FIG. 1 A

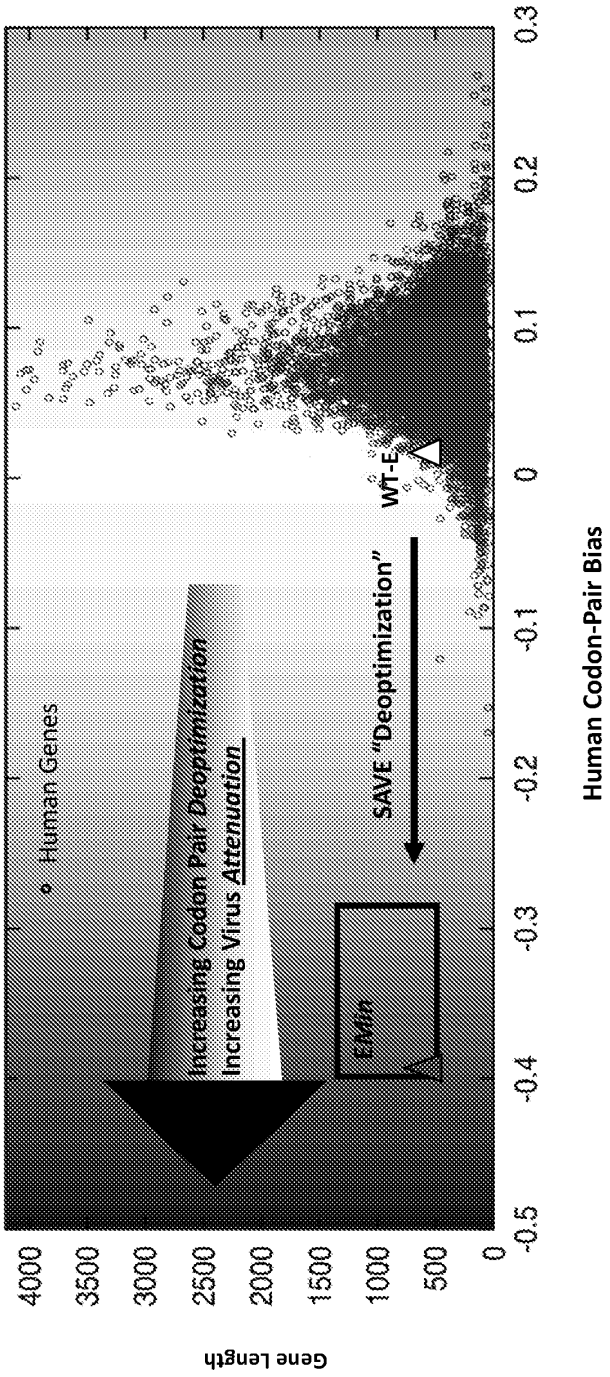

Human Genes
Increasing Codon Pair Deoptimization
Increasing Virus Attenuation
SAVE "Deoptimization"
WT-E
E.Min
Gene Length
Human Codon-Pair Bias
4000
3500
3000
2500
2000
1500
1000
500
0
0.3
0.2
0.1
0
-0.1
-0.2
-0.3
-0.4
-0.5

FIG. 1B

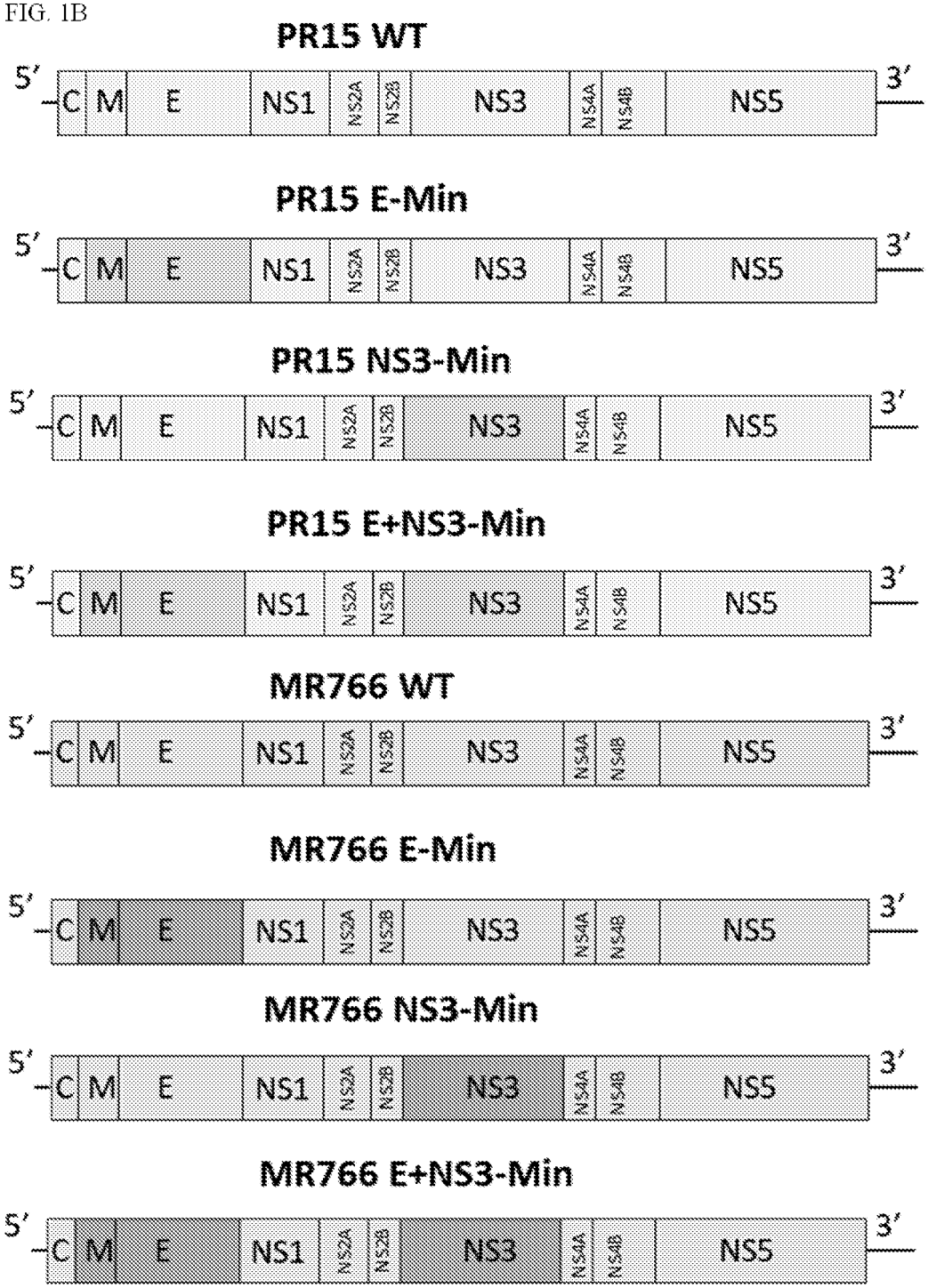

PR15 WT
5′
C
M
E
NS1
NS2A
NS2B
NS3
NS4A
NS4B
NS5
3′
PR15 E-Min
PR15 NS3-Min
PR15 E+NS3-Min
MR766 WT
MR766 E-Min
MR766 NS3-Min
MR766 E+NS3-Min

FIG. 2

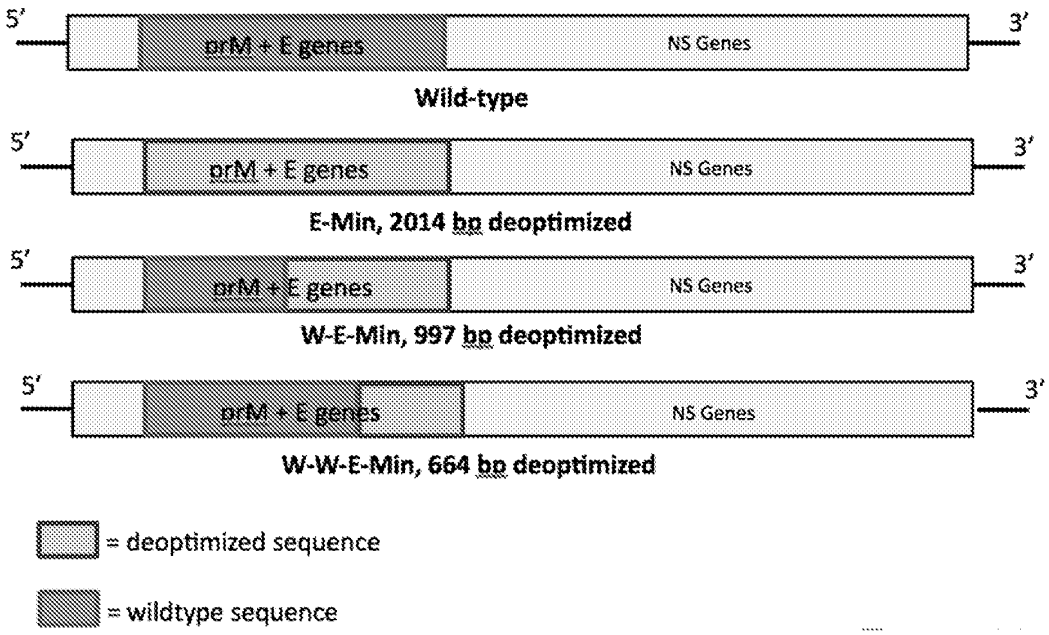

5'
prM + E genes
NS Genes
3'
Wild-type
5'
prM + E genes
NS Genes
3'
E-Min, 2014 bp deoptimized
5'
prM + E genes
NS Genes
3'
W-E-Min, 997 bp deoptimized
5'
prM + E genes
NS Genes
3'
W-W-E-Min, 664 bp deoptimized
= deoptimized sequence
= wildtype sequence

FIG. 3

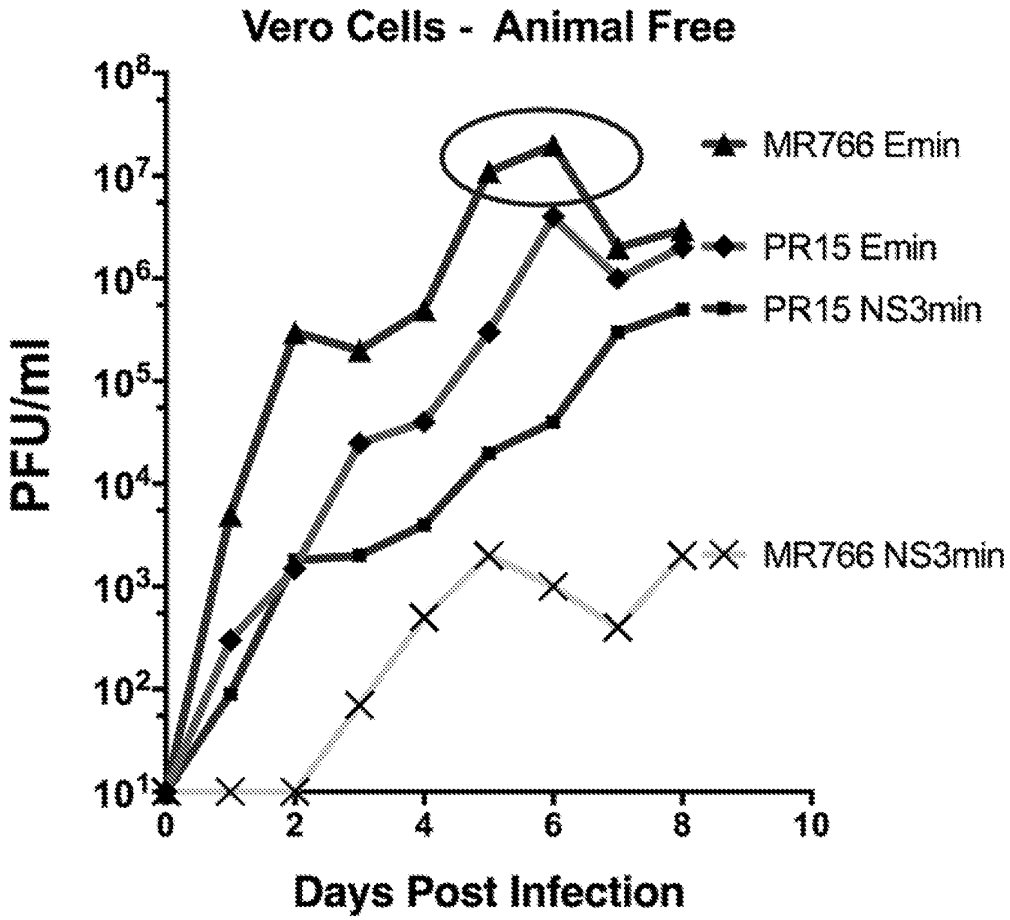

Vero Cells - Animal Free
PFU/ml
10^8
10^7
10^6
10^5
10^4
10^3
10^2
10^1
0
2
4
6
8
10
Days Post Infection
MR766 Emin
PR15 Emin
PR15 NS3min
MR766 NS3min

FIG. 4

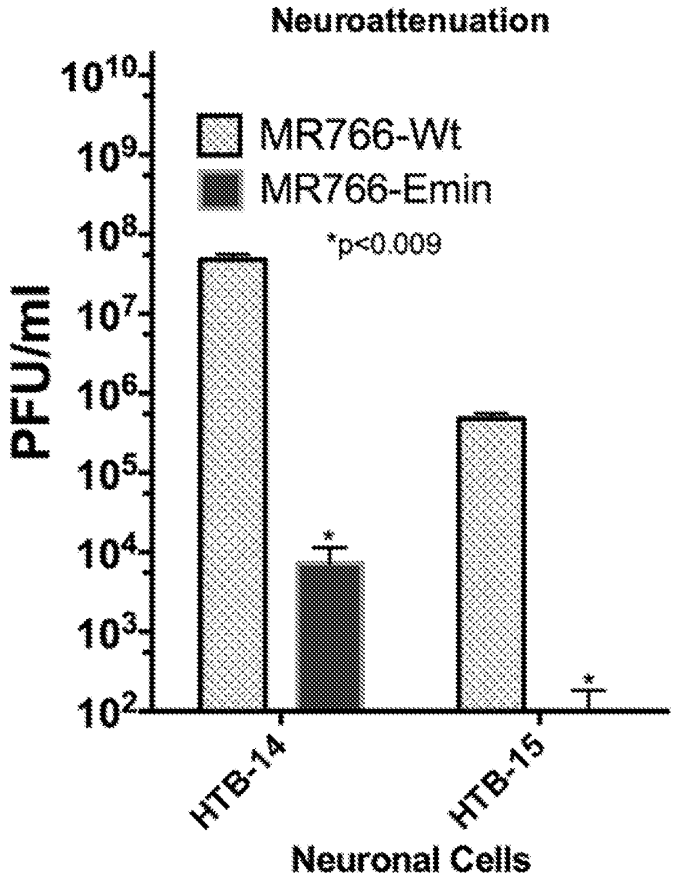

Neuroattenuation
MR766-Wt
MR766-Emin
*p<0.009
PFU/ml
10^{10}
10^{9}
10^{8}
10^{7}
10^{6}
10^{5}
10^{4}
10^{3}
10^{2}
*
*
HTB-14
HTB-15
Neuronal Cells

FIG. 5

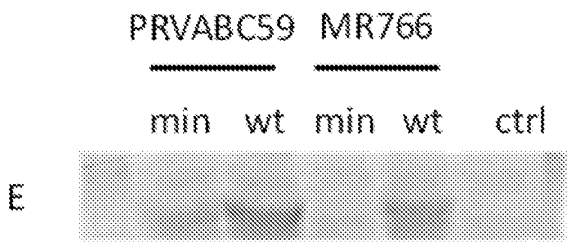

PRVABC59
MR766
min
wt
min
wt
ctrl
E

FIG. 6

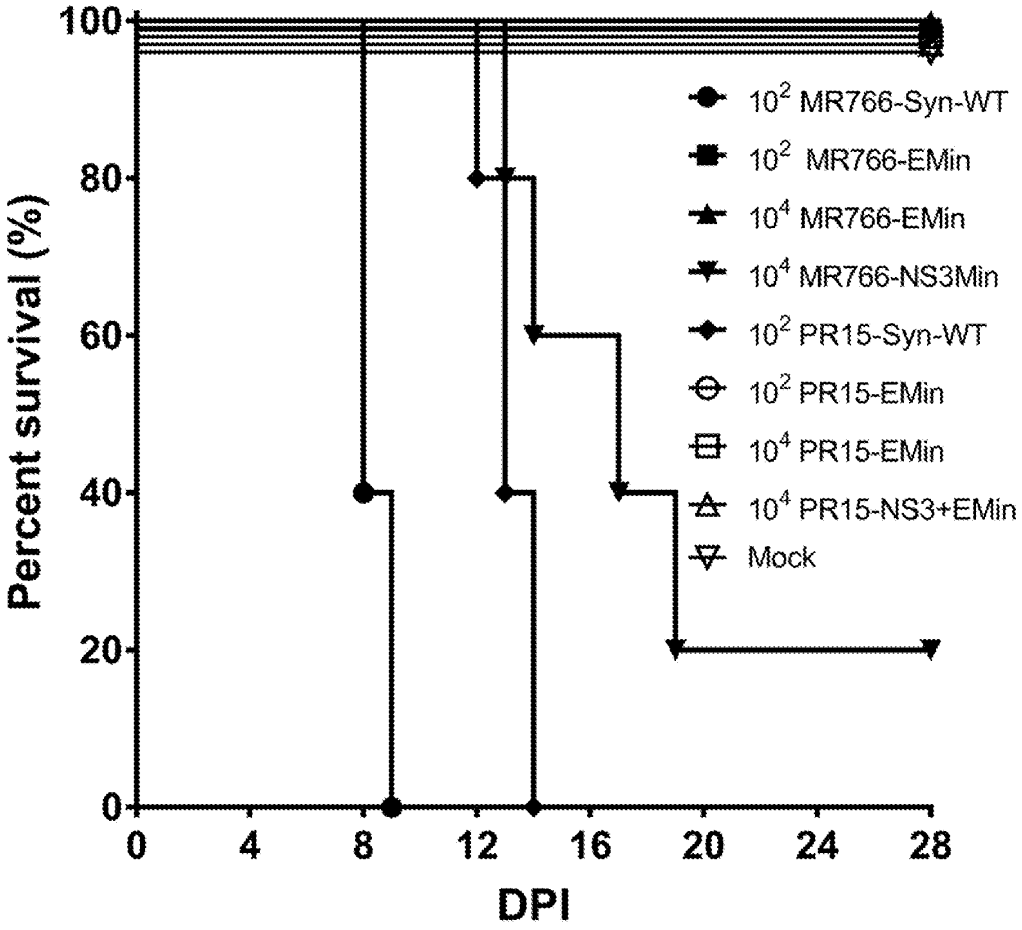

100
80
60
40
20
0
Percent survival (%)
0
4
8
12
16
20
24
28
DPI
10^2 MR766-Syn-WT
10^2 MR766-EMin
10^4 MR766-EMin
10^4 MR766-NS3Min
10^2 PR15-Syn-WT
10^2 PR15-EMin
10^4 PR15-EMin
10^4 PR15-NS3+EMin
Mock

FIG. 7

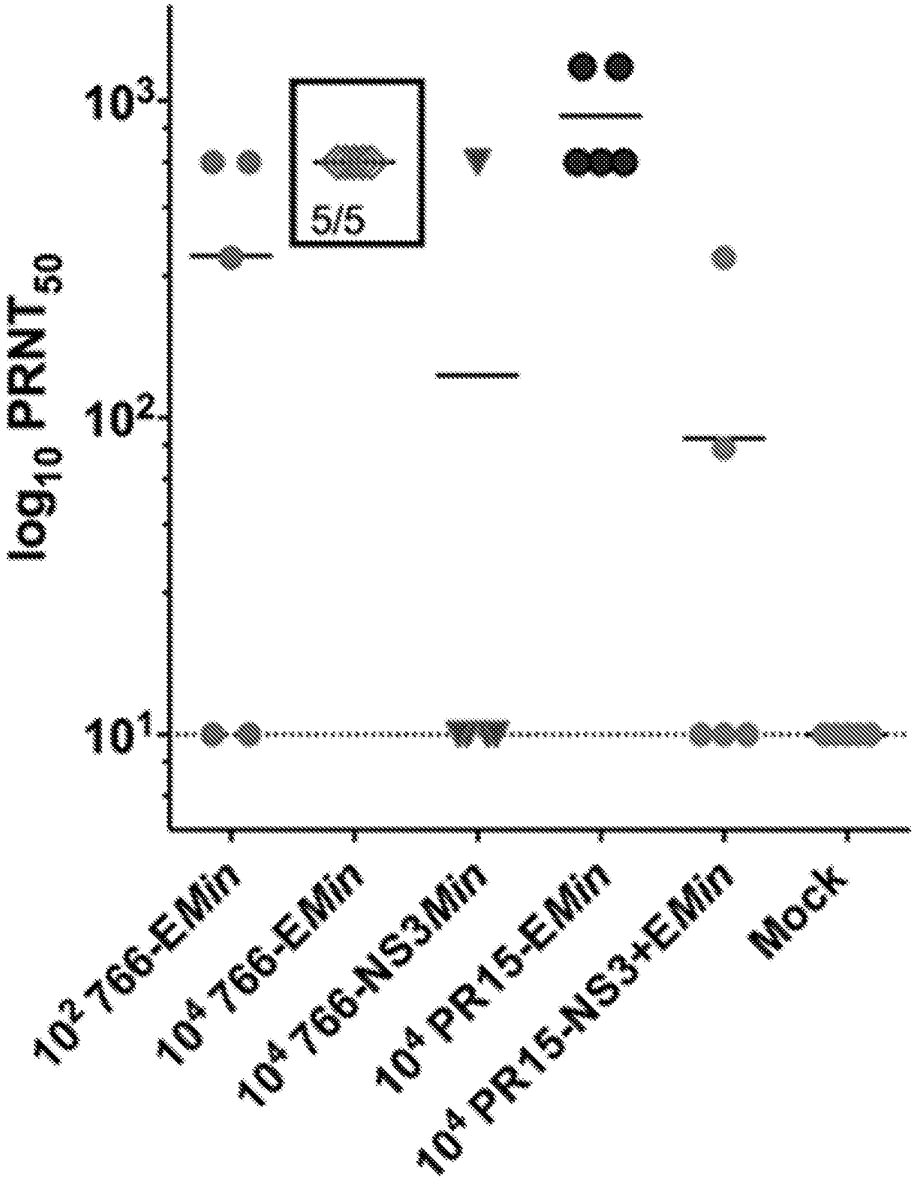

10^3
10^2
10^1
log_{10} $PRNT_{50}$
5/5
10^2 766-EMin
10^4 766-EMin
10^4 766-NS3Min
10^4 PR15-EMin
10^4 PR15-NS3+EMin
Mock

FIG. 8

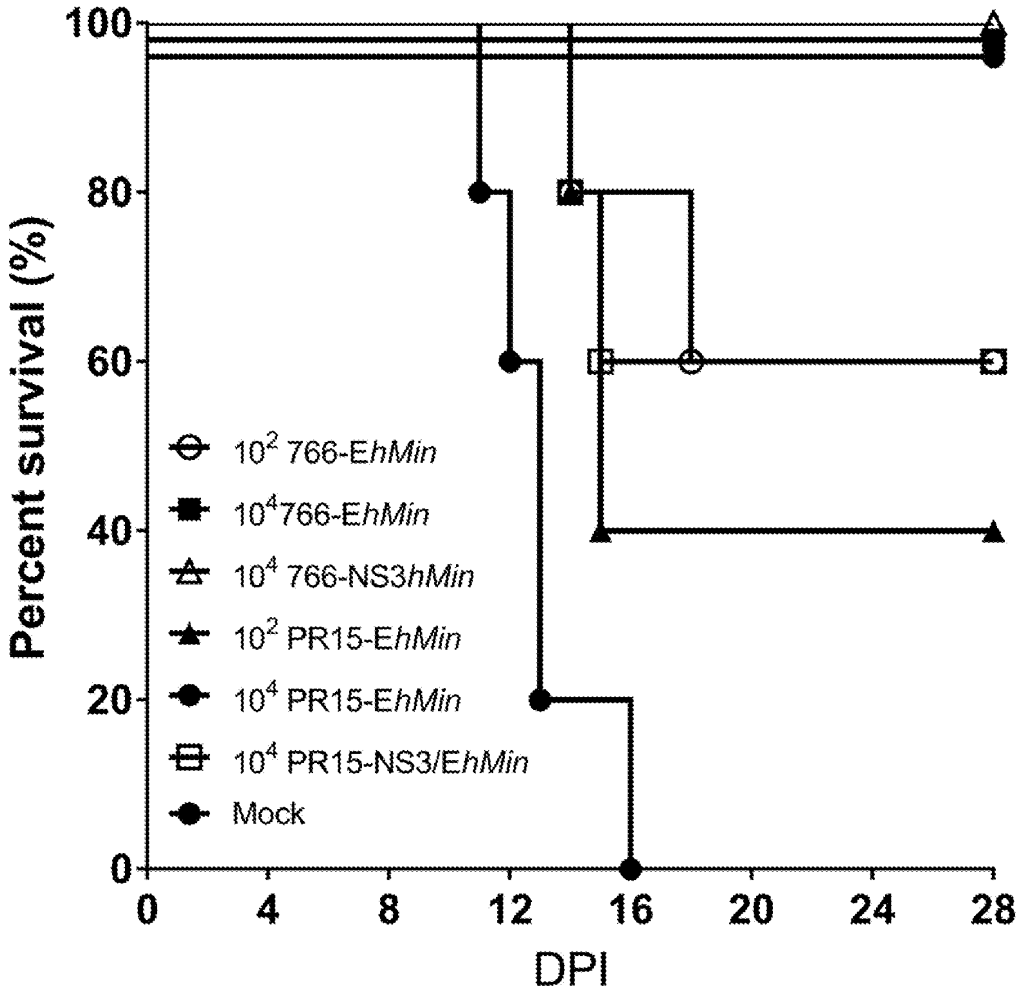

100
80
60
40
20
0
Percent survival (%)
0
4
8
12
16
20
24
28
DPI
10^2 766-EhMin
10^4766-EhMin
10^4 766-NS3hMin
10^2 PR15-EhMin
10^4 PR15-EhMin
10^4 PR15-NS3/EhMin
Mock

FIG. 9

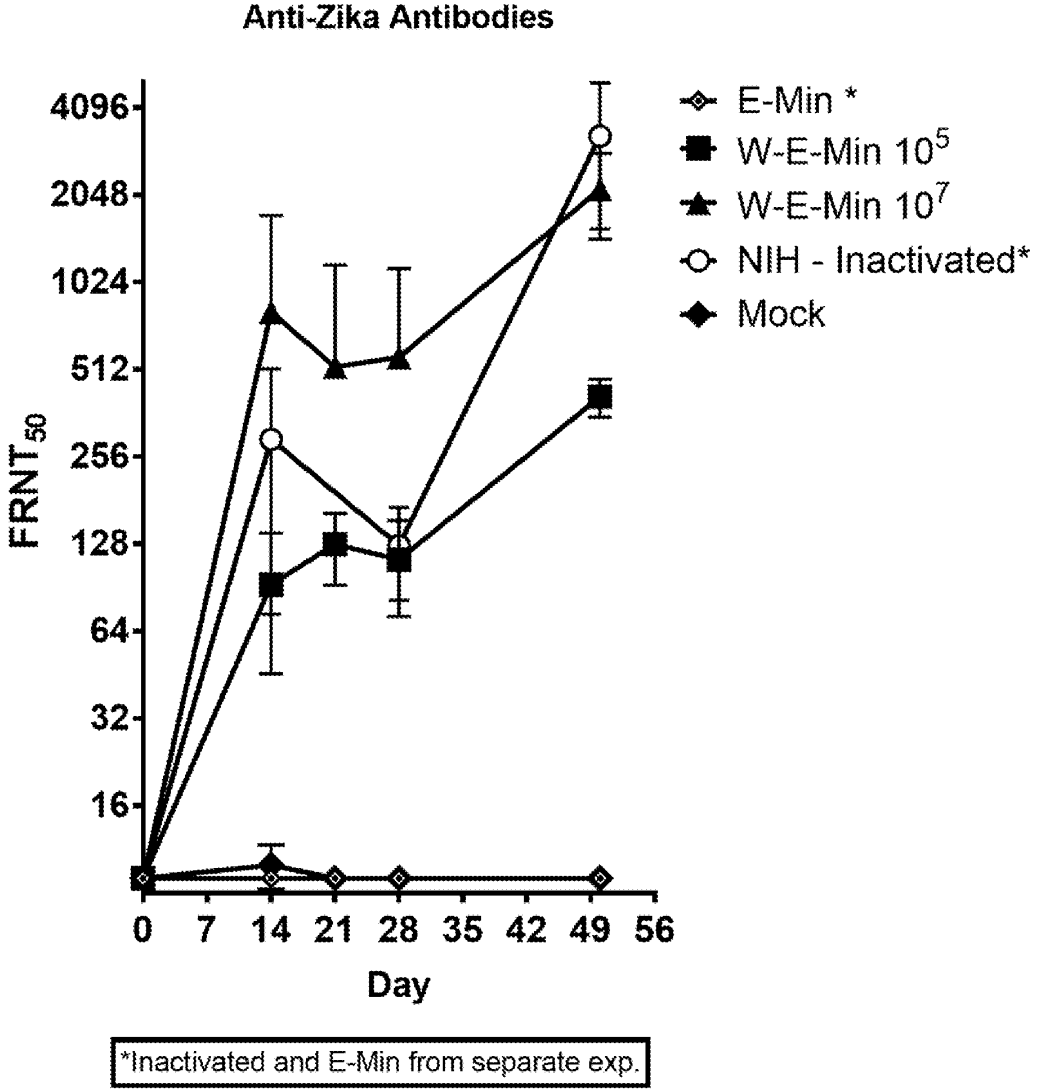
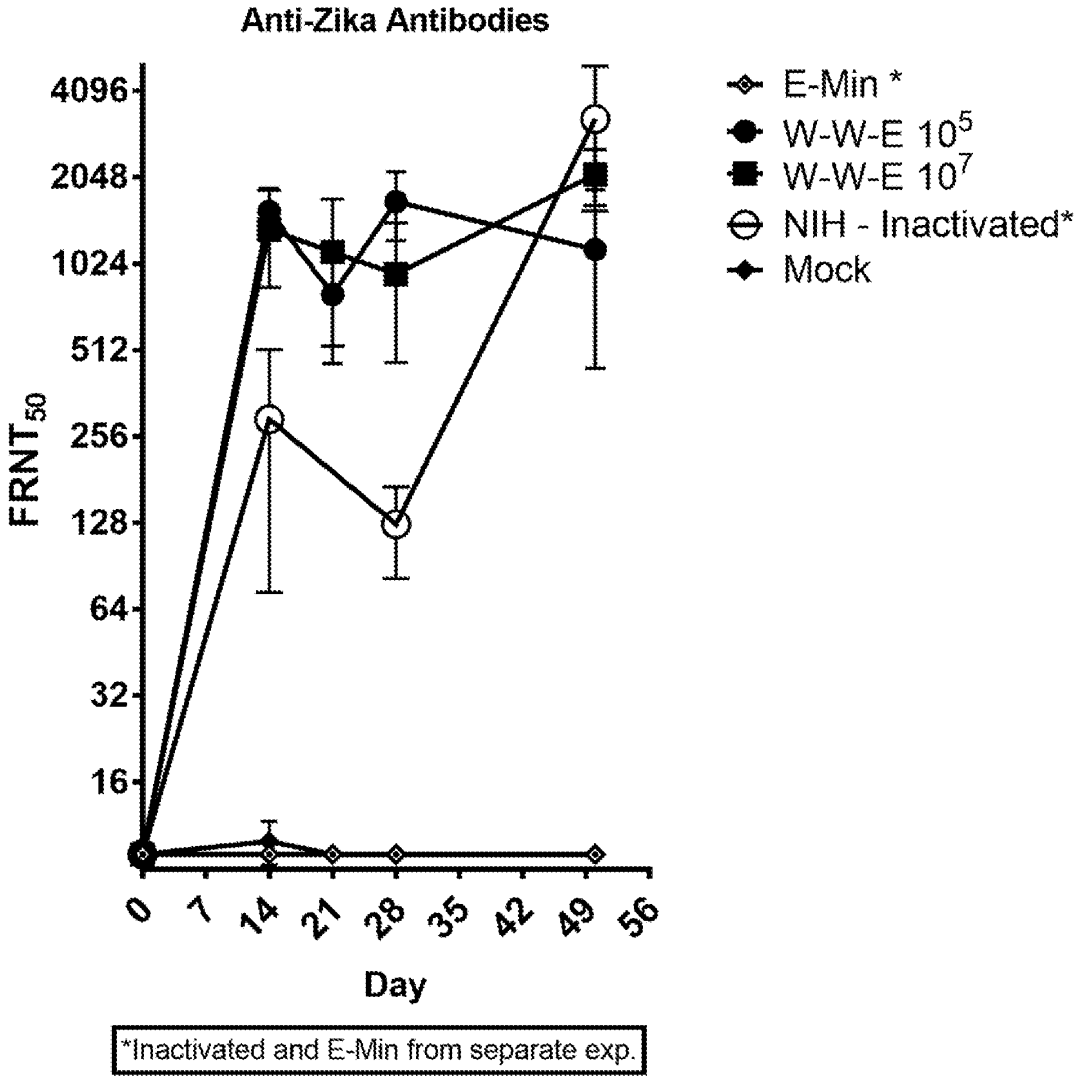

Anti-Zika Antibodies
4096
2048
1024
512
256
128
64
32
16
FRNT50
0 7 14 21 28 35 42 49 56
Day
E-Min *
W-E-Min 10^5
W-E-Min 10^7
NIH - Inactivated*
Mock
*Inactivated and E-Min from separate exp.

FIG. 10


Anti-Zika Antibodies
4096
2048
1024
512
256
128
64
32
16
FRNT50
0
7
14
21
28
35
42
49
56
Day
E-Min *
W-W-E 10^5
W-W-E 10^7
NIH - Inactivated*
Mock
*Inactivated and E-Min from separate exp.