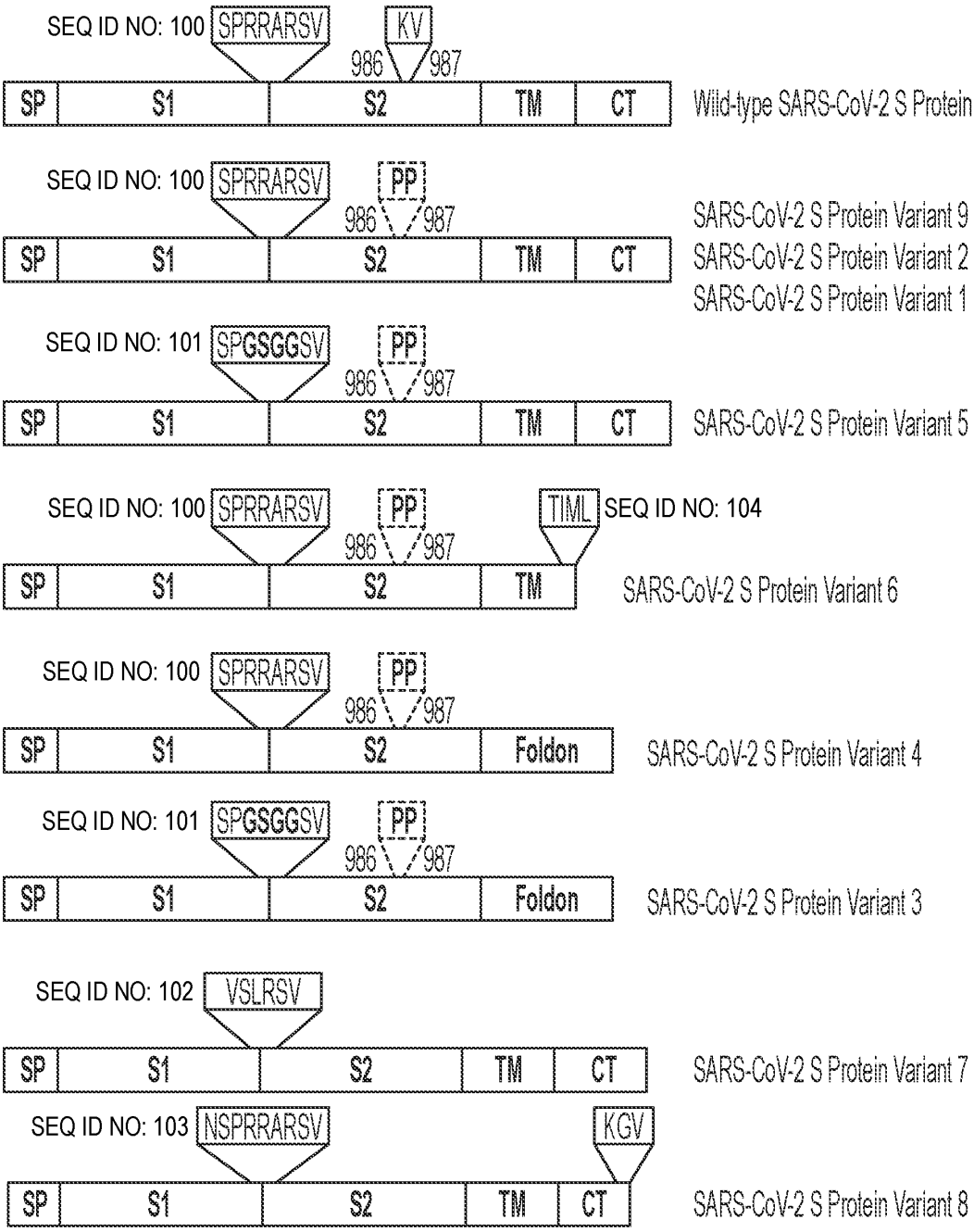

SEQ ID NO: 100
SPRRARSV
KV
986
987
SP
S1
S2
TM
CT
Wild-type SARS-CoV-2 S Protein
SEQ ID NO: 100
SPRRARSV
PP
986
987
SARS-CoV-2 S Protein Variant 9
SARS-CoV-2 S Protein Variant 2
SARS-CoV-2 S Protein Variant 1
SEQ ID NO: 101
SPGSGGSV
PP
986
987
SARS-CoV-2 S Protein Variant 5
SEQ ID NO: 100
SPRRARSV
PP
986
987
TIML
SEQ ID NO: 104
SARS-CoV-2 S Protein Variant 6
SEQ ID NO: 100
SPRRARSV
PP
986
987
Foldon
SARS-CoV-2 S Protein Variant 4
SEQ ID NO: 101
SPGSGGSV
PP
986
987
Foldon
SARS-CoV-2 S Protein Variant 3
SEQ ID NO: 102
VSLRSV
SARS-CoV-2 S Protein Variant 7
SEQ ID NO: 103
NSPRRARSV
KGV
SARS-CoV-2 S Protein Variant 8

FIG. 1

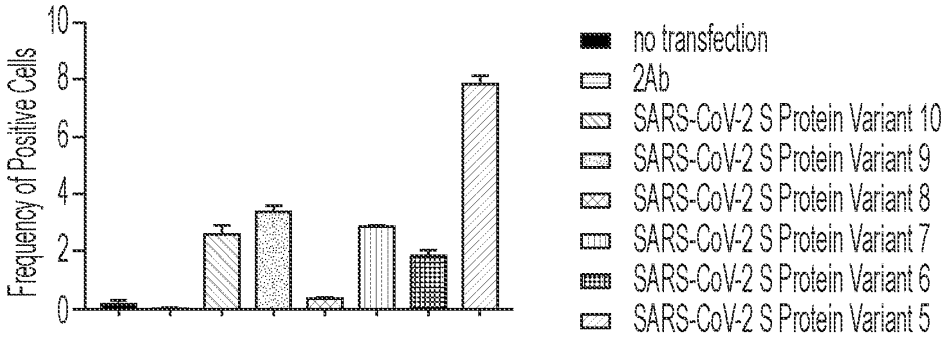

Frequency of Positive Cells
10
8
6
4
2
0
no transfection
2Ab
SARS-CoV-2 S Protein Variant 10
SARS-CoV-2 S Protein Variant 9
SARS-CoV-2 S Protein Variant 8
SARS-CoV-2 S Protein Variant 7
SARS-CoV-2 S Protein Variant 6
SARS-CoV-2 S Protein Variant 5

FIG. 2

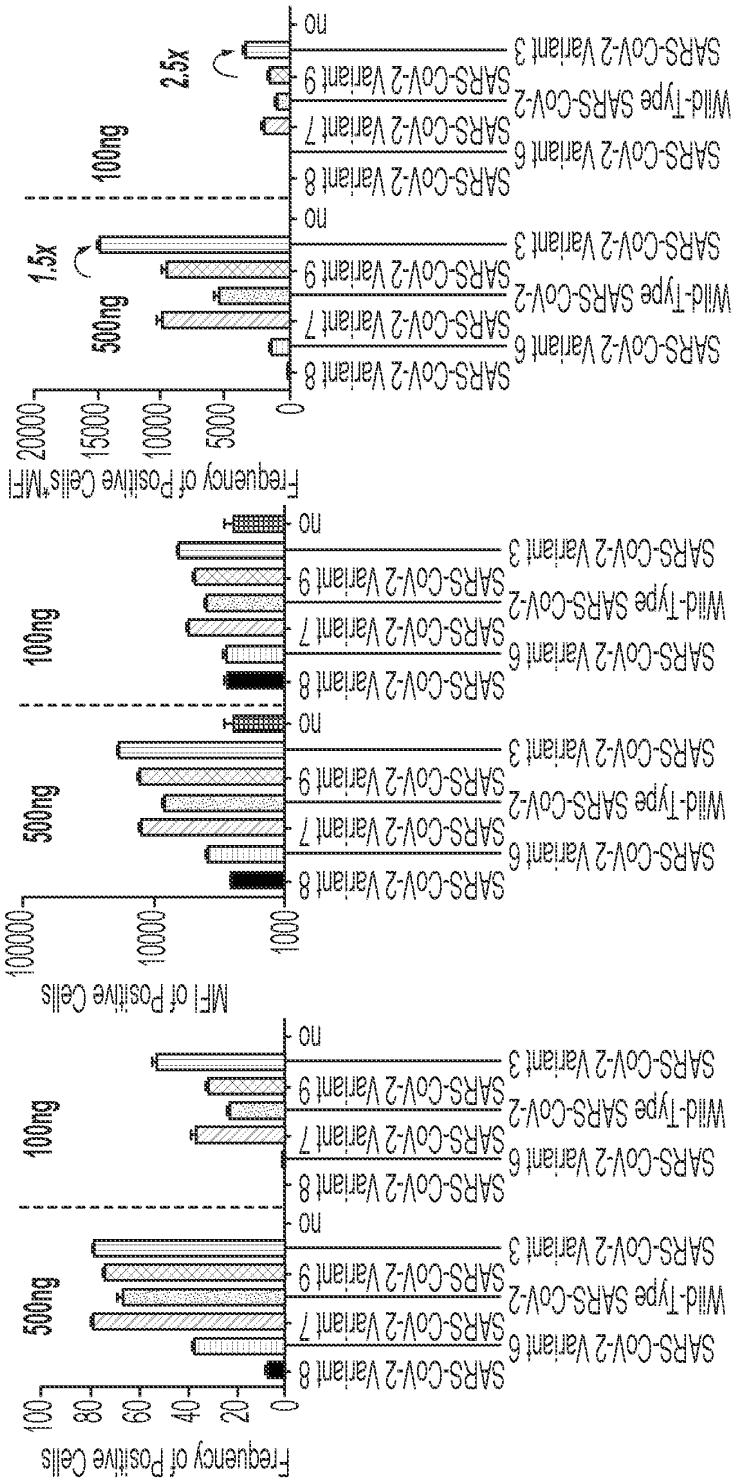

Frequency of Positive Cells
100
80
60
40
20
0
500ng
100ng
no
SARS-CoV-2 Variant 8
SARS-CoV-2 Variant 7
SARS-CoV-2 Variant 9
SARS-CoV-2 Variant 3
SARS-CoV-2 Variant 6
Wild-Type SARS-CoV-2
MFI of Positive Cells
1000000
100000
10000
1000
Frequency of Positive Cells*MFI
20000
15000
10000
5000
0
1.5x
2.5x

FIG. 3

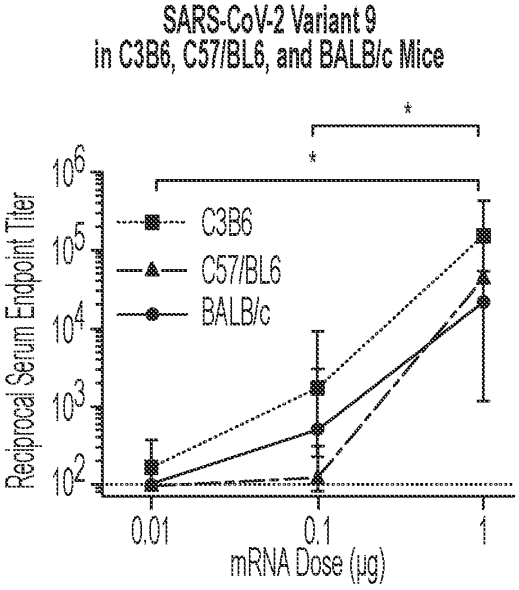


FIG. 4A

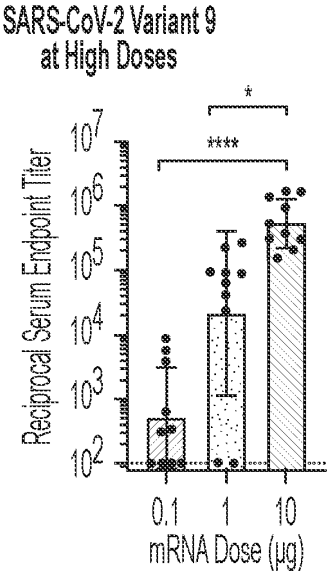


FIG. 4B

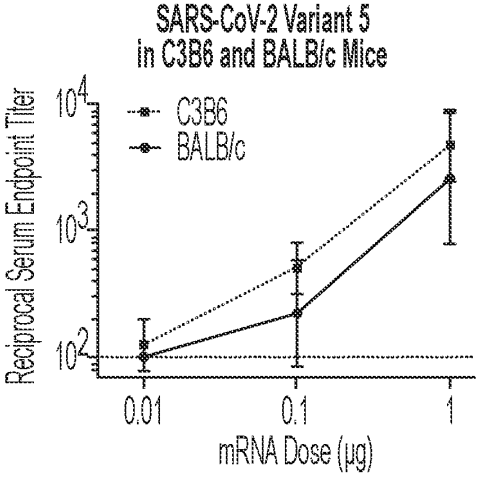


FIG. 5A

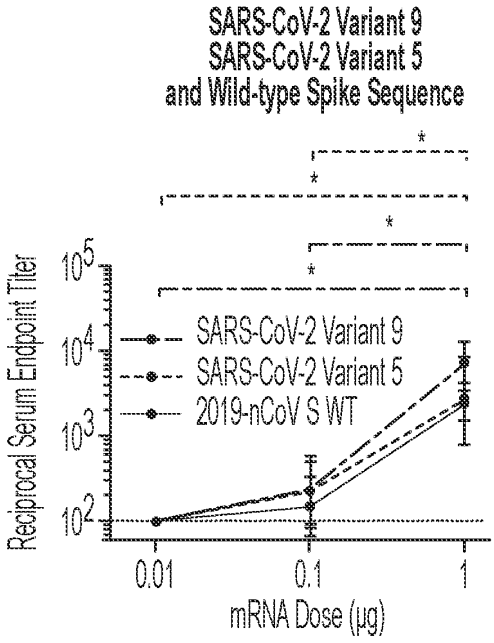


FIG. 5B

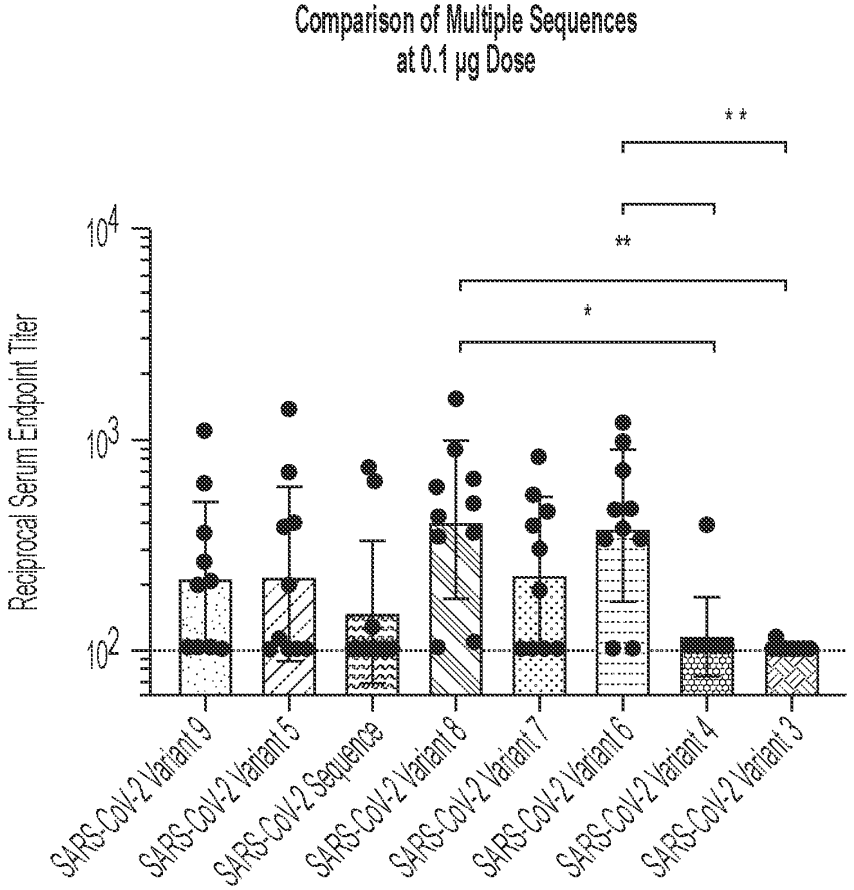

Comparison of Multiple Sequences
at 0.1 µg Dose
Reciprocal Serum Endpoint Titer
10^4
10^3
10^2
**
**
*
SARS-CoV-2 Variant 9
SARS-CoV-2 Variant 5
SARS-CoV-2 Sequence
SARS-CoV-2 Variant 8
SARS-CoV-2 Variant 7
SARS-CoV-2 Variant 6
SARS-CoV-2 Variant 4
SARS-CoV-2 Variant 3

FIG. 5C

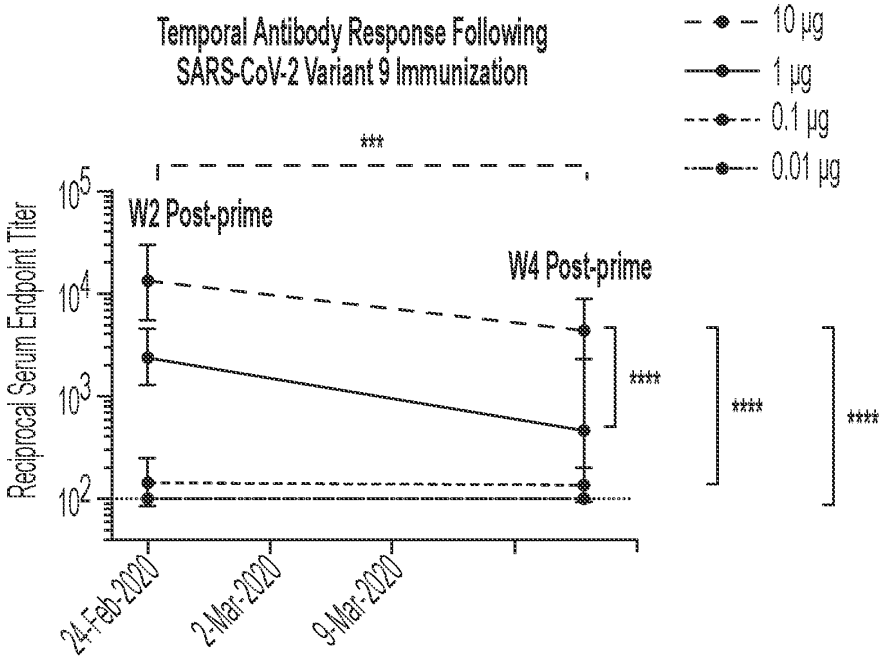

Temporal Antibody Response Following
SARS-CoV-2 Variant 9 Immunization
10 µg
1 µg
0.1 µg
0.01 µg
***
W2 Post-prime
W4 Post-prime
****
****
****
Reciprocal Serum Endpoint Titer
10^5
10^4
10^3
10^2
24-Feb-2020
2-Mar-2020
9-Mar-2020

FIG. 6

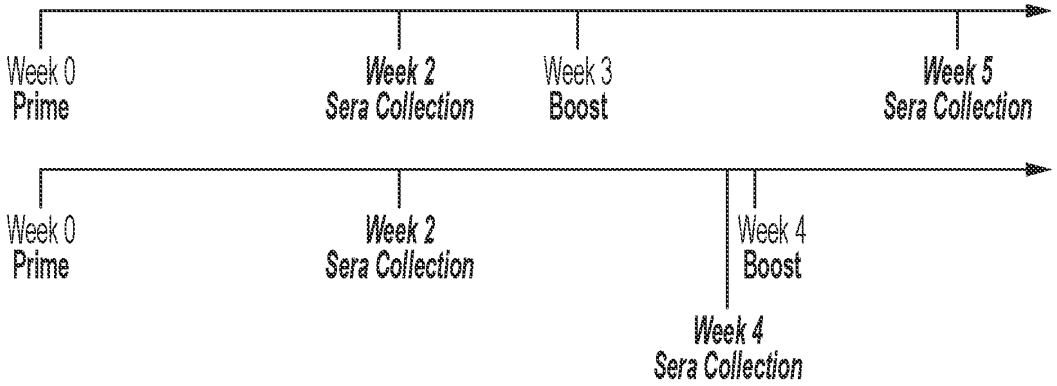

Week 0
Prime
Week 2
Sera Collection
Week 3
Boost
Week 5
Sera Collection
Week 0
Prime
Week 2
Sera Collection
Week 4
Boost
Week 4
Sera Collection

FIG. 7

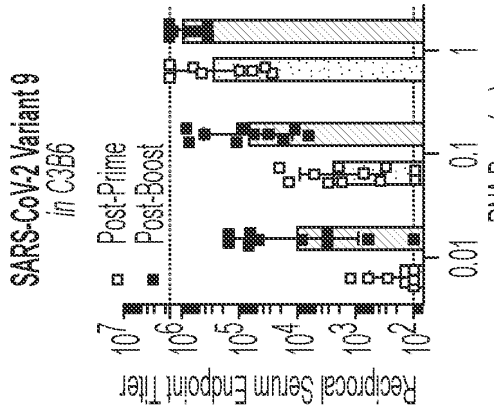


FIG. 8C

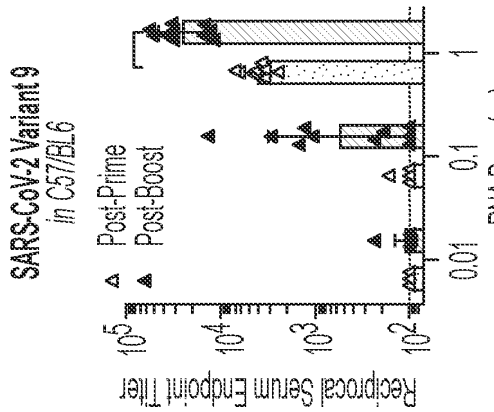


FIG. 8B

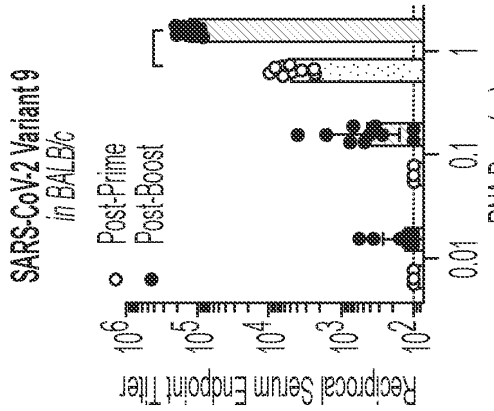


FIG. 8A

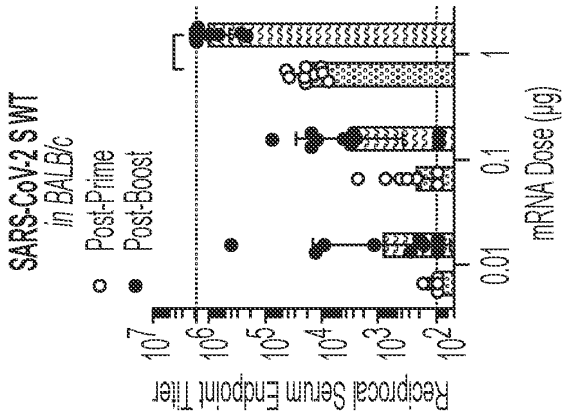


FIG. 9C

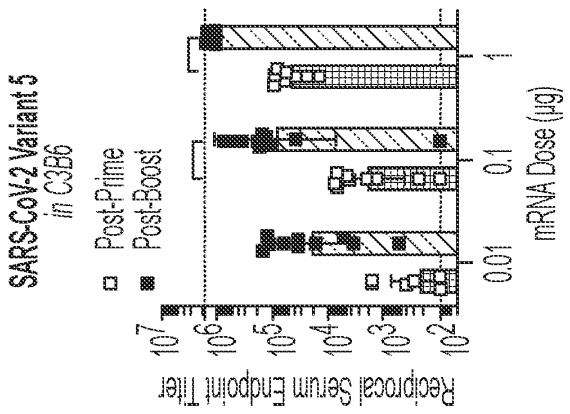


FIG. 9B

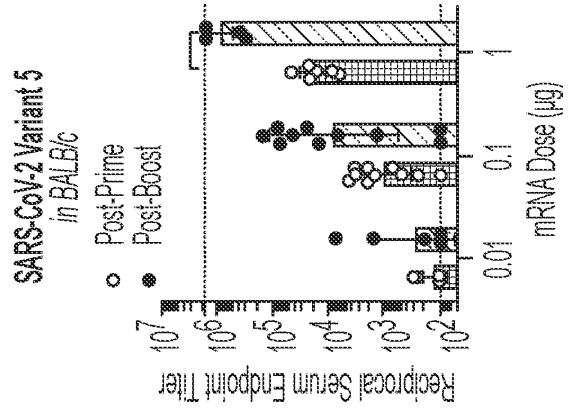


FIG. 9A

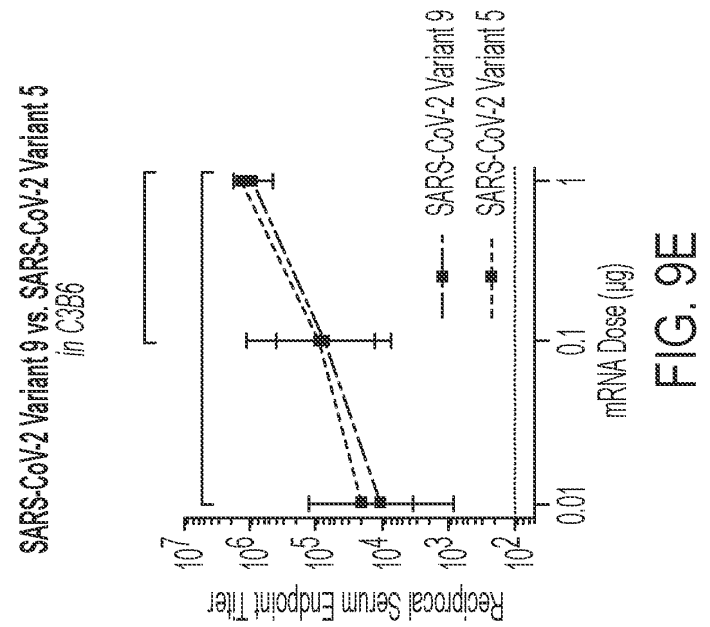

SARS-CoV-2 Variant 9 vs. SARS-CoV-2 Variant 5
in C3B6
Reciprocal Serum Endpoint Titer
10^7
10^6
10^5
10^4
10^3
10^2
0.01
0.1
1
mRNA Dose (µg)
SARS-CoV-2 Variant 9
SARS-CoV-2 Variant 5

FIG. 9E

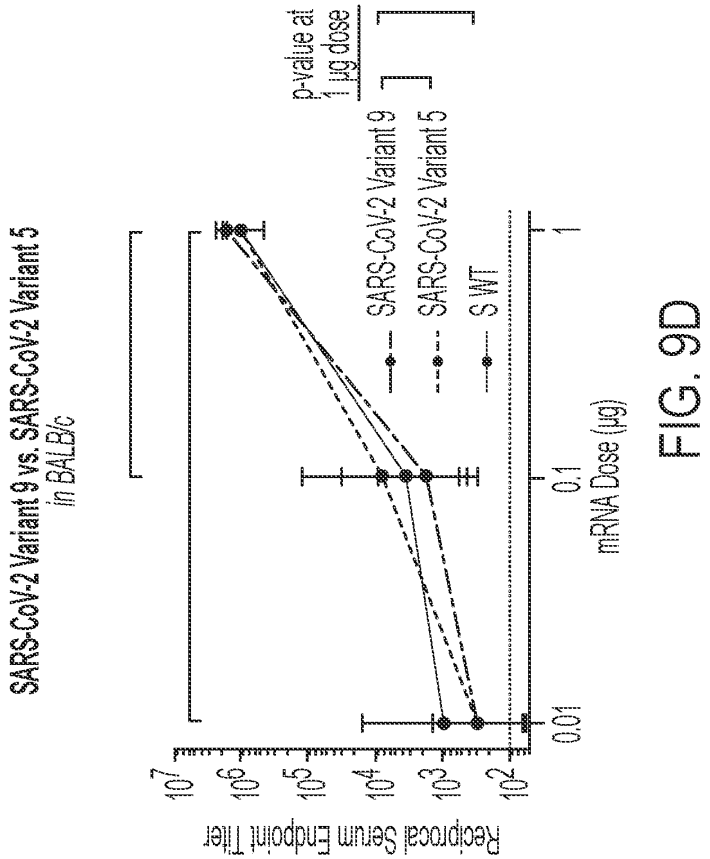

SARS-CoV-2 Variant 9 vs. SARS-CoV-2 Variant 5
in BALB/c
Reciprocal Serum Endpoint Titer
10^7
10^6
10^5
10^4
10^3
10^2
0.01
0.1
1
mRNA Dose (µg)
SARS-CoV-2 Variant 9
SARS-CoV-2 Variant 5
S WT
p-value at 1 µg dose

FIG. 9D

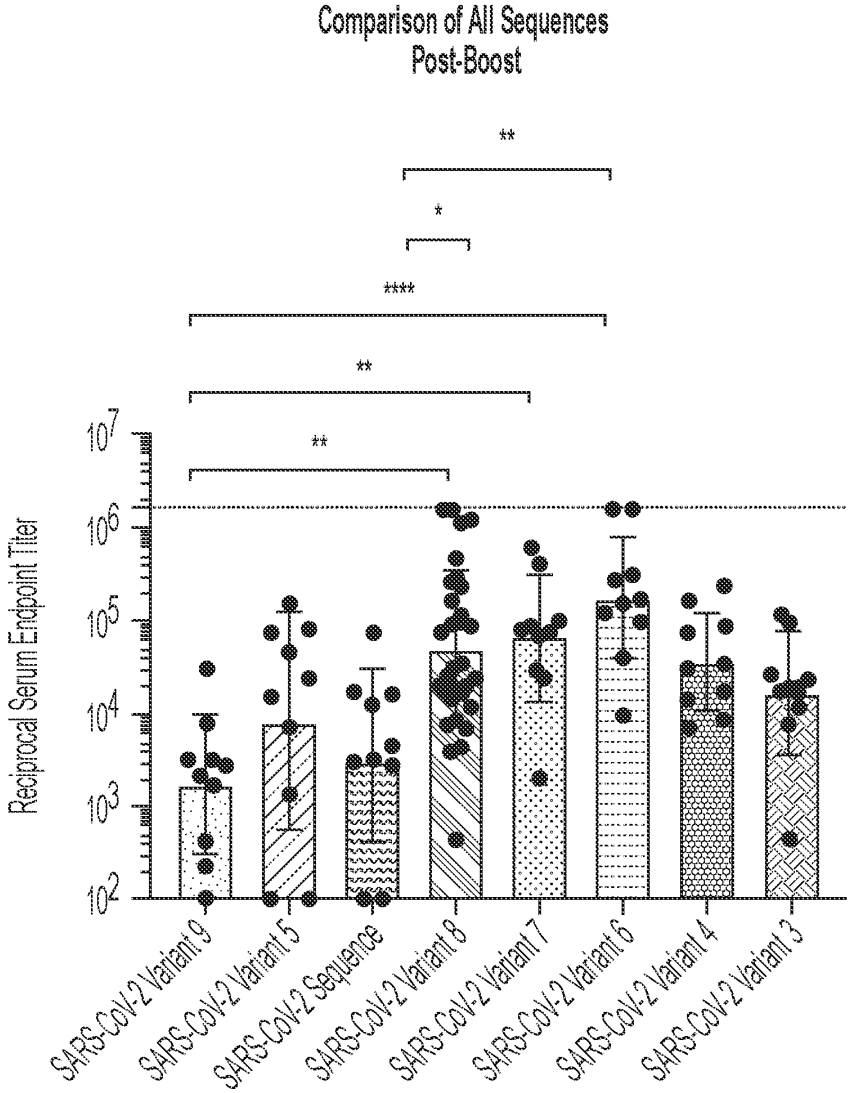

Comparison of All Sequences
Post-Boost
**
*
****
**
**
Reciprocal Serum Endpoint Titer
10^7
10^6
10^5
10^4
10^3
10^2
SARS-CoV-2 Variant 9
SARS-CoV-2 Variant 5
SARS-CoV-2 Sequence
SARS-CoV-2 Variant 8
SARS-CoV-2 Variant 7
SARS-CoV-2 Variant 6
SARS-CoV-2 Variant 4
SARS-CoV-2 Variant 3

FIG. 10

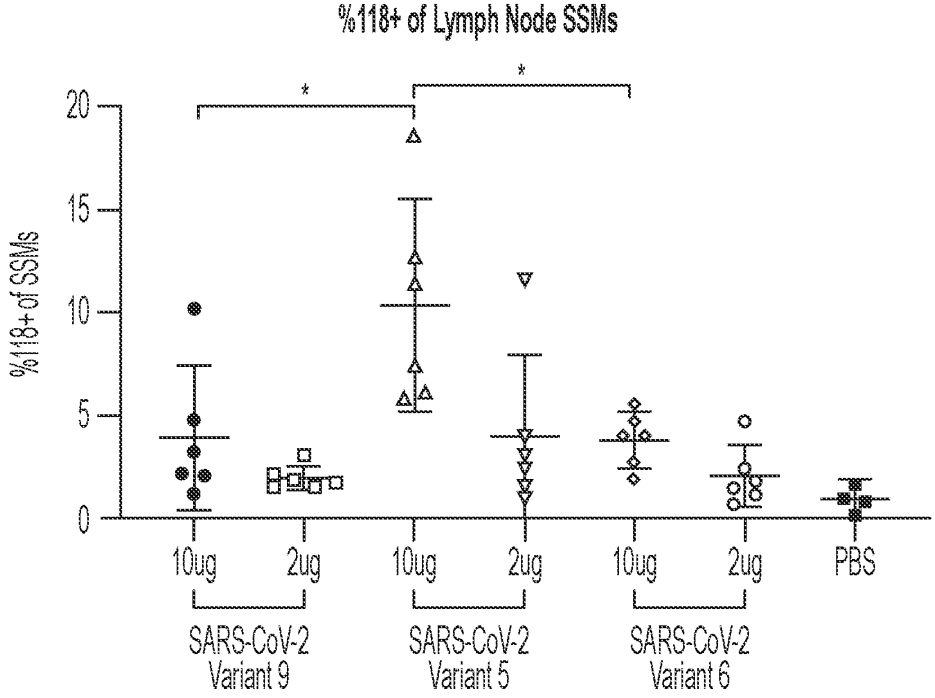


FIG. 11A

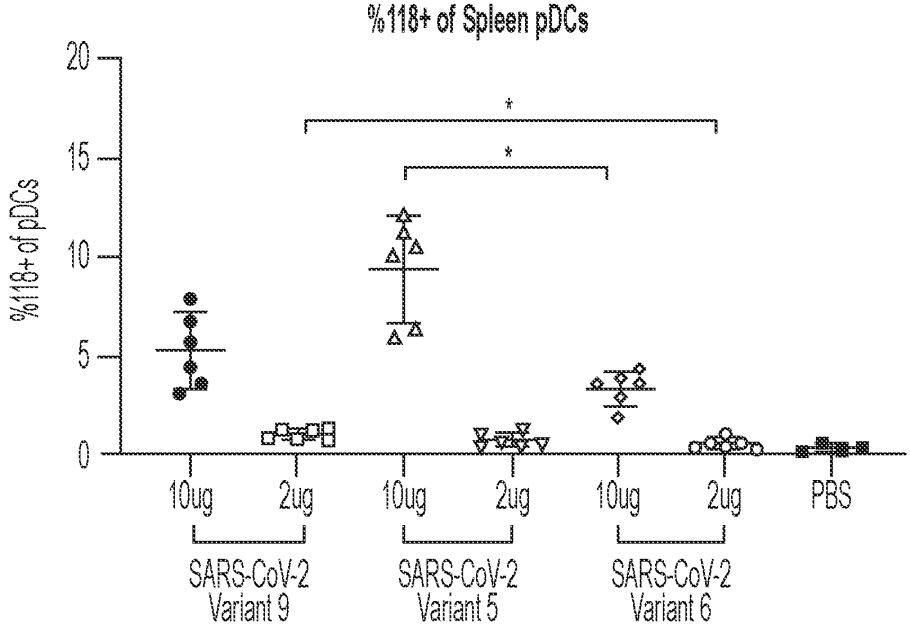


FIG. 11B

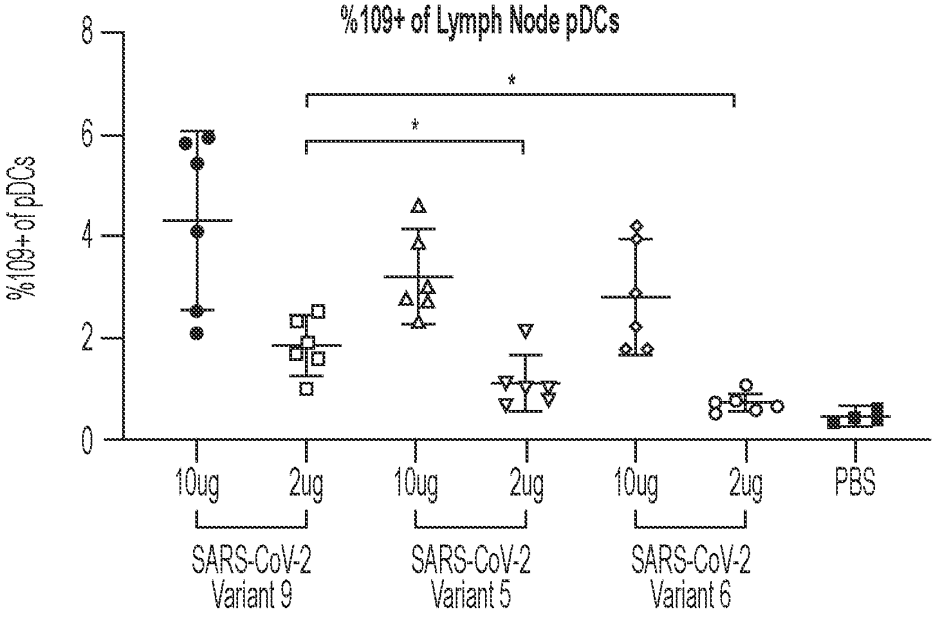


FIG. 12A

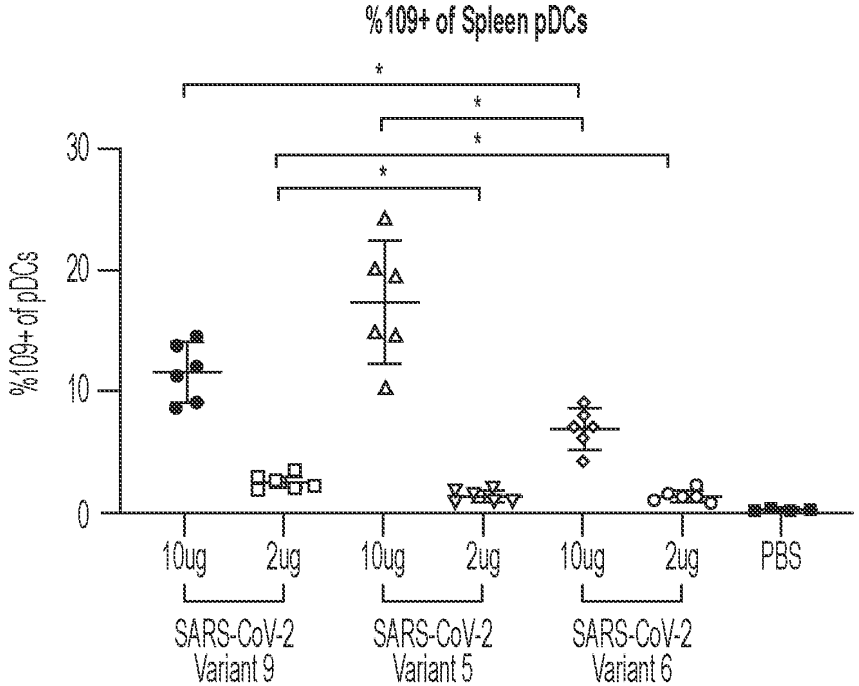


FIG. 12B

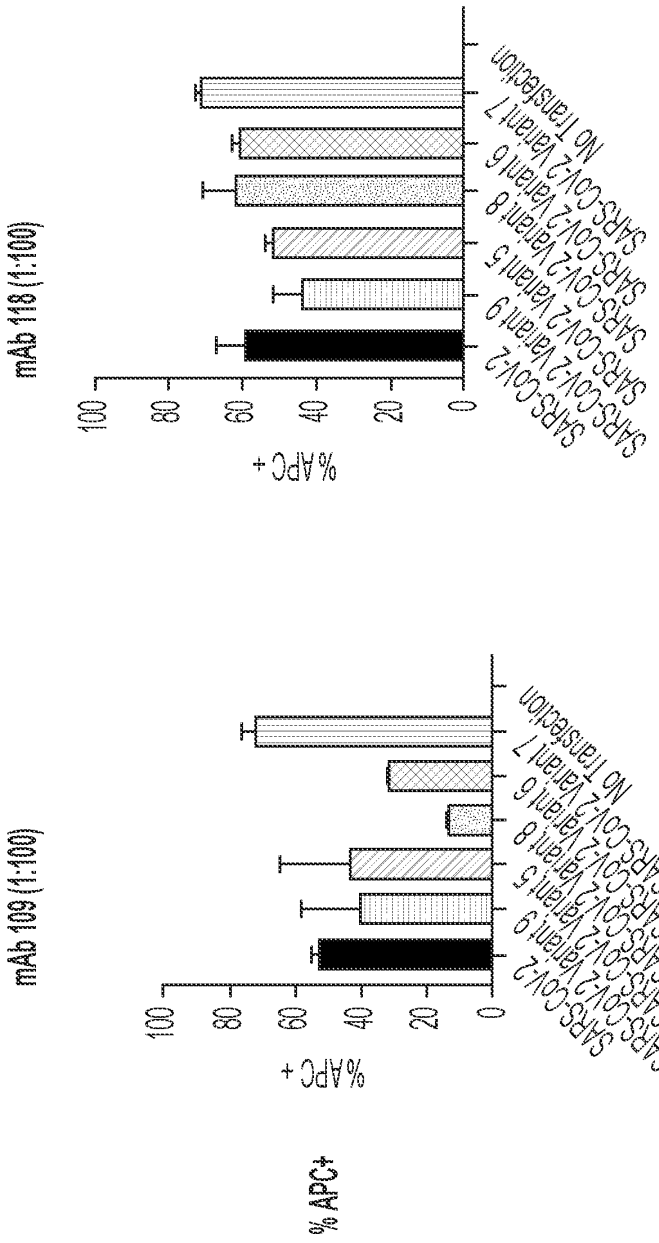

mAb 118 (1:100)
% APC +
100
80
60
40
20
0
SARS-CoV-2
SARS-CoV-2 Variant 9
SARS-CoV-2 Variant 5
SARS-CoV-2 Variant 8
SARS-CoV-2 Variant 6
SARS-CoV-2 Variant 7
No Transfection
mAb 109 (1:100)
% APC +
100
80
60
40
20
0
SARS-CoV-2
SARS-CoV-2 Variant 9
SARS-CoV-2 Variant 5
SARS-CoV-2 Variant 8
SARS-CoV-2 Variant 6
SARS-CoV-2 Variant 7
No Transfection
% APC+

FIG. 13A

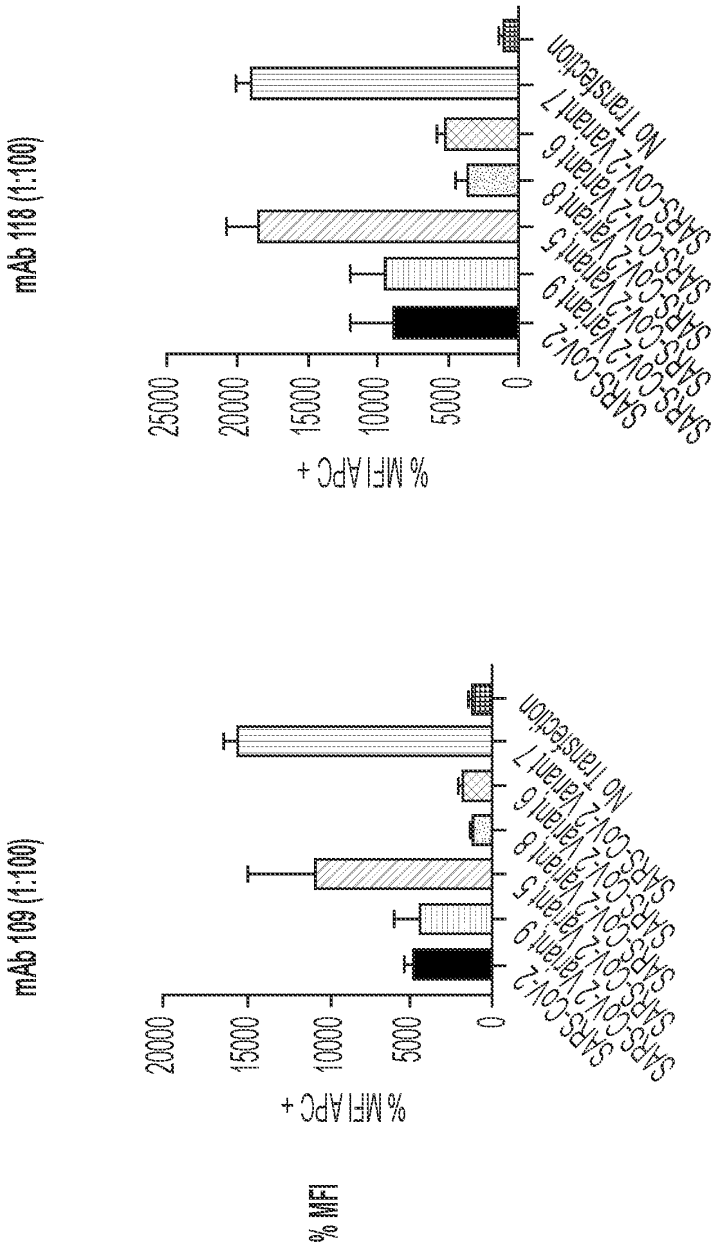

% MFI
mAb 109 (1:100)
% MFI APC +
20000
15000
10000
5000
0
SARS-CoV-2
SARS-CoV-2 Variant 9
SARS-CoV-2 Variant 5
SARS-CoV-2 Variant 8
SARS-CoV-2 Variant 6
SARS-CoV-2 Variant 7
No Transfection
mAb 118 (1:100)
% MFI APC +
25000
20000
15000
10000
5000
0
SARS-CoV-2
SARS-CoV-2 Variant 9
SARS-CoV-2 Variant 5
SARS-CoV-2 Variant 8
SARS-CoV-2 Variant 6
SARS-CoV-2 Variant 7
No Transfection

FIG. 13B

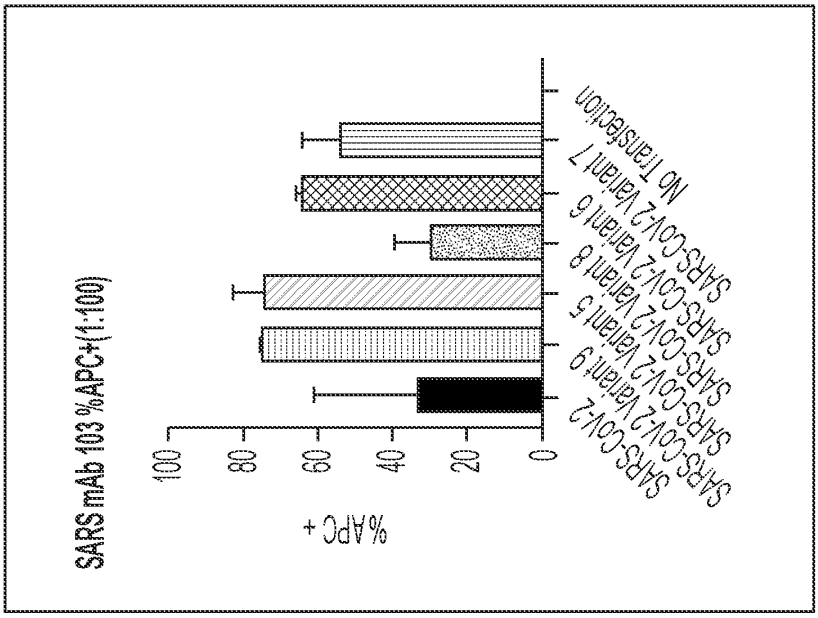

Positive Control
SARS mAb 103 %APC+(1:100)
%APC +
100
80
60
40
20
0
SARS-CoV-2
SARS-CoV-2 Variant 9
SARS-CoV-2 Variant 5
SARS-CoV-2 Variant 8
SARS-CoV-2 Variant 6
SARS-CoV-2 Variant 7
No Transfection

FIG. 13C

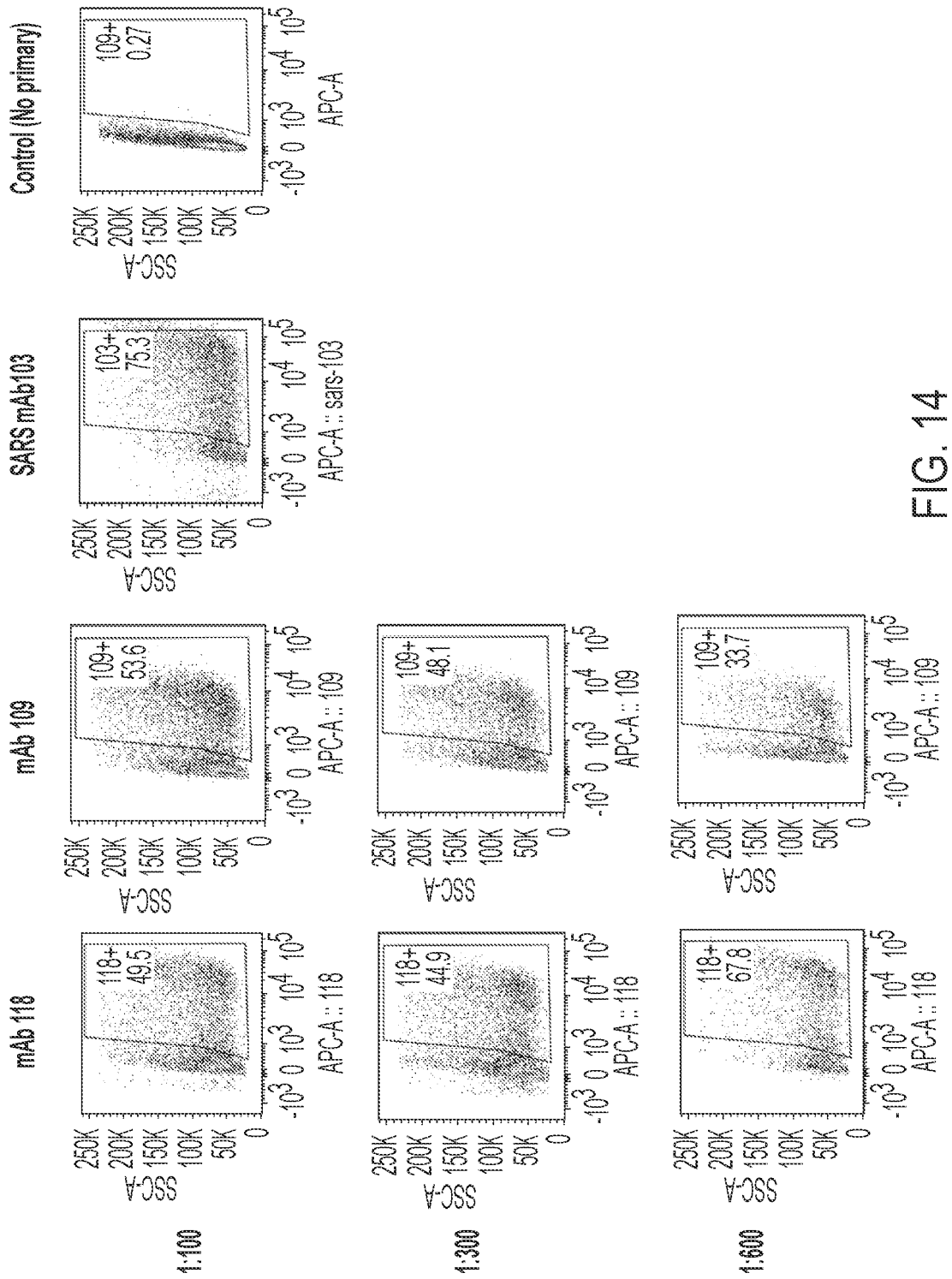

Control (No primary)
SARS mAb103
mAb 109
mAb 118
1:100
1:300
1:600
SSC-A
APC-A
APC-A :: sars-103
APC-A :: 109
APC-A :: 118
109+ 0.27
103+ 75.3
109+ 53.6
109+ 48.1
109+ 33.7
118+ 49.5
118+ 44.9
118+ 67.8

FIG. 14

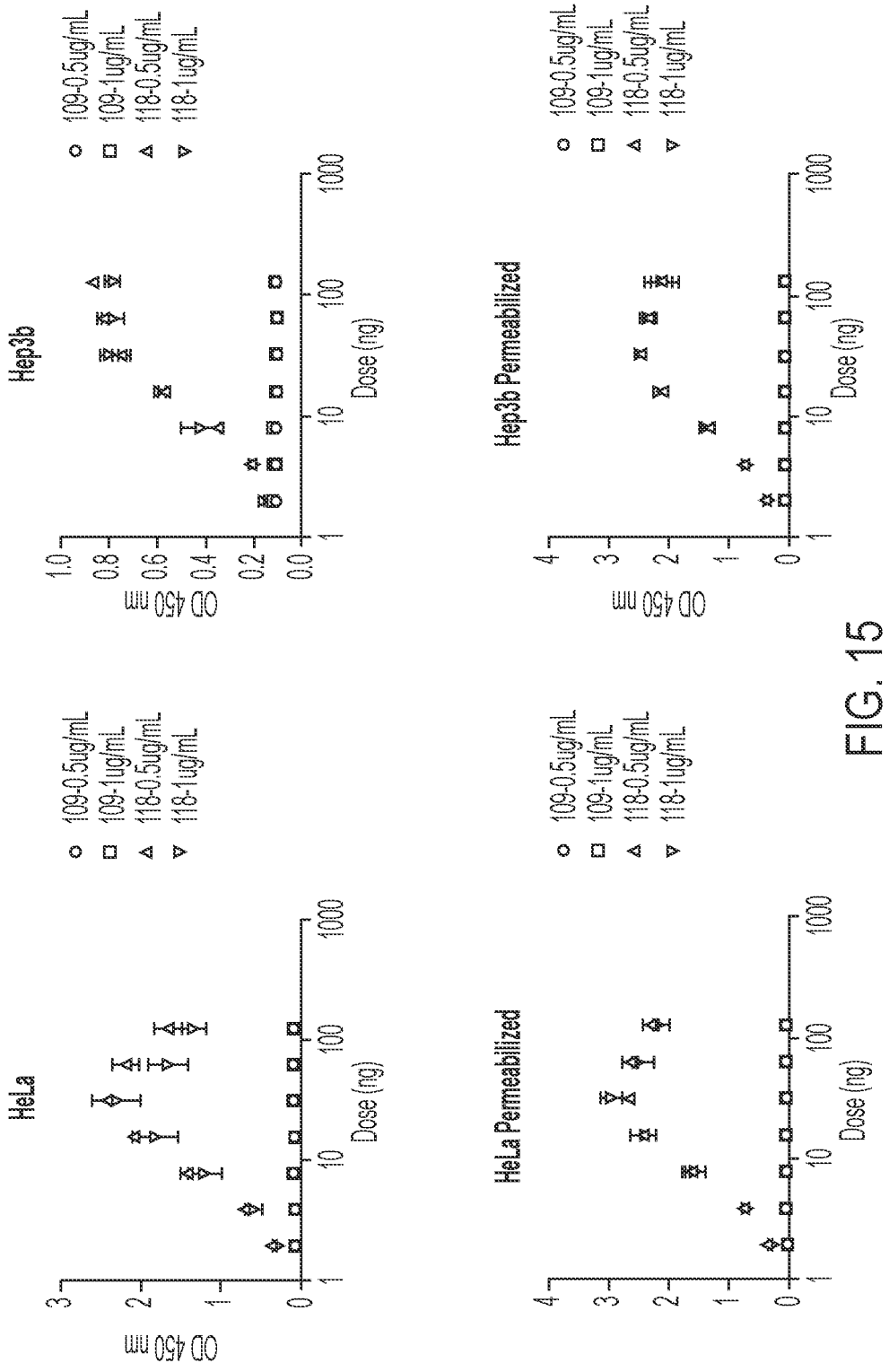

Hep3b
109-0.5ug/mL
109-1ug/mL
118-0.5ug/mL
118-1ug/mL
OD 450 nm
Dose (ng)
Hep3b Permeabilized
HeLa
HeLa Permeabilized

FIG. 15

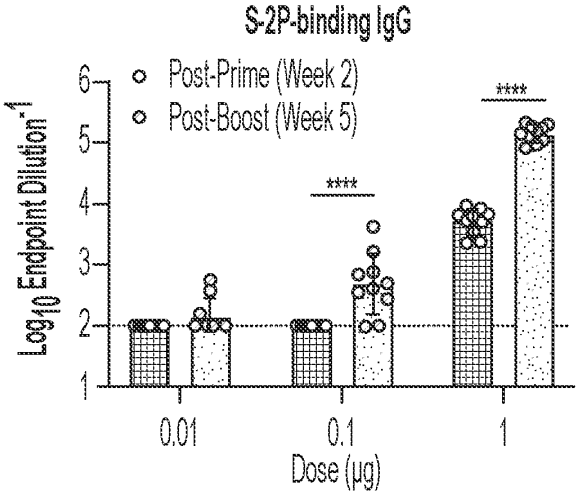


FIG. 16A

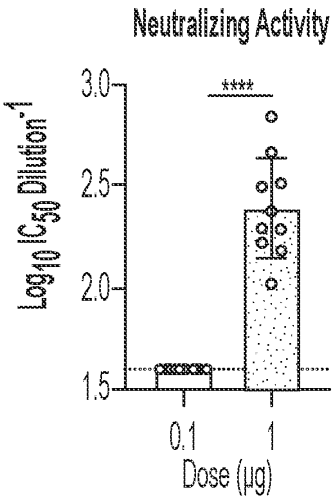


FIG. 16B

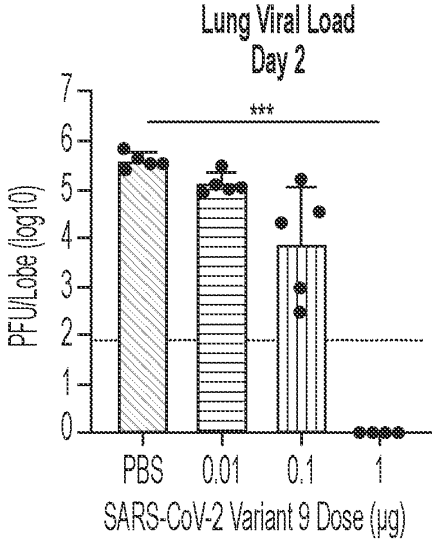


FIG. 17A

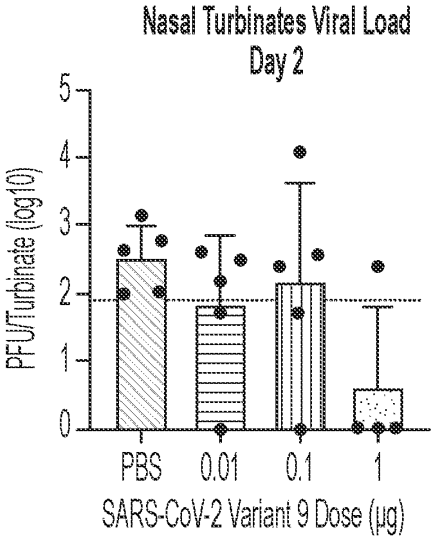


FIG. 17B

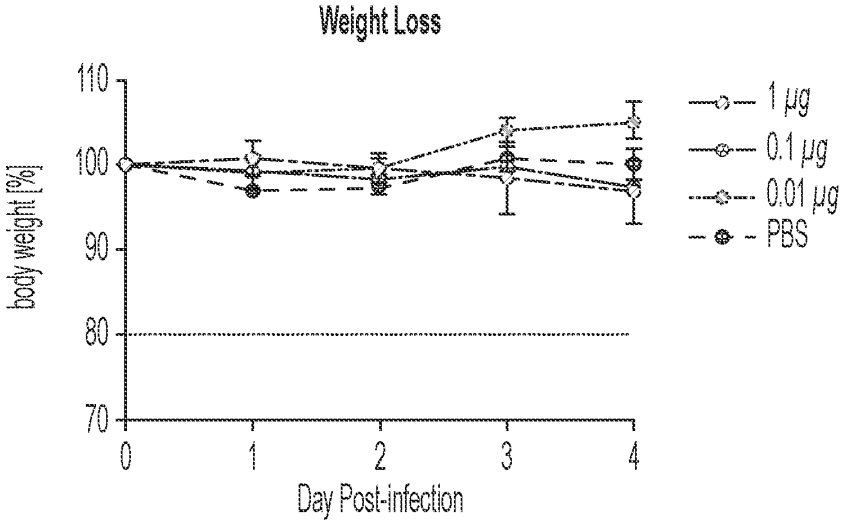


FIG. 17C

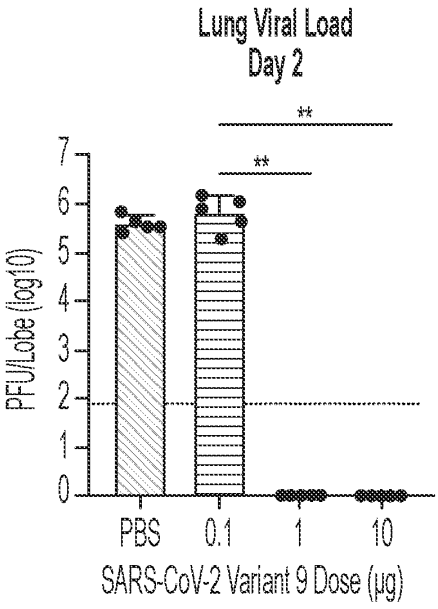


FIG. 18A

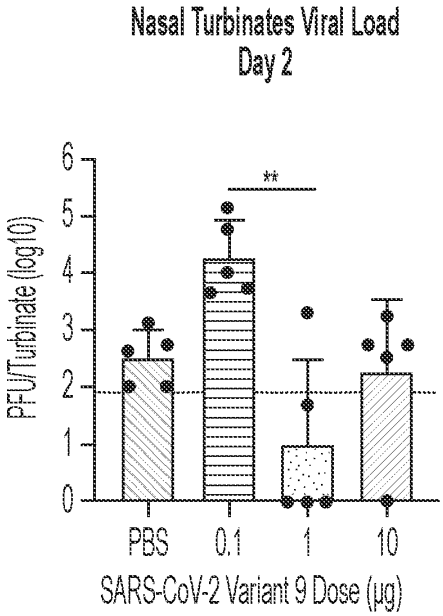


FIG. 18B

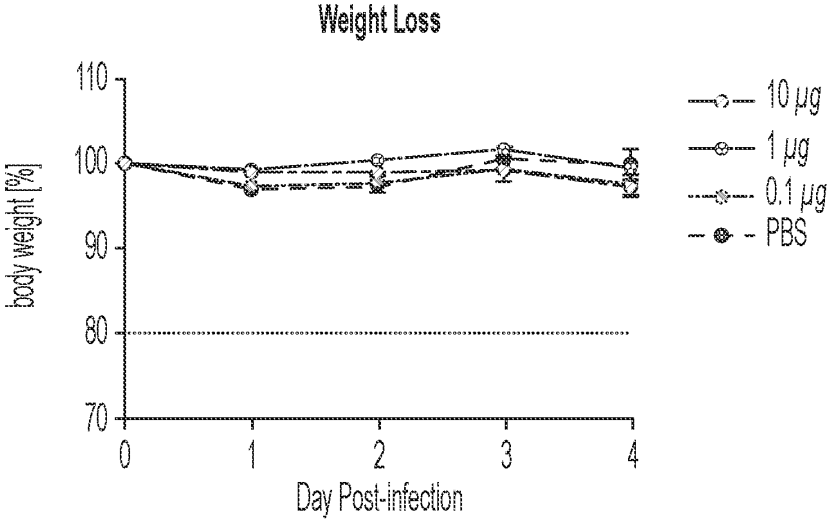


FIG. 18C

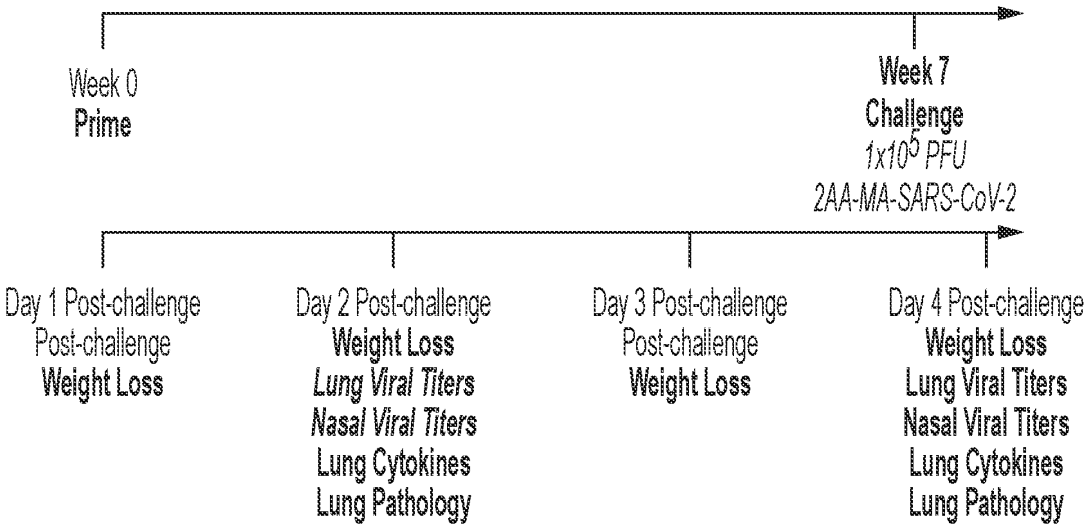


FIG. 19

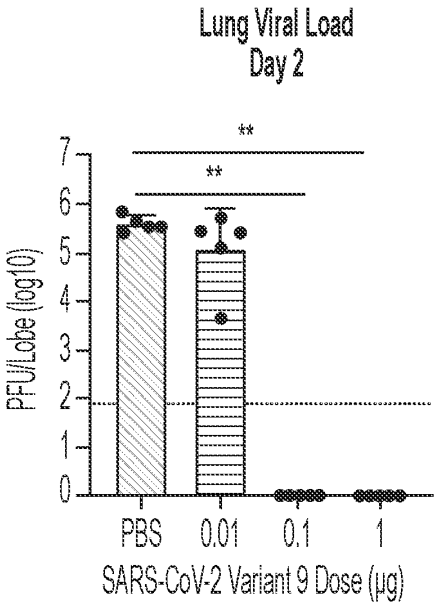


FIG. 20A

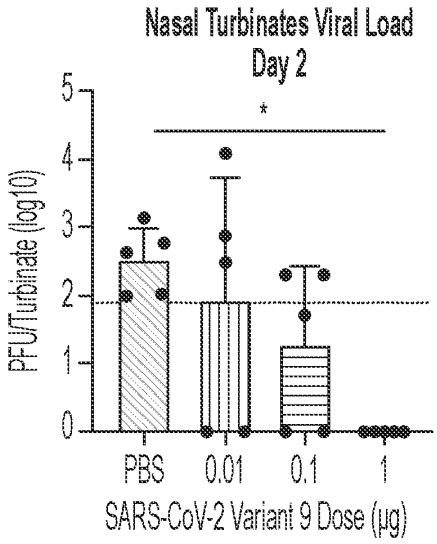


FIG. 20B

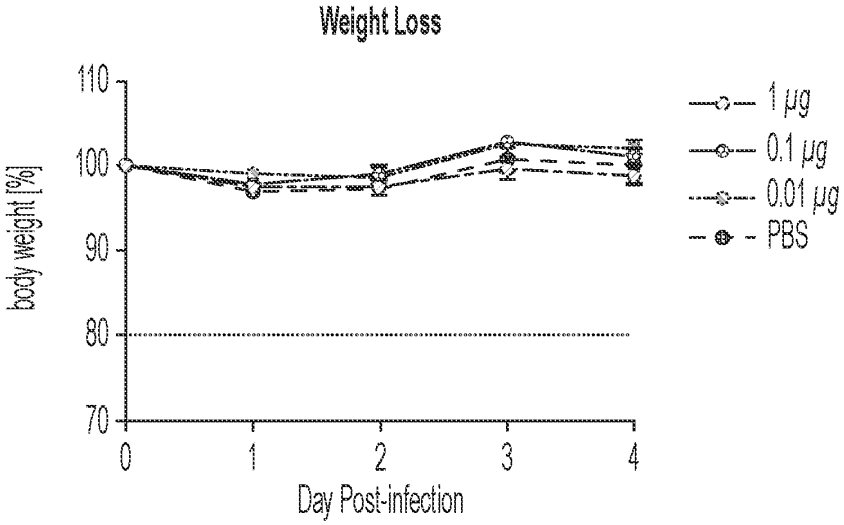


FIG. 20C

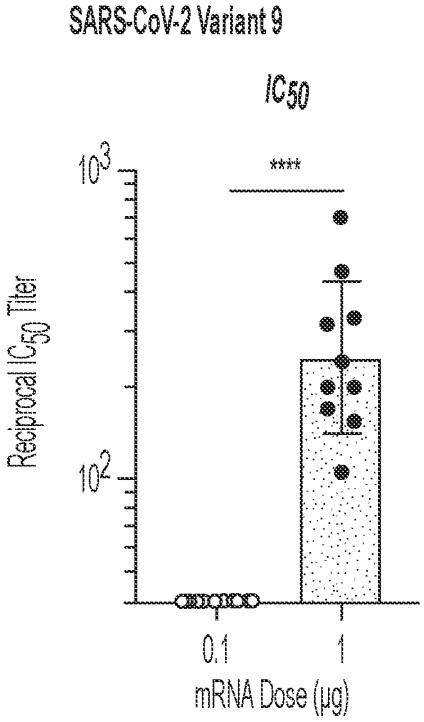


FIG. 21A

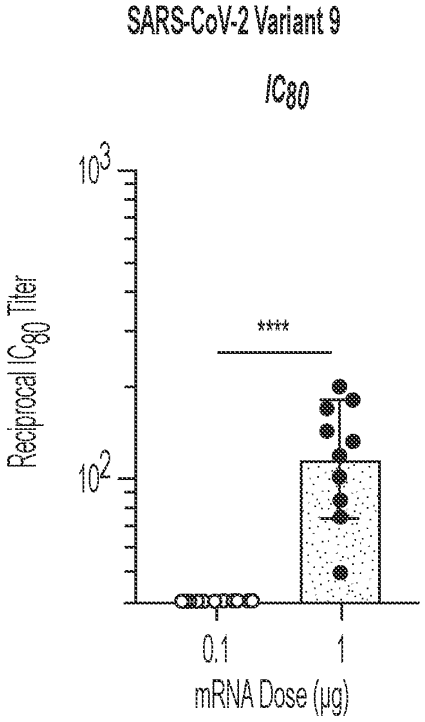


FIG. 21B

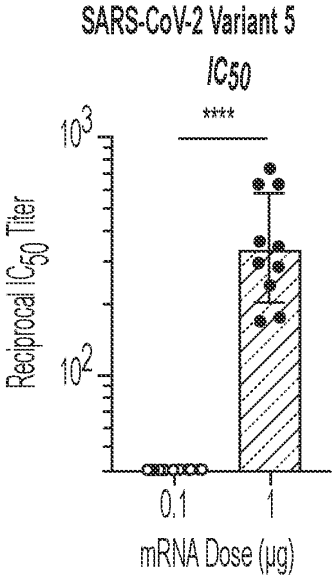


FIG. 21C

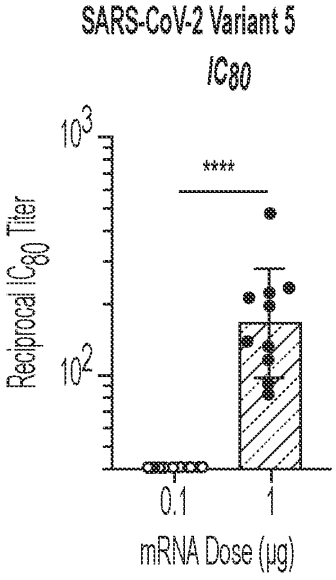


FIG. 21D

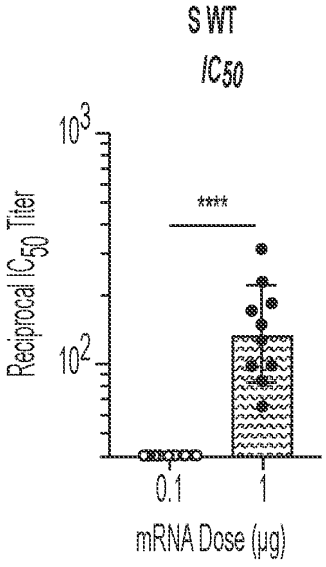


FIG. 21E

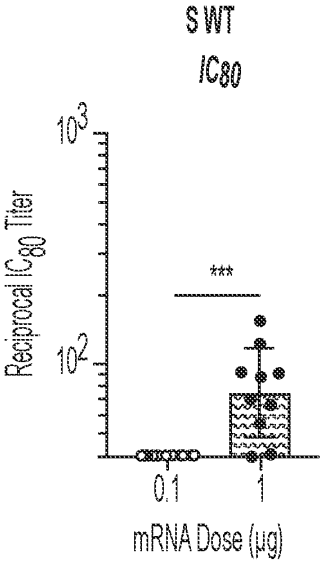


FIG. 21F

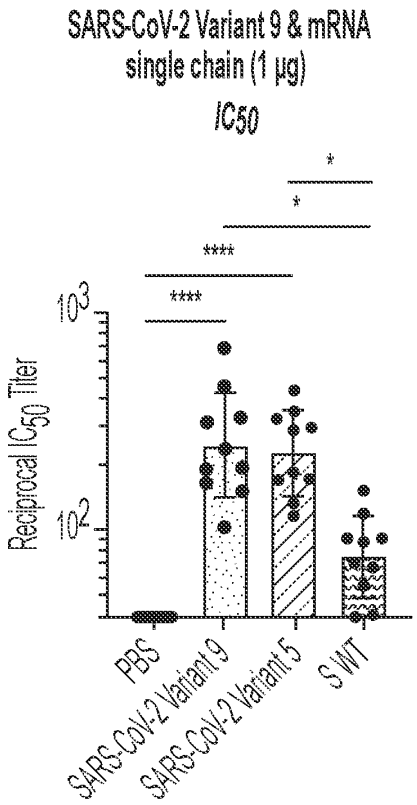


FIG. 21G

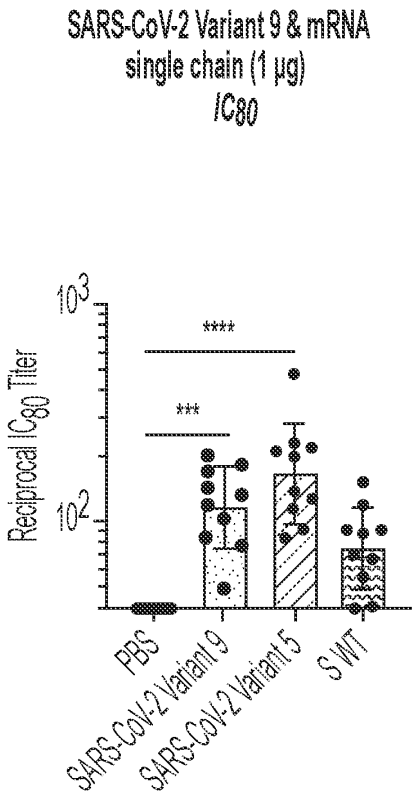


FIG. 21H

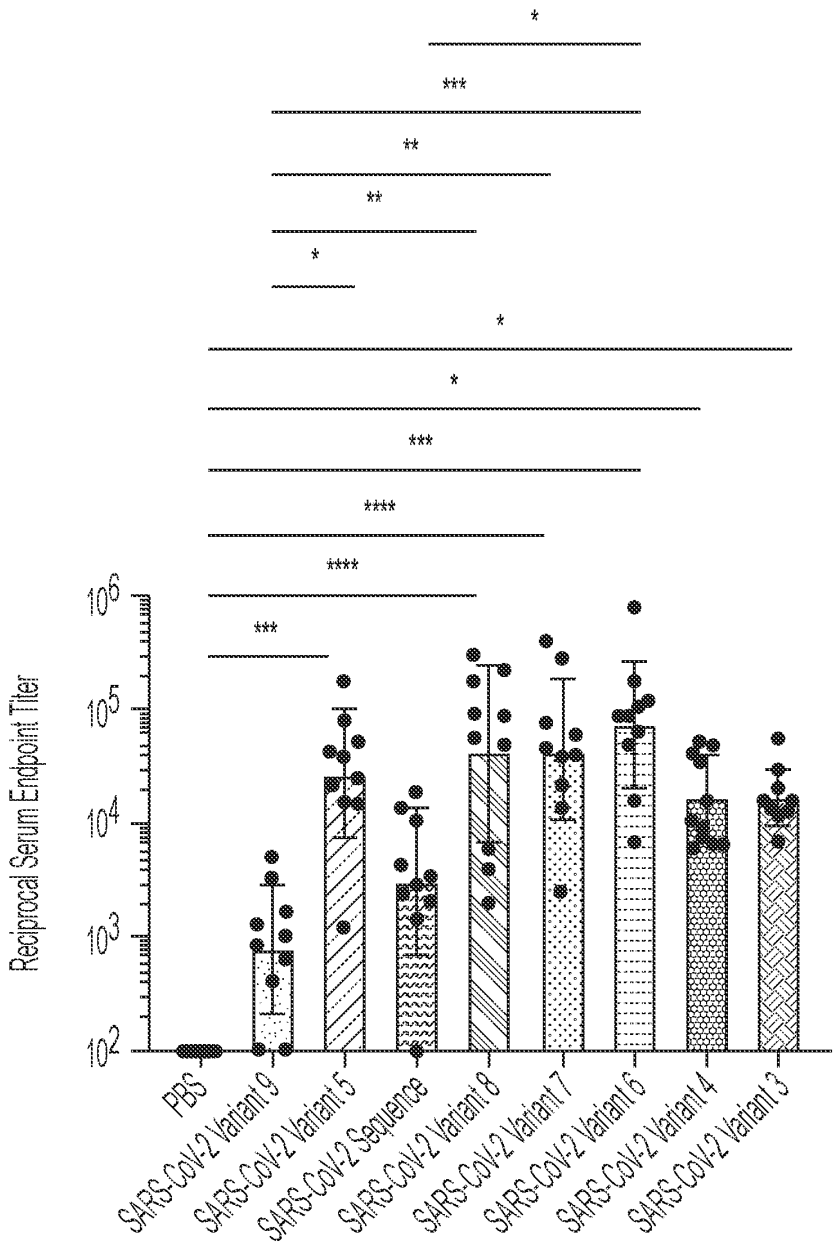

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***
Reciprocal Serum Endpoint Titer
10^6
10^5
10^4
10^3
10^2
PBS
SARS-CoV-2 Variant 9
SARS-CoV-2 Variant 5
SARS-CoV-2 Sequence
SARS-CoV-2 Variant 8
SARS-CoV-2 Variant 7
SARS-CoV-2 Variant 6
SARS-CoV-2 Variant 4
SARS-CoV-2 Variant 3

FIG. 22A

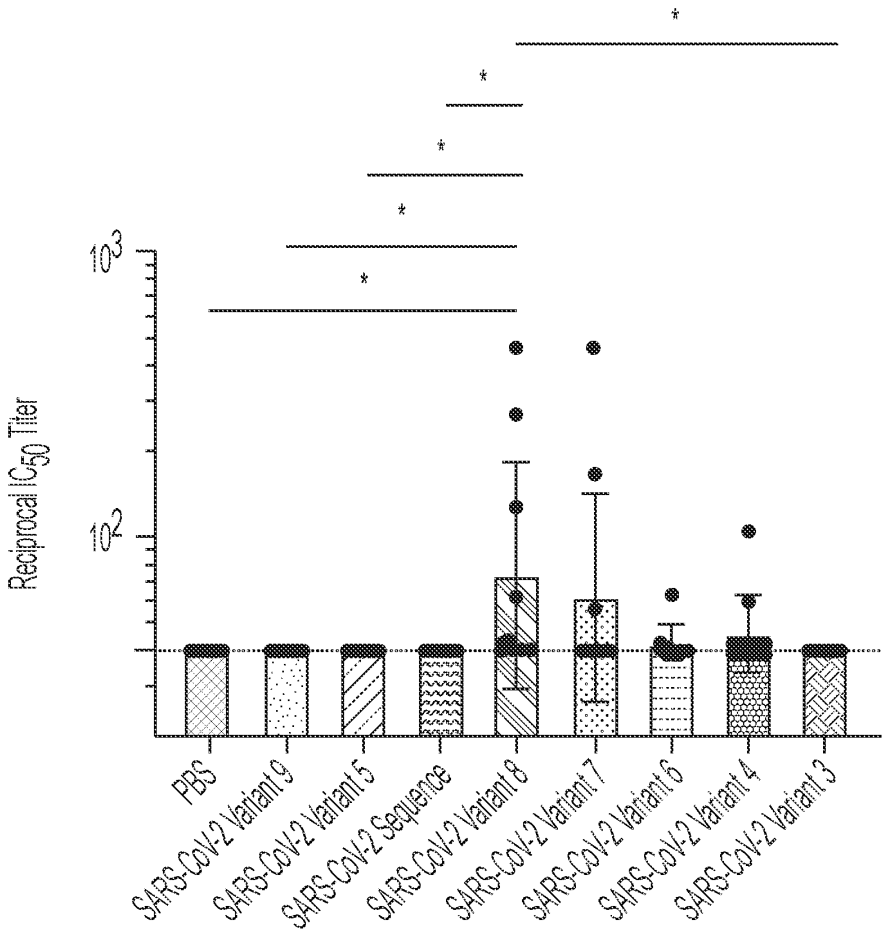

Reciprocal IC50 Titer
10^3
10^2
*
*
*
*
*
PBS
SARS-CoV-2 Variant 9
SARS-CoV-2 Variant 5
SARS-CoV-2 Sequence
SARS-CoV-2 Variant 8
SARS-CoV-2 Variant 7
SARS-CoV-2 Variant 6
SARS-CoV-2 Variant 4
SARS-CoV-2 Variant 3

FIG. 22B

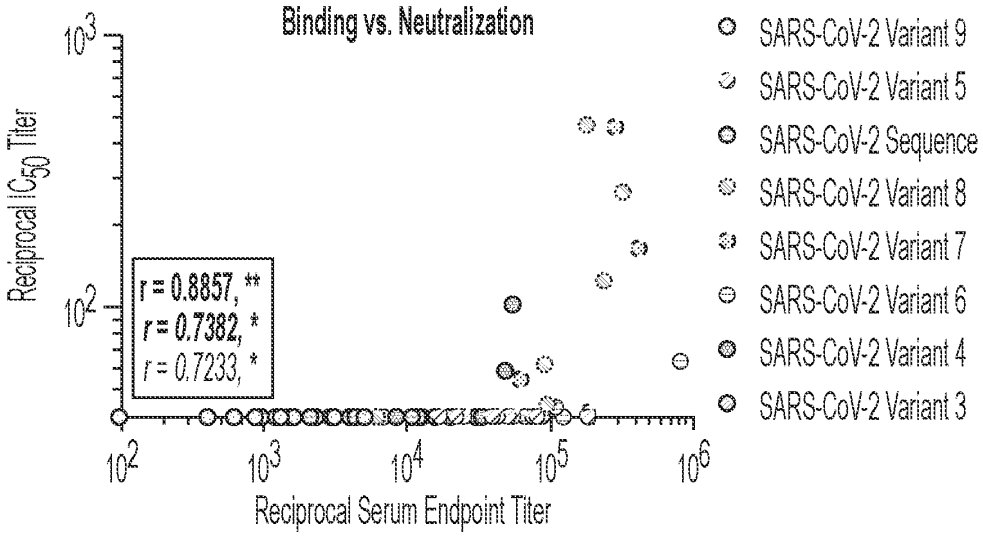

Binding vs. Neutralization
Reciprocal IC50 Titer
Reciprocal Serum Endpoint Titer
r = 0.8857, **
r = 0.7382, *
r = 0.7233, *
SARS-CoV-2 Variant 9
SARS-CoV-2 Variant 5
SARS-CoV-2 Sequence
SARS-CoV-2 Variant 8
SARS-CoV-2 Variant 7
SARS-CoV-2 Variant 6
SARS-CoV-2 Variant 4
SARS-CoV-2 Variant 3

FIG. 22C