSTA SSWSYIVETP
   A/Gilroy/231/11_HA  EDKHNGKLCK LRGVAPLHLG KCNIAGWILG NPECESLSTA SSWSYIVETS
                  101                          H1 mature protein # 125 127  150
  A/Brisbane/10/10_HA  SSDNGTCYPG DFIDYEELRE QLSSVSSFER FEIFPKTSSW PDHESNKGVT
A/California/04/09_HA  SSDNGTCYPG DFIDYEELRE QLSSVSSFER FEIFPKTSSW PNHDSNKGVT
   A/Gilroy/231/11_HA  SSDNGTCYPG DFINYEELRE QLSSVSSFER FEIFPKTSSW PNHDSNKGVT
                  151                                                 200
  A/Brisbane/10/10_HA  AACPHAGAKS FYKNLIWLVK KGNSYPKLSK SYINDKGKEV LVLWGIHHPS
A/California/04/09_HA  AACPHAGAKS FYKNLIWLVK KGNSYPKLSK SYINDKGKEV LVLWGIHHPS
   A/Gilroy/231/11_HA  AACPHAGAKS FYKNLIWLVK KGNSYPKLSK SYINDKGKEV LVLWGIHHPS
                  201                                                 250
  A/Brisbane/10/10_HA  TSADQQSLYQ NADAYVFVGT SRYSKKFKPE IAIRPKVRDQ EGRMNYYWTL
A/California/04/09_HA  TSADQQSLYQ NADTYVFVGS SRYSKKFKPE IAIRPKVRDQ EGRMNYYWTL
   A/Gilroy/231/11_HA  TSADQQSLYQ NADAYVFVGT SKYSKKFKPE IAVRPKVRDQ EGRMNYYWTL
                  251                                                 300
  A/Brisbane/10/10_HA  VEPGDKITFE ATGNLVVPRY AFAMERNAGS GIIISDTPVH DCNTTCQTPK
A/California/04/09_HA  VEPGDKITFE ATGNLVVPRY AFAMERNAGS GIIISDTPVH DCNTTCQTPK
   A/Gilroy/231/11_HA  VEPGDKITFE ATGNLLVPRY AFAMERNAGS GIIISDTPVH DCNTTCQTPE
                  301                                                 350
  A/Brisbane/10/10_HA  GAINTSLPFQ NIHPITIGKC PKYVKSTKLR LATGLRNVPS IQSRGLFGAI
A/California/04/09_HA  GAINTSLPFQ NIHPITIGKC PKYVKSTKLR LATGLRNIPS IQSRGLFGAI
   A/Gilroy/231/11_HA  GAINTSLPFQ NIHPITLGKC PKYVKSTKLR LATGLRNVPS IQSRGLFGAI
                  351                                                 400
  A/Brisbane/10/10_HA  AGFIEGGWTG MVDGWYGYHH QNEQGSGYAA DLKSTQNAID KITNKVNSVI
A/California/04/09_HA  AGFIEGGWTG MVDGWYGYHH QNEQGSGYAA DLKSTQNAID EITNKVNSVI
   A/Gilroy/231/11_HA  AGFIEGGWTG MVDGWYGYHH QNEQGSGYAA DLKSTQNAID KITNKVNSVI
                  401                                                 450
  A/Brisbane/10/10_HA  EKMNTQFTAV GKEFNHLEKR IENLNKKVDD GFLDIWTYNA ELLVLLENER
A/California/04/09_HA  EKMNTQFTAV GKEFNHLEKR IENLNKKVDD GFLDIWTYNA ELLVLLENER
   A/Gilroy/231/11_HA  EKMNTQFTAV GKEFNHLEKR IENLNKKVDD GFLDIWTYNA ELLVLLENER
                  451                                                 500
  A/Brisbane/10/10_HA  TLDYHDSNVK NLYEKVRSQL KNNAKEIGNG CFEFYHKCDN TCMESVKNGT
A/California/04/09_HA  TLDYHDSNVK NLYEKVRSQL KNNAKEIGNG CFEFYHKCDN TCMESVKNGT
   A/Gilroy/231/11_HA  TLDYHDSNVK NLYEKVRSQL KNNAKEIGNG CFEFYHKCDN TCMESVKNGT
                  501                                                 550
  A/Brisbane/10/10_HA  YDYPKYSEEA KLNREEIDGV KLESTRIYQI LAIYSTVASS LVLVVSLGAI
A/California/04/09_HA  YDYPKYSEEA KLNREEIDGV KLESTRIYQI LAIYSTVASS LVLVVSLGAI
   A/Gilroy/231/11_HA  YDYPKYSEEA KLNREEIDGV KLESTRIYQI LAIYSTVASS LVLVVSLGAI
                  551             566
  A/Brisbane/10/10_HA  SFWMCSNGSL QCRICI
A/California/04/09_HA  SFWMCSNGSL QCRICI
   A/Gilroy/231/11_HA  SFWMCSNGSL QCRICI
```

Figure 9

```
                      1                                                  50
 A/Brisbane/10/10_NA   MNPNQKIITI GSVCITIGMA NLILQIGNII SIWISHSIQL GNQNQIETCN
A/California/04/09_NA  MNPNQKIITI GSVCMTIGMA NLILQIGNII SIWISHSIQL GNQNQIETCN
   A/Gilroy/231/11_NA  MNPNQKIITI GSVCMTIGMA NLILQIGNII SIWISHSIQL GNQSQIETCN
                      51                                                 100
 A/Brisbane/10/10_NA   QSVITYENNT WVNQTYVNIS NTNFAAGQSV VSVKLAGNSS LCPVSGWAIY
A/California/04/09_NA  QSVITYENNT WVNQTYVNIS NTNFAAGQSV VSVKLAGNSS LCPVSGWAIY
   A/Gilroy/231/11_NA  QSVITYENNT WVNQTYVNIS NTNFAAGQSV VSVKLAGNSS LCPVSGWAIY
                      101                                                150
 A/Brisbane/10/10_NA   SKDNSIRIGS KGDVFVIREP FISCSPLECR TFFLTQGALL NDKHSNGTIK
A/California/04/09_NA  SKDNSVRIGS KGDVFVIREP FISCSPLECR TFFLTQGALL NDKHSNGTIK
   A/Gilroy/231/11_NA  SKDNSIRIGS KGDVFVIREP FISCSPLECR TFFLTQGALL NDKHSNGTIK
                      151                                                200
 A/Brisbane/10/10_NA   DRSPYRTLMS CPIGEVPSPY NSRFESVAWS ASACHDGISW LTIGISGPDN
A/California/04/09_NA  DRSPYRTLMS CPIGEVPSPY NSRFESVAWS ASACHDGINW LTIGISGPDN
   A/Gilroy/231/11_NA  DRSPYRTLMS CPIGEVPSPY NSRFESVAWS ASACHDGINW LTIGISGPDN
                      201                                                250
 A/Brisbane/10/10_NA   GAVAVLKYNG IITDTIKSWR NNILRTQESE CACVNGSCFT VMTDGPSDGQ
A/California/04/09_NA  GAVAVLKYNG IITDTIKSWR NNILRTQESE CACVNGSCFT VMTDGPSNGQ
   A/Gilroy/231/11_NA  GAVAVLKYNG IITDTIKSWR NSILRTQESE CACVNGSCFT IMTDGPSDGQ
                      251                                                300
 A/Brisbane/10/10_NA   ASYKIFRIEK GKIVKSVEMN APNYHYEECS CYPDSSEITC VCRDNWHGSN
A/California/04/09_NA  ASYKIFRIEK GKIVKSVEMN APNYHYEECS CYPDSSEITC VCRDNWHGSN
   A/Gilroy/231/11_NA  ASYKIFRIEK GKIVKSVEMN APNYHYEECS CYPDSSEITC VCRDNWHGSN
                      301                                                350
 A/Brisbane/10/10_NA   RPWVSFNQNL EYQIGYICSG IFGDNPRPND KTGSCGPVSS NGANGVKGFS
A/California/04/09_NA  RPWVSFNQNL EYQIGYICSG IFGDNPRPND KTGSCGPVSS NGANGVKGFS
   A/Gilroy/231/11_NA  RPWVSFNQNL EYQIGYICSG IFGDNPRPND KTGSCGPVSS NGANGVKGFS
                      351                                                400
 A/Brisbane/10/10_NA   FKYGNGVWIG RTKSISSRNG FEMIWDPNGW TGTDNNFSIK QDIVGINEWS
A/California/04/09_NA  FKYGNGVWIG RTKSISSRNG FEMIWDPNGW TGTDNNFSIK QDIVGINEWS
   A/Gilroy/231/11_NA  FKYGNGVWIG RTKSISSRKG FEMIWDPNGW TGTDNNFSIK QDIVGINEWS
                      401                                                450
 A/Brisbane/10/10_NA   GYSGSFVQHP ELTGLDCIKP CFWVELIRGR PKENTIWTSG SSISFCGVNS
A/California/04/09_NA  GYSGSFVQHP ELTGLDCIRP CFWVELIRGR PKENTIWTSG SSISFCGVNS
   A/Gilroy/231/11_NA  GYSGSFVQHP ELTGLDCIRP CFWVELIRGR PKENTIWTSG SSMSFCGVNS
                      451                469
 A/Brisbane/10/10_NA   DTVGWSWPDG AELPFTIDK
A/California/04/09_NA  DTVGWSWPDG AELPFTIDK
   A/Gilroy/231/11_NA  DTVGWSWPDG AELPFTIDK
```

Figure 10A

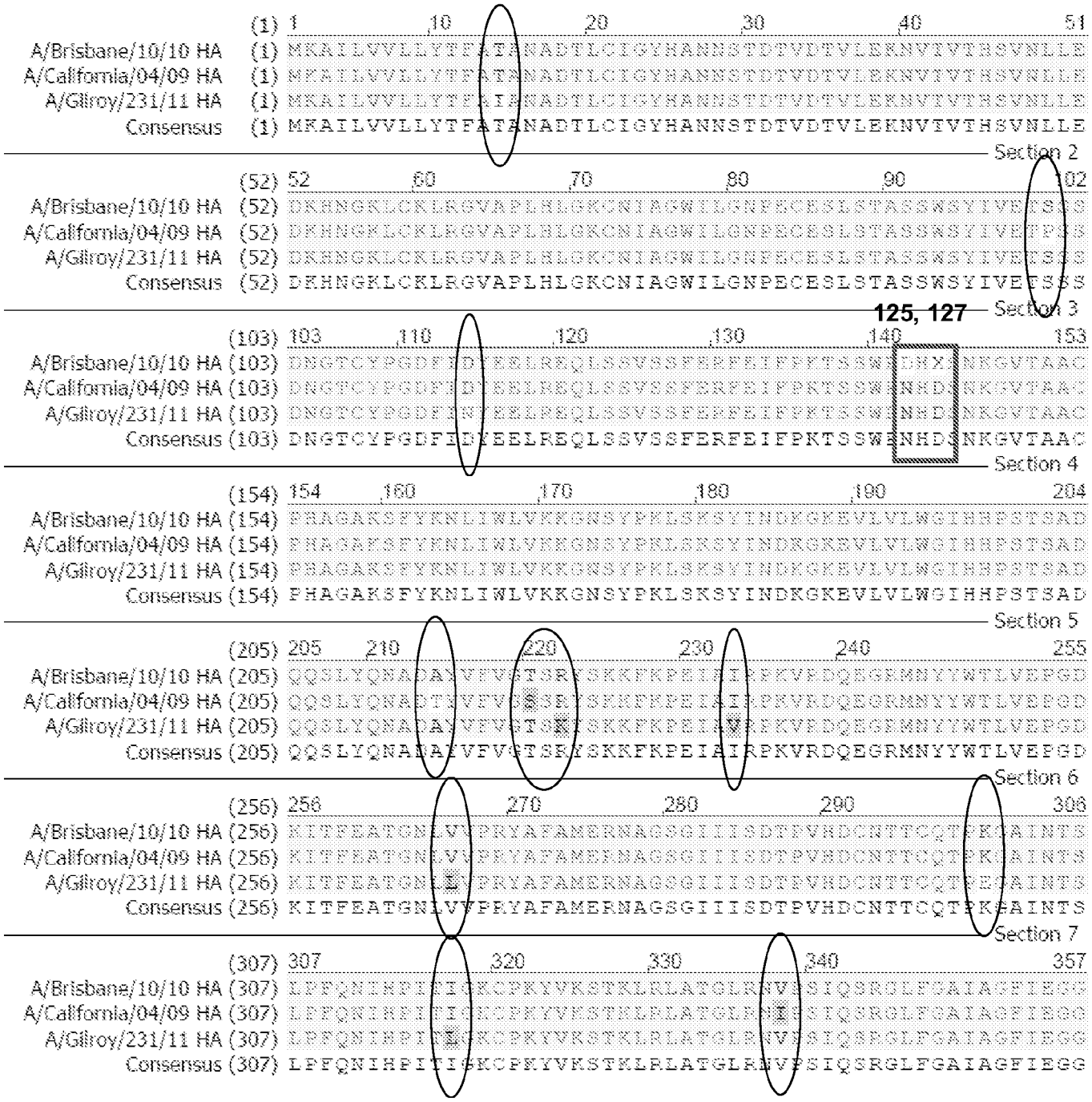

A/Brisbane/10/10 HA
A/California/04/09 HA
A/Gilroy/231/11 HA
Consensus
Section 2
Section 3
125, 127
Section 4
Section 5
Section 6
Section 7

Figure 10B

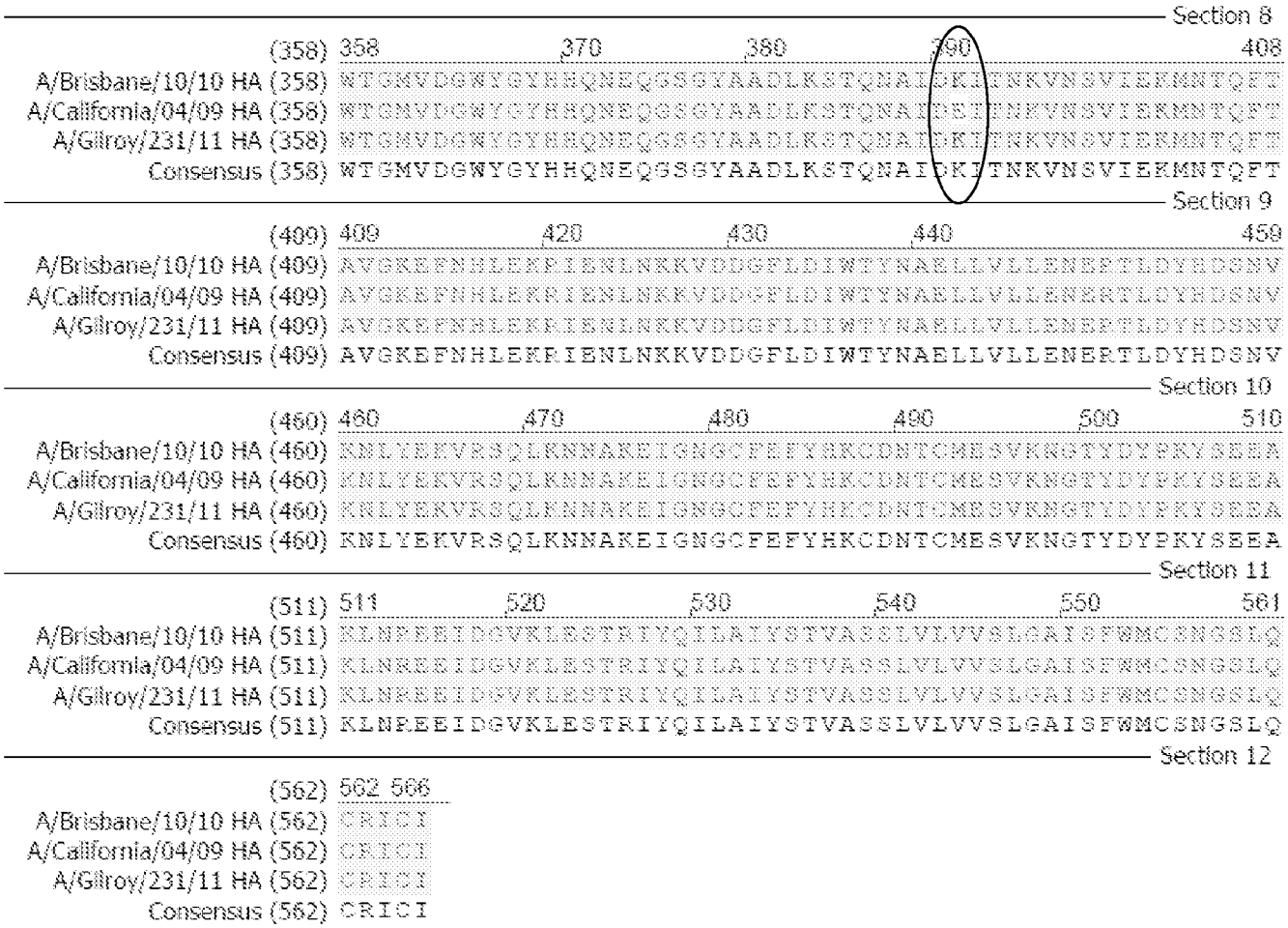

Section 8
(358) 358 370 380 390 408
A/Brisbane/10/10 HA (358) WTGMVDGWYGYHHQNEQGSGYAADLKSTQNAIDKITNKVNSVIEKMNTQFT
A/California/04/09 HA (358) WTGMVDGWYGYHHQNEQGSGYAADLKSTQNAIDEITNKVNSVIEKMNTQFT
A/Gilroy/231/11 HA (358) WTGMVDGWYGYHHQNEQGSGYAADLKSTQNAIDKITNKVNSVIEKMNTQFT
Consensus (358) WTGMVDGWYGYHHQNEQGSGYAADLKSTQNAIDKITNKVNSVIEKMNTQFT
Section 9
(409) 409 420 430 440 459
A/Brisbane/10/10 HA (409) AVGKEFNHLEKRIENLNKKVDDGFLDIWTYNAELLVLLENERTLDYHDSNV
A/California/04/09 HA (409) AVGKEFNHLEKRIENLNKKVDDGFLDIWTYNAELLVLLENERTLDYHDSNV
A/Gilroy/231/11 HA (409) AVGKEFNHLEKRIENLNKKVDDGFLDIWTYNAELLVLLENERTLDYHDSNV
Consensus (409) AVGKEFNHLEKRIENLNKKVDDGFLDIWTYNAELLVLLENERTLDYHDSNV
Section 10
(460) 460 470 480 490 500 510
A/Brisbane/10/10 HA (460) KNLYEKVRSQLKNNAKEIGNGCFEFYHKCDNTCMESVKNGTYDYPKYSEEA
A/California/04/09 HA (460) KNLYEKVRSQLKNNAKEIGNGCFEFYHKCDNTCMESVKNGTYDYPKYSEEA
A/Gilroy/231/11 HA (460) KNLYEKVRSQLKNNAKEIGNGCFEFYHKCDNTCMESVKNGTYDYPKYSEEA
Consensus (460) KNLYEKVRSQLKNNAKEIGNGCFEFYHKCDNTCMESVKNGTYDYPKYSEEA
Section 11
(511) 511 520 530 540 550 561
A/Brisbane/10/10 HA (511) KLNREEIDGVKLESTRIYQILAIYSTVASSLVLVVSLGAISFWMCSNGSLQ
A/California/04/09 HA (511) KLNREEIDGVKLESTRIYQILAIYSTVASSLVLVVSLGAISFWMCSNGSLQ
A/Gilroy/231/11 HA (511) KLNREEIDGVKLESTRIYQILAIYSTVASSLVLVVSLGAISFWMCSNGSLQ
Consensus (511) KLNREEIDGVKLESTRIYQILAIYSTVASSLVLVVSLGAISFWMCSNGSLQ
Section 12
(562) 562 566
A/Brisbane/10/10 HA (562) CRICI
A/California/04/09 HA (562) CRICI
A/Gilroy/231/11 HA (562) CRICI
Consensus (562) CRICI

Figure 11

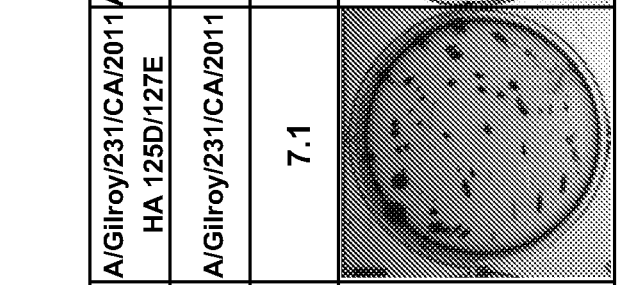
HA	A/Gilroy/231/CA/2011 HA 125D/127E	A/Gilroy/231/CA/2011 HA 125D/127E	A/Brisbane/10/10	A/CA/09 119E, 186D	A/Gilroy/231/CA/2011 HA 125E/127E	A/Gilroy/231/CA/2011 HA 125E/127E
NA	A/Gilroy/231/CA/2011	A/Brisbane/10/10	A/Brisbane/10/10	A/CA/09	A/Gilroy/231/CA/2011	A/Brisbane/10/10
Virus titer (log_{10}PFU/ml)	7.1	7.7	8.1	8	6.7	7.2
Plaque Image						

Figure 12

		FFA	TCID50	PFU
FLU 1464	ca A/New Hampshire/02/10	7.4	3.4	not visible
FLU 1465	ca A/South Carolina/02/10-127E	7.7	4.2	not visible
FLU 1467	ca A/Christchurch/16/10	8.4	8.4	7.8
FLU 1468	ca A/Hong Kong/2212/10	7.8	7.7	7.2
FLU 1447	6:2 A/Gilroy/231/CA/2011-125D/127E	7.9	7.3	6.4
FLU 1462	6:1:1A/Gilroy/231/CA/2011-125D/127E/ Bris NA	8.3	8.4	7.4
FLU 1334	ca A/Bris/10/10 (Positive)	8.5	8.9	7.8

Figure 13

Virus lot	ca A/Gilroy/231/CA/2011 with changes in HA	Additional site changes in HA	Virus titer (Log_{10}PFU/ml)
FLU 1456-13	125D +127E	N97D	$1X10^7$
FLU 1457-16	125D +127E	K205R	$5X10^6$
FLU 1458-21	125D +127E	V216I	$1X10^7$
FLU 1459-25	125D +127E	L249V	$1X10^7$
FLU 1460-42	125D +127E	E283K	$1X10^7$
	125D +127E	K119E	Virus not rescued