FIG. 1

```
MSDNGPQNQR NAPRITFGGP SDSTGSNQNG ERSGARSKQR RPQGLPNNTA SWFTALTQHG        60
KEDLKFPRGQ GVPINTNSSP DDQIGYYRRA TRRIRGGDGK MKDLSPRWYF YYLGTGPEAG       120
LPYGANKDGI IWVATEGALN TPKDHIGTRN PANNAAIVLQ LPQGTTLPKG FYAEGSRGGS       180
QASSRSSSRS RNSSRNSTPG SSRGTSPARM AGNGGDAALA LLLLDRLNQL ESKMSGKGQQ       240
QQGQTVTKKS AAEASKKPRQ KRTATKAYNV TQAFGRRGPE QTQGNFGDQE LIRQGTDYKH       300
WPQIAQFAPS ASAFFGMSRI GMEVTPSGTW LTYTGAIKLD DKDPNFKDQV ILLNKHIDAY       360
KTFPPTEPKK DKKKKADETQ ALPQRQKKQQ TVTLLPAADL DDFSKQLQQS MSSADSTQA        419
(SEQ ID NO:2)
```

```
MSDNGPQSNQ RSAPRITFGG PTDSTDNNQN GGRNGARPKQ RRPQGLPNNT ASWFTALTQH        60
GKEELRFPRG QGVPINTNSG PDDQIGYYRR ATRRVRGGDG KMKELSPRWY FYYLGTGPEA       120
SLPYGANKEG IVWVATEGAL NTPKDHIGTR NPNNNAATVL QLPQGTTLPK GFYAEGSRGG       180
SQASSRSSSR SRGNSRNSTP GSSRGNSPAR MASGGGETAL ALLLLDRLNQ LESKVSGKGQ       240
QQQGQTVTKK SAAEASKKPR QKRTATKQYN VTQAFGRRGP EQTQGNFGDQ DLIRQGTDYK       300
HWPQIAQFAP SASAFFGMSR IGMEVTPSGT WLTYHGAIKL DDKDPQFKDN VILLNKHIDA       360
YKTFPPTEPK KDKKKKTDEA QPLPQRQKKQ PTVTLLPAAD MDDFSRQLQN SMSGASADST       420
QA  (SEQ ID NO:14)
```

FIG. 2

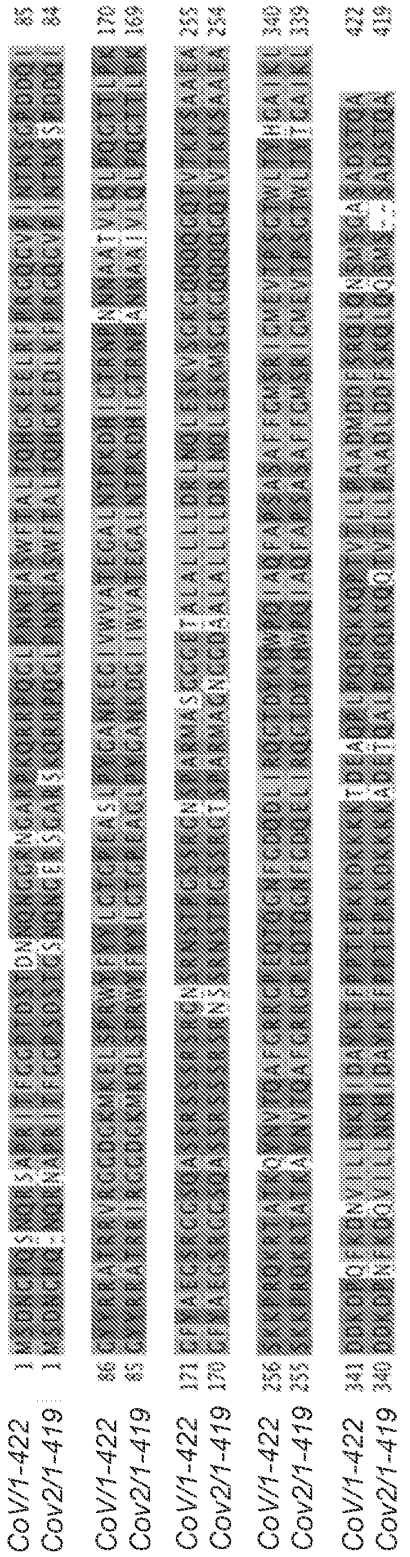


FIG. 3

FIG. 4

SEQ ID NO:1

MAGNGGDAALALLLLDRLNQLESKMSGKGQQQQGQTVTKKSAAEASKKPRQKRTAT
KAYNVTQAFGRRGPEQTQGNFGDQELIRQGTDYKHWPQIAQFAPSASAFFGMSRIGME
VTPSGTWLTYTGAIKLDDKDPNFKDQVILLNKHIDAYKTFPPTEPKKDKKKKADETQAL
PQRQKKQQTVTLLPAADLDDFSKQLQQSMSSADSTQA

SEQ ID NO:2

MSDNGPQNQR NAPRITFGGP SDSTGSNQNG ERSGARSKQR RPQGLPNNTA SWFTALTQHG
KEDLKFPRGQ GVPINTNSSP DDQIGYYRRA TRRIRGGDGK MKDLSPRWYF YYLGTGPEAG
LPYGANKDGI IWVATEGALN TPKDHIGTRN PANNAAIVLQ LPQGTTLPKG FYAEGSRGGS
QASSRSSSRS RNSSRNSTPG SSRGTSPARM AGNGGDAALA LLLLDRLNQL ESKMSGKGQQ
QQGQTVTKKS AAEASKKPRQ KRTATKAYNV TQAFGRRGPE QTQGNFGDQE LIRQGTDYKH
WPQIAQFAPS ASAFFGMSRI GMEVTPSGTW LTYTGAIKLD DKDPNFKDQV ILLNKHIDAY
KTFPPTEPKK DKKKKADETQ ALPQRQKKQQ TVTLLPAADL DDFSKQLQQS MSSADSTQA

SEQ ID NO:3

HHHHHH

SEQ ID NO:4

DDDDK

SEQ ID NO:5

ADDDDK

SEQ ID NO:6

RNAPRITFG

SEQ ID NO:7

RSAPRITFG

SEQ ID NO:8

YNST

FIG. 4 (Cont.)

SEQ ID NO:9
YNSA

SEQ ID NO:10
DDFM

SEQ ID NO:11
DDFT

SEQ ID NO:12
FSTFKCYGVSATK

SEQ ID NO:13
FSTFKCYGVSPTK

SEQ ID NO:14
MSDNGPQSNQ RSAPRITFGG PTDSTDNNQN GGRNGARPKQ RRPQGLPNNT ASWFTALTQH
GKEELRFPRG QGVPINTNSG PDDQIGYYRR ATRRVRGGDG KMKELSPRWY FYYLGTGPEA
SLPYGANKEG IVWVATEGAL NTPKDHIGTR NPNNNAATVL QLPQGTTLPK GFYAEGSRGG
SQASSRSSSR SRGNSRNSTP GSSRGNSPAR MASGGGETAL ALLLLDRLNQ LESKVSGKGQ
QQQGQTVTKK SAAEASKKPR QKRTATKQYN VTQAFGRRGP EQTQGNFGDQ DLIRQGTDYK
HWPQIAQFAP SASAFFGMSR IGMEVTPSGT WLTYHGAIKL DDKDPQFKDN VILLNKHIDA
YKTFPPTEPK KDKKKKTDEA QPLPQRQKKQ PTVTLLPAAD MDDFSRQLQN SMSGASADST
QA

FIG. 4 (Cont.)

SEQ ID NO:15

```
MFVFLVLLPL VSSQCVNLTT RTQLPPAYTN SFTRGVYYPD KVFRSSVLHS TQDLFLPFFS          60
NVTWFHAIHV SGTNGTKRFD NPVLPFNDGV YFASTEKSNI IRGWIFGTTL DSKTQSLLIV         120
NNATNVVIKV CEFQFCNDPF LGVYYHKNNK SWMESEFRVY SSANNCTFEY VSQPFLMDLE         180
GKQGNFKNLR EFVFKNIDGY FKIYSKHTPI NLVRDLPQGF SALEPLVDLP IGINITRFQT         240
LLALHRSYLT PGDSSSGWTA GAAAYYVGYL QPRTFLLKYN ENGTITDAVD CALDPLSETK         300
CTLKSFTVEK GIYQTSNFRV QPTESIVRFP NITNLCPFGE VFNATRFASV YAWNRKRISN         360
CVADYSVLYN SASFSTFKCY GVSPTKLNDL CFTNVYADSF VIRGDEVRQI APGQTGKIAD         420
YNYKLPDDFT GCVIAWNSNN LDSKVGGNYN YLYRLFRKSN LKPFERDIST EIYQAGSTPC         480
NGVEGFNCYF PLQSYGFQPT NGVGYQPYRV VVLSFELLHA PATVCGPKKS TNLVKNKCVN         540
FXaaFNGLTGTG VLTESNKKFL PFQQFGRDIA DTTDAVRDPQ TLEILDITPC SFGGVSVITP       600
GTNTSNQVAV LYQDVNCTEV PVAIHADQLT PTWRVYSTGS NVFQTRAGCL IGAEHVNNSY         660
ECDIPIGAGI CASYQTQTNS PRRARSVASQ SIIAYTMSLG AENSVAYSNN SIAIPTNFTI         720

SVTTEILPVS MTKTSVDCTM YICGDSTECS NLLLQYGSFC TQLNRALTGI AVEQDKNTQE         780
VFAQVKQIYK TPPIKDFGGF NFSQILPDPS KPSKRSFIED LLFNKVTLAD AGFIKQYGDC         840
LGDIAARDLI CAQKFNGLTV LPPLLTDEMI AQYTSALLAG TITSGWTFGA GAALQIPFAM         900
QMAYRFNGIG VTQNVLYENQ KLIANQFNSA IGKIQDSLSS TASALGKLQD VVNQNAQALN         960
TLVKQLSSNF GAISSVLNDI LSRLDKVEAE VQIDRLITGR LQSLQTYVTQ QLIRAAEIRA        1020
SANLAATKMS ECVLGQSKRV DFCGKGYHLM SFPQSAPHGV VFLHVTYVPA QEKNFTTAPA        1080
ICHDGKAHFP REGVFVSNGT HWFVTQRNFY EPQIITTDNT FVSGNCDVVI GIVNNTVYDP        1140
LQPELDSFKE ELDKYFKNHT SPDVDLGDIS GINASVVNIQ KEIDRLNEVA KNLNESLIDL        1200
QELGKYEQYI KWPWYIWLGF IAGLIAIVMV TIMLCCMTSC CSCLKGCCSC GSCCKFDEDD        1260
SEPVLKGVKL HYT                                                           1273
```

wherein Xaa at position 542 optionally is N or S

SEQ ID NO:16

```
MFIFLLFLTL TSGSDLDRCT TFDDVQAPNY TQHTSSMRGV YYPDEIFRSD TLYLTQDLFL          60
PFYSNVTGFH TINHTFGNPV IPFKDGIYFA ATEKSNVVRG WVFGSTMNNK SQSVIIINNS         120
TNVVIRACNF ELCDNPFFAV SKPMGTQTHT MIFDNAFNCT FEYISDAFSL DVSEKSGNFK         180
HLREFVFKNK DGFLYVYKGY QPIDVVRDLP SGFNTLKPIF KLPLGINITN FRAILTAFSP         240
AQDIWGTSAA AYFVGYLKPT TFMLKYDENG TITDAVDCSQ NPLAELKCSV KSFEIDKGIY         300
QTSNFRVVPS GDVVRFPNIT NLCPFGEVFN ATKFPSVYAW ERKKISNCVA DYSVLYNSTF         360
FSTFKCYGVS ATKLNDLCFS NVYADSFVVK GDDVRQIAPG QTGVIADYNY KLPDDFMGCV         420
LAWNTRNIDA TSTGNYNYKY RYLRHGKLRP FERDISNVPF SPDGKPCTPP ALNCYWPLND         480
YGFYTTTGIG YQPYRVVVLS FELLNAPATV CGPKLSTDLI KNQCVNFXaaFN GLTGTGVLTP       540
SSKRFQPFQQ FGRDVSDFTD SVRDPKTSEI LDISPCAFGG VSVITPGTNA SSEVAVLYQD         600
VNCTDVSTAI HADQLTPAWR IYSTGNNVFQ TQAGCLIGAE HVDTSYECDI PIGAGICASY         660
HTVSLLRSTS QKSIVAYTMS LGADSSIAYS NNTIAIPTNF SISITTEVMP VSMAKTSVDC         720
NMYICGDSTE CANLLLQYGS FCTQLNRALS GIAAEQDRNT REVFAQVKQM YKTPTLKYFG         780
GFNFSQILPD PLKPTKRSFI EDLLFNKVTL ADAGFMKQYG ECLGDINARD LICAQKFNGL         840
TVLPPLLTDD MIAAYTAALV SGTATAGWTF GAGAALQIPF AMQMAYRFNG IGVTQNVLYE         900
NQKQIANQFN KAISQIQESL TTTSTALGKL QDVVNQNAQA LNTLVKQLSS NFGAISSVLN         960
DILSRLDKVE AEVQIDRLIT GRLQSLQTYV TQQLIRAAEI RASANLAATK MSECVLGQSK        1020
RVDFCGKGYH LMSFPQAAPH GVVFLHVTYV PSQERNFTTA PAICHEGKAY FPREGVFVFN        1080
GTSWFITQRN FFSPQIITTD NTFVSGNCDV VIGIINNTVY DPLQPELDSF KEELDKYFKN        1140
HTSPDVDLGD ISGINASVVN IQKEIDRLNE VAKNLNESLI DLQELGKYEQ YIKWPWYVWL        1200
GFIAGLIAIV MVTILLCCMT SCCSCLKGAC SCGSCCKFDE DDSEPVLKGV KLHYT             1255
```

wherein X_{aa} at position 528 is an N or S

FIG. 4 (Cont.)

SEQ ID NO:17

RVQPTESIVRFPNITNLCPFGEVFNATRFASVYAWNRKRISNCVADYSVLYNSASFSTFKCYGV
SPTKLNDLCFTNVYADSFVIRGDEVRQIAPGQTGKIADYNYKLPDDFTGCVIAWNSNNLDSKVG
GNYNYLYRLFRKSNLKPFERDISTEIYQAGSTPCNGVEGFNCYFPLQSYGFQPTNGVGYQPYRV
VVLSFELLHAPATVCGPKKSTNLVKNKCVNFX$_{aa}$

wherein X$_{aa}$ is either absent or present, and when present, is an N or S

SEQ ID NO:18

RVVPSGDVVRFPNITNLCPFGEVFNATKFPSVYAWERKKISNCVADYSVLYNSTF
FSTFKCYGVSATKLNDLCFSNVYADSFVVKGDDVRQIAPGQTGVIADYNYKLPDDFMGCV
LAWNTRNIDATSTGNYNYKYRYLRHGKLRPFERDISNVPFSPDGKPCTPPALNCYWPLND
YGFYTTTGIGYQPYRVVVLSFELLNAPATVCGPKLSTDLIKNQCVNFX$_{aa}$

wherein X$_{aa}$ is either absent or present, and when present, is an N or S

SEQ ID NO:19 (amino acid residues 430-449 of SEQ ID NO:16)

ATSTGNYNYKYRYLRHGKLR

SEQ ID NO:20 (amino acid residues 484-503 of SEQ ID NO:16)

YTTTGIGYQPYRVVLSFEL

SEQ ID NO:21

GPQNQ

SEQ ID NO:22

GPQSNQ

SEQ ID NO:23

GPTDST

FIG. 4 (Cont.)

SEQ ID NO:24

MAGNGGDAALALLLLDRLNQLESKMFGKGQQQQGQTVTKKSAAEASKKPRQKRTAT
KAYNVTQAFGRRGPEQTQGNFGDQELIRQGTDYKHWPQIAQFAPSASAFFGMSRIGME
VTPSGTWLTYTGAIKLDDKDPNFKDQVILLNKHIDAYKTFPPTEPKKDKKKKADETQAL
PQRQKKQQTVTLLPAADLDDFSKQLQQSMSSADSTQA

SEQ ID NO:25

```
MFVFLVLLPL VSSQCVNLTT RTQLPPAYTN SFTRGVYYPD KVFRSSVLHS TQDLFLPFFS      60
NVTWFHAIHV SGTNGTKRFD NPVLPFNDGV YFASTEKSNI IRGWIFGTTL DSKTQSLLIV     120
NNATNVVIKV CEFQFCNDPF LGVYYHKNNK SWMESEFRVY SSANNCTFEY VSQPFLMDLE     180
GKQGNFKNLR EFVFKNIDGY FKIYSKHTPI NLVRDLPQGF SALEPLVDLP IGINITRFQT     240
LLALHRSYLT PGDSSSGWTA GAAAYYVGYL QPRTFLLKYN ENGTITDAVD CALDPLSETK     300
CTLKSFTVEK GIYQTSNFRV QPTESIVRFP NITNLCPFGE VFNATRFASV YAWNRKRISN     360
CVADYSVLYN SASFSTFKCY GVSPTKLNDL CFTNVYADSF VIRGDEVRQI APGQTGXaaIAD     420
YNYKLPDDFT GCVIAWNSNN LDSKVGGNYN YLYRLFRKSN LKPFERDIST EIYQAGSTPC     480
NGVXaaGFNCYF PLQSYGFQPT XaaGVGYQPYRV VVLSFELLHA PATVCGPKKS TNLVKNKCVN     540
FXaaFNGLTGTG VLTESNKKFL PFQQFGRDIA DTTDAVRDPQ TLEILDITPC SFGGVSVITP     600
GTNTSNQVAV LYQDVNCTEV PVAIHADQLT PTWRVYSTGS NVFQTRAGCL IGAEHVNNSY     660
ECDIPIGAGI CASYQTQTNS PRRARSVASQ SIIAYTMSLG AENSVAYSNN SIAIPTNFTI     720
SVTTEILPVS MTKTSVDCTM YICGDSTECS NLLLQYGSFC TQLNRALTGI AVEQDKNTQE     780
VFAQVKQIYK TPPIKDFGGF NFSQILPDPS KPSKRSFIED LLFNKVTLAD AGFIKQYGDC     840
LGDIAARDLI CAQKFNGLTV LPPLLTDEMI AQYTSALLAG TITSGWTFGA GAALQIPFAM     900
QMAYRFNGIG VTQNVLYENQ KLIANQFNSA IGKIQDSLSS TASALGKLQD VVNQNAQALN     960
TLVKQLSSNF GAISSVLNDI LSRLDKVEAE VQIDRLITGR LQSLQTYVTQ QLIRAAEIRA    1020
SANLAATKMS ECVLGQSKRV DFCGKGYHLM SFPQSAPHGV VFLHVTYVPA QEKNFTTAPA    1080
ICHDGKAHFP REGVFVSNGT HWFVTQRNFY EPQIITTDNT FVSGNCDVVI GIVNNTVYDP    1140
LQPELDSFKE ELDKYFKNHT SPDVDLGDIS GINASVVNIQ KEIDRLNEVA KNLNESLIDL    1200
QELGKYEQYI KWPWYIWLGF IAGLIAIVMV TIMLCCMTSC CSCLKGCCSC GSCCKFDEDD    1260
SEPVLKGVKL HYT                                                       1273
```

wherein Xaa at position 417 optionally is K or N

wherein Xaa at position 484 optionally is E or K

wherein Xaa at position 501 optionally is N or Y

wherein Xaa at position 542 optionally is N or S

FIG. 5

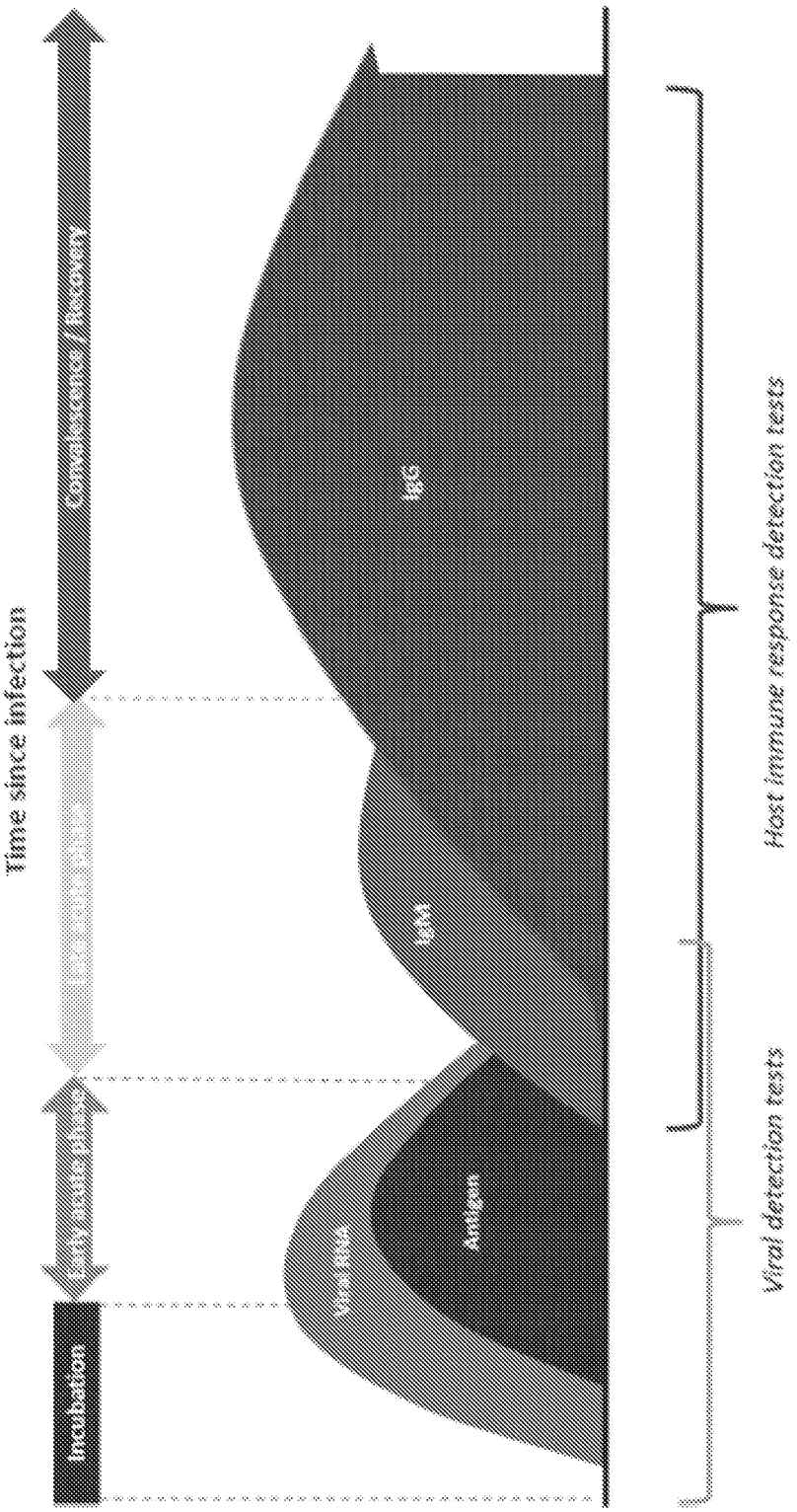

Time since infection
Convalescence / Recovery
IgG
IgM
Antigen
Viral RNA
Incubation
Host immune response detection tests
Viral detection tests

FIG. 6

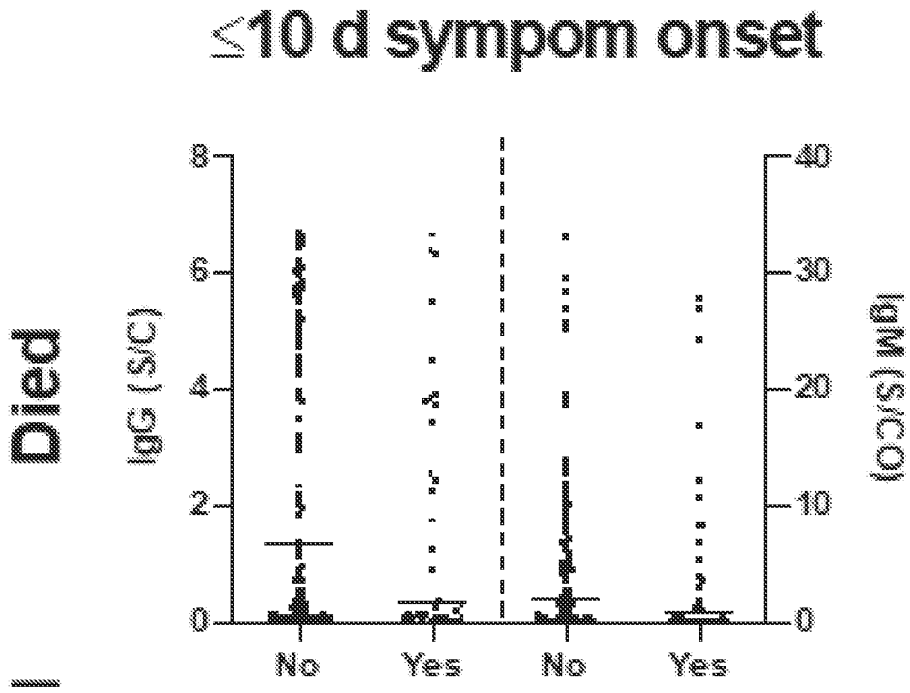
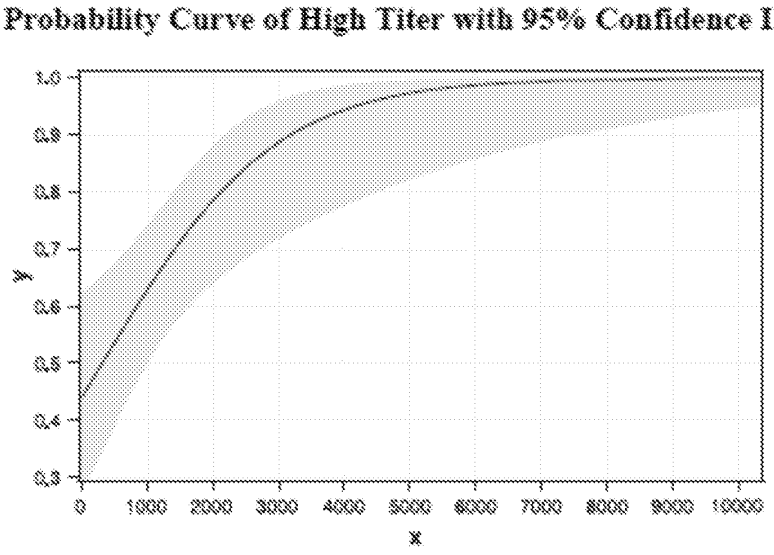

≤10 d sympom onset
Died
IgG (S/C)
IgM (S/CO)
8
6
4
2
0
40
30
20
10
0
No
Yes
No
Yes

FIG. 7



x	SARS-CoV-2 IgG Concentration (AU/mL)
y	Probability

FIG. 8

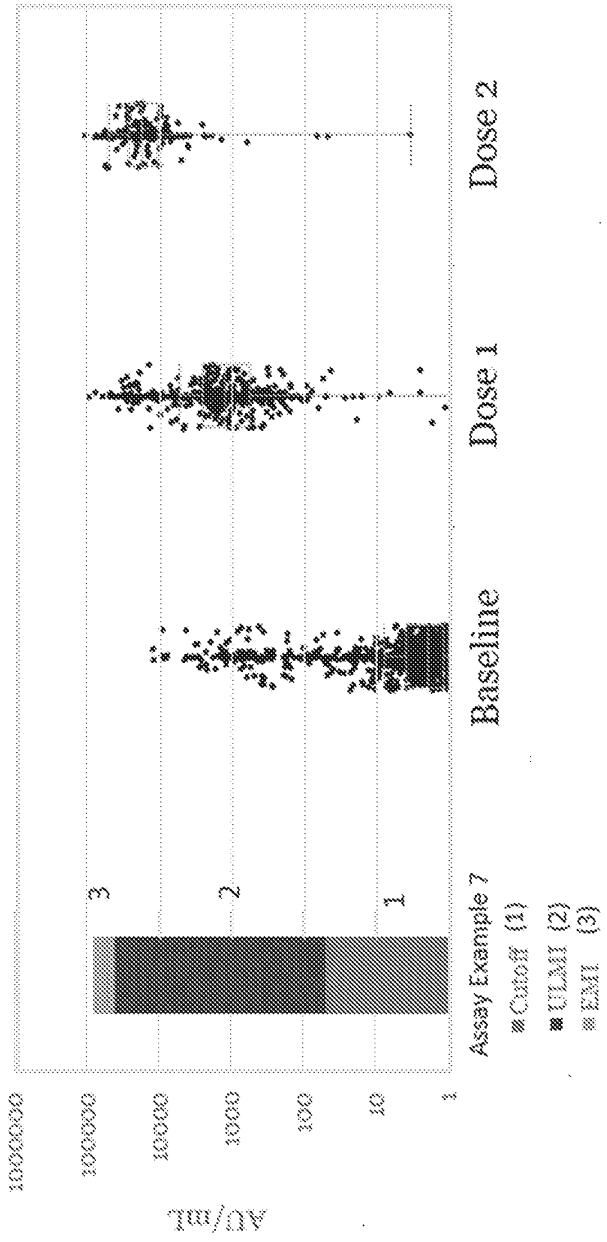

AU/mL
1000000
100000
10000
1000
100
10
1
Baseline
Dose 1
Dose 2
Assay Example 7
Cutoff (1)
ULMI (2)
LMI (3)
1
2
3

FIG. 9

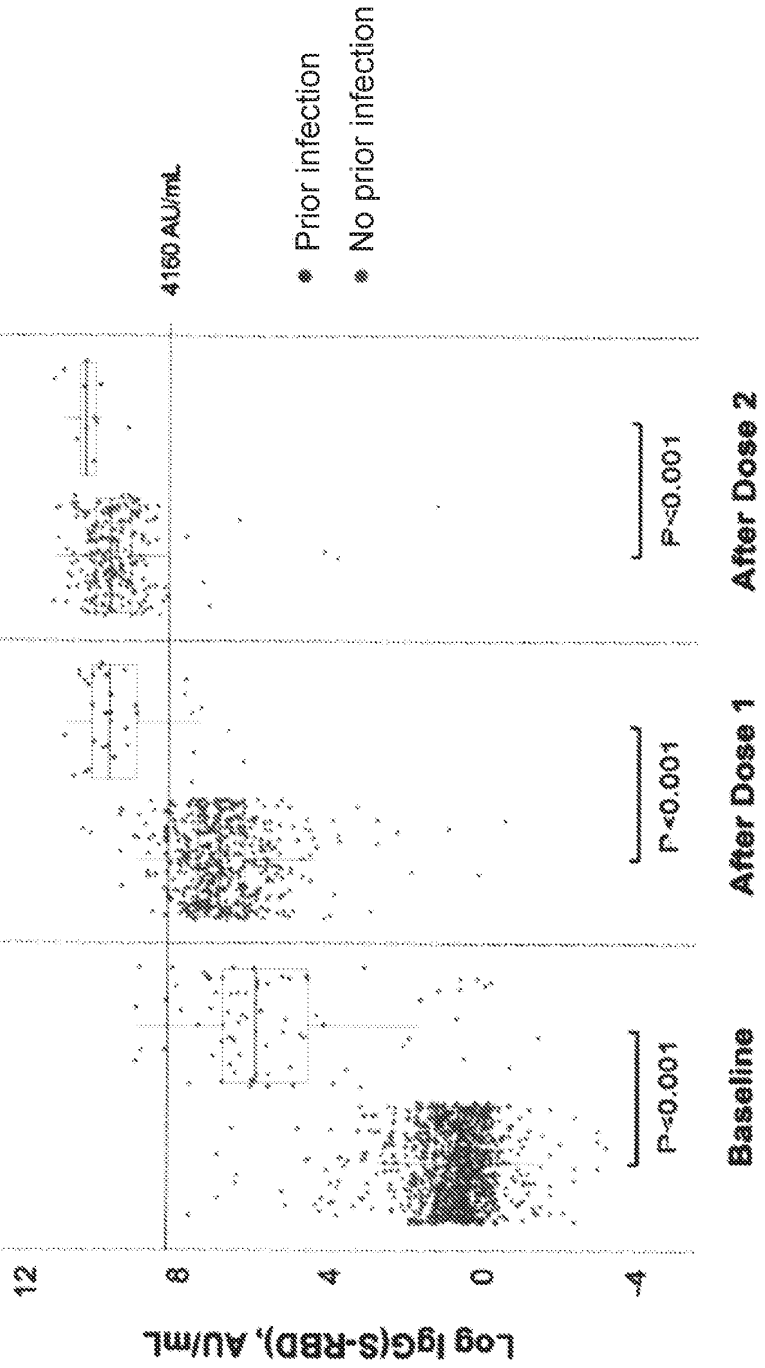

Log IgG(S-RBD), AU/mL
12
8
4
0
-4
4160 AU/mL
Prior infection
No prior infection
Baseline
After Dose 1
After Dose 2
P<0.001
P=0.92
P<0.001
P<0.001
P<0.001

FIG. 10

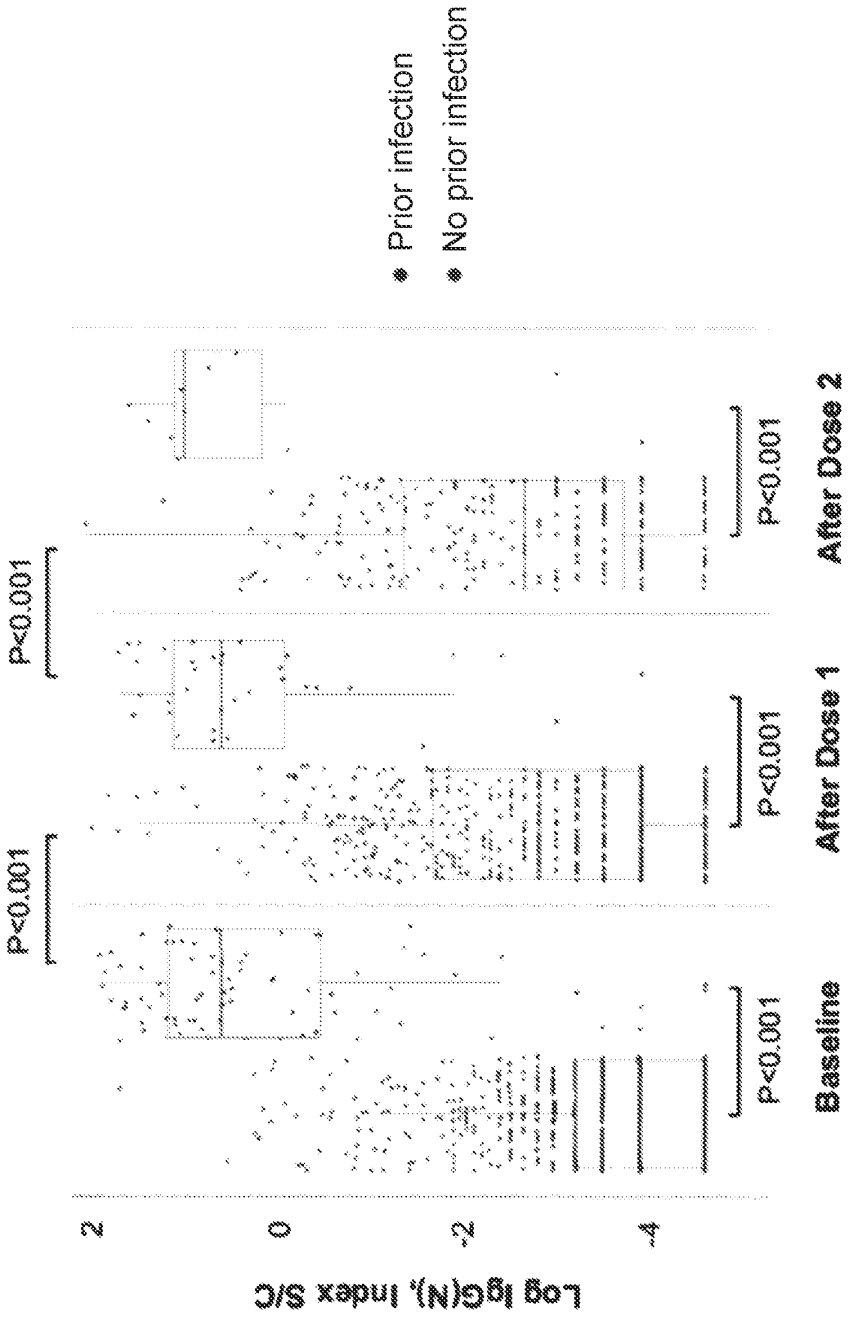

Prior infection
No prior infection
Log IgG(N), Index S/C
2
0
-2
-4
P<0.001
P<0.001
P<0.001
P<0.001
P<0.001
Baseline
After Dose 1
After Dose 2

FIG. 11

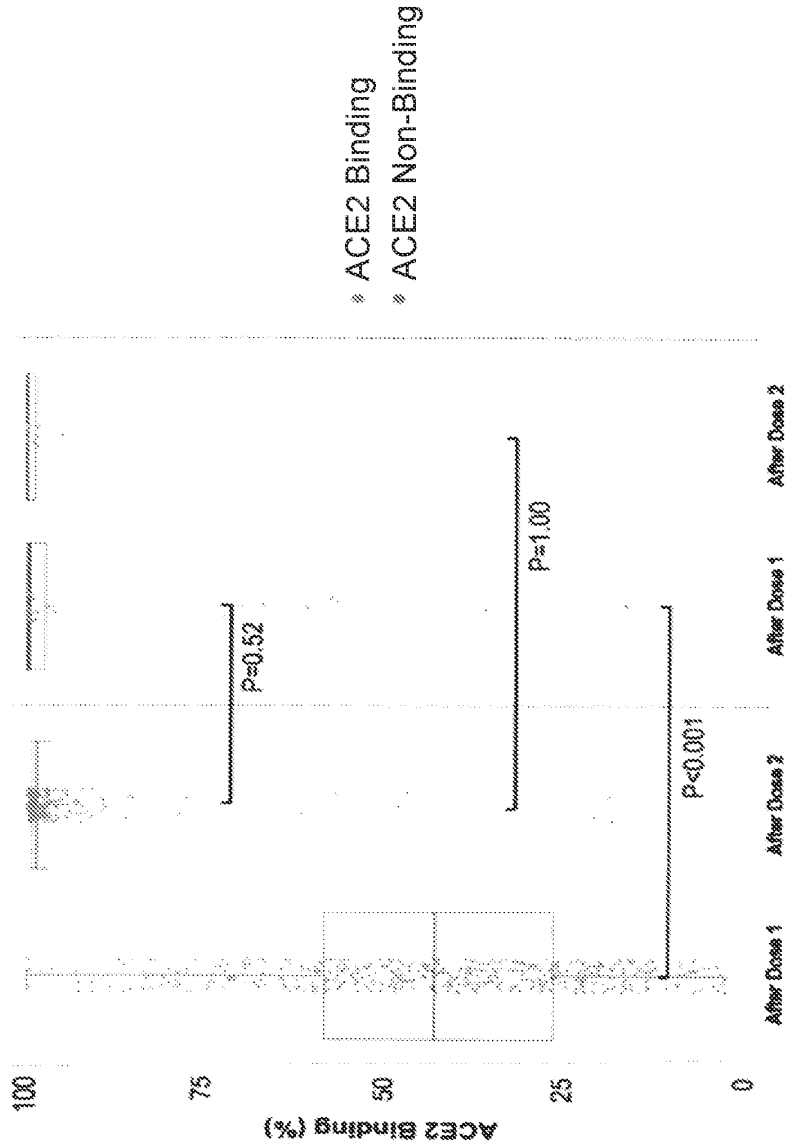

ACE2 Binding
ACE2 Non-Binding
No Prior Infection
Prior Infection
P=0.52
P=1.00
P<0.001
After Dose 1
After Dose 2
After Dose 1
After Dose 2
ACE2 Binding (%)
100
75
50
25
0

FIG. 12

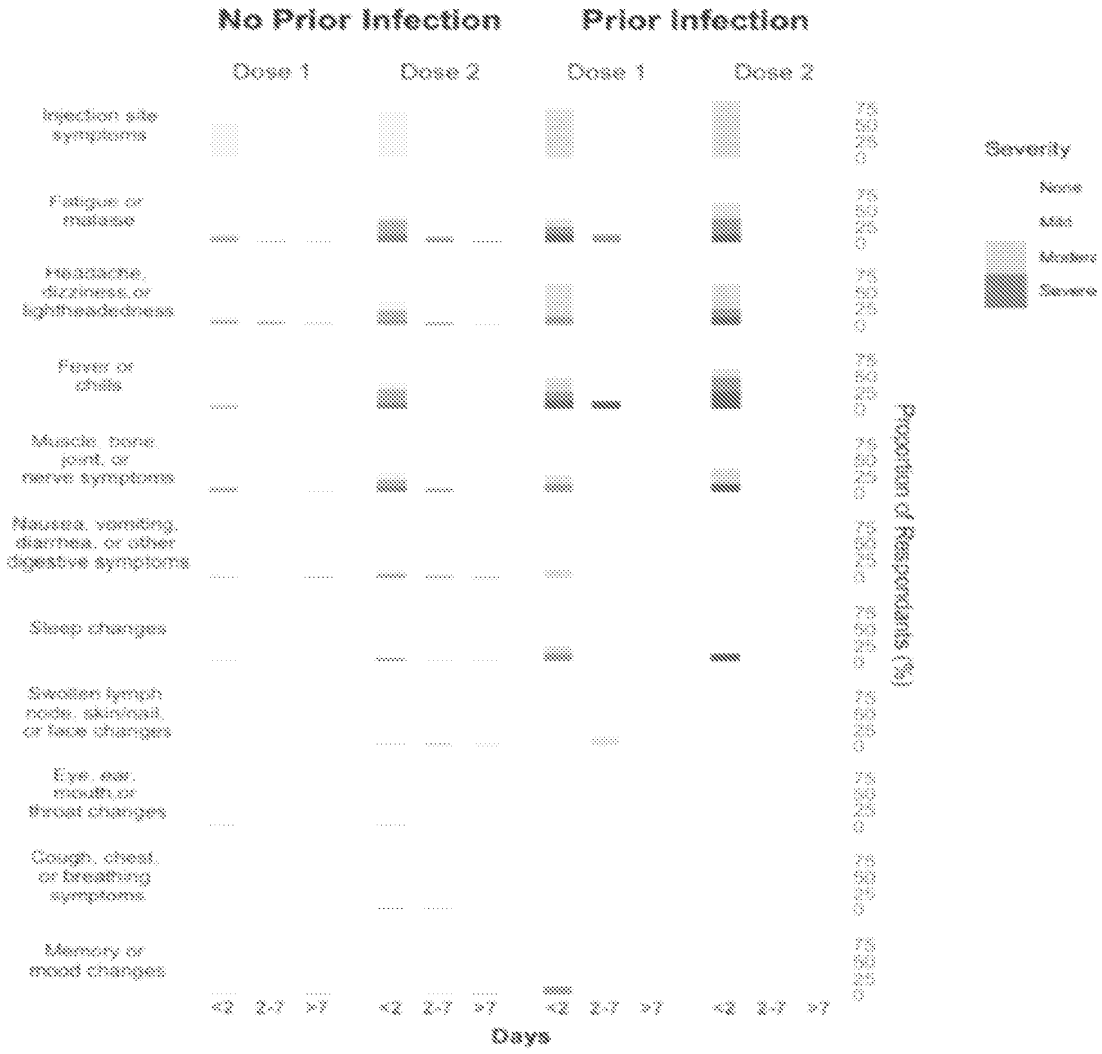
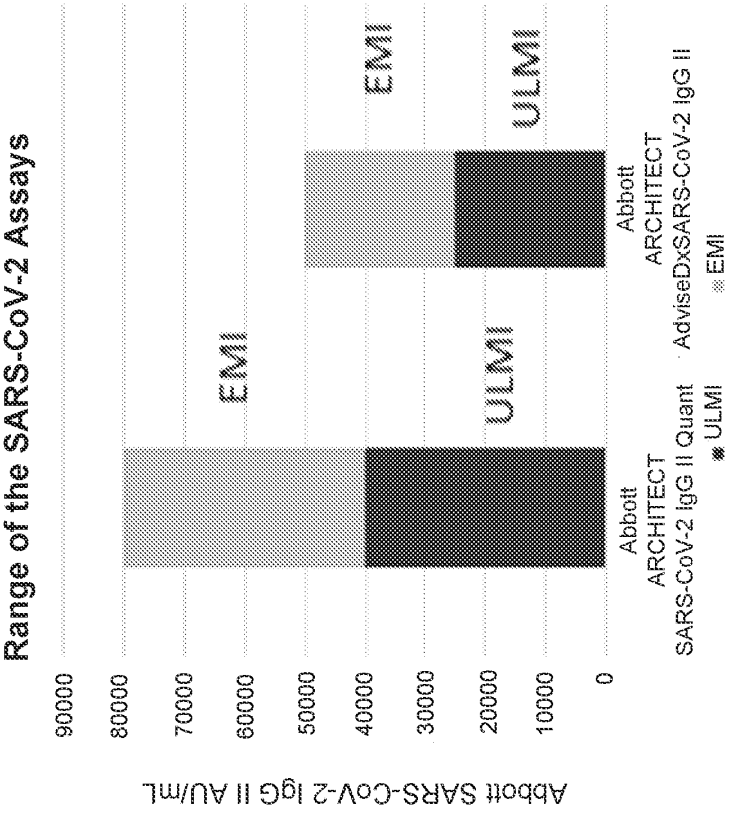

No Prior Infection
Prior Infection
Dose 1
Dose 2
Dose 1
Dose 2
Injection site symptoms
Fatigue or malaise
Headache, dizziness, or lightheadedness
Fever or chills
Muscle, bone, joint, or nerve symptoms
Nausea, vomiting, diarrhea, or other digestive symptoms
Sleep changes
Swollen lymph nodes, skin rash, or face changes
Eye, ear, mouth or throat changes
Cough, chest, or breathing symptoms
Memory or mood changes
0%
20%
40%
60%
80%
100%
Proportion of Respondents (%)
Severity
None
Mild
Moderate
Severe
<2
2-7
>7
Days

FIG. 13


Range of the SARS-CoV-2 Assays
Abbott SARS-CoV-2 IgG II AU/mL
90000
80000
70000
60000
50000
40000
30000
20000
10000
0
EMI
ULMI
EMI
ULMI
Abbott ARCHITECT SARS-CoV-2 IgG II Quant
Abbott ARCHITECT AdviseDxSARS-CoV-2 IgG II
ULMI
EMI