ATGGGCAGCAGCCATCATCATCATCACAGCAGCGGCCTGGTGCCGCGCGGCAGC*CATAT*
*G*GCTAGCATGGAAAAGTTCGCGCCTGAATTCCATGGAGAAGATGCAAACAACAGGGCTACTA
AATTCCTAGAATCAATAAAGGGCAAATTCACATCACCCAAAGATCCCAAGAAAAAAGATAGTAT
CATATCTGTCAACTCAATAGATATAGAAGTAACCAAAGAAAGCCCTATAACATCAAATTCAACTA
TTATCAACCCAACAAATGAGACAGATGATACTGCAGGGAACAAGCCCAATTATCAAAGAAAAC
CTCTAGTAAGTTTCAAAGAAGACCCTACACCAAGTGATAATCCCTTTTCTAAACTATACAAAGA
AACCATAGAAACATTTGATAACAATGAAGAAGAATCCAGCTATTCATACGAAGAAATAAATGAT
CAGACAAACGATAATATAACAGCAAGATTAGATAGGATTGATGAAAAATTAAGTGAAATACTAG
GAATGCTTCACACATTAGTAGTGGCAAGTGCAGGACCTACATCTGCTCGGGATGGTATAAGAG
ATGCCATGGTTGGTTTAAGAGAAGAAATGATAGAAAAAATCAGAACTGAAGCATTAATGACCA
ATGACAGATTAGAAGCTATGGCAAGACTCAGGAATGAGGAAAGTGAAAAGATGGCAAAAGA
CACATCAGATGAAGTGTCTCTCAATCCAACATCAGAGAAATTGAACAACCTATTGGAAGGGAA
TGATAGTGACAATGATCTATCACTTGAAGATTTTAAGCTTGCGGGCGCACTCGAG

(a)

MGSSHHHHHHSSGLVPRGSHMASMEKFAPEFHGEDANNRATKFLESIKGKFTSPKDPKKKDSII
SVNSIDIEVTKESPITSNSTIINPTNETDDTAGNKPNYQRKPLVSFKEDPTPSDNPFSKLYKETIETFD
NNEEESSYSYEEINDQTNDNITARLDRIDEKLSEILGMLHTLVVASAGPTSARDGIRDAMVGLREE
MIEKIRTEALMTNDRLEAMARLRNEESEKMAKDTSDEVSLNPTSEKLNNLLEGNDSDNDLSLED
FKLAGALE

(b)

ATGGAAAAGTTCGCGCCTGAATTCCATGGAGAAGATGCAAACAACAGGGCTACTAAATTCCTA
GAATCAATAAAGGGCAAATTCACATCACCCAAAGATCCCAAGAAAAAAGATAGTATCATATCTG
TCAACTCAATAGATATAGAAGTAACCAAAGAAAGCCCTATAACATCAAATTCAACTATTATCAAC
CCAACAAATGAGACAGATGATACTGCAGGGAACAAGCCCAATTATCAAAGAAAACCTCTAGTA
AGTTTCAAAGAAGACCCTACACCAAGTGATAATCCCTTTTCTAAACTATACAAAGAAACCATAG
AAACATTTGATAACAATGAAGAAGAATCCAGCTATTCATACGAAGAAATAAATGATCAGACAAA
CGATAATATAACAGCAAGATTAGATAGGATTGATGAAAAATTAAGTGAAATACTAGGAATGCTT
CACACATTAGTAGTGGCAAGTGCAGGACCTACATCTGCTCGGGATGGTATAAGAGATGCCATG
GTTGGTTTAAGAGAAGAAATGATAGAAAAAATCAGAACTGAAGCATTAATGACCAATGACAGA
TTAGAAGCTATGGCAAGACTCAGGAATGAGGAAAGTGAAAAGATGGCAAAAGACACATCAG
ATGAAGTGTCTCTCAATCCAACATCAGAGAAATTGAACAACCTATTGGAAGGGAATGATAGTG
ACAATGATCTATCACTTGAAGATTTT

(c)

FIG 1

MEKFAPEFHGEDANNRATKFLESIKGKFTSPKDPKKKDSIISVNSIDIEVTKESPITSNSTIINPTNET
DDTAGNKPNYQRKPLVSFKEDPTPSDNPFSKLYKETIETFDNNEEESSYSYEEINDQTNDNITARLD
RIDEKLSEILGMLHTLVVASAGPTSARDGIRDAMVGLREEMIEKIRTEALMTNDRLEAMARLRNE
ESEKMAKDTSDEVSLNPTSEKLNNLLEGNDSDNDLSLEDF

(d)

ATGGGCAGCAGCCATCATCATCATCATCACAGCAGCGGCCTGGTGCCGCGCGGCAGCCATAT
GGCTAGCATGGAAAAGTTCGCGCCTGAATTCCATGGAGAAGATGCAAACAACAGGGCTACTA
AATTCCTAGAATCAATAAAGGGCAAATTCACATCACCCAAAGATCCCAAGAAAAAAGATAGTAT
CATATCTGTCAACTCAATAGATATAGAAGTAACCAAAGAAAGCCCTATAACATCAAATTCAACTA
TTATCAACCCAACAAATGAGACAGATGATACTGCAGGGAACAAGCCCAATTATCAAAGAAAAC
CTCTAGTAAGTTTCAAAGAAGACCCTACACCAAGTGATAATCCCTTTTCTAAACTATACAAAGA
AACCATAGAAACATTTGATAACAATGAAGAAGAATCCAGCTATTCATACGAAGAAATAAATGAT
CAGACAAACGATAATATAACAGCAAGATTAGATAGGATTGATGAAAAATTAAGTGAAATACTAG
GAATGCTTCACACATTAGTAGTGGCAAGTGCAGGACCTACATCTGCTCGGGATGGTATAAGAG
ATGCCATGGTTGGTTTAAGAGAAGAAATGATAGAAAAAATCAGAACTGAAGCATTAATGACCA
ATGACAGATTAGAAGCTATGGCAAGACTCAGGAATGAGGAAAGTGAAAAGATGGCAAAAGA
CACATCAGATGAAGTGTCTCTCAATCCAACATCAGAGAAATTGAACAACCTATTGGAAGGGAA
TGATAGTGACAATGATCTATCACTTGAAGATTTTAAGCTTGCGGGCGCACTCGAGCACCACCA
CCACCACCACTGA

(e)

MGSSHHHHHHSSGLVPRGSHMASMEKFAPEFHGEDANNRATKFLESIKGKFTSPKDPKKKDSII
SVNSIDIEVTKESPITSNSTIINPTNETDDTAGNKPNYQRKPLVSFKEDPTPSDNPFSKLYKETIETFD
NNEEESSYSYEEINDQTNDNITARLDRIDEKLSEILGMLHTLVVASAGPTSARDGIRDAMVGLREE
MIEKIRTEALMTNDRLEAMARLRNEESEKMAKDTSDEVSLNPTSEKLNNLLEGNDSDNDLSLED
FKLAGALE**HHHHHH**

(f)

FIG 1 (cont'd)

ATGGCACAAGTCATTAATACCAACAGCCTCTCGCTGATCACTCAAAATAATATCAACAAGAACC
AGTCTGCGCTGTCGAGTTCTATCGAGCGTCTGTCTTCTGGCTTGCGTATTAACAGCGCGAAGG
ATGACGCAGCGGGTCAGGCGATTGCTAACCGTTTCACCTCTAACATTAAAGGCCTGACTCAGG
CGGCCCGTAACGCCAACGACGGTATCTCCGTTGCGCAGACCACCGAAGGCGCGCTGTCCGAA
ATCAACAACAACTTACAGCGTGTGCGTGAACTGACGGTACAGGCCACTACCGGTACTAACTCT
GAGTCTGATCTGTCTTCTATCCAGGACGAAATTAAATCCCGTCTGGATGAAATTGACCGCGTAT
CTGGTCAGACCCAGTTCAACGGCGTGAACGTGCTGGCAAAAAATGGCTCCATGAAAATCCAG
GTTGGCGCAAATGATAACCAGACTATCACTATCGATCTGAAGCAGATTGATGCTAAAACTCTTG
GCCTTGATgctagcgctacgacgacGGATCCGCTGAAAGCGCTGGACGATGCTATCGCATCTGTAGA
CAAATTCCGTTCTTCCCTCGGTGCGGTGCAAAACCGTCTGGATTCCGCGGTTACCAACCTGAA
CAACACCACTACCAACCTGTCTGAAGCGCAGTCCCGTATTCAGGACGCCGACTATGCGACCGA
AGTGTCCAATATGTCGAAAGCGCAGATCATCCAGCAGGCCGGTAACTCCGTGTTGGCAAAAG
CTAACCAGGTACCGCAGCAGGTTCTGTCTCTGCTGCAGGGT

(g)

MAQVINTNSLSLITQNNINKNQSALSSSIERLSSGLRINSAKDDAAGQAIANRFTSNIKGLTQAAR
NANDGISVAQTTEGALSEINNNLQRVRELTVQATTGTNSESDLSSIQDEIKSRLDEIDRVSGQTQF
NGVNVLAKNGSMKIQVGANDNQTITIDLKQIDAKTLGLDASATTTDPLKALDDAIASVDKFRSSL
GAVQNRLDSAVTNLNNTTTNLSEAQSRIQDADYATEVSNMSKAQIIQQAGNSVLAKANQVPQ
QVLSLLQG

(h)

FIG 1 (cont'd)

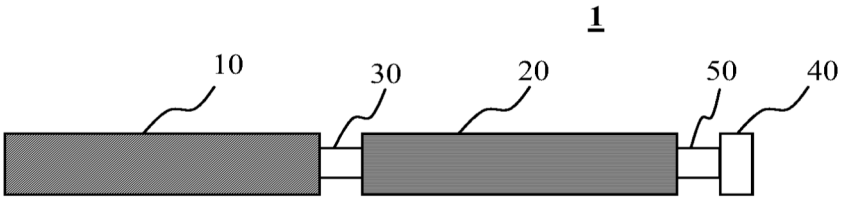
ATGGGCAGCAGCCATCATCATCATCATCACAGCAGCGGCCTGGTGCCGCGCGGCAGC*CATAT*
*GGCTAGC*ATGGAAAAGTTCGCGCCTGAATTCCATGGAGAAGATGCAAACAACAGGGCTACTA
AATTCCTAGAATCAATAAAGGGCAAATTCACATCACCCAAAGATCCCAAGAAAAAAGATAGTAT
CATATCTGTCAACTCAATAGATATAGAAGTAACCAAAGAAAGCCCTATAACATCAAATTCAACTA
TTATCAACCCAACAAATGAGACAGATGATACTGCAGGGAACAAGCCCAATTATCAAAGAAAAC
CTCTAGTAAGTTTCAAAGAAGACCCTACACCAAGTGATAATCCCTTTTCTAAACTATACAAAGA
AACCATAGAAACATTTGATAACAATGAAGAAGAATCCAGCTATTCATACGAAGAAATAAATGAT
CAGACAAACGATAATATAACAGCAAGATTAGATAGGATTGATGAAAAATTAAGTGAAATACTAG
GAATGCTTCACACATTAGTAGTGGCAAGTGCAGGACCTACATCTGCTCGGGATGGTATAAGAG
ATGCCATGGTTGGTTTAAGAGAAGAAATGATAGAAAAAATCAGAACTGAAGCATTAATGACCA
ATGACAGATTAGAAGCTATGGCAAGACTCAGGAATGAGGAAAGTGAAAAGATGGCAAAAGA
CACATCAGATGAAGTGTCTCTCAATCCAACATCAGAGAAATTGAACAACCTATTGGAAGGGAA
TGATAGTGACAATGATCTATCACTTGAAGATTTC*GGGCGCGCC*ATGGCACAAGTCATTAATACC
AACAGCCTCTCGCTGATCACTCAAAATAATATCAACAAGAACCAGTCTGCGCTGTCGAGTTCTA
TCGAGCGTCTGTCTTCTGGCTTGCGTATTAACAGCGCGAAGGATGACGCAGCGGGTCAGGCG
ATTGCTAACCGTTTCACCTCTAACATTAAAGGCCTGACTCAGGCGGCCCGTAACGCCAACGAC
GGTATCTCCGTTGCGCAGACCACCGAAGGCGCGCTGTCCGAAATCAACAACAACTTACAGCG
TGTGCGTGAACTGACGGTACAGGCCACTACCGGTACTAACTCTGAGTCTGATCTGTCTTCTATC
CAGGACGAAATTAAATCCCGTCTGGATGAAATTGACCGCGTATCTGGTCAGACCCAGTTCAAC
GGCGTGAACGTGCTGGCAAAAAATGGCTCCATGAAAATCCAGGTTGGCGCAAATGATAACCA
GACTATCACTATCGATCTGAAGCAGATTGATGCTAAAACTCTTGGCCTTGATgctagcgctacgacga
cGGATCCGCTGAAAGCGCTGGACGATGCTATCGCATCTGTAGACAAATTCCGTTCTTCCCTCGG
TGCGGTGCAAAACCGTCTGGATTCCGCGGTTACCAACCTGAACAACACCACTACCAACCTGTC
TGAAGCGCAGTCCCGTATTCAGGACGCCGACTATGCGACCGAAGTGTCCAATATGTCGAAAGC
GCAGATCATCCAGCAGGCCGGTAACTCCGTGTTGGCAAAAGCTAACCAGGTACCGCAGCAGG
TTCTGTCTCTGCTGCAGGGTctcgag**caccaccaccaccaccac**TGA

(i)

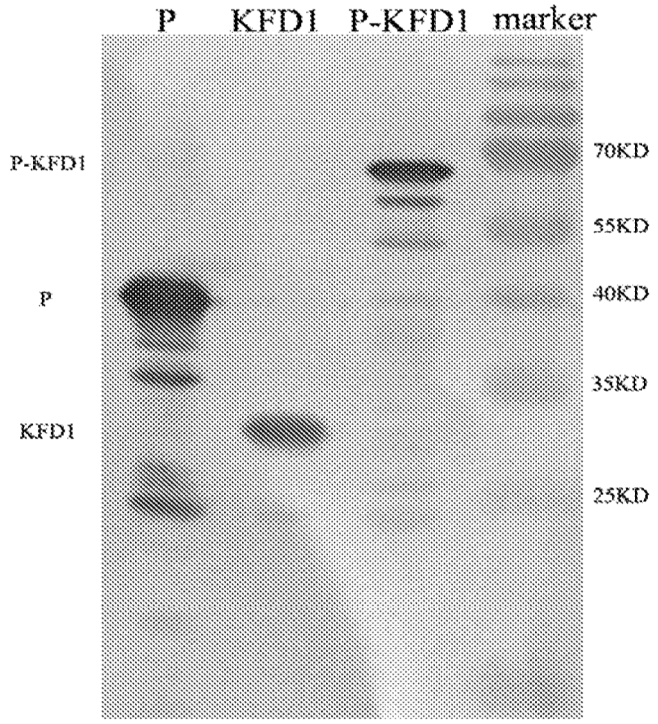
MGSSHHHHHHSSGLVPRGSHMASMEKFAPEFHGEDANNRATKFLESIKGKFTSPKDPKKKDSII
SVNSIDIEVTKESPITSNSTIINPTNETDDTAGNKPNYQRKPLVSFKEDPTPSDNPFSKLYKETIETFD
NNEEESSYSYEEINDQTNDNITARLDRIDEKLSEILGMLHTLVVASAGPTSARDGIRDAMVGLREE
MIEKIRTEALMTNDRLEAMARLRNEESEKMAKDTSDEVSLNPTSEKLNNLLEGNDSDNDLSLED
FGRAMAQVINTNSLSLITQNNINKNQSALSSSIERLSSGLRINSAKDDAAGQAIANRFTSNIKGLT
QAARNANDGISVAQTTEGALSEINNNLQRVRELTVQATTGTNSESDLSSIQDEIKSRLDEIDRVSG
QTQFNGVNVLAKNGSMKIQVGANDNQTITIDLKQIDAKTLGLDASATTTDPLKALDDAIASVDK
FRSSLGAVQNRLDSAVTNLNNTTTNLSEAQSRIQDADYATEVSNMSKAQIIQQAGNSVLAKANQ
VPQQVLSLLQGLE**HHHHHH**

(j)

FIG 1 (cont'd)


1
10
30
20
50
40

(a)


P
KFD1
P-KFD1
marker
P-KFD1
P
KFD1
70KD
55KD
40KD
35KD
25KD

(b)

FIG 2

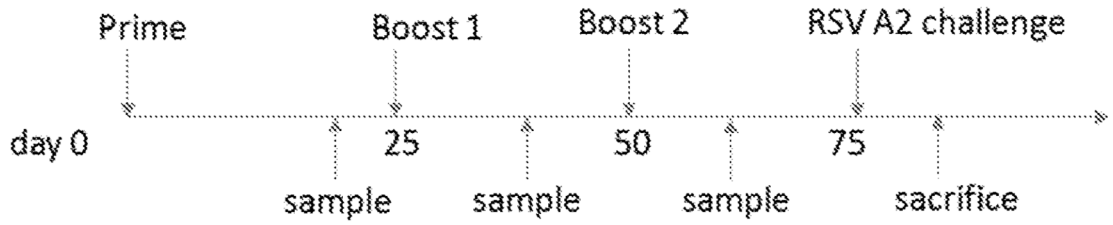

Prime
Boost 1
Boost 2
RSV A2 challenge
day 0
25
50
75
sample
sample
sample
sacrifice

FIG 3

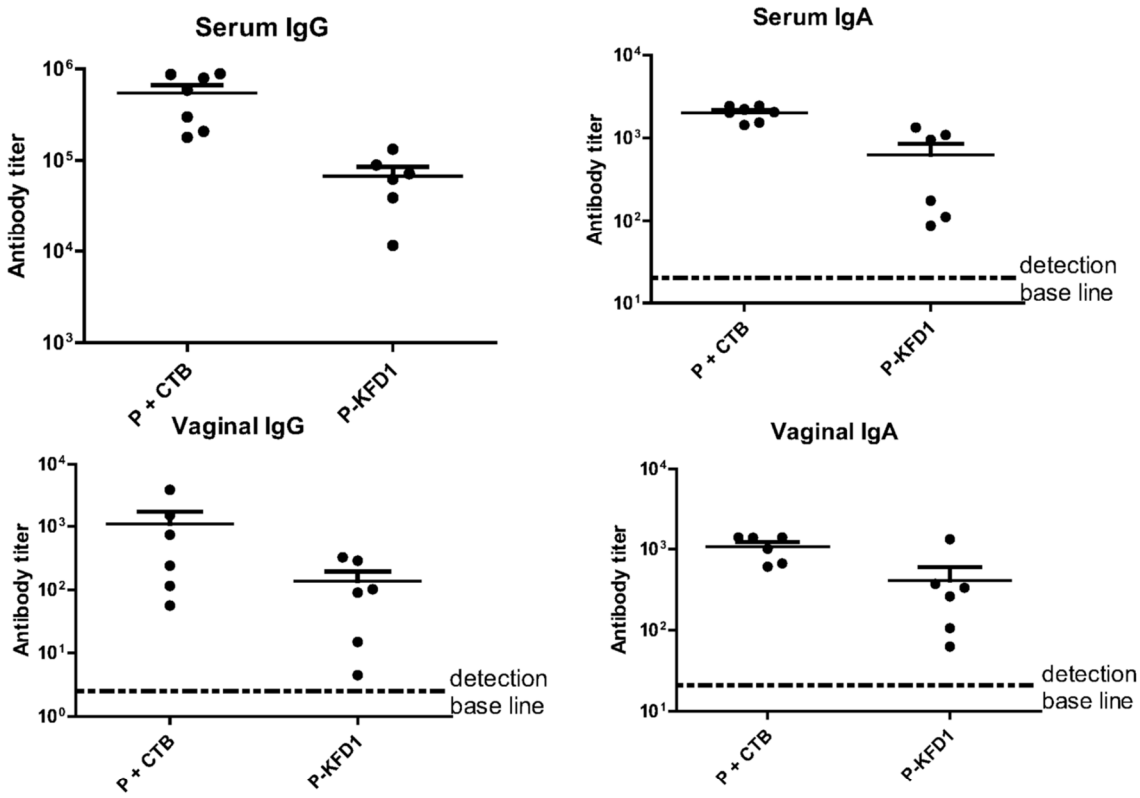
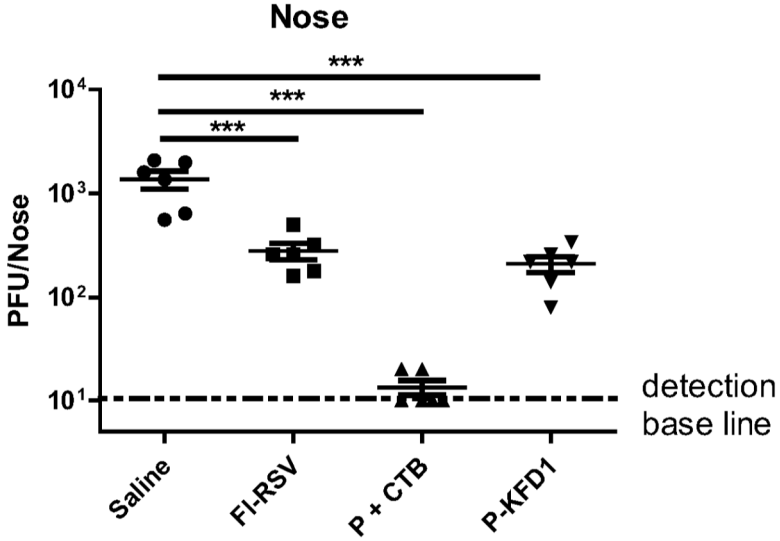
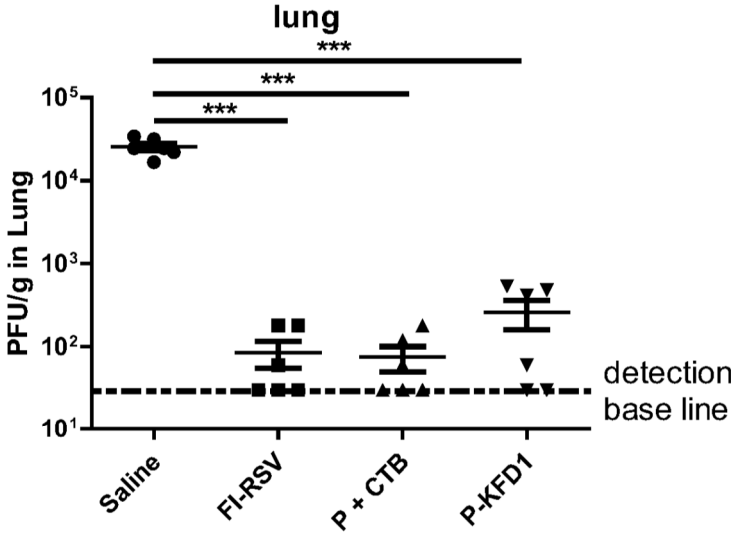

Serum IgG
Antibody titer
10^6
10^5
10^4
10^3
P + CTB
P-KFD1
Serum IgA
Antibody titer
10^4
10^3
10^2
10^1
detection
base line
P + CTB
P-KFD1
Vaginal IgG
Antibody titer
10^4
10^3
10^2
10^1
10^0
detection
base line
P + CTB
P-KFD1
Vaginal IgA
Antibody titer
10^4
10^3
10^2
10^1
detection
base line
P + CTB
P-KFD1

FIG 4


Nose
***
***
***
10^4
10^3
10^2
10^1
PFU/Nose
detection
base line
Saline
FI-RSV
P + CTB
P-KFD1

(a)


lung
***
***
***
10^5
10^4
10^3
10^2
10^1
PFU/g in Lung
detection
base line
Saline
FI-RSV
P + CTB
P-KFD1

(b)

FIG 5

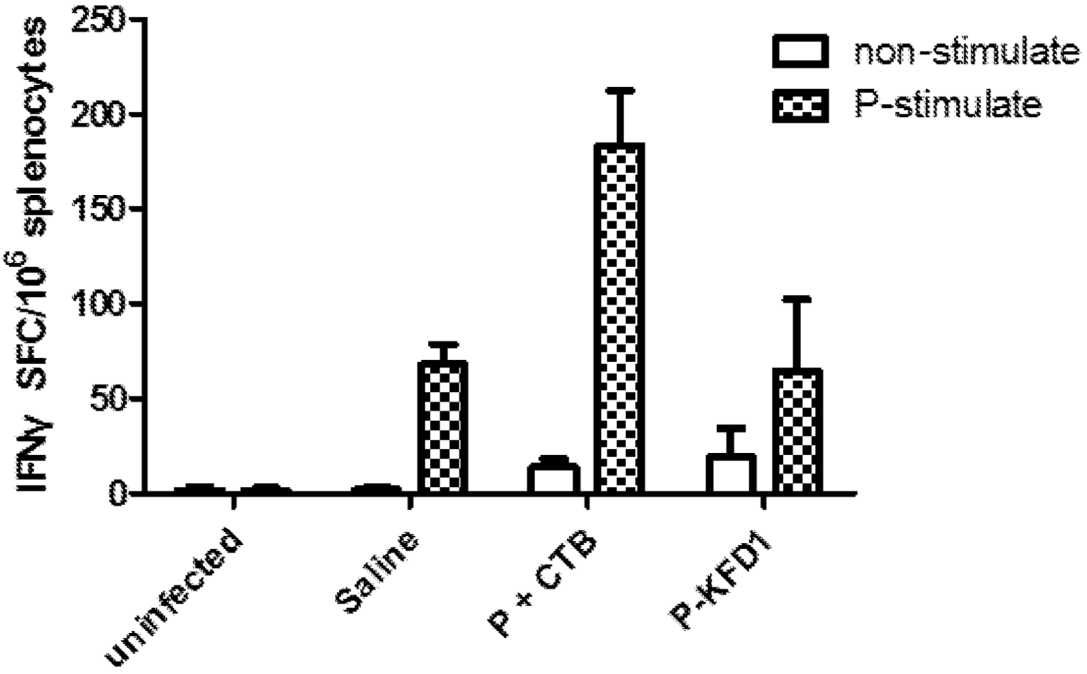
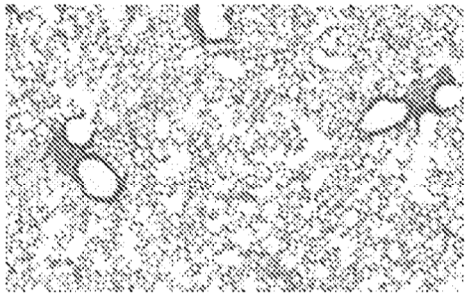
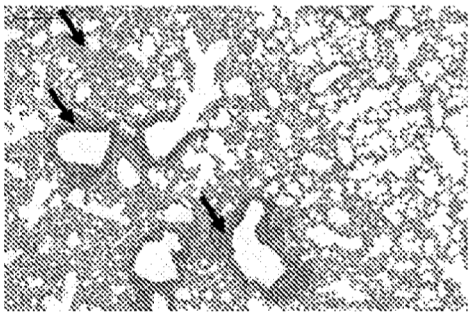

IFNγ SFC/10^6 splenocytes
250
200
150
100
50
0
non-stimulate
P-stimulate
uninfected
Saline
P + CTB
P-KFD1

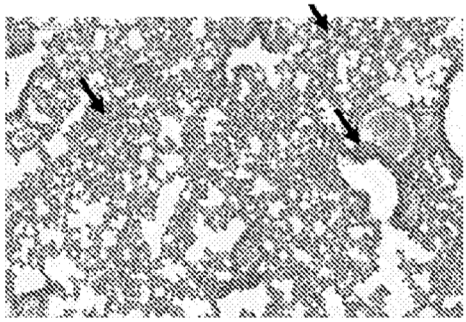
FIG 6



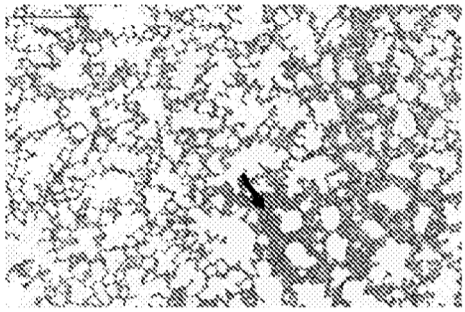
(a)



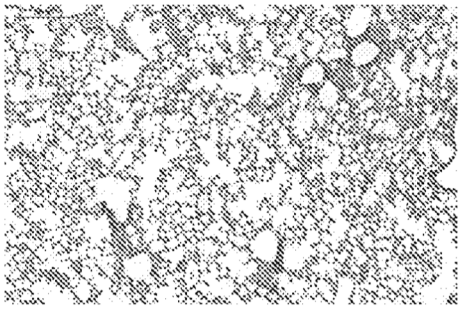
(b)



(c)



(d)



(e)

FIG 7

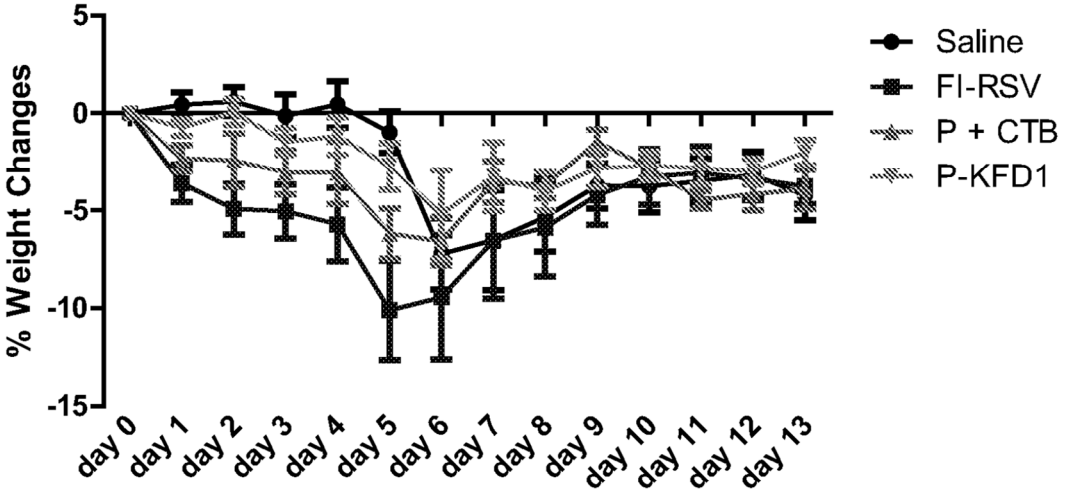
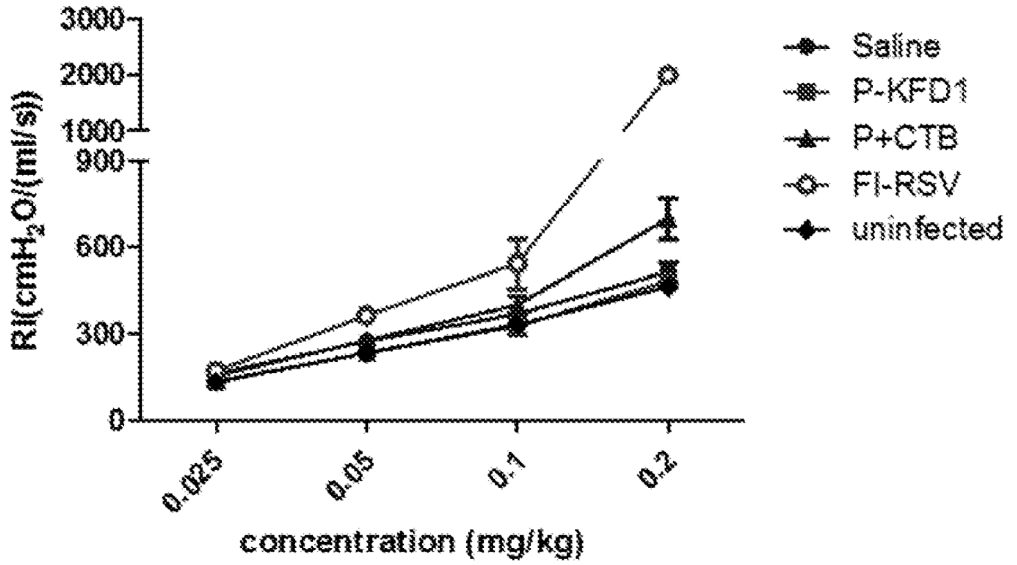
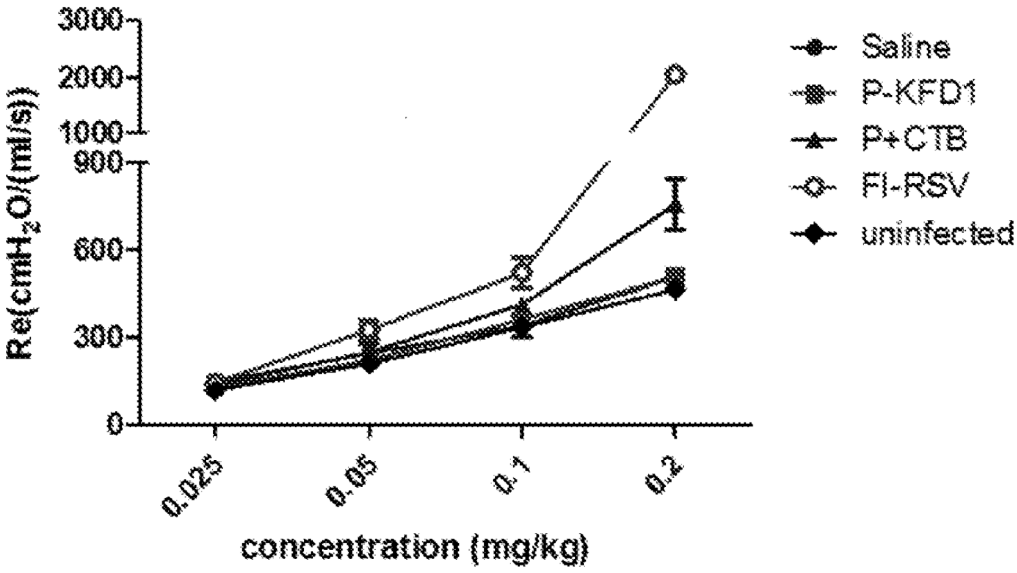

% Weight Changes
5
0
-5
-10
-15
day 0
day 1
day 2
day 3
day 4
day 5
day 6
day 7
day 8
day 9
day 10
day 11
day 12
day 13
Saline
FI-RSV
P + CTB
P-KFD1

FIG 8

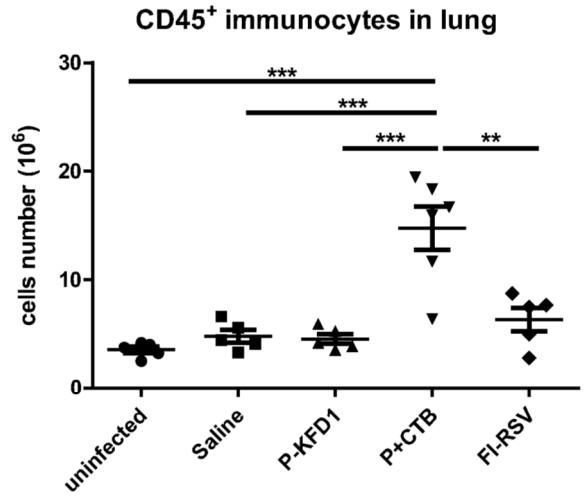

3000
2000
1000
900
600
300
0
RI(cmH2O/(ml/s))
0.025
0.05
0.1
0.2
concentration (mg/kg)
Saline
P-KFD1
P+CTB
FI-RSV
uninfected

(a)

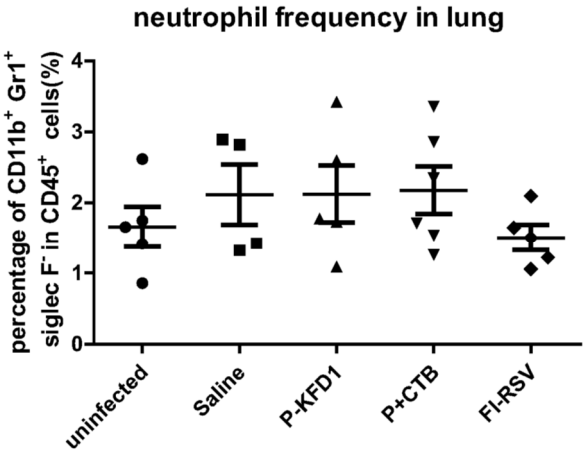

3000
2000
1000
900
600
300
0
Re(cmH2O/(ml/s))
0.025
0.05
0.1
0.2
concentration (mg/kg)
Saline
P-KFD1
P+CTB
FI-RSV
uninfected

(b)

FIG 9

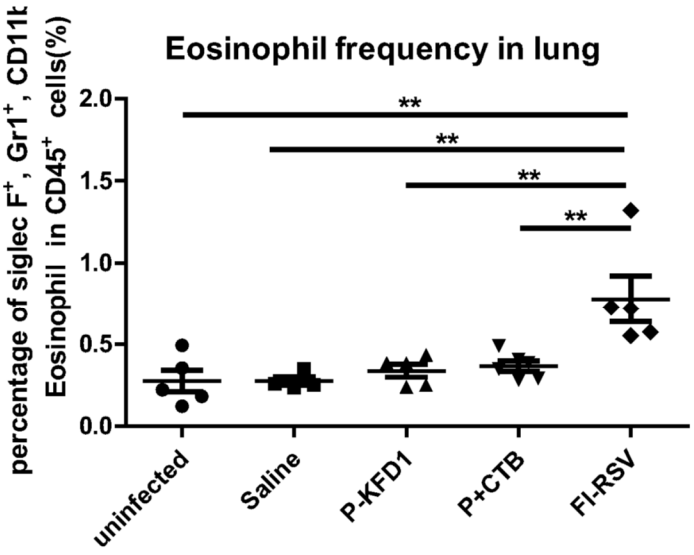

CD45+ immunocytes in lung
cells number (10^6)
30
20
10
0
***
***
***
**
uninfected
Saline
P-KFD1
P+CTB
FI-RSV

(a)

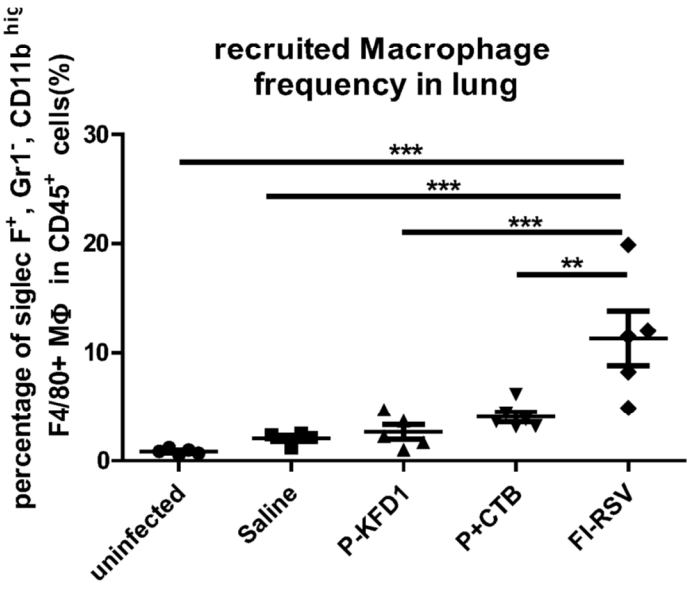

neutrophil frequency in lung
percentage of CD11b+ Gr1+ siglec F- in CD45+ cells(%)
4
3
2
1
0
uninfected
Saline
P-KFD1
P+CTB
FI-RSV

(b)

FIG 10



(c)



(d)

FIG 10 (cont'd)