

Figure 1

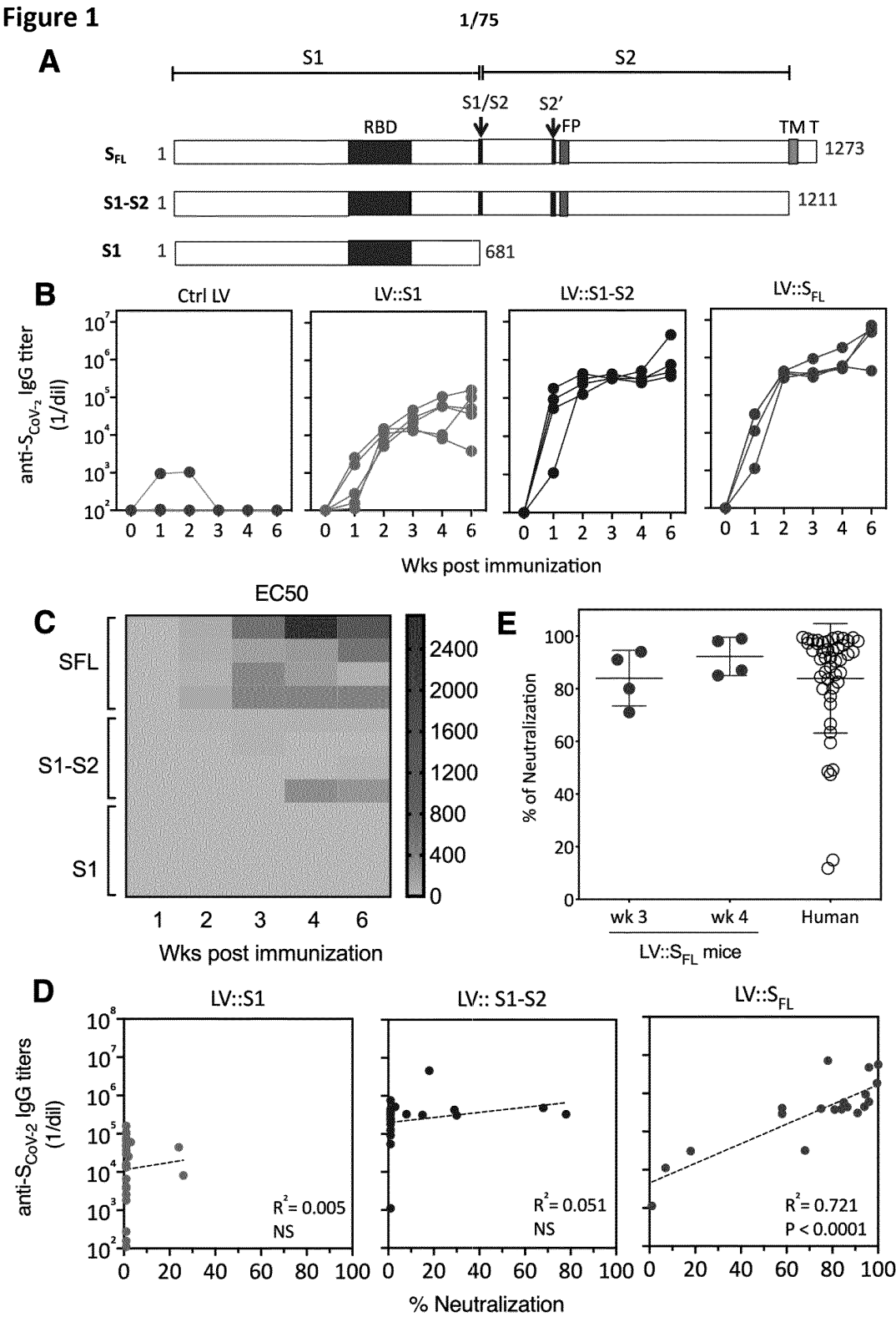


Figure 2

2/75

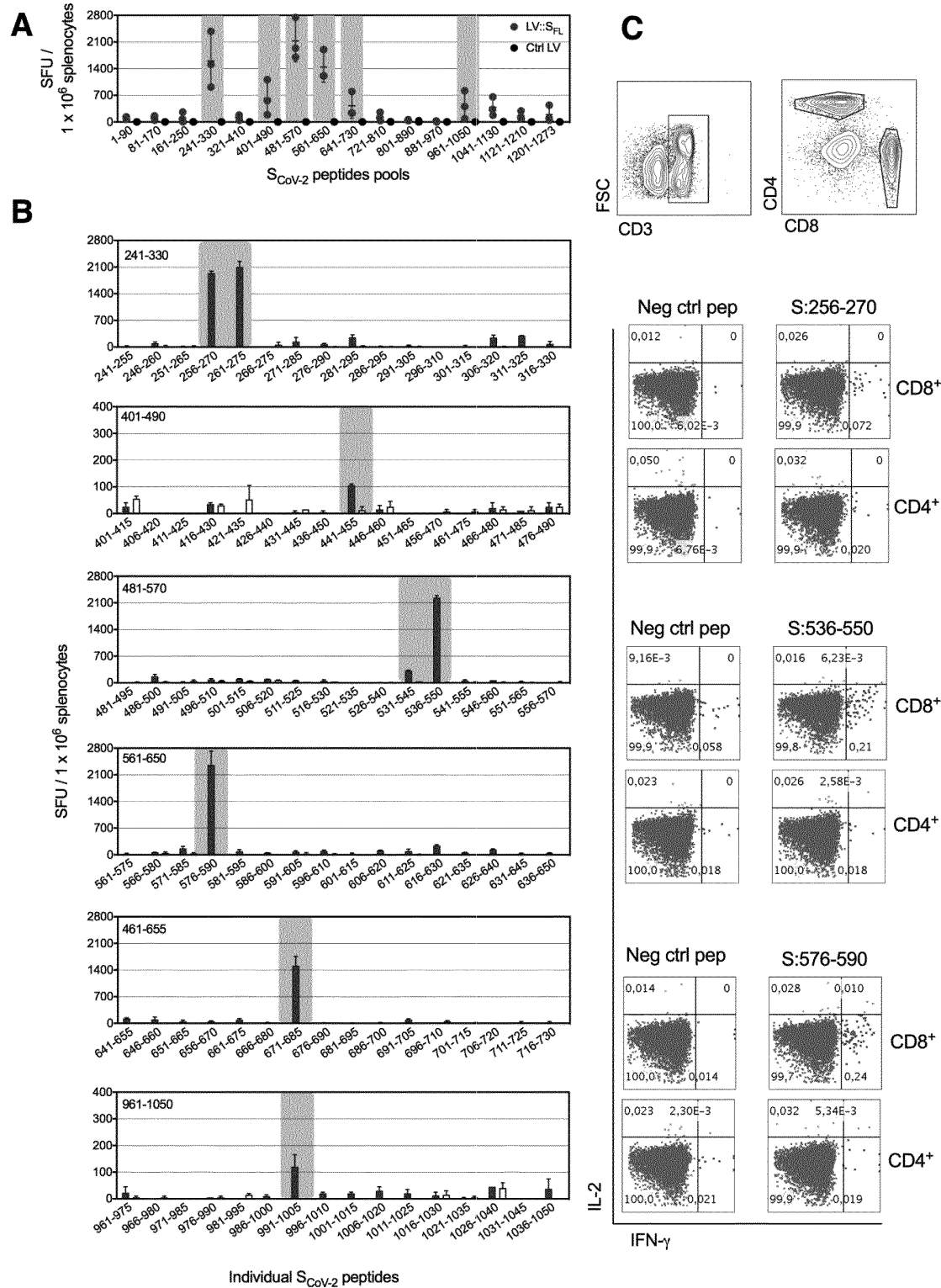


Figure 3

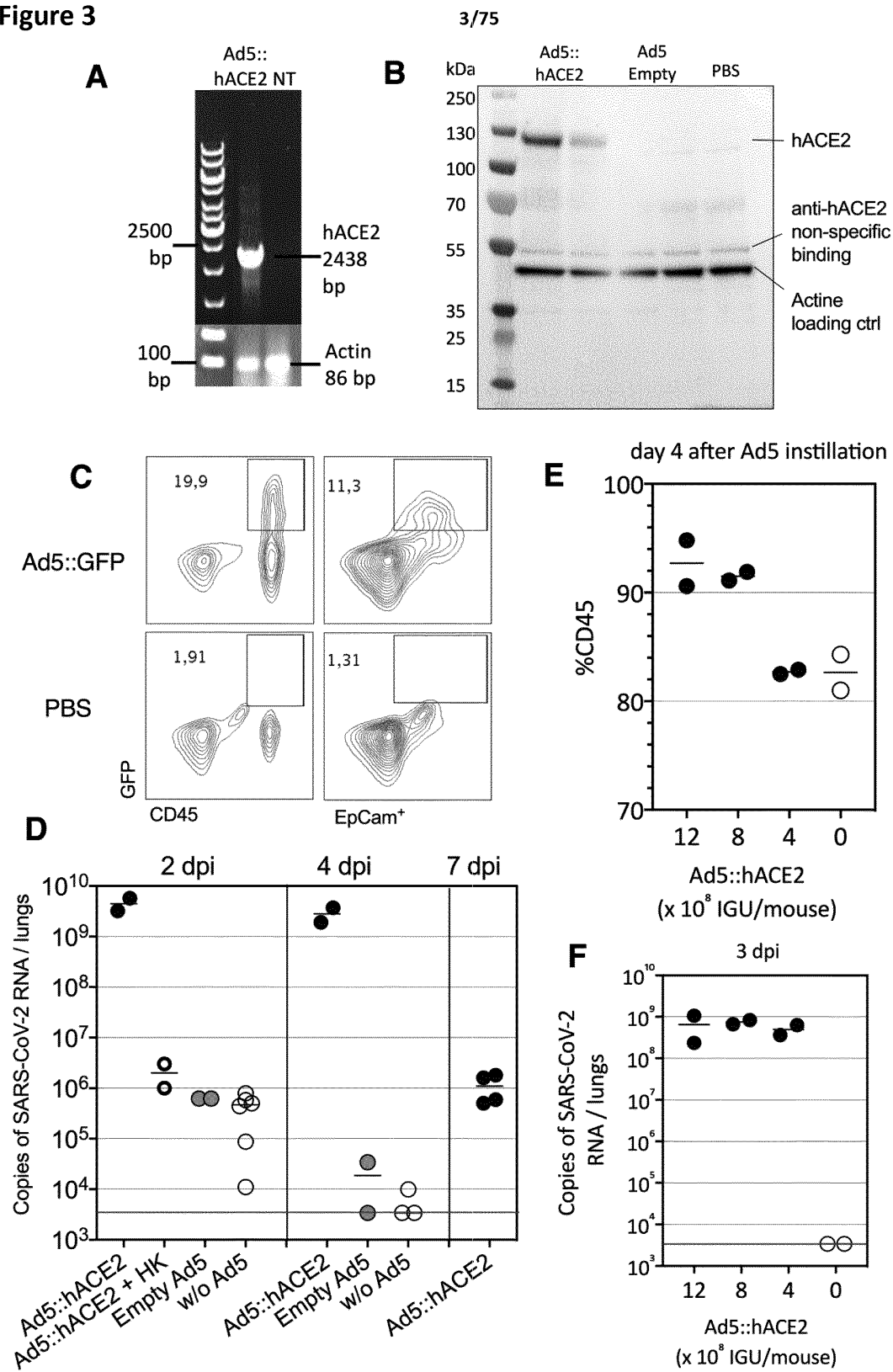


Figure 4

4/75

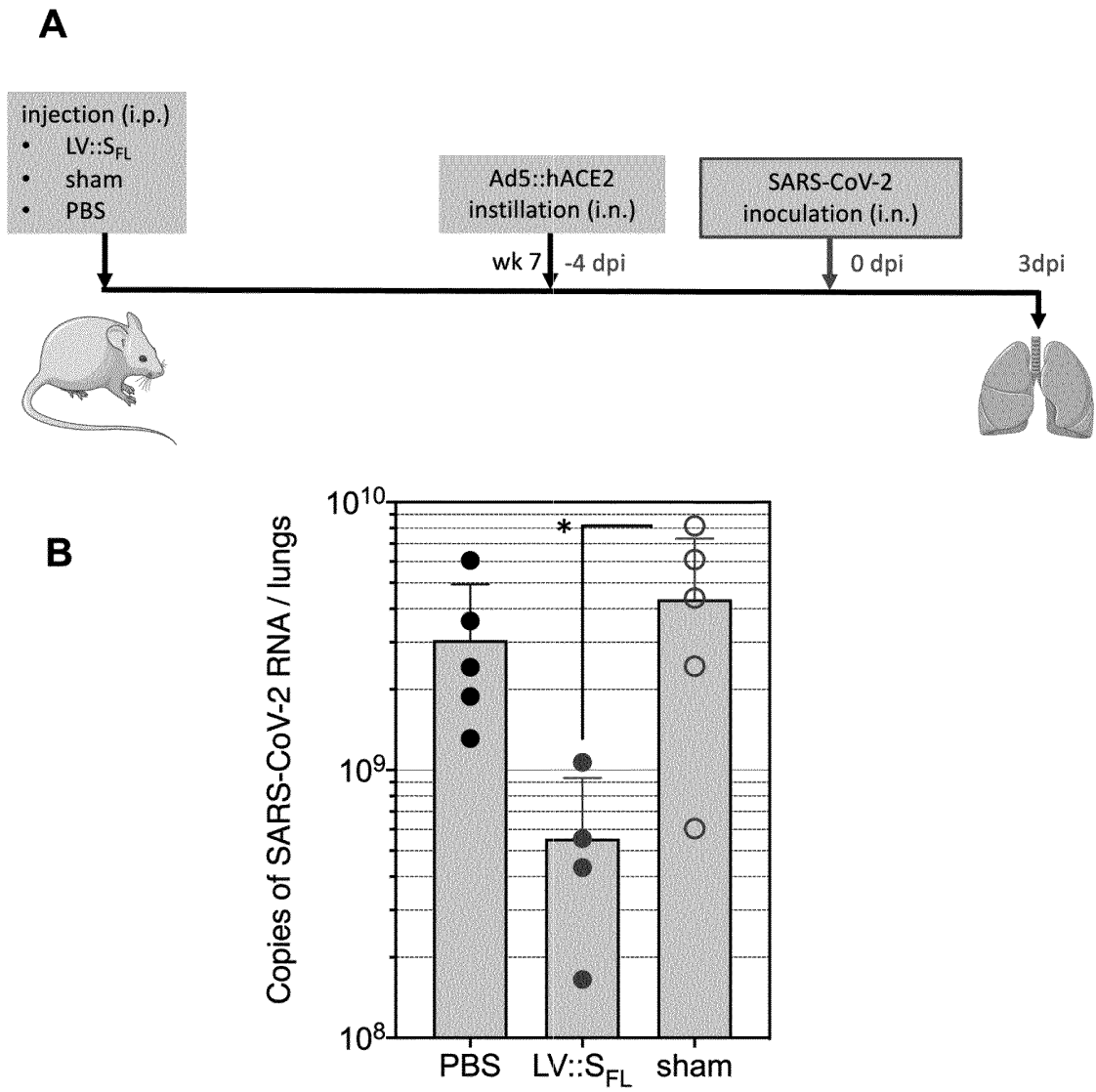


Figure 5

5/75

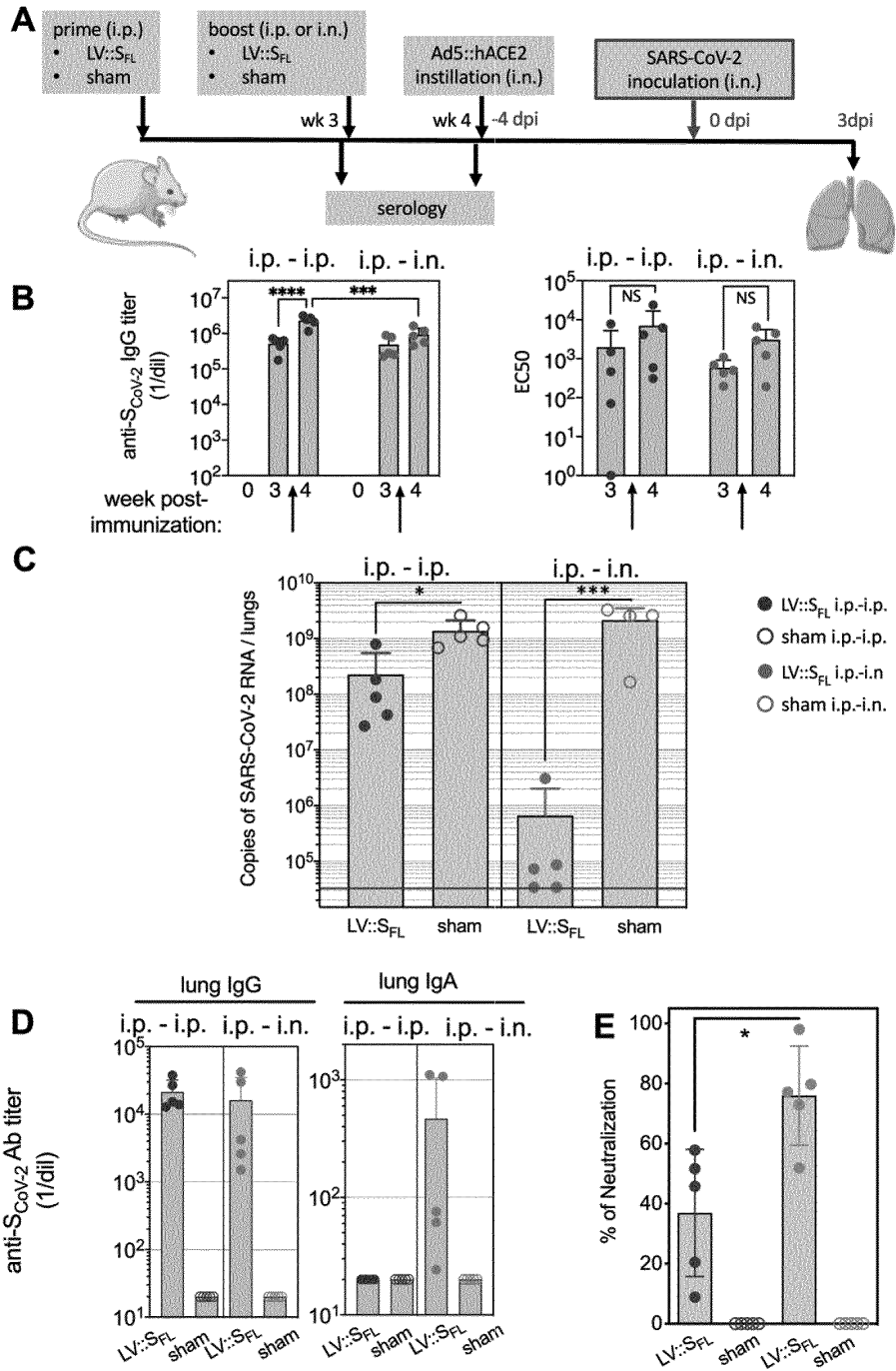




FIGURE 6

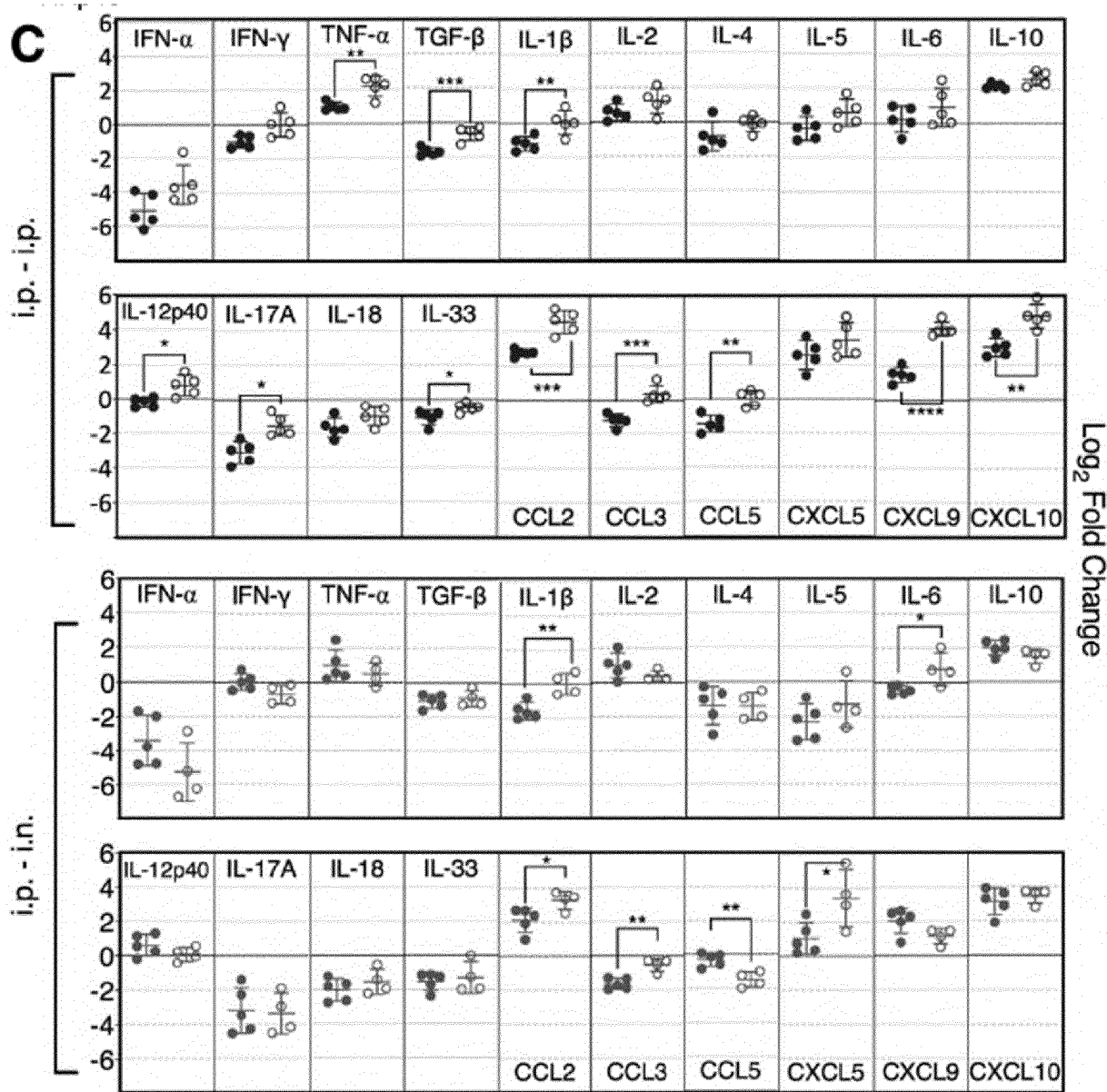


Figure 7

7/75

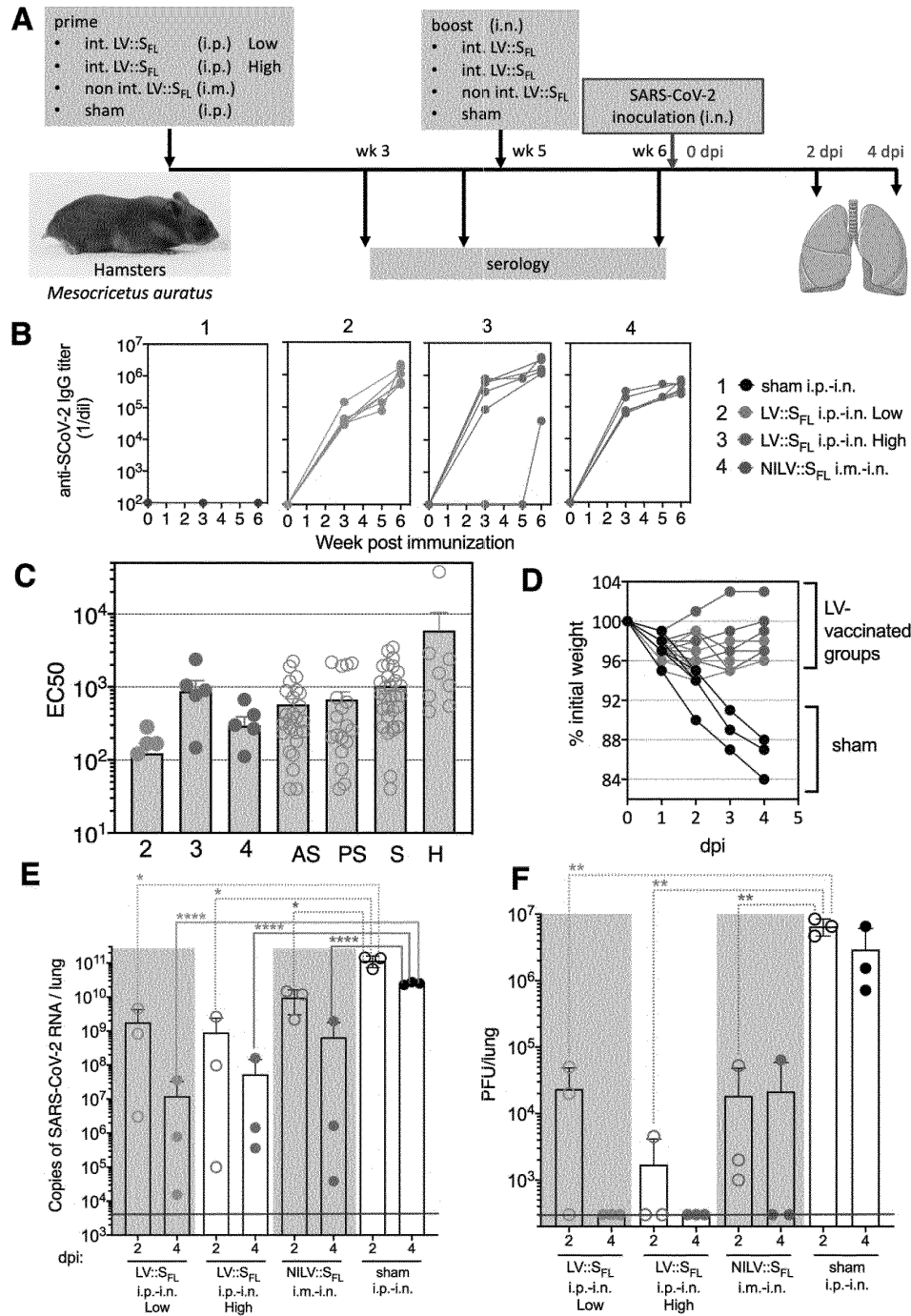
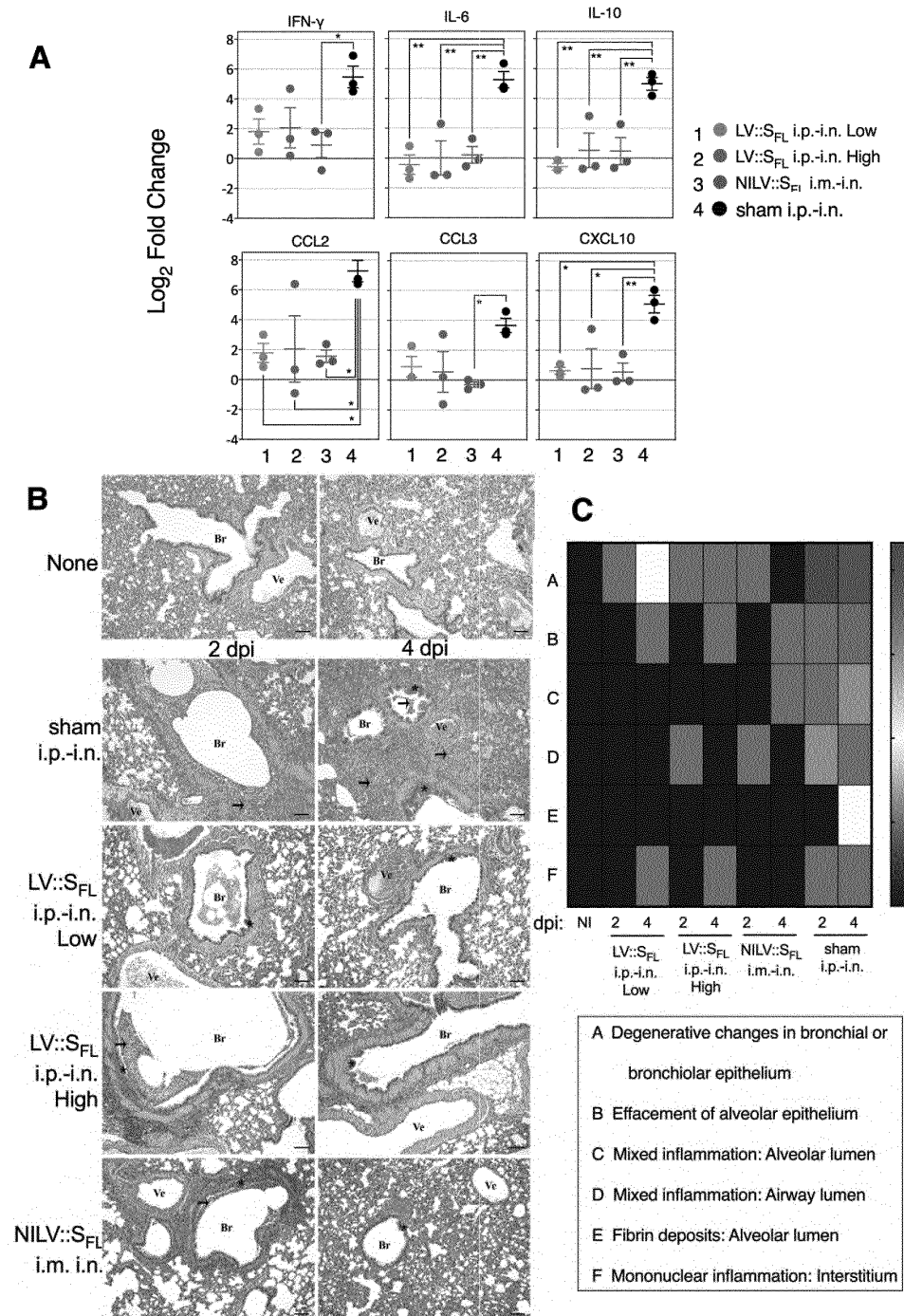


Figure 8

8/75



A

Log₂ Fold ChangeIFN- γ

IL-6

IL-10

CCL2

CCL3

CXCL10

1 ● LV::S_{FL} i.p.-i.n. Low
2 ● LV::S_{FL} i.p.-i.n. High
3 ● NILV::S_{FL} i.m.-i.n.
4 ● sham i.p.-i.n.

B

None

4 dpi

sham

i.p.-i.n.

 $LV::S_{EI}$

i.p.-i.n.

Low

 $LV::S_{FI}$

i.p.-i.n.

High

$$\text{NILV}::S_{\text{FI}}$$

i.m. i.n.

C

Figure 1 is a 6x6 grid of grayscale images showing the distribution of ¹²⁵I-labeled ligands in the brain. The rows are labeled A through F, and the columns are labeled with dpi (2, 4) for four groups: LV::S_{FL}, LV::S_{FL}, NILV::S_{FL}, and sham. A color scale on the right indicates intensity from 0 (black) to 4 (white).

- A Degenerative changes in bronchial or bronchiolar epithelium
- B Effacement of alveolar epithelium
- C Mixed inflammation: Alveolar lumen
- D Mixed inflammation: Airway lumen
- E Fibrin deposits: Alveolar lumen
- F Mononuclear inflammation: Interstitium

Figure 9

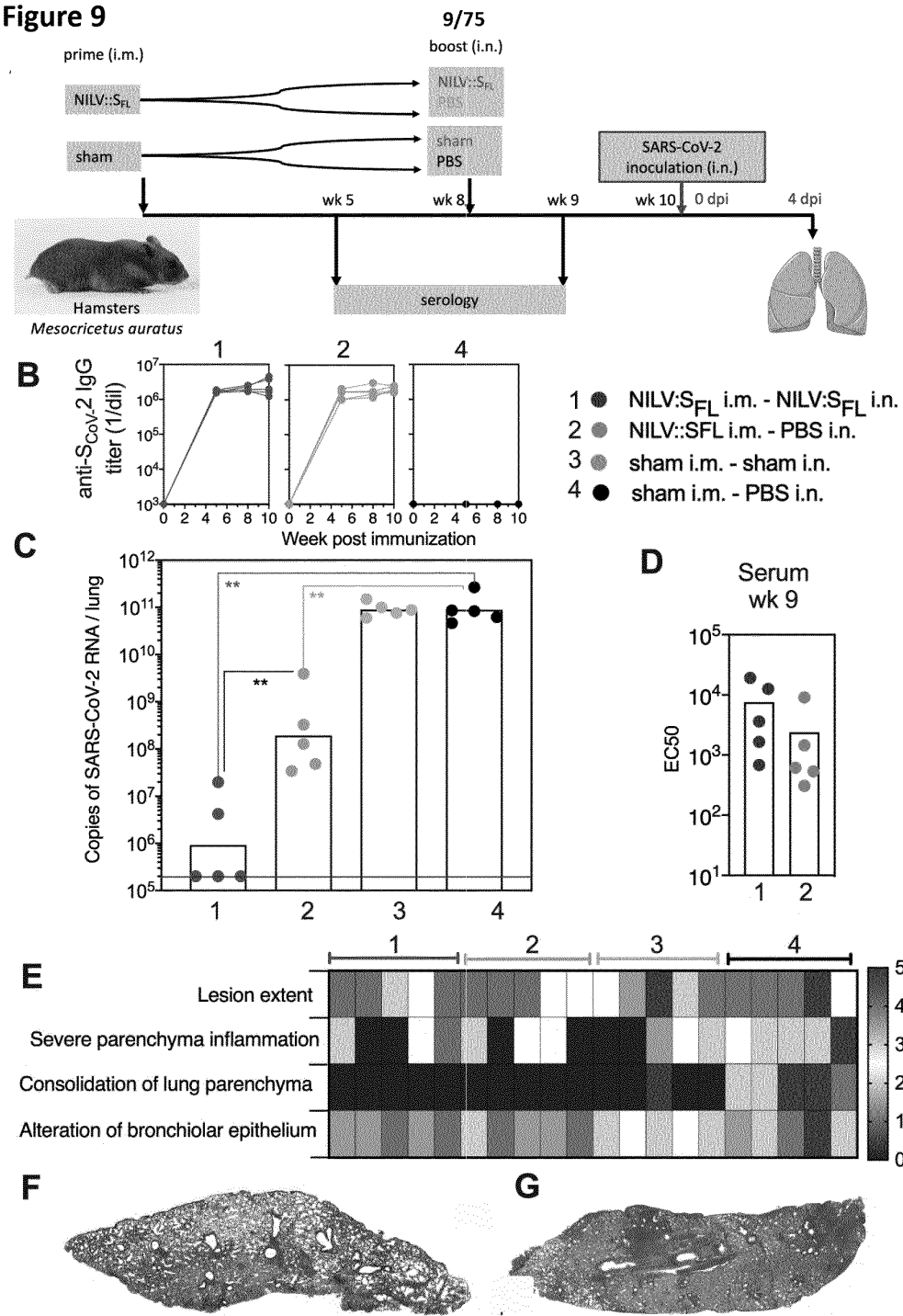


Figure 10

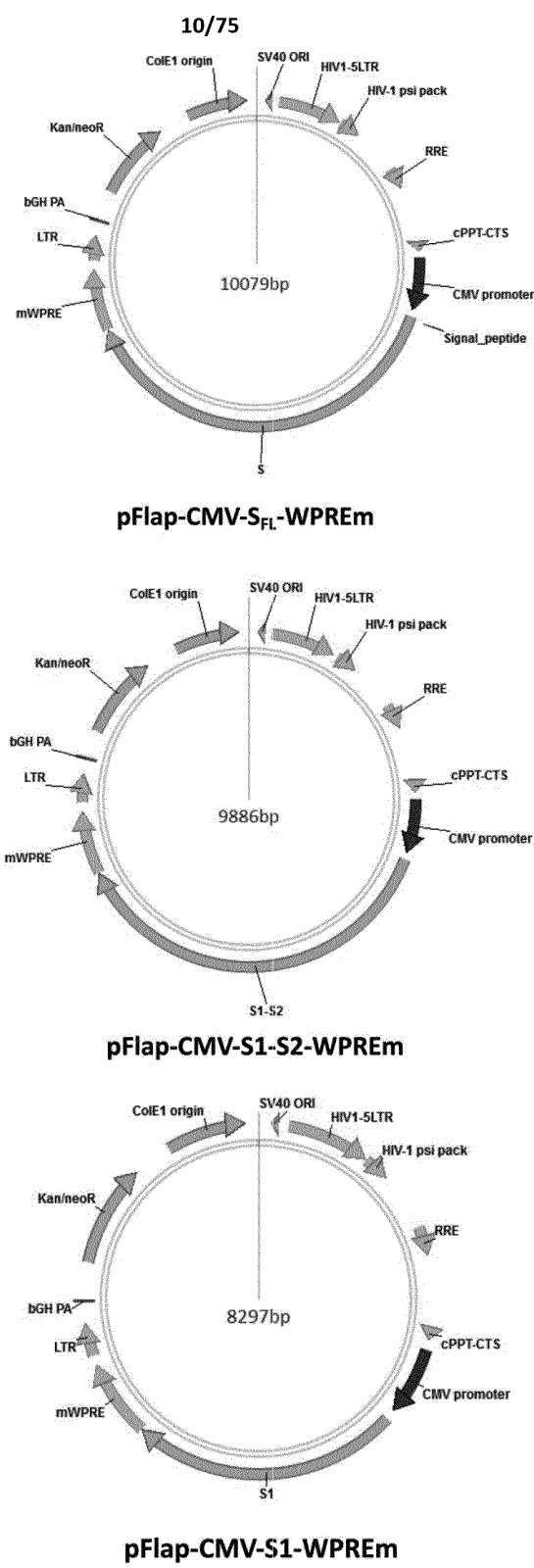


Figure 11

11/75

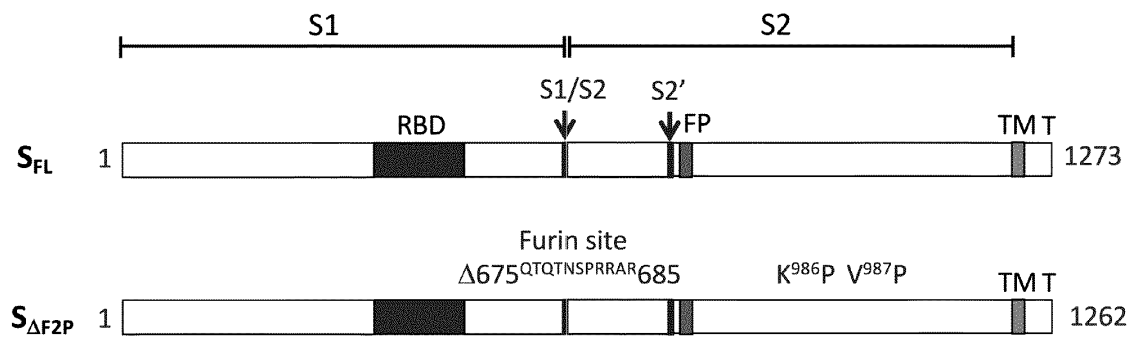


Figure 12

12/75

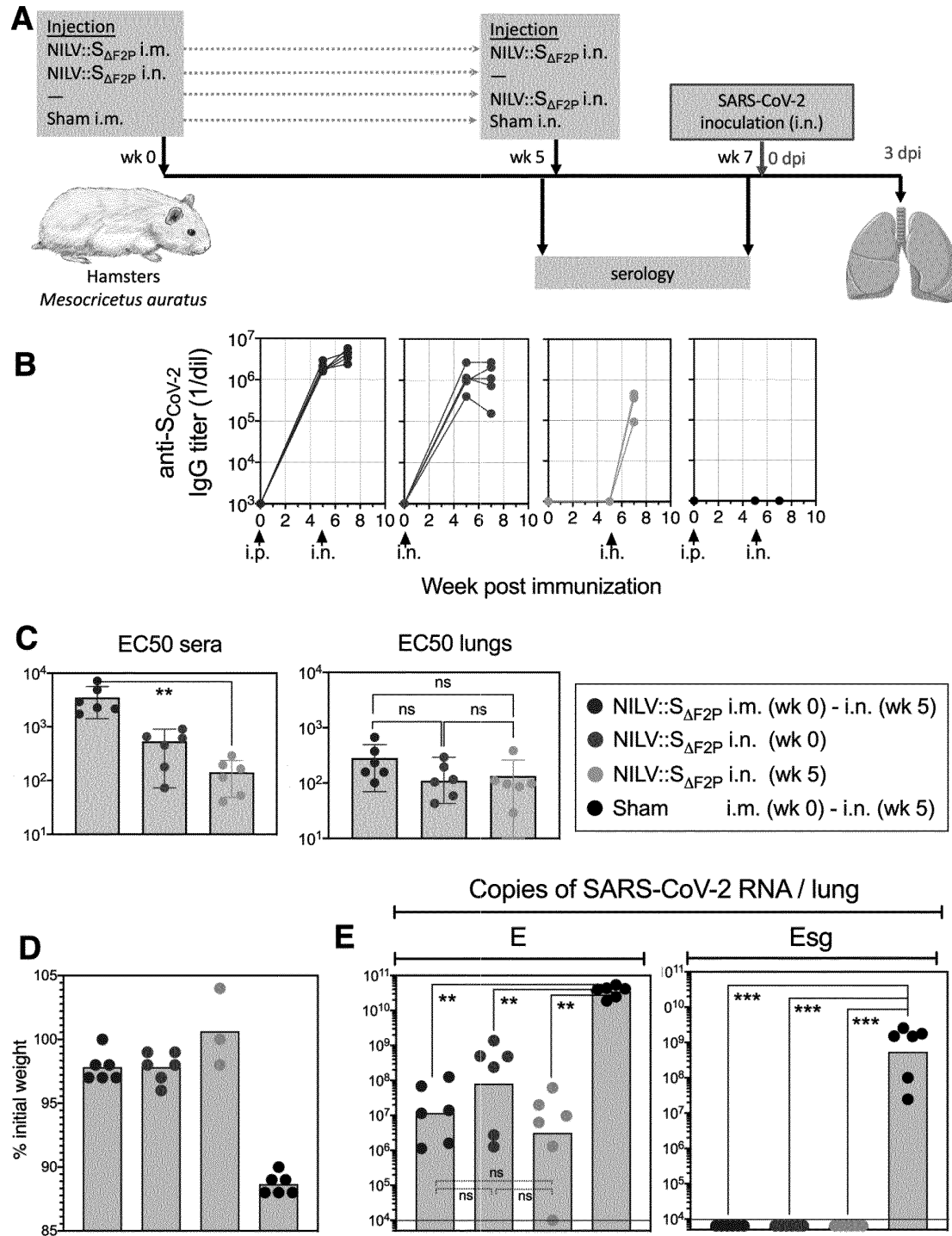


Figure 13

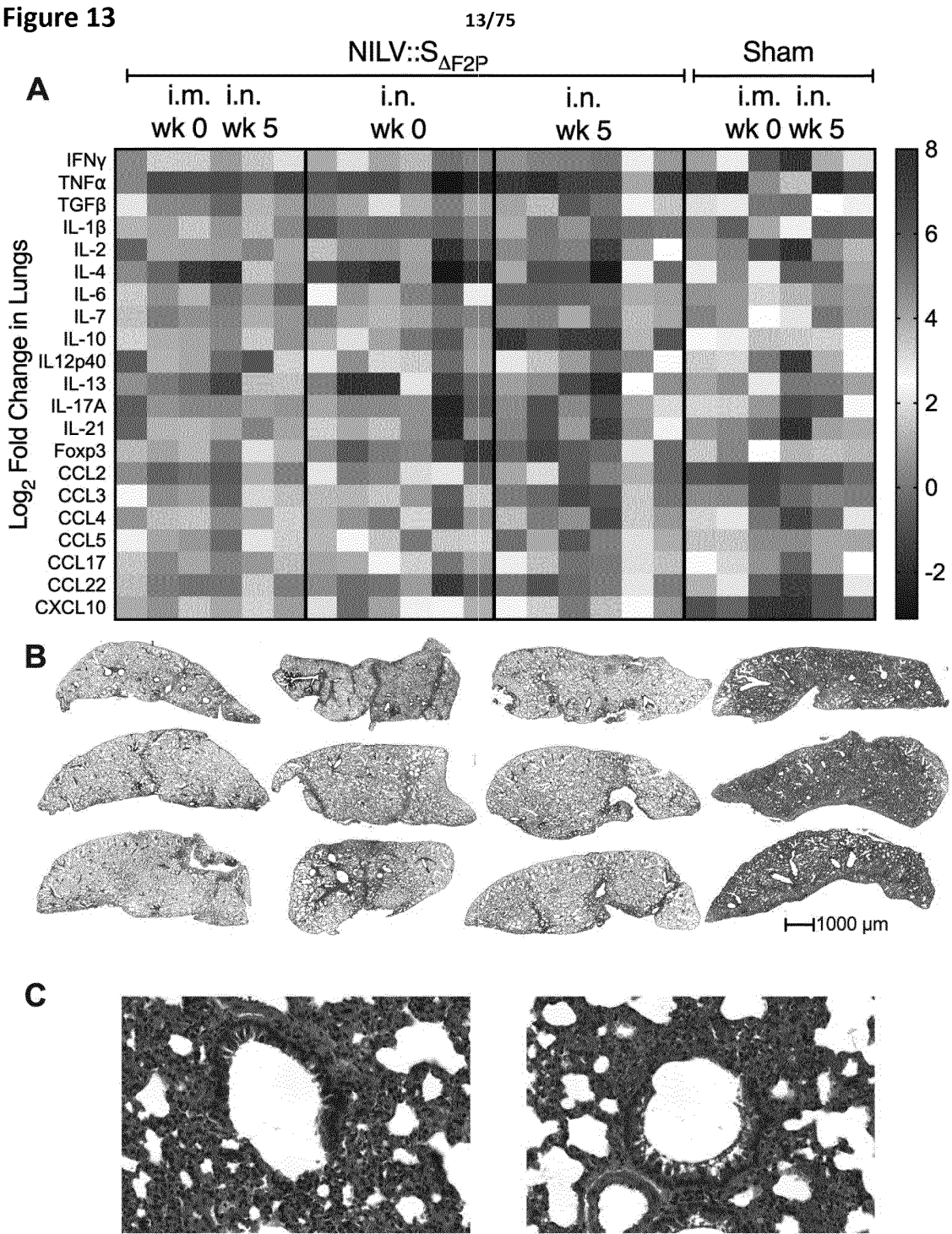


Figure 14

14/75

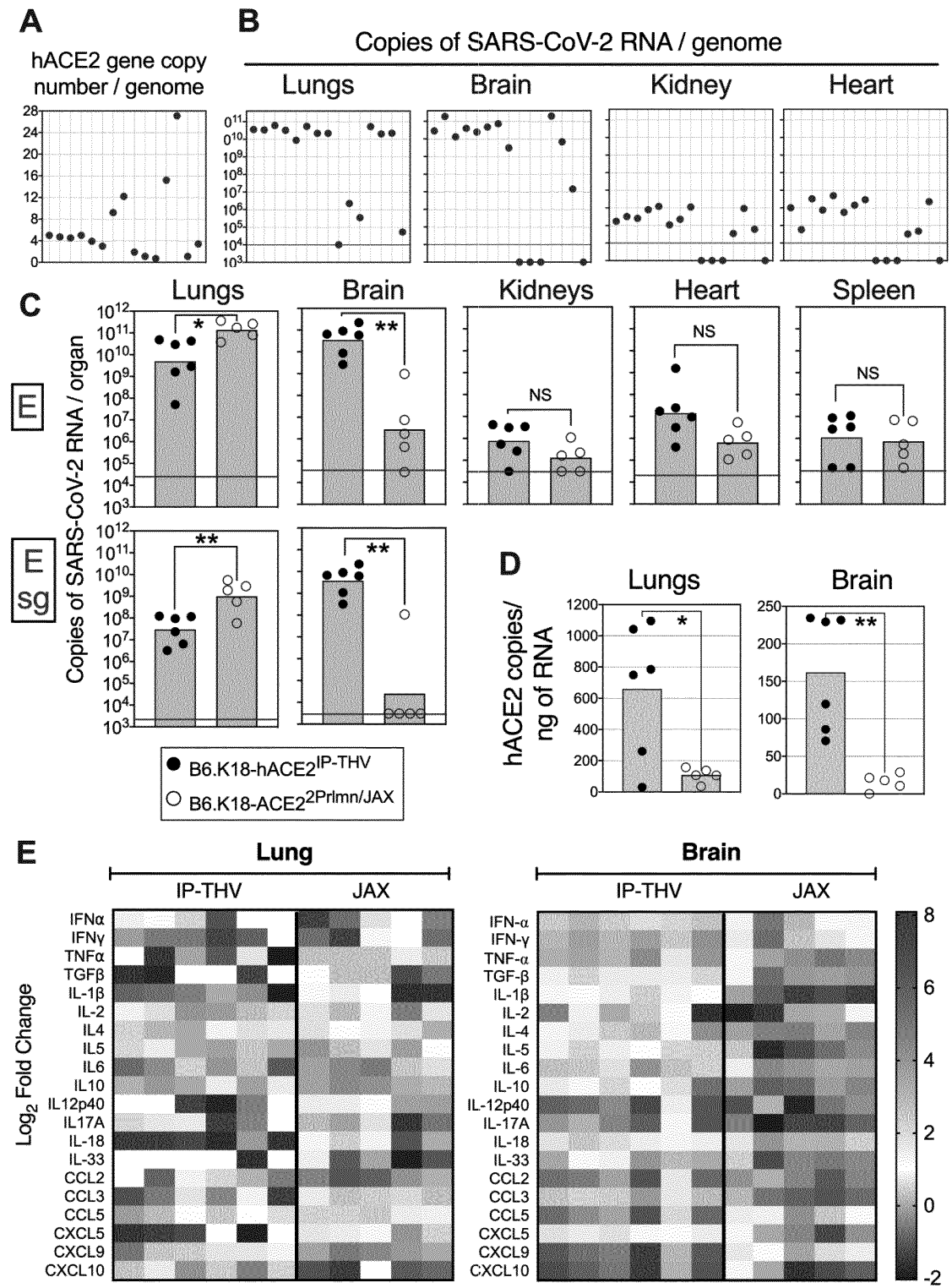


Figure 15

15/75

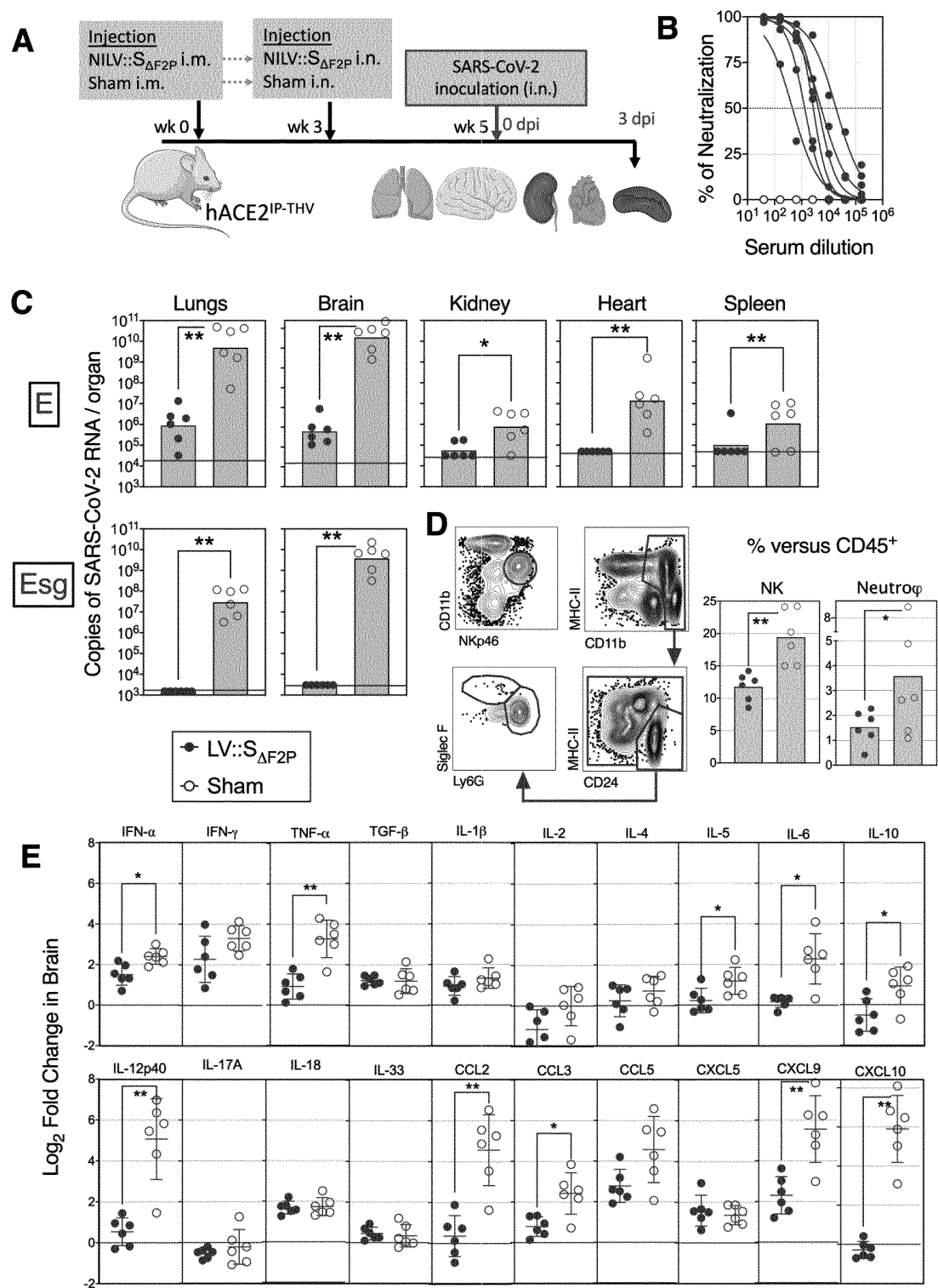


Figure 16

16/75

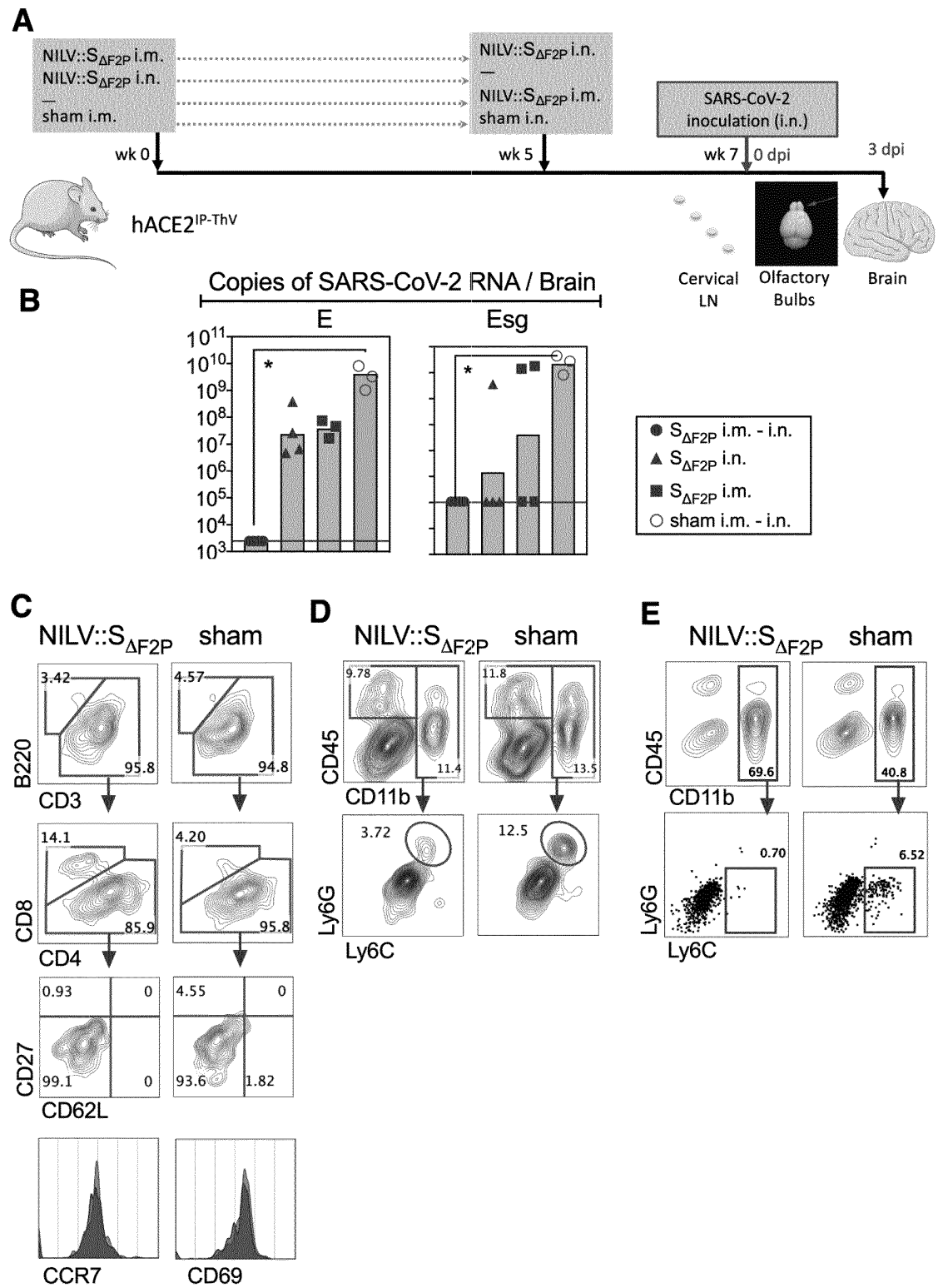
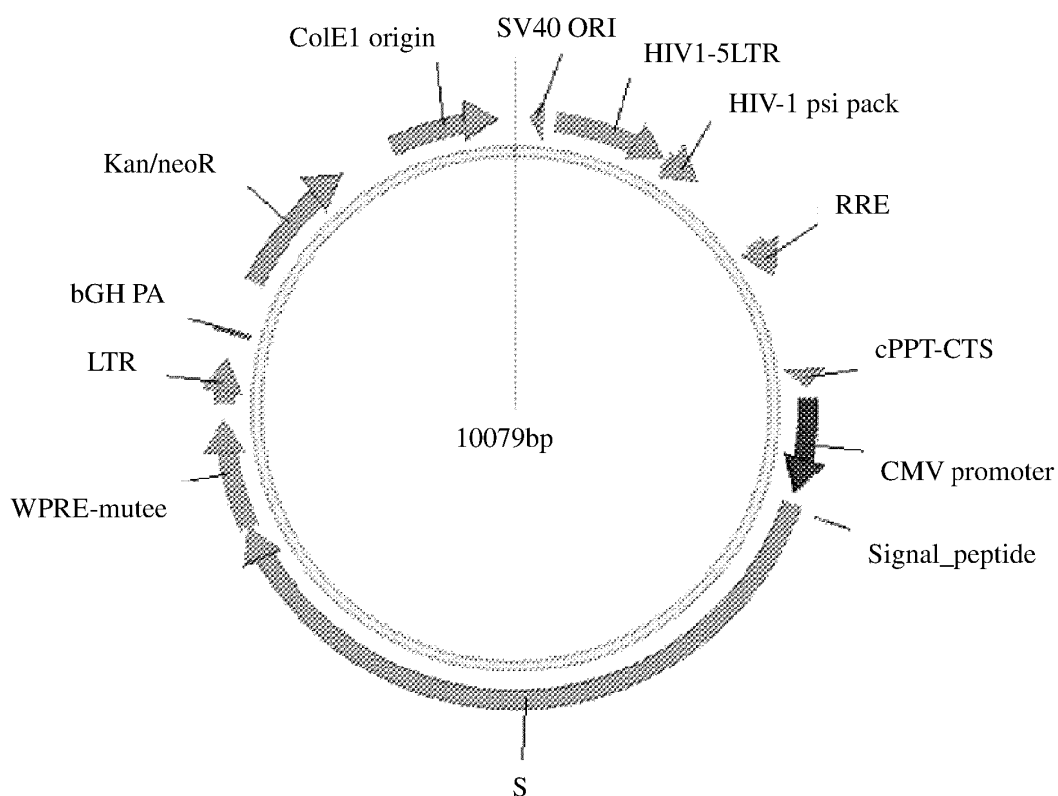
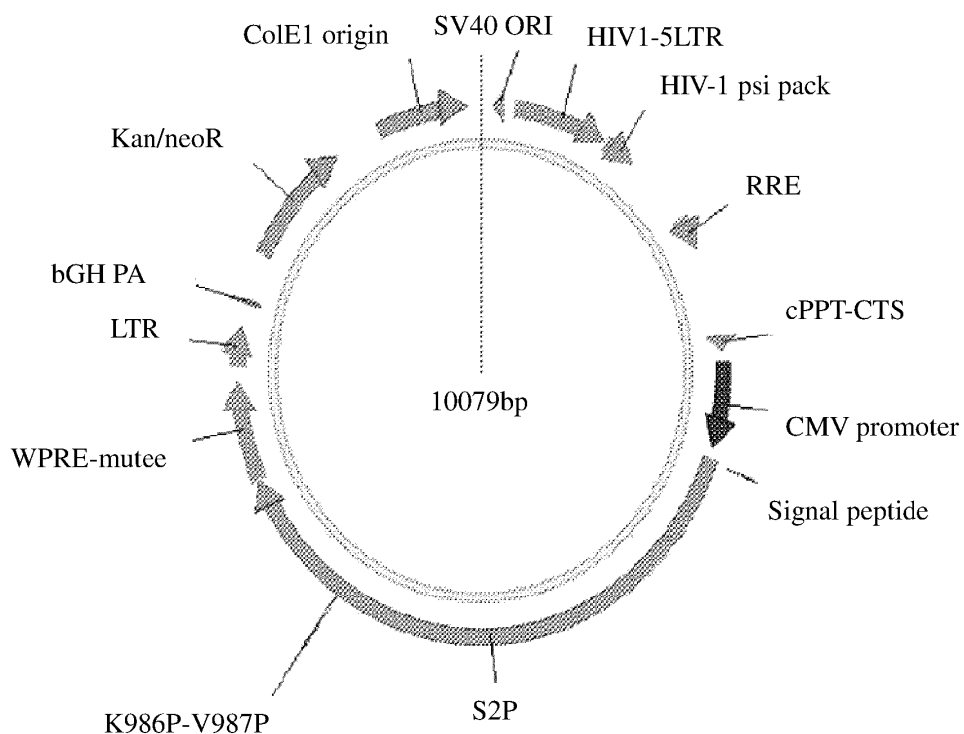


FIGURE 17**pFlap-ieCMV-S_{FI}-WPREm****pFlap-ieCMV-S_{2P}-WPREm**

18/75

Figure 17

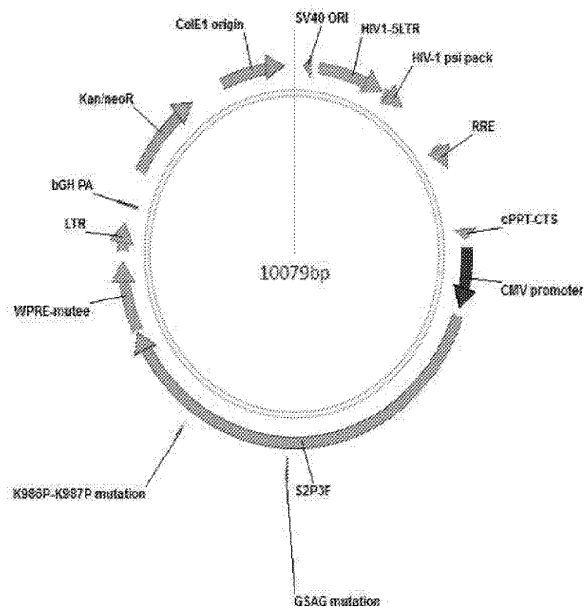
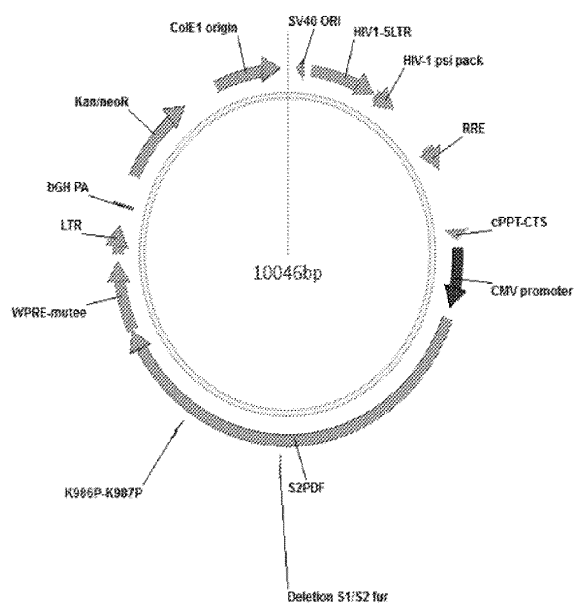
**pFlap-icCMV-S2P3F-WPREm****pFlap-icCMV-S2P-ΔF-WPREm**

Figure 18

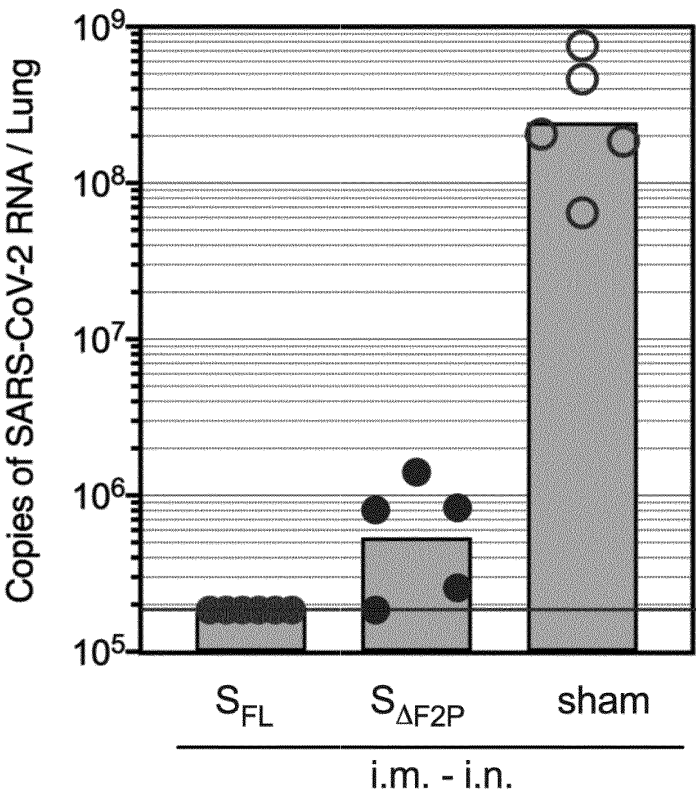


Figure 19

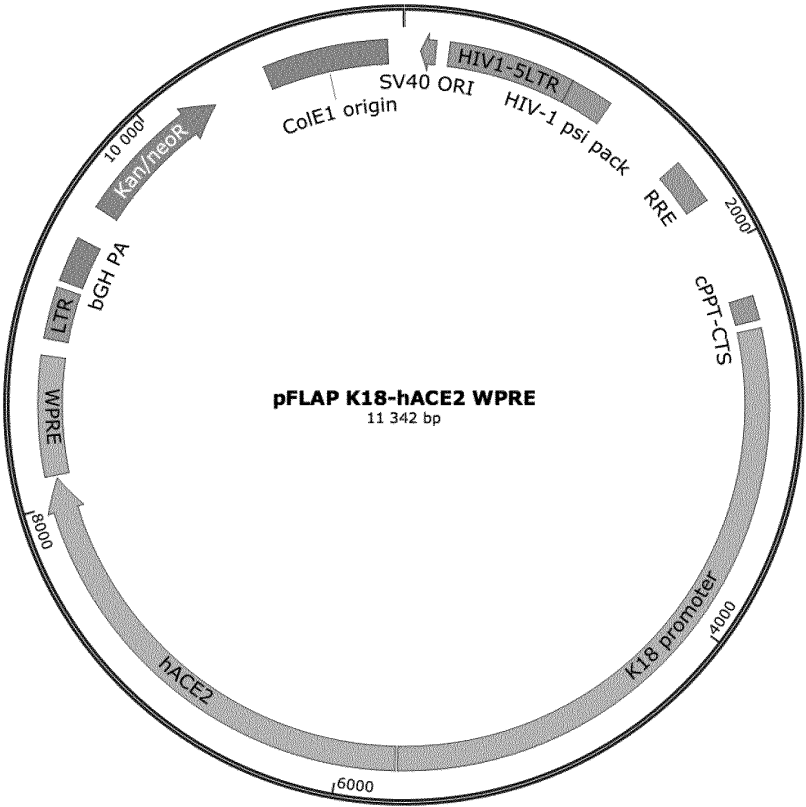


Figure 20

Fig 20A: >pFlap-CMV-S-2019-nCoV-WPREm – SEQ ID No. 3

CGCGTTGGGAGCTTTTGC AAAAGCCTAGGCCTCCAAAAAGCCTCCTCACTACTTCTGGAATAGCTCAGAGGCAGAGGC
GGCCTCGGCCTCTGCATAAAATAAAAAAATTAGTCAGCCATGGGGCGGAGAATGGGCGGAAGTGGGCGGAGTTAGGGGCG
GGATGGGCGGAGTTAGGGGCGGGACTATGGTTGCTGACTAATTGAGATGCCCGACATTGATTATTGACTAGTTGGAAGGG
CTAATTCACCTCCCAACGAAGACAAGATATCCTTGATCTGTGGATCTACCACACACAAGGCTACTTCCCTGATTAGCAGAA
CTACACACCAGGGGCCAGGGATCAGATATCCACTGACCTTTGGATGGTGCTACAAGCTAGTACCAGTTGAGCCAGAGAAGT
TAGAAGAAGCCAACAAGGAGAGAACCACAGCTTGTACAACCTGTGAGCCTGCATGGGATGGATGACCCGGAGAGAGAA
GTGTTAGAGTGGAGGTTTGACAGCCGCCTAGCATTTTCACCGTGGCCCGAGAGCTGCATCCGGAGTACTTCAAGAACT
GCTGATATCGAGCTTGTACAAGGGACTTTCCGCTGGGGGACTTTCCAGGGAGGCGTGGCCTGGGCGGGACTGGGGAGTG
GCGAGCCCTCAGATCCTGCATATAAGCAGCTCTTTTGCCTGTACTGGGTCTCTCTGGTTAGACCAGATCTGAGCCTGG
GAGCTCTCTGGCTAACTAGGGAACCCACTGCTTAAGCCTCAATAAAGCTTGCCTTGAGTGCTTCAAGTAGTGTGTGCCCG
TCTGTTGTGTACTCTGGTAAGTACAGATCCCTCAGACCCTTTTAGTCAGTGTGGAATCTCTAGCAGTGGCGCCCGAA
CAGGGACTTGAAAGCGAAAGGGAACAGAGGAGCTCTCTGACGCGAGGACTCGGCTTGCTGAAGCGCGCACGGCAAGAG
GCGAGGGGCGGCGACTGGTGAGTACGCCAAAAATTTGACTAGCGGAGGCTAGAAGGAGAGAGATGGGTGCGAGAGCGTG
AGTATTAAGCGGGGAGAAATTAGATCGCGATGGGAAAAATTCGGTTAAGGCCAGGGGGAAGAAAAATATAAATTAA
ACATATAGTATGGGCAAGCAGGGAGCTAGAACGATTCCGAGTTAATCTGGCCTGTTAGAAACATCAGAAGGCTGTAGAC
AAATACTGGGACAGCTACAACTATCCCTTCAGACAGGATCAGAAGAAGCTTAGATCATTATATAATACAGTAGCAACCCTC
TATTGTGTGCATCAAAGGATAGAGATAAAAGACACCAAGGAAGCTTTAGACAAGATAGAGGAAGGCAAAACAAAAGTAA
GACCACCGCAGCAGCAAGCGCGCTGATCTTCAGACCTGGAGGAGGAGATATGAGGGACAATTGGAGAAGTGAATTATAT
AAATATAAAGTAGTAAAAATTGAACATTAGGAGTAGCACCCACCAAGGCAAGAGAGAGTGGTGACAGAGAAAAAG
AGCAGTGGGAATAGGAGCTTTGTTCTTGGGTTCTTGGGAGCAGCAGGAAGCACTATGGGCGCAGCGTCAATGACGCTGA
CGGTACAGGCGCAGCAATTATTGTCTGTATAGTGCAGCAGACACAATTTGCTGAGGGCTATTGAGGCGCAACAGCAT
CTGTTGCAACTCAGACTCAGCTGGGACCTCAAGCAGCTCCAGGCAAGAATCTGGCTGTGGAAGATACCTAAAGGATCAACA
GCTCTGGGATTGGGTTGCTCTGGAAGCACTTTGCACCACTGCTGTGCCTTGGAAATGCTAGTTGGAGTAATAAAT
CTCTGGAACAGATTGGAATCACACGACCTGGATGGAGTGGGACAGAGAAATTAACAATTACACAAGCTTAATACACTCC
TTAATTGAAGAATCGCAAAACCAGCAAGAAAAGAAATGAACAAGAAATTATTGGAATTAGATAAATGGGCAAGTTTGTGGA
TTGGTTTAAACATAACAAATTGGCTGTGGTATATAAAATTATTCATAATGATAGTAGGAGGCTTGGTAGGTTTAAAGATAG
TTTTGCTGTACTTTCTATAGTGAATAGAGTTAGGCAGGGATATTCACCATTATCGTTTCAGACCCACCTCCCAACCCCG
AGGGGACCCGACAGGCCGAAGGAATAGAAGAAGAAGGTGGAGAGAGAGACAGAGACAGATCCATTTCGATTAGTGAACGG
ATCTCGACGGTATCGCCGAATTCACAAATGGCAGTATTCATCCACAATTTTAAAGAAAAGGGGGGATTGGGGGTACAG
TGCAGGGGAAGAATAGTAGACATAATAGCAACAGACATACAACTAAAGAATTACAAAAACAAATTACAAAAATTCAA
ATTTTCGGGTTTATTACAGGGACAGCAGAGATCCACTTTGGCTGATACGCGTGGAGTTCCGCGTTACATAACTTACGGTA
AATGGCCCGCTGGCTGACCGCCCAACGACCCCGCCATTGACGTCAATAATGACGTATGTTCCCATAGTAACGCCAAT
AGGGACTTTCCATTGACGTCAATGGGTGGAGTATTTACGGTAACTGCCACTTGGCAGTACATCAAGTGTATCATATGC
CAAGTACGCCCTTATTGACGTCAATGACGGTAAATGGCCGCTGGCATTATGCCAGTACATGACCTTATGGGACTTT
CCTACTTGGCAGTACATCTACGTATTAGTCATCGCTATTACCATGGTGATGCGGTTTTGGCAGTACATCAATGGGCGTGG
ATAGCGGTTTGACTACGGGGATTCCAAGTCTCCACCCATTGACGTCAATGGGAGTTTGTGTTGGACCAAAATCAAC
GGGACTTTCCAAATGTCTGAACAACTCCGCCCCATTGACGCAATGGGCGGTAGGCGGTACGCTGGGAGGTCTATATA
AGCAGAGCTCGTTTATGTAACCGTCAGATCGCTGGAGACGCCATCCACGCTGTTTGACCTCCATAGAAGACACCGCGA
TCGGATCCCGTACGGCCACCATGTTCTGTGTTCTGGTGCTGCTGCCACTGGTGTCAGTCAAGTGCCTGAACCTGACCACA
CGAACACAGCTGCCACGACCTACACCAATAGCTTCACCCGCGGAGTGACTACCCGACAAGGTGTTCCGACAGCGGT
GCTGCATAGCACCCAGGATCTGTTTCTGCCCTTCTCAGCAACGTGACCTGGTTCCACGCCATCCACGTGTCCGGCACCA
ATGGCACCAAGCGCTTCGATAATCCCGTGTGCCCTTCAACGATGGCGTGACTTTGCCAGCACCGAGAAGTCCAATATC
ATCCGCGGCTGGATCTTCGGCACCACTGGATAGCAAGACCCAGAGCCTGCTGATCGTGAACAACGCCACCAACGTGGT
CATCAAAGTGTGCGAGTTCCAGTTCTGCAACGACCCCTTCTGGGCGTCTACTACCAACAAGAACAAAGAGCTGGATGG
AAAGCGAGTTCGCGGTGTACAGCAGCGCCAACAAGTGCACCTTCGAGTACGTGTCCAGCCATTCTGATGGACCTGGAA
GGCAAGCAGGGCAACTTCAAGAAGCTGCGGAGTTCTGTTCGAAGAATCGACGGCTACTTCAAAATCTACAGCAAGCA
CACCCCAATCAACCTCTGTGCGGATCTGCCACAGGGATTACGTGCTCTGGAACCCCTGGTGGATCTGCCATCGGCATCA
ACATTACCCGCTTTCAGACACTGCTGGCCCTGCACCGCAGTTACTTGACACCAGGCGATAGCAGCAGTGGATGGACAGCT
GGTGGCGCGCTTACTACGTTGGATATCTGACGCCACGCACCTTTCTGCTGAAGTACAACGAGAACGGCACCATCCCGA
CGCCGTGGATTGTGCTCTCGATCCCTGAGCGAGACAAAGTGACCCCTGAAGTCTTACCCGTGAGAAGGGCATCTACC
AGACCAGCAATTTCCGCGTGCAGCCACCGAGAGCATCGTGCGCTTCCCAATATCACCAATCTGTGCCCTTCGGCGAG
GTGTTCAATGCCACACGCTTTGCCTCCGTGTACGCTGGAATCGCAAGCGCATTAGCAACTGCGTGGCCGACTACTCCGT
GCTGATAGCAATAGCGCCAGCTTCAGACCTTCAAGTGTACGCGGTGTACCCACCAAGCTGAACGACCTGTGCTTACCA
ATGTGTACGCCGACAGCTTCGTGATCCGCGGAGATGAAGTGCAGACAGATTGCCCGAGGCCAGACCGCAAGATCGCCGAG

22/75
Figure 20

TACAATTACAAGTGTCCCGACGACTTCACCGGCTGCGTGATCGCCTGGAACAGCAACAACCTGGATTCCAAAGTCGGCGG
CAACTACAACCTACCTGTACCGCTGTTCGCAAGAGCAATCTGAAGCCCTTCGAGCGCGACATCAGCACCGAAATCTACC
AGGCCGGAAGCACCCCATGCAACGGCGTGGAAGGCTTCAACTGCTACTTCCACTGCAGTCCTACGGATTTAGCCACACA
AATGGCGTGGGCTACAGCCATATCGAGTGGTGGTGTGAGCTTCGAACTGCTGCATGCTCCAGCTACCGTGTGCGGCC
CAAGAAGAGTACCAACCTGGTCAAGAACAATGCGTGAACCTCAACTTCAACGGCCTGACCGGAACCGGCGTGTGACCC
AGAGTAACAAGAAGTTCTGCCATTCCAGCAGTTTGGCCGCGCAGATTGCCGATACAACCGATGCCGTTCCGCGATCCCCAG
ACCTTGGAGATCCTGGATATTACCCATGCTCCTTCGGCGGCGTGTCCGTGATTACACAGGCACCAATACCAGCAACCA
GGTGGCCGTTCTGTACCAAGGATGTGAATTGCACAGAGGTGCCCGTGGCCATTACGCCGATCAATTGACACCAACATGGC
GCGTGTACTCCACCGGCAGCAATGTGTTCAAACCCGCGCTGGATGCCTGATTGGAGCCGAGCAGTGAACAATAGCTAC
GAGTGCATATCCCCATCGGAGCCGGAATCTGCGCCTCTATCAGACCCAGACCAATAGTCCACGACGAGCCCGAAGTGT
GGCCAGCCAGAGCATCAATTGCCTATACCATGAGCCTGGGCGCCGAGAATAGCGTGGCCTACTCCAACAACAGCATTGTCTA
TCCCCACCAACTTACCATCAGCGTGACCACCGAGATCCTGCCAGTGTCCATGACCAAGACCAGCGTGGACTGCACCATG
TACATCTGCGGAGATAGCACCGAGTGCAGCAACCTGCTGCTGCAGTACGGAAGTTTCTGCACCCAGCTGAATCGCGCCCT
GACAGGCATTGGCCGTGGAACAGGATAAGAACAACCAAGAGGTGTTCCGCCAAGTGAAGCAAATCTACAAGACCCCAACAA
TCAAGGATTTGCGCGGCTTCAATTTAGCCAGATTCTGCCGATCCAAGCAAGCCAGCAAGCGCAGCTTATCAGGAGAC
CTGCTGTTCAACAAAGTGACTGCGCCGACGCGGATTATCAAGCAGTATGGCGATTGCCTGGGCGATATTGCCGACG
CGATCTGATTGCGCCAGAAAGTTTAAACGGACTGACCGTCTGCCACCACTGCTGACAGATGAGATGATCGCCAGTACA
CAAGTGCCCTGCTGGCCGGAACCATACCAGCGGATGGACATTTGGAGCCGGTGGCCCTCTGCAGATTCCTTCGCTATG
CAGATGGCCTACCGCTTCAATGGCATTGGCGTGACCCAGAATGTGCTGTACGAGAACCAGAAGCTGATCGCCAAACCACTT
CAACAGCGCCATCGGCAAGATTCAAGACAGCCTGAGTAGTACCGCCAGCGCTCTGGGAAAGCTGCAGGATGTGGTCAACC
AGAACGCTCAGGCCCTGAACACCTGTGTTAAGCAGCTGAGCAGCAACTTCCGCGCCATCAGTAGCGTGTGTAACGATATC
CTGAGCCGCTGGATAAGGTGGAAGCCGAGGTGCAGATCGCTGATTACCGGACGCTGCAGTCCCTGCAGACCTA
TGTGACACAGCAGCTGATCCGAGCCGCGAGATTGAGCTAGTGCTAATCTGGCCGCCACCAAGATGAGCGAATGTGTGC
TGGGACAGAGCAAGCGCGTGGACTTTTGGGCAAGGGATACCACTGATGAGCTTCCACAGAGTGCTCCACACGGCGTG
GTGTTTCTGCATGTGACCTACGTGCCGCTCAAGAGAAGAAATTTACCACCGCTCCAGCCATCTGCCACGACGGAAAGGC
CCATTTTCCACGCGAGGGCGTGTTCGTTAGCAACGGCACTCATTGGTTCTGTCACCCAGCGCAACTTCTACGAGCCCCAGA
TCATCACCAACCGACAACACCTTCGTCAGCGGCAACTGCGACGTGATCGGCATTGTGAACAACACCGTGTACGATCCA
CTGACGCCCCGAGCTGGACAGCTTCAAAGAGGAACTGGACAAGTACTTTAAGAACCACACAAGCCCCGACGTGGACCTGGG
AGACATTAGCGGAATCAACGCCAGCGTGGTCAACATCCAGAAAGAGATTGACCGCTGAACGAGGTGGCCAAGAACTCTGA
ACGAGAGCCTGATGACCTGCAAGAACTGGGCAATACGAGCAGTACATTAAGTGGCCCTGTTACATCTGGCTGGGCTTC
ATTGCCGAGCTGATTGCCATCGTGATGGTCAACATTATGCTGTGCTGCATGACCAAGTTGCTGCAGCTGCCTGAAGGGATG
CTGCAGTTGCGGAAGCTGCTGCAAGTTGACGAGGATGATAGCGAGCCAGTGTGTAAGGGCGTCAAGCTGCACTACACCT
GATAACGAGCGCGCCTCGAGAATCCCGATAATCAACCTCTGGATTACAAAATTTGTGAAGATTGACTGGTATTCTTAA
CTATGTTGCTCCTTTTACGCTATGTGGATACGCTGCTTAAATGCCTTTGTATCATGCTATTGCTTCCCGTATGGCTTTCA
TTTTCTCTCTTGTATAAATCCTGGTTGCTGTCTTTATGAGGAGTTGTGGCCGTTGTACGGCAACGTGGCGTGGTG
TGCATGTGTTTGTGACGCAACCCCACTGTTGGGGCATTGCCACCACTGTACGCTCCTTCCGGGACTTTCGCTTT
CCCCCTCCTATTGCCACGGCGGAACATATCGCCGCTGCTTGGCCGCTGCTGGACAGGGGCTCGGCTGTTGGGCACTG
ACAATCCGTGGTGTGTCGGGGAAGCTGACGTCCTTCCGCGGCTGCTGCGCTGTGTTGCCACCTGGATTCTGCGCGGG
ACGTCCTTCTGCTACGTCACCTTCGCGCCCTCAATCCAGCGGACCTTCTTCCCGCGGCTGCTCGCGGCTCTGCGGCTCT
TCCGCTCTTCCGCTTCCGCTCAGACGAGTCCGATCTCCCTTGGGCGGCTCCCGCATCGGGGTACCTTTAAGACC
AATGACTTACAAGGCAGCTGTAGATCTTAGCCACTTTTTAAAGAAAAGGGGGGACTGGAAGGGCTAATCACTCCCAAC
GAAGACAAGATCGTCGAGAGATGCTGCATATAAGCAGCTGCTTTTGTGTTGACTGGGTCTCTGTTAGACCAGATCT
GAGCCTGGGAGCTCTGCGCTAACTAGGGAACCACTGCTTAAGCCTCAATAAAGCTTGCCTTGAGTGCTTCAAGTAGTG
TGTGCCCCTGCTGTTGTGTGACTCTGGTAAGTACGATCCCTCAGACCTTTTGTGCTGAGTGGGAAATCTCTAGCAGTTT
TAGAGGGCCGTTTAAACCCGCTGATCAGCTCGACTTCTAGTTGCCAGCCATCTGTTGTTTGGCCCTCCCGG
TGCTTCTTACCCCTGGAAGGTGCCACTCCCACTGCTTCTTCTAATAAAATGAGGAAATGATCGCATTGTCTGAGT
AGGTGTCATTCTATTCTGGGGGTGGGGTGGGGCAGGACAGCAAGGGGGAGGATTGGGAAGACAATAGCAGGCATGCTGG
GGATGCGGTGGGCTCTATGGCTTCTACTGGGCGGTTTTATGGACAGCAAGCGAACCAGGAAATGCCAGCTGGGGCGCCCTC
TGGTAAGGTTGGGAAGCCCTGCAAAGTAACTGGATGGCTTCTCGCCGCCAAGGATCTGATGGCGCAGGGGATCAAGCT
CTGATCAAGAGACAGGATGAGGATCGTTTCGCATGATTGAACAAGATGGATTGCACGACAGTTCTCCGGCCGCTTGGGTG
GAGAGGCTATTGGCTATGACTGGGCACAACAGACAATCGGCTGCTGATGCCCGCTGTTCCGGCTGTACGCGCAGGG
GCGCCCGGTTCTTTTGTCAAGACCGACCTGTCCGGTGCCCTGAATGAAGTCAAGACGAGGACGCGCGCTATCGTGGC
TGGCCACGACGGGCGTTCTTGCAGCTGTGCTGACGTTGTCACTGAAGCGGGAAGGGACTGGCTGCTATTGGGCGAA
GTGCCGGGGCAGGATCTCTGTATCTACCTTGTCTGCTGCGGAGAAAGTATCCATCATGGCTGATGCAATGCGCGGCT
GCATACGCTTGATCCGGTACCTGCCATTGACACCAAGCGAAACATCGCATCGAGCGAGCAGTACTCGGATGGAAG

23/75
Figure 20

CCGGTCTTGTGATCAGGATGATCTGGACGAAGAGCATCAGGGGCTCGCGCCAGCCGAACGTTCGCCAGGCTCAAGGCG
AGCATGCCGACGGCGAGGATCTCGTCGTGACCCATGGCGATGCTGCTTGCCGAATATCATGGTGAAAATGGCCGCTT
TTCTGGATTATCAGCTGTGGCCGGCTGGGTGTGGCGGACCGCTATCAGGACATAGCGTTGGCTACCCGTGATATTGCTG
AAGAGCTTGGCGGCAATGGGCTGACCGCTTCTCGTCTTTACGGTATCGCCGCTCCCGATTGCGACGCGATCGCCTTC
TATCGCCTTCTTGACGAGTTCTTGAATTATTAAACGCTTACAATTTCTGATGCGGTATTTTCTCCTTACGCATCTGTG
CGGTATTTACACCGCATACAGGTGGCAGCTTTTCGGGGAATGTGCGCGGAACCCCTATTTGTTTATTTTCTAAATACA
TTCAAATATGTATCCGCTCATGAGACAATAACCTGTATAATGCTTCAATAATAGCACGTGTAAAATTCATTTTTAAT
TTAAAGGATCTAGGTGAAGATCCTTTTGTATAATCTCATGACCAAAATCCCTTAACGTGAGTTTTCTTCCACTGAGCG
TCAGACCCGCTAGAAAAGATCAAAGGATCTTCTTGAGATCCTTTTTCTGCGCGTAATCTGCTGCTTGCAACAAAAA
ACCACCGCTACCAGCGGTGGTTTGTGTCGGGATCAAGAGCTACCAACTCTTTTCCGAAGGTAAGTGGCTTCAGCAGAG
CGCAGATACCAAATACTGTCTTCTAGTGTAGCCGTAGTTAGGCCACCACTTCAAGAACTCTGTAGCACCAGCCTACATAC
CTCGCTCTGCTAATCTGTTACAGTGGCTGCTGCCAGTGGCGATAAGTCGTGCTTACCGGGTTGGACTCAAGACGATA
GTTACCGGATAAGGCGCAGCGGTGGGCTGAACGGGGGGTTCGTGCACACAGCCAGCTTGGAGCGAAGCACCTACACCG
AACTGAGATACCTACAGCGTGAGCTATGAGAAAAGCGCCACGCTTCCGAAGGAGAAAAGGCGGACAGGTATCCGGTAAGC
GGCAGGGTGGAAACAGGAGAGCGACGAGGGAGCTTCCAGGGGAAACGCTGTATCTTTATAGTCCTGTGCGGGTTTCG
CCACCTCTGACTTGAGCGTCGATTTTGTGATGCTGTCAGGGGGGCGGAGCCTATGAAAAACGCCAGCAACGCGGCT
TTTTACGGTCTCGGGCTTTTGTGCGCTTTTGTACATGTTCTTGACTCTTCGCGATGTACGGGCCAGATATACGCG

FIG20B: > S-2019-nCoV = S Wild-type (3825pb) - SEQ ID No. 4

ATGTTCTGTGTTTCTGGTGCTGCTGCCACTGGTGTCCAGTCAAGTGAACCTGACCACACGAACACAGCTGCCACCAGC
CTACACCAATAGCTTACCCGCGGAGTGACTACCCGACAAGGTGTTCCGACGACGCTGCTGCATAGCACCAGGATC
TGTTTCTGCCCTTCTTCAACAACGTGACCTGGTTCCACGCCATCCACGTGTCGGCACCAATGGCACCAAGCGCTTCGAT
AATCCCGTCTGCCCTTCAACGATGCGGTGACTTTGCCAGCACCGAGAAGTCCAATATCATCCGCGGTGGATCTTCGG
CACCACACTGGATAGCAAGACCCAGAGCCTGCTGATCGTGAACAACGCCACCAACGTGGTCATCAAAGTGTGCGAGTTCC
AGTTCGCAACGACCCCTTCTGGGCGTCTACTACCACAAGAACAACAGAGCTGGATGGAAGCGAGTTCGCGGTGAC
AGCAGCGCAACAACGTGACCTTCGAGTACGTGTCCAGCCATCTGATGGACCTGGAAGGCAAGCAGGCACTTCAA
GAACCTGCGCGAGTTCTGTTCAAGAACATCGACGGCTACTTCAAATCTACAGCAAGCACACCCCAATCAACCTCGTGC
GCGATCTGCCACAGGGATTCACTGCTCTGGAACCCCTGGTGGATCTGCCATCGGCATCAACATTACCCGCTTCAGACA
CTGCTGGCCCTGCACCGAGTTACTTGACACCAGGCGATAGCAGCAGTGGATGGACAGCTGGTGCCGCGCTTACTACGT
TGGATATCTGCAGCCACGCACCTTCTGCTGAAGTACAACGAGAACGGCACCATCACCGACGCCGTGGATTGTGCTCTCG
ATCCCTGAGCGAGACAAAGTGCACCTGAAGTCTTACCCTCGAGAAGGGCATCTACAGACCAGCAATTTCCGCGTG
CAGCCACCGAGAGCATCGTGCGCTTCCCAATATCACCATCTGTGCCCTTCGGCGAGGTGTTCAATGCCACACGCTT
TGCTCTCGGTACGCTGGAATCGAAGCGCATTAGCAACTGCGTGGCCGACTACTCGTGTGTACAATAGCGCCAGCT
TCAGCACCTTCAAGTGCTACGGCGTGTACCCACCAAGCTGAACGACCTGTGCTTACCAATGTGTACGCCGACAGCTTC
GTGATCCGCGGAGATGAAGTGCAGAGATTGCCCGAGGCCAGACCGGCAAGATCGCCGACTACAATTACAAGTGCCTCGA
CGACTTACCCGGTGTGCTGATCGCCTGGAACAGCAACAACCTGGATTCCAAAGTCGGCGGCAACTACAACCTGTACC
GCCTGTTCCGCAAGAGCAATCTGAAGCCCTTCGAGCGCGACATCAGCACCAGAAATCTACAGGCCGGAAGCACCCCATGC
AACGCGGTGGAAGGCTTCAACTGCTACTTCCCACTGCAGTCTTACGGATTTCAGCCCAAAATGGCGTGGGCTACCAAGC
ATATCGAGTGGTGGTGTGCTGAGCTTCAACTGCTGATGCTCCAGCTACCGTGTGCGGCCCAAGAAGAGTACCAACCTGG
TCAAGAACAATGCGTGAACCTCAACTTCAACGGCCTGACCGGAACCGGCGTGTGACCGAGAGTAACAAGAAGTCTGTG
CCATTCCAGCAGTTTGGCCGCGACATTGCCGATACAACCGATGCCGTTCGCGATCCCGAGACCTTGGAGATCTGGATAT
TACCCCATGCTCCTTCGCGCGCGGTGTCCGTGATTACACCAGGCACCAATACCAGCAACCAAGTGGCCGTTCTGTACCAGG
ATGTGAATTGCACAGAGGTGCCCGTGGCCATTACGCCGATCAATTGACACCAACATGGCGCGTGTACTCCACCGGCAGC
AATGTGTTTCAACCCGCGCTTGATGCTGATTGGAGCCGAGCAGTGAACAATAGCTACGAGTGCATATCCCATCTGG
AGCCGAATCTGCGCTCTCATCAGACCCAGACCAATAGTCCACGACGAGCCGAAAGTGTGGCCAGCCAGAGCATCTTG
CCTATACCATGAGCCTGGGCGCGGAGAATAGCGTGGCCTACTCCAACAACAGCATTGCTATCCCACTCACTTCACTC
AGCGTGACCCAGAGATCCTGCCAGTGTCCATGACCAAGACCAGCGTGGACTGCACCATGTACATCTGCGGAGATAGCAC
CGAGTGCAGCAACCTGCTGCTGAGTACGGAAGTTTCTGCACCCAGCTGAATCGCGCCCTGACAGGCATTGCCGTGGAAC
AGGATAAGAACACCAAGAGGTGTTCCGCCAAGTGAAGCAATCTACAAGACCCCAATCAAGGATTTCGGCGGCTTC
AATTCAGCCAGATTCTGCCGATCAAGCAAGCCAGCAAGCGCAGCTTATCGAGGACCTGCTGTTCAACAAAGTGAC
ACTGGCCGACGCGGATTATCAAGCAGTATGGCGATTGCTGGGCGATATTGCCGACGCGATCTGATTTGCGCCAGA
AGTTTAAACGAGTACCGTCTGCCACCACTGCTGACAGATGAGATGATCGCCAGTACACAAGTGCCTGCTGGCCGGA
ACCATTACAGCGGATGGACATTTGGAGCCGGTGCCGCTGTCAGATTCCTTCGCTATGAGATGGCCTACCGCTTCAA
TGGCATTGGCGTGACCCAGAATGTGCTGTACGAGAACCAGAAGCTGATCGCCAACCAAGTTCAACAGCGCCATCGGCAAGA

24/75

Figure 20

TTCAGGACAGCCTGAGTAGTACCGCCAGCGCTCTGGGAAAGCTGCAGGATGTGGTCAACCAGAACGCTCAGGCCCTGAAC
ACCTGTTAAGCAGCTGAGCAGCAACTTCGGCGCCATCAGTAGCGTGCTGAACGATATCCTGAGCCGCTGGATAAGGT
GGAAGCCGAGGTGCAGATCGATCGCCTGATTACCGGACGCCTGCAGTCCCTGCAGACCTATGTGACACAGCAGCTGATCC
GAGCCGCCGAGATTGAGCTAGTGCTAATCTGGCCGCCACCAAGATGAGCGAATGTGTGCTGGGACAGAGCAAGCGCGTG
GACTTTTTCGGCAAGGGATACCACCTGATGAGCTTCCACAGAGTGCTCCACACGGCGTGGTGTCTGTCATGTGACCTA
CGTGCCCGCTCAAGAGAAGAATTCACCACCGCTCCAGCCATCTGCCACGACGGAAGGGCCATTTCCACGCGAGGGCG
TGTTCTGTAGCAACGGCACTCATTGGTTCGTACCCAGCGCAACTTCTACGAGCCCCAGATCATCACCACCGACAACACC
TTCGTGAGCGGCAACTGCGACGTCGTGATCGGCATTGTGAACAACACCGTGACGATCCACTGCAGCCCGAGCTGGACAG
CTTCAAAGAGGAAGTGGACAAGTACTTTAAGAACCACACAAGCCCCGACGTGGACCTGGGAGACATTAGCGGAATCAACG
CCAGCGTGGTCAACATCCAGAAAGAGATTGACCGCTGAACGAGGTGGCAAGAATCTGAACGAGAGCCTGATCGACCTG
CAAGAACTGGGCAAAATACGAGCAGTACATTAAAGTGGCCCTGGTACATCTGGCTGGGCTTCATTGCCGACTGATTGCCAT
CGTGATGGTCACCATATGCTGTGCTGCATGACCAAGTGTGTCAGCTGCCTGAAGGGATGCTGCAGTTGCGGAAGCTGCT
GCAAGTTCGACGAGGATGATAGCGAGCCAGTGTGAAGGGCGTCAAGCTGCACTACACCTGATAA

Fig 20C>S-2019-nCoV = S Wild-Type (1274aa) - SEQ ID No. 5

MFVFLVLLPLVSSQCVNLTTRQLPPAYTNSFTRGVYYPDKVFRSSVLHSTQDLFLPFFSNVTWFHAIHVSGTNGTKRFD
NPVLPFNDGVYFASTEKSNIIRGWIFGTTLDSTQSLIVNNATNVVIKVECFQCNDFLGVYYHKNNKSWMESEFRVY
SSANNCTFEYVSQPFLLMDLEGKQGNFKNLREFVFNIDGYFKIYKHTPINLVRDLPQGFSALEPLVDLPIGINITRFQT
LLALHRSYLTGDSGGWTAGAAAYVGYLQPRFTLLKYNENGTITDAVDCALDPLSETKCTLSFTVEKGIYQTSNFRV
QPTESIVRFPNITNLCPFGEVFNATRFASVYAWNRRKRISNCVADYSVLYNSASFSTFKCYGVSPKLNLDLCTNRYADSF
VIRGDEVRIAPGQTGKIADYNYKLDDFTGCVIAWNSNNLDSKVGGNYNLYRLFRKSNLKPFERDISTEIQAGSTPC
NGVEGFNCYFPLQSYGFQPTNGVGYQPYRVVLSFELLHAPATVCGPKKSTNLVKNKCVNFNFNGLTGTGVLTESNKKFL
PFQFGRDIADTTDAVRDPQTLEILDITPCSFGGVSVITPGTNTSNQVAVLYQDVNCTEVPVAIHADQLTPTWRVYSTGS
NVFQTRAGCLIGAHEVNNSYECDIPIGAGICASYQTQTNSPRRARSVASQSIIAYTMSLGAENSVAYSNNISAIPTNFTI
SVTTEILPVSMTKTSVDCTMYICGDSTECNLLLQYGSFCTQLNRALTGIAVEQDKNTQEVFAQVKQIYKTPPIKDFGGF
NFSQILPDPSKPSKRSFIEDLLFNKVTADAGFIKQYGDCLGDIARDLCAQKFNGLTVLPPLTDEMIAQYTSALLAG
TITSGWTFGAGAALQIPFAMQMAYRFNGIGVTQNVLYENQKLIANQFNSAIGKIQDSLSTASALGKLQDVVNQNAQALN
TLVKQLSSNFGAISSVLNDILSRDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASANLAATKMSECVLGQSKRV
DFCGKGYHLMSFPQSAPHGVVFLHVTYVPAQEKNFTTAPAICHGDKAHFPREGVFSNGTHWVFTQRNFYEPQIITDNT
FVSGNCDVVIGIVNNTVYDPLQPELDSFKEELDKYFNHTSPDVLGDISGINASVVNIQKEIDRLNEVAKNLNESLIDL
QELGKYEYQIKWPWYIWLGFIAGLIAIVMTIMLCMTSCCSCLKGCCSCGSCCKFDEDDSEPVLLKGVKLHYT*

25/75
Figure 21

Fig 21A: >pFlap-ieCMV-S2P-WPREm (10079pb) – SEQ ID No. 6

CGCGTTGGGAGCTTTTTGCAAAAGCCTAGGCCTCCAAAAAGCCTCCTCACTACTTCTGGAATAGCTCAGAGGCAGAGGC
GGCCTCGGCTCTGCATAAATAAAAAAATAGTCAGCCATGGGGCGGAGAATGGGCGGAAGTGGGCGGAGTTAGGGGCG
GGATGGGCGGAGTTAGGGGCGGGACTATGGTTGCTGACTAATTGAGATGCCCCGACATTGATTATTGACTAGTTGGAAGGG
CTAATTCACCTCCCAACGAAGACAAGATATCCTTGATCTGTGGATCTACCCACACAAGGCTACTTCCCTGATTAGCAGAA
CTACACACAGGGCCAGGGATCAGATATCCACTGACCTTTGGATGGTGCTACAAGCTAGTACCAGTTGAGCCAGAGAAGT
TAGAAGAAGCCAACAAGGAGAGAACCACAGCTTGTACAACCTGTGAGCCTGCATGGGATGGATGACCCGGAGAGAGAA
GTGTTAGAGTGGAGGTTTGACAGCCGCTAGCATTTTCATCACGGTGGCCCGAGAGCTGCATCCGGAGTACTTCAAGAACT
GCTGATATCGAGCTTGCTACAAGGGACTTTCCGCTGGGGGACTTTCCAGGGAGGCGTGGCCTGGGCGGAGTGGGGAGTG
GCGAGCCCTCAGATCCTGCATATAAGCAGCTGCTTTTTGCTGTACTGGGTCTCTCTGGTTAGACCAGATCTGAGCCTGG
GAGCTCTCTGGCTAACTAGGGAACCCACTGCTTAAGCCTCAATAAAGCTTGCCTTGAGTGCTTCAAGTAGTGTGTGCCCCG
TCTGTTGTGTGACTCTGGTAACTAGAGATCCCTCAGACCTTTTAGTCAGTGTGGAAAATCTCTAGCAGTGGCGCCCGAA
CAGGGACTTGAAAGCGAAAGGGAAACCAAGAGGAGCTCTCTGACGCGAGGACTCGGCTTGTGAAGCGCGACGGCAAGAG
GCGAGGGGCGGCGACTGGTGAGTACGCCAAAAATTTTACTAGCGGAGGCTAGAAGGAGAGAGATGGGTGCGAGAGCGTCT
AGTATTAAGCGGGGAGAATTAGATCGCGATGGGAAAAATTCGGTTAAGGCCAGGGGGAAGAAAAAATAAATTAATA
ACATATAGTATGGGCAAGCAGGGAGCTAGAACGATTGCGAGTTAATCCTGGCCTGTAGAAACATCAGAAGGCTGTAGAC
AAATACTGGGACAGCTACAACCATCCCTTCAGACAGGATCAGAAGAACTTAGATCATTATATAATACAGTAGCAACCTC
TATTGTGTGCATCAAAGGATAGAGATAAAGACACCAAGGAAGCTTTAGACAAAGATAGAGGAAGAGCAAAACAAAAGTAA
GACCACCGCACAGCAAGCGGCCGCTGATCTTCAGACCTGGAGGAGGAGATATGAGGGACAATTGGAGAAGTGAATTATAT
AAATATAAAGTAGTAAAAATTGAACCTTAGGAGTAGCACCCACCAAGGCAAGAGAGAGTGGTGCAGAGAGAAAAAG
AGCAGTGGGGAATAGGAGCTTTGTTCTTGGGTTCTTGGGAGCAGCAGGAAGCACTATGGGCGCAGCGTCAATGACGCTGA
CGGTACAGGCCAGACAATTATTGTCTGGTATAGTGCAGCAGCAGAACAAATTTGCTGAGGGCTATTGAGGCGCAACAGCAT
CTGTTGCAACTCAGAGTCTGGGGCATCAAGCAGCTCCAGGCAAGAATCCTGGCTGTGAAAGATACCTAAAGGATCAACA
GCTCTGGGGATTTGGGGTTGCTCTGGAATACTCATTGCAACCACTGCTGTGCCTTGGAATGCTAGTTGGAGTAATAAT
CTCTGGAACAGATTTGGAATCACACGACCTGGATGGAGTGGGACAGAGAAATTAACAATTACACAAGCTTAATACACTCC
TTAATTGAAGAATCGAAAACAGCAAGAAAAAGAAATGAACAAGAATTATTGGAATTAGATAAATGGGCAAGTTTGTGGAA
TTGGTTTAACATAACAAATTGGCTGTGGTATATAAAATATTATCAATGATAGTAGGAGGCTTGGTAGGTTAAGAATAG
TTTTGTGTACTTTCTATAGTGAATAGAGTTAGGCAGGGATATTACCATTATCGTTTCAGACCCACCTCCCAACCCCG
AGGGGACCCGACAGGCCGAAGGAATAGAAGAAGAAGGTGGAGAGAGAGACAGAGACAGATCCATTCGATTAGTGAACGG
ATCTCGACGGTATCGCCGAATTCACAAATGGCAGTATTATCCACAATTTTAAAGAAAAGGGGGGATTGGGGGTACAG
TGCAGGGGAAAGAATAGTAGACATAATAGCAACAGACATACAACTAAAGAATTACAAAAACAAATTAACAAAAATTCAAA
ATTTTCGGGTTTATTACAGGGACAGCAGAGATCCACTTTGGCTGATACGCGTGGAGTTCCGCGTTACATAACTTACGGTA
AATGGCCCGCTGGCTGACCGCCCAACGACCCCGCCCAATTGACGTCAATAATGACGTATGTTCCCATAGTAAACGCCAAT
AGGGACTTTCCATTGACGTCAATGGGTGGAGTATTTACGGTAAACTGCCCACTTGGCAGTACATCAAGTGTATCATATGC
CAAGTACGCCCCCTATTGACGTCAATGACGGTAAATGGCCGCGCTGGCATTATGCCAGTACATGACCTTATGGGACTTT
CCTACTTGGCAGTACATCTACGTATTAGTCATGCTATTACCATGGTGATGCGGTTTTGGCAGTACATCAATGGGCGTGG
ATAGCGGTTTGACTACGGGGATTTCCAAGTCTCCACCCATTGACGTCAATGGGAGTTTGTGTTGGCACAAAATCAAC
GGGACTTTCCAAATGTCGTAACAACTCCGCCCCATTGACGCAATGGGCGGTAGGCGGTACGGTGGGAGGTCTATATA
AGCAGAGCTCGTTTAGTGAACCGTCAGATCGCTGGAGACGCCATCCACGCTGTTTGGACCTCCATAGAAGACACCGCGA
TCGGATCTCGTACGGGACCATGTTCTGTGTTTCTGGTGCTGCTGCCACTGGTGCCAGTCAAGTGCCTGAACCTGACCACA
CGAACACAGCTGCCACAGCCTACACCAATAGCTTCACCCGCGGAGTGTACTACCCGACAAGGTGTTCCGACGACGCT
GCTGCATAGCACCCAGGATCTGTTTCTGCCCTTCTCAGCAACGTGACCTGGTCCACGCCATCCACGTGTCCGGACCA
ATGGCACCAAGCGCTTCGATAATCCCGTGTGCTGCTTCAACGATGGCGGTGACTTTGCCAGCACCGAGAAGTCCAATATC
ATCCGCGGCTGGATCTTCGGCACCACTGGATAGCAAGACCCAGAGCCTGCTGATCGTGAACAACGCCACCAACGTGGT
CATCAAAGTGTGCGAGTTCCAGTTCTGCAACGACCCCTTCTGGGCGTCTACTACCACAAGAACACAAGAGCTGGATGG
AAAGCGAGTTCCGCGGTATACAGCAGCGCCAACTGACCTTCGAGTACGTGTCAGGCTCCAGGCTTCTGATGGACCTGGAA
GGCAAGCAGGGCAACTTCAAGAACCTGCGCGAGTTCTGTGTTCAAGAACATCGACGGCTACTTCAAAATCTACAGCAAGCA
CACCCCAATCAACCTCGTGCAGATCTGCCACAGGGATTAGTGCTCTGGAACCCCTGGTGGATCTGCCATCGGCATCA
ACATTACCCGCTTTCAGACACTGCTGGCCCTGCACCGCAGTTACTTGACACCGAGCGATAGCAGCAGTGGATGGACAGCT
GGTGGCCGCGCTTACTACGTTGGATATCTGCAGCCACGCACCTTCTGCTGAAGTACAACGAGAACGGCACCATCACCGA
CGCGTGGATTGTGCTCTCGATCCCCTGAGCGAGACAAAGTGCACCTGAAGTCTTACCCTCGAGAAGGGCATCTACC
AGACCAAGTTCGCGGTGACGCCACCGAGAGCATCGTGGCTTCCCAATATACCAATCTGTGCCCTTCGCGGAG
GTGTTCAATGCCACACGCTTTGCTCCGTGTACGCTGGAATCGCAAGCGCATTAGCAACTGCGTGGCCGACTACTCCGT
GCTGTACAATAGCGCCAGCTTCAGCACCTTCAAGTGCTACGGCGTGTACCCACCAAGCTGAACGACCTGTGCTTACCA
ATGTGTACGCCGACAGCTTCGTGATCCGCGGAGATGAAGTGCACAGATTGCCCGAGGCCAGACCGCAAGATCGCCGAC

26/75
Figure 21

TACAATTACAAGCTGCCCCGACGACTTCACCGGCTGCGTGATCGCCTGGAACAGCAACAACCTGGATTCCAAAGTCGGCGG
CAACTACAACCTACCTGTACCGCCTGTCCGCAAGAGCAATCTGAAGCCCTTCGAGCGCGACATCAGCACCGAAATCTACC
AGGCCGGAAGCACCCCATGCAACGGCGTGGAAGGCTTCAACTGCTACTTCCCACTGCAGTCTACGGATTTCAGCCACA
AATGGCGTGGGCTACCAGCCATATCGAGTGGTGGTGTGAGCTTCAACTGCTGCATGCTCCAGTACCGTGTGCGGCC
CAAGAAGAGTACCAACCTGGTCAAGAACAATGCGTGAACCTTCAACTTCAACGGCCTGACCGGAACCGCGTGCTGACCC
AGAGTAACAAGAAGTTCTGCCATTCCAGCAGTTTGGCCGCGACATTGCCGATACAACCGATGCCGTTCCGATCCCCAG
ACCTTGGAGATCCTGGATATTACCCCATGCTCCTTCGGCGGCGTGCCGTGATTACACCAAGGCACCAATACCAGCAACA
GGTGGCGCTTCTGTACCAGGATGTGAATTGCACAGAGGTGCCCGTGGCCATTACGCCGATCAATTGACACCAACATGGC
GCGTGTACTTCCACCGGCAGCAATGTGTTTCAAACCCGCGCTGGATGCTGATTGGAGCCGAGCACGTGAACAATAGCTAC
GAGTGCATATCCCCATCGGAGCCGGAATCTGCGCCTCTATCAGACCCAGACCAATAGTCCACGACGAGCCCCGAAGTGT
GGCCAGCCAGAGCATATTGCTATACCATGAGCCTGGGCGCGGAGAATAGCGTGGCTACTCCAAACAAGCATTGCTA
TCCCCACCACTTACCATCAGCGTGACCACCGAGATCCTGCCAGTGTCCATGACCAAGACCAAGCGTGGACTGCACCATG
TACATCTGCGGAGATAGCACCGAGTGCAGCAACCTGCTGCTGCAGTACGGAAGTTTCTGCACCCAGCTGAATCGCGCCCT
GACAGGCATTGCCGTGGAACAGGATAAGAACAACCAAGAGGTGTTGCGCCAAGTGAAGCAAATCTACAAGACCCCAACA
TCAAGGATTTCCGCGGCTTCAATTTAGCCAGATTCTGCCCGATCCAAGCAAGCCAGCAAGCGCAGCTTCATCGAGGAC
CTGCTGTTCAACAAAGTGACACTGGCCGACGCGGATTCTCAAGCAGTATGGCGATTGCTGGGCGATATTGCCGACG
CGATCTGATTGCGCCAGAAGTTTAAACGGACTGACCGTCTGCCACCACTGCTGACAGATGAGATGATCGCCAGTACA
CAAGTGCCCTGCTGGCCGGAACCATACCAGCGGATGGACATTTGGAGCCGGTGGCGCTCTGCAGATTCCTTCGCTATG
CAGATGGCCTACCGCTTCAATGGCATTGGCGTGACCCAGAATGTGCTGTACGAGAACCAGAAGCTGATCGCAACCGATT
CAACAGCGCCATCGGCAAGATTGAGGACAGCCTGAGTAGTACCGCCAGCGCTCTGGGAAAGCTGCAGGATGTGGTCAAC
AGAACGCTCAGGCCCTGAACACCTGGTTAAGCAGCTGAGCAGCAACTTCGGCGCCATCAGTAGCGTGTGAACGATATC
CTGAGCCGCTGGATCCACCAGAAGCCGAGGTGCAGATCGATGCTGCTGATTACCGGACGCTGCAGTCCCTGCAGACCTA
TGTGACACAGCAGTGTATCCGAGCCGCGGAGATTGAGCTAGTGCTAATCTGGCCGCCACCAAGATGAGCGAATGTGTG
TGGGACAGAGCAAGCGCGTGGACTTTTGGCGCAAGGGATACCACTGATGAGCTTCCACAGAGTGTCCACACGGCGTG
GTGTTTCTGCATGTGACCTACGTGCCGCTCAAGAGAAGAATTTACCAACCGCTCCAGCCATCTGCCACGACGGAAGGC
CCATTTTCCACGCGAGGGCGTGTCTTGTAGCAACGGCACTATTGGTTGCTACCCAGCGCAACTTCTACGAGCCACAG
TCATCACCAACGACAACACCTTCGTGACGCGCAACTGCGACGTCGTGATCGGCATTGTGAACAACACCGTGTACGATCCA
CTGCAGCCGAGCTGGACAGCTTCAAAGAGGAACTGGACAAGTACTTTAAGAACCACACAAGCCCCGACGTGGACCTGGG
AGACATTAGCGGAATCAACGCCAGCGTGGTCAACATCCAGAAAGAGATTGACCGCTGAACGAGGTGGCCAAGAAATCTGA
ACGAGAGCCTGATCGACCTGCAAGAAGTGGGCAAAATACGAGCAGTACATTAAGTGGCCCTGGTACATCTGGCTGGGCTTC
ATTGCCGACTGATTGCCATCGTGTGTTGCTGCTGCTGCTGATGACCAAGTGTGCTGAGCTGCTGAAGGGATG
CTGCAGTTGCGGAAGCTGCTGCAAGTTGACGAGGATGATAGCGAGCCAGTGTGTAAGGGCGTCAAGCTGCACTACACCT
GATAACGAGCGCGCTCGAGAATCCCGGATAATCAACCTCTGGATTACAAAATTTGTGAAGATTGACTGGTATTCTTAA
CTATGTTGCTCCTTTTACGCTATGTGGATACGCTGCTTAAATGCCTTTGTATCATGCTATTGCTTCCGATGGCTTTCA
TTTTCTCCTCTGTATAAATCCTGGTGTGCTCTTTATGAGGAGTTGTGGCCGTTGTGAGGCAACGTTGGCGTGGTG
TGCACTGTGTTTGTGACGCAACCCCACTGGTTGGGGCATTGCCACCACCTGTCAGCTCCTTTCCGGGACTTTGCTTT
CCCCCTCCTATTGCCACGGCGGAATCATCGCCGCTGCTTGGCCGCTGCTGGACAGGGGCTCGGCTGTTGGGCACTG
ACAATTCGCTGGTGTGTCGGGGAAGCTGACGTCCTTTCGCGGCTGCTGCTGCTGTTGCCACCTGGATTCTGCGCGG
ACGTCCTTCTGCTACGTCCTTTCGGCCCTCAATCCAGCGGACCTTCTTCCGCGGCTGCTGCGGCTCTGCGGCTCT
TCCGCGTCTTGCCTTCGCCCTCAGACGAGTCGGATCTCCTTTGGGCGCCTCCCGCATCGGGGTACCTTTAAGACC
AATGACTTACAAGGCAGCTGTAGATCTTAGCCACTTTTTAAAGAAAAGGGGGACTGGAAGGGCTAATCACTCCCAAC
GAAGACAAGATCGTCGAGAGATGCTGCATATAAGCAGCTGCTTTTGTCTGTACTGGGTCTCTGTTAGACAGATCT
GAGCCTGGGAGCTCTGCTGCTAAGGGAACCACTGCTTAAAGCCTCAATAAAGCTTGCCTTGAAGTCTCAAGTAGTG
TGTGCCGCTGCTGTTGTGCTGCTGTAAGTACGATCCCTCAGACCTTTTGTGCTGCTGGAAGTCTCTAGCAGTTC
TAGAGGGCCGCTTTAAACCCGCTGATCAGCCTCGACTGTGCTTCTAGTTGCCAGCCATCTGTTGTTTCCCGCTCCCGG
TGCCTTCTTGACCTGGAAGGTGCCACTCCACTGTCTTCTCAATAAAATGAGGAAATTGCATCGCATTGTCTGAGT
AGGTGTCTATTCTATTGCGGGGTGGGGTGGGGCAGGACAGCAAGGGGGAGGATTGGGAAGACAATAGCAGGCATGCTGG
GGATGCGGTGGGCTCTATGGCTTACTGGGCGGTTTTATGGACAGCAAGCGAACCAGAAATTGCCAGCTGGGGCGCCCTC
TGGTAAGGTTGGGAAGCCCTGCAAAGTAACTGGATGGCTTCTCGCCGCCAAGGATCTGATGGCGCAGGGGATCAAGCT
CTGATCAAGAGACAGGATGAGGATCGTTTTCGATGATTGAACAAGATGGATTGCACGCAGGTTCTCCGGCCGCTTGGGTG
GAGAGGCTATTCGGCTATGACTGGGCACAACAGACAATCGGCTGCTGATGCGCGCGTGTTCGGCTGTCAAGCGCAGGG
GCGCCCGGTTCTTTTGTCAAGACCGACCTGTCCGGTCCCTGAATGAAGTCAAGACGAGGACGCGCGCTATCGTGGC
TGGCCACGACGGGCTTCTTGCAGCTGTGCTGACGTTGTCACTGAAGCGGGAAGGGACTGGCTGCTATTGGGCGAA
GTGCCGGGGCAGGATCTCTGTCATCTACCTTGTCTGCGGAGAAAGTATCCATCATGGCTGATGCAATTGCGGCGCT
GCATACGCTTGTATCGGGTACCTGCCCATTCGACCACCAAGCGAAACATCGCATCGAGCGAGCACGTAAGTGGATGGAAG

27/75
Figure 21

CCGGTCTTGTCGATCAGGATGATCTGGACGAAGAGCATCAGGGGCTCGCGCCAGCCGAACGTTCGCCAGGCTCAAGGCG
AGCATGCCGACGGCGAGGATCTCGTCGTGACCATGGCGATGCCTGCTTGCCGAATATCATGGTGAAAAATGGCCGCTT
TTCTGGATTATCGACTGTGGCCGGCTGGGTGTGGCGGACCGCTATCAGGACATAGCGTTGGCTACCCGTGATATTGCTG
AAGAGCTTGCGGCGAATGGGCTGACCGCTTCTCTGCTTTACGGTATCGCCGCTCCCGATTTCGACGCGCATCGCCTTC
TATCGCCTTCTTGACGAGTCTTCTGAATTATTAAACGCTTACAATTTCTGATGCGGTATTTTCTCCTTACGCATCTGTG
CGGTATTTACACCCGATACAGGTGGCACTTTTCGGGGAATGTGCGCGGAACCCCTATTTGTTTATTTTCTAAATACA
TTCAAATATGTATCCGCTCATGAGACAATAACCCGTGATAAATGCTTCAATAATAGCACGTGCTAAAACCTCATTTTTAAT
TTAAAAGGATCTAGGTGAAGATCCTTTTTGATAATCTCATGACCAAAATCCCTAACGTGAGTTTTCTTCACTGAGCG
TCAGACCCGATAGAAAAGATCAAAGGATCTTCTGAGATCCTTTTTCTGCGCGTAATCTGCTGCTTGCACAAAAA
ACCACCGCTACACGCGGTGGTTTGTTCGCCGATCAAGAGCTACCAACTCTTTTCCGAAGGTAACCTGGCTTACGACAG
CGCAGATACCAAATCTGCTTCTAGTGTAGCCGTAGTTAGGCCACCACTTCAAGAACTCTGTAGCACCCTACATAC
CTCGCTGCTGAATCCTGTTACAGTGGCTGCTGCCAGTGGCGATAAGTCGTGCTTACCGGGTTGGACTCAAGACGATA
GTTACCGGATAAGGCGCAGCGGTGCGGCTGAACGGGGGTTCTGTGCACACAGCCAGCTTGGAGCGAACCACTACACCG
AACTGAGATACCTACAGCGTGAGCTATGAGAAAGCGCCACGCTTCCGAAGGGAGAAAGGCGGACAGGTATCCGGTAAGC
GGCAGGGTGGAAACAGGAGAGCGCAGAGGGAGCTTCCAGGGGAAACGCCTGGTATCTTTATAGTCTGTGCGGTTTCG
CCACCTCTGACTTGAGCGTCGATTTTTGTGATGCTCGTCAGGGGGCGGAGCCTATGGAAAAACGCCAGCAACGCGCCT
TTTTACGGTCTCTGGGCTTTTGTGTCGCTTTTGTCTACATGTTCTTACTCTTCGCGATGTACGGGCCAGATATACGCG

Fig 21B: >S2P (3825pb) – SEQ ID No. 7

ATGTTCTGTTTTCTGGTGCTGCTGCCACTGGTGCTCAGTCAGTGCCTGAACCTGACCACACGAACACAGCTGCCACCAGC
CTACACCAATAGCTTACCCGCGGAGTGACTACCCGACAAGGTGTTCCGACGACGCTGCTGCATAGCACCAGGATC
TGTTTCTGCCCTTCTTACGCAACGTGACCTGGTTCCACGCCATCCACGTGTCCGCGACCAATGGCACCAAGCGCTTCGAT
AATCCCGTGTGCCCTTCAACGATGGCGTGACTTTGCCAGCACCGAGAAGTCCAATATCATCCGCGGTGGATCTTCGG
CACCACACTGGATAGCAAGACCCAGAGCCTGCTGATCGTGAACAACGCCACCAACGTGGTCAAAAGTGTGCGAGTTCC
AGTTCTGCAACGACCCCTTCTGGGCTGCTACTACCAACAAGAACAAGAGCTGGATGAAAAGCGAGTTCCGCGTGTAC
AGCAGCGCCAACTGCACTTCGAGTACGTGTCCAGCCATTCTGATGGACCTGGAAGGCAAGCAGGGCACTTCAA
GAACCTGCGCGAGTTCTGTTCAAGAACATCGACGGCTACTTCAAATCTACAGCAAGCACACCCCAATCAACCTCGTGC
GCGATCTGCCACAGGGATTCACTGCTCTGGAACCCCTGGTGGATCTGCCATCGGCATCAACATTACCCGCTTTCAGACA
CTGCTGGCCCTGCACCGCAGTTACTTGACACCAGCGATAGCAGCAGTGGATGGACAGCTGGTGCCGCGCTTACTACGT
TGGATATCTGCAGCCACGCACCTTCTGCTGAAGTACAACGAGAACGGCACCATCACCGACGCGGTGGATTGTGCTCTCG
ATCCCTGAGCGAGACAAAGTGCACCTGAAGTCTTACCCTGAGAAAGGCGATCTACAGACCAGCAATTTCCGCGTG
CAGCCACCGAGAGCATCGTGCGCTTCCCAATATCACCATCTGTGCCCCTTCGGCGAGGTGTTCAATGCCACACGCTT
TGCTCTCGGTACGCTGGAATCGAAGCGCATTAGCAACTGCGTGGCCGACTACTCCGTGCTGTACAATAGCGCCAGCT
TCAGCACCTTCAAGTGTACGGCGTGTACCCACCAAGCTGAACGACCTGTGCTTACCAATGTGTACGCCGACAGCTTC
GTGATCCGCGGAGATGAAGTGCAGAGATTGCCCGAGGCCAGACCGGCAAGATCGCCGACTACAATTACAAGTGCCTCGA
CGACTTACCCGGTGTGCTGATCGCTGGAACAGCAACAACCTGGATTCCAAAGTTCGGCGGCAACTACAACCTGTACC
GCCTGTTCCGCAAGAGCAATCTGAAGCCCTTCGAGCGCGACATCAGCACCAGAAATCTACAGGCCGGAAGCACCCCATGC
AACGCGTGGAAGGCTTCAACTGCTACTTCCCACTGCAGTCTTACGGATTTCAGCCCAAAATGGCGTGGGCTACCAAGCC
ATATCGAGTGGTGGTGTGCTGAGCTTCAACTGCTGATGCTCCAGCTACCGTGTGCGGCCCAAGAAGAGTACCAACCTGG
TCAAGAACAAATGCGTGAACCTTCAACTTCAACGGCCTGACCGGAACCGCGTGTGACCGAGAGTAACAAGAAGTTCCTG
CCATTCCAGCAGTTTGGCCGCGACATTGCCGATACAACCGATGCCGTTCCGCGATCCCGAGACCTTGAGATCCTGGATAT
TACCCCATGCTCCTTCGGCGCGGTGTCCGTGATTACACAGGCACCAATACAGCAACCAAGTGGCCGTTCTGTACCAGG
ATGTGAATTGCACAGAGGTGCCCGTGGCCATTACGCCGATCAATTGACACCAACATGGCGCGTGTACTCCACCGGCAGC
AATGTGTTTCAACCCGCGCTGGATGCTGATTGGAGCCGAGCACGTGAACAATAGCTACGAGTGCAGATATCCCATCGG
AGCCGGAATCTGCGCTCTATCAGACCCAGACCAATAGTCCACGACGAGCCGGAAGTGTGGCCAGCCAGAGCATATTG
CCTATACCATGAGCCTGGGCGCCGAGAATAGCGTGGCTACTTCAAACAACAGCATTGCTATCCCACTCACTTCAACATC
AGCGTGACCAACGAGATCCTGCCAGTGTCCATGACCAAGACCAGCGTGGACTGCACCATGTACATCTGCGGAGATAGCAC
CGAGTGCAGCAACCTGCTGCTGAGTACGGAAGTTCTGCACCCAGCTGAATCGCGCCCTGACAGGCATTGCCGTGGAAC
AGGATAAGAACACCAAGAGGTGTTCCGCCAAGTGAAGCAATCTACAAGACCCCAATCAAGGATTTCCGGCGGCTTC
AATTTAGCCAGATTCTGCCGATCCAAGCAAGCCAGCAAGCGCAGCTTATCGAGGACCTGCTGTTCAACAAAGTGAC
ACTGGCCGACGCGGATTATCAAGCAGTATGGCGATTGCTGGGCGATATTGCCGACGCGATCTGATTTGCGCCAGAG
AGTTTAACGGACTGACCGTCTGCCACCACTGCTGACAGATGAGATGATCGCCAGTACACAAGTGCCTGCTGGCCGGA
ACCATTACAGCGGATGGACATTTGGAGCCGGTGGCGCTGTCAGATTCCCTTCGCTATGAGATGGCCTACCGCTTCAA
TGGCATTGGCGTGACCCAGAATGTGCTGTACGAGAACCAGAAGCTGATCGCAACCAAGTTCAACAGCGCCATCGGCAAGA
TTCAGGACAGCCTGAGTAGTACCGCCAGCGCTCTGGGAAAGCTGCAGGATGTGGTCAACCAGAACGCTCAGGCCCTGAAC

28/75
Figure 21

ACCCTGGTTAAGCAGCTGAGCAGCAACTTCGGCGCCATCAGTAGCGTGCTGAACGATATCCTGAGCCGCTGGATCCACC
AGAAGCCGAGGTGCAGATCGATCGCTGATTACCGGACGCCTGCAGTCCCTGCAGACCTATGTGACACAGCAGCTGATCC
GAGCCGCCGAGATTGAGCTAGTGCTAATCTGGCCGCCACCAAGATGAGCGAATGTGTGCTGGGACAGAGCAAGCGCGTG
GACTTTTTCGGCAAGGGATACCACTGATGAGCTTCCACAGAGTGTCCACACGGCGTGGTGTTCGATGTGACCTA
CGTGCCCGCTCAAGAGAAGAATTCACCACCGCTCCAGCCATCTGCCACGACGGAAAGGCCATTTCCACGCGAGGGCG
TGTTCTGTAGCAACGGCACTCATTGGTTCGTACCCAGCGCAACTTCTACGAGCCCCAGATCATCACCACCGACAACACC
TTCGTGAGCGGCAACTGCGACGCTGATCGGCATTGTGAACAACACCGTGTACGATCCACTGCAGCCCGAGCTGGACAG
CTTCAAAGAGGAACTGGACAAGTACTTTAAGAACACACAAGCCCCGACGTGGACCTGGGAGACATTAGCGGAATCAACG
CCAGCGTGGTCAACATCCAGAAAAGAGATTGACCGCCTGAACGAGGTGGCCAAGAATCTGAACGAGAGCCTGATCGACCTG
CAAGAACTGGCAAATACGAGCAGTACATTAAGTGGCCCTGGTACATCTGGCTGGGCTTCATTGCCGACTGATTGCCAT
CGTGATGGTCAACATTATGCTGTGCTGCATGACCAAGTGTGCTGACGTGCCTGAAGGGATGCTGCAGTTGCGGAAGCTGCT
GCAAGTTCGACGAGGATGATAGCGAGCCAGTGCTGAAGGGCGTCAAGCTGCACTACACCTGATAA

Fig 21C : >S2P (1274aa) – SEQ ID No. 8

MFVFLVLLPLVSSQCVNLTRTQLPPAYTNSFTRGVYYPDKVFRSSVLHSTQDLFLPFFSNVTWFHAIHVSGTNGTKRFD
NPVLPFNDGVYFASTEKSNIRGWIFGTTLDSTQSLIVNNATNVVIVKCEFCNDPFLGVVYHKNNKSWMESEFRVY
SSANNCTFEYVSQPFLLMDLEGKQGNFKNLREFVFNIDGYFKIYSKHTPINLVRDLPQGFSALEPLVDLPIGINITRFQT
LLALHRSYLTGPDSSSGWTAGAAAYYVGYLQPRTFLLKYNENGTITDAVDCALDPLSETKCTLSFTVEKGIYQTSNFRV
QPTESIVRFPNITNLCPFGEVFNATRFASVYAWNRKRISNCVADYSVLYNSASFSTFKCYGVSPTKLNDLCFTNVYADSF
VIRGDEVRIAPGQTGKIADYNYKLDDFTGCVIAWNSNNLDSKVGNGYNYLYRLFRKSNLKPFERDISTEIQAGSTPC
NGVEGFNCYFPLQSYGFQPTNGVGYQPYRVVLSFELLHAPATVCGPKKSTNLVKNKCVNFNFNGLTGTGVLTESNKKFL
PFQQFGRDIADTTDAVRDPQTLEILDITPCSFGGVSVITPGTNTSNQVAVLYQDVNCTEVPVAIHADQLTPTWRVYSTGS
NVFQTRAGCLIGAHEVNNSYECDIPIGAGICASYQTQTNSPRRARSVASQSIAYTMSLGAENSVAYSNNISAIPTNFTI
SVTTEILPVSMTKTSVDCTMYICGDSTECNLLLQYGSFCTQLNRALTGIAVEQDKNTQEVFAQVKQIYKTPPIKDFGGF
NFSQILPDPSPKRSFIEDLLFNKVTADAGFIKQYGDCLGDIAARDLCAQKFNGLTVLPPLLTDEMIAQYTSALLAG
TITSGWTFGAGAAALQIPFAMQMAYRFNGIGVTQNVLYENQKLIANQFNSAIGKIQDSLSSTASALGKLQDVVNQNAQALN
TLVKQLSSNFGAISSVLNDILSRDPPPEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASANLAATKMSECVLGQSKRV
DFCGKGYHLMSPQSAFHGVFLHVTYVPAQEKNFTTAPAICHGDKAHFPREGVFVSNNGTHWFTVQRNFYEPQIITDNT
FVSGNCDVVIGIVNNTVYDPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQKEIDRLNEVAKNLNESLIDL
QELGKYEYIKWPWYIWLGFIAGLIAIVMVTIMLCMTSCCSCLKGCSCGSCCKFDEDDSEPVLKGVKLHYT*

29/75
Figure 22

Fig 22A: >pFlap-ieCMV-S2P3F-WPREm (10079pb) – SEQ ID No. 9

CGCGTTGGGAGCTTTTTCAAAAAGCCTAGGCCTCCAAAAAGCCTCCTCACTACTTCTGGAATAGCTCAGAGGCAGAGGC
GGCCTCGGCTCTGCATAATAAAAAAATTAGTCAGCCATGGGGCGGAGAATGGGCGGAAGTGGGCGGAGTTAGGGGCG
GGATGGGCGGAGTTAGGGGCGGACTATGGTTGCTGACTAATTGAGATGCCGACATTGATTATTGACTAGTTGGAAGGG
CTAATTCACTCCCAACGAAGACAAGATATCCTTGATCTGTGGATCTACCACACACAAGGCTACTTCCCTGATTAGCAGAA
CTACACACCAGGGCCAGGGATCAGATATCCACTGACCTTTGGATGGTGCTACAAGCTAGTACCAGTTGAGCCAGAGAAGT
TAGAAGAAGCCAACAAAGGAGAGAACCACAGCTTGTACAACCTGTGAGCCTGCATGGGATGGATGACCCGGAGAGAGAA
GTGTTAGAGTGGAGGTTTGACAGCCGCTAGCATTTTCATCACGGTGGCCCGAGAGCTGCATCCGGAGTACTTCAAGAACT
GCTGATATCGAGCTTGCTACAAGGGACTTTCCGCTGGGGGACTTTCCAGGGAGGCGTGGCCTGGGCGGGAGTGGGGAGTG
GCGAGCCCTCAGATCCTGCATATAAGCAGCTGCTTTTGCTGTACTGGGTCTCTCTGGTTAGACCAGATCTGAGCCTGG
GAGCTCTCTGGCTAACTAGGGAACCCACTGCTTAAGCCTCAATAAGGCTTGCTTGAAGTGTCAAGTAGTGTGTGCCCCG
TCTGTTGTGTGACTCTGGTAAGTAGATCCCTCAGACCCTTTTGTAGTCAGTGTGGAAAATCTCTAGCAGTGGCGCCCGAA
CAGGGACTTGAAAGCGAAAGGGAAACCAAGGAGCTCTCTCGACGCAGGACTCGGCTTGCTGAAGCGGCACGGCAAGAG
GCGAGGGGCGGCGACTGGTGAGTACGCCAAAAATTTGACTAGCGGAGGCTAGAAGGAGAGAGATGGGTGCGGAGAGCGTC
AGTATTAAGCGGGGAGAAATTAGATCGCGATGGGAAAAAATTCGGTTAAGGCCAGGGGAAAGAAAAAATATAAATTAA
ACATATAGTATGGCAAGCAGGGAGCTAGAACGATTGCGAGTTAATCCTGGCCTGTAGAAACATCAGAAGGCTGTAGAC
AAATACTGGGACAGCTACAACCATCCCTTCAGACAGGATCAGAAGAACTTAGATCATTATATAATACAGTAGCAACCCCTC
TATTGTGTGCATCAAAGGATAGAGATAAAAGACACCAAGGAAGCTTTAGACAAGATAGAGGAAGAGCAAAACAAAAGTAA
GACCACCGCACAGCAAGCGGCGCTGATCTTCAGACCTGGAGGAGGAGATATGAGGGACAATTGGAGAAGTGAATTATAT
AAATATAAAGTAGTAAAAAATTGAACCATTAGGAGTAGCACCCCAAGGCAAGGAGAGAGAGTGGTGCGAGAGAAAAAAG
AGCAGTGGGAATAGGAGCTTTGTTCTTGGGTTCTTGGGAGCAGCAGGAAGCACTATGGGCGCAGCGTCAATGACGCTGA
CGGTACAGGCCAGACAATTATTGTCTGGTATAGTGCAGCAGCAGAACAAATTTGCTGAGGGCTATTGAGGCGCAACAGCAT
CTGTTGCAACTCAGAGCTGGGGCATCAAGCAGCTCCAGGCAAGAATCCTGGCTGTGGAAGATACCTAAAGGATCAACA
GCTCCTGGGGATTGGGGTTGCTCTGGAAGCACTTTGCAACCACTGCTGTGCCTTGAATGCTAGTTGGAGTAATAAAT
CTCTGGAACAGATTTGGAATCACACGACCTGGATGGAGTGGGACAGAGAAATTAACAATTACACAAGCTTAATACACTCC
TTAATTGAAGAATCGCAAAACAGCAAGAAAAAGAAATGAACAAGAAATTATTGGAATTAGATAAATGGGCAAGTTTGTGGAA
TTGGTTTAACATAACAAATTGGCTGTGGTATATAAAATTTATCATAATGATAGTAGGAGGCTTGGTAGGTTTAAGAATAG
TTTTGCTGTACTTTCTATAGTGAATAGAGTTAGGCAGGGATATTCACCATTATCGTTTCAGACCCACCTCCCAACCCCG
AGGGGACCCGACAGGCCGAAGGAATAGAAGAAGAAGGTGGAGAGAGAGACAGAGACAGATCCATTCGATTAGTGAACGG
ATCTCGACGGTATCGCCGAATTCACAAATGGCAGTATTCATCCACAATTTTAAAGAAAAAGGGGGGATTGGGGGTACAG
TGCAGGGGAAAGAATAGTAGACATAATAGCAACAGACATACAACTAAAGAATTACAAAAACAAATACAAAAATTCAAA
ATTTTCGGGTTTATTACAGGGACAGCAGAGATCCACTTTGGCTGATACGCGTGGAGTTCCGCTTACATAACTTACGGTA
AATGGCCCGCTGGCTGACCGCCCAACGACCCCGCCCTTTGACGTCAATAATGACGTATGTTCCCATAGTAACGCAAT
AGGGACTTTCCATTGACGTCAATGGGTGGAGTATTTACGGTAACTGCCCACTTGGCAGTACATCAAGTGTATCATATGC
CAAGTACGCCCCCTATTGACGTCAATGACGGTAAATGGCCGCTGGCATTATGCCAGTACATGACCTTATGGGACTTT
CCTACTTGGCAGTACATCTACGTATTAGTCATCGCTATTACCATGGTGATGCGGTTTTGGCAGTACATCAATGGGCGTGG
ATAGCGGTTTGACTACGGGGATTTCGAAGTCTCCACCCATTGACGTCAATGGGAGTTTGTGGCCACCAAAATCAAC
GGGACTTTCCAAATGTCGTAACTCCGCCCCATTGACGCAATGGGCGGTAGGCGGTACGGTGGGAGGTCTATATA
AGCAGAGCTGTTTTAGTGAACCGTCAGATCGCTGGAGACGCCATCCACGCTGTTTTGACCTCCATAGAAGACACCGCA
TCGGATCTCGTACGGCCACCATGTTCTGTTTCTGGTGTGCTGCCACTGGTGTCCAGTCAGTGCCTGAACCTGACCACA
CGAACACAGCTGCCACAGCCTACACCAATAGCTTCACCCGCGGAGTGTACTACCCGACAAGGTGTTCCGACGAGCGT
GCTGCATAGCACCCAGGATCTGTTTCTGCCCTTCTCAGCAACGTGACCTGGTTCCACGCCATCCACGTGTCCGGCACC
ATGGCACCAAGCGCTTCGATAATCCCGTGTGCCCTTCAACGATGGCGTGTACTTTGCCAGCACCGAGAAGTCCAATATC
ATCCGCGGCTGGATCTTCGGCACCACACTGGATAGCAAGACCCAGAGCCTGCTGATCGTGAACAACGCCACCAACGTGGT
CATCAAAGTGTGCGAGTTCCAGTTCTGCAACGACCCCTTCTGGGCGTCTACTACCAACAAGAACAACAAGAGCTGGATGG
AAAGCGAGTTCCGCGTGTACAGCAGCGCCAACAACTGCACCTTCGAGTACGTGTCCAGCCATTCCTGATGGACCTGGAA
GGCAAGCAGGGCAACTTCAAGAACCTGCGCGAGTTCTGTTCAAGAACATCGACGGCTACTTCAAAATCTACAGCAAGCA
CACCCCAATCAACCTCGTGCGCGATCTGCCACAGGGATTAGTGTCTGGAACCCCTGGTGGATCTGCCCATCGGCATCA
ACATTACCCGCTTTCAGACACTGCTGGCCCTGCACCGCAGTTACTTGACACACAGGCGATAGCAGCAGTGGATGGACAGCT
GGTGCCGCGCTTACTACGTTGGATATCTGCAGCCACGCACCTTTCTGCTGAAGTACAACGAGAACGGCACCATCACCGA
CGCCGTGGATTGTCTCTGCATCCCTGAGCGAGACAAAGTGCACCTGAAGTCTTACCCTCGAGAAGGGCATCTACCC
AGACCAAGCAATTTCCGCGTGCAGCCCAAGAGCATCGTGCCTTCCCAATATACCAATCTGTGCCCTTCCGCGAG
GTGTTCAATGCCACACGCTTTGCCTCGTGTACGCTGGAATCGCAAGCGCATTAGCAACTGCGTGGCCGACTACTCCGT
GCTGTACAATAGCGCCAGCTTCAGCACCTTCAAGTGTACGGCGTGTACCCACCAAGCTGAACGACCTGTGCTTACCA
ATGTGTACGCCGACAGCTTCGTGATCCGCGGAGATGAAGTGCACAGATTGCCACAGGCCAGCCGCAAGATCGCCGAC

30/75
Figure 22

TACAATTACAAGTGTCCCGACGACTTCACCGGCTGCGTGATCGCCTGGAACAGCAACAACCTGGATTCCAAAGTCGGCGG
CAACTACAACCTGTACCGCTGTCCGCAAGAGCAATCTGAAGCCCTTCGAGCGCGACATCAGCACCGAAATCTACC
AGGCCGGAAGCACCCCATGCAACGGCGTGGAAAGGCTTCAACTGCTACTTCCACTGCAGTCCTACGGATTTAGCCACACA
AATGGCGTGGGCTACAGCCATATCGAGTGGTGGTGTGAGCTTCGAACTGCTGCATGCTCCAGCTACCGTGTGCGGCC
CAAGAAGAGTACCAACCTGGTCAAGAACAAATGCGTGAACCTCAACTTCAACGGCCTGACCGGAACCGGCGTGTGACCC
AGAGTAACAAGAAGTTCTGCCATTCCAGCAGTTTGGCCGCGCAGATTGCCGATACAACCGATGCCGTTCCGCGATCCCCAG
ACCTTGGAGATCTGGATATTACCCATGCTCCTTCGGCGGCGTGTCCGTGATTACACAGGCACCAATACCAGCAACCA
GGTGGCCGTTCTGTACCAAGGATGTGAATTGCACAGAGGTGCCCGTGGCCATTACGCCGATCAATTGACACCAACATGGC
GCGTGTACTCCACCGGCAGCAATGTGTTCAAACCCGCGCTGGATGCCTGATTGGAGCCGAGCAGTGAACAATAGCTAC
GAGTGCATATCCCCATCGGAGCCGGAATCTGCGCCTCTATCAGACCCAGACCAATAGTCCAGGATCCGCCGGAAGTGT
GGCCAGCCAGAGCATATTGCCTATACCATGAGCCTGGGCGCCGAGAATAGCGTGGCCTACTCCAACAACAGCATTGTGTA
TCCCCACCAACTTACCATCAGCGTGACCACCGAGATCTGCCAGTGTCCATGACCAAGACCAGCGTGGACTGCACCATG
TACATCTGCGGAGATAGCACCGAGTGCAGCAACCTGCTGCTGCAGTACGGAAGTTTCTGCACCCAGCTGAATCGCGCCCT
GACAGGCATTGGCCGTGGAACAGGATAAGAACACCCCAAGAGGTGTTCCGCCAAGTGAAGCAAATCTACAAGACCCCAACAA
TCAAGGATTTCCGCGGCTTCAATTTAGCCAGATTCTGCCGATCCAAGCAAGCCAGCAAGCGCAGCTTATCAGAGGAC
CTGCTGTTCAACAAAGTGACACTGGCCGACGCGGATTATCAAGCAGTATGGCGATTGCCTGGGCGATATTGCCGACG
CGATCTGATTGCGCCAGAAAGTTTAAACGGACTGACCGTCTGCCACCACTGCTGACAGATGAGATGATCGCCAGTACA
CAAGTGCCCTGCTGGCCGGAACCATACCAGCGGATGGACATTTGGAGCCGCTGCCGCTCTGCAGATTCCTTCGCTATG
CAGATGGCCTACCGCTTCAATGGCATTGGCGTGACCCAGAATGTGCTGTACGAGAACCAGAAGCTGATCGCCAAACCACTT
CAACAGCGCCATCGGCAAGATTCAAGACAGCCTGAGTAGTACCGCCAGCGCTCTGGGAAAGCTGCAGGATGTGGTCAACC
AGAACGCTCAGGCCCTGAACCCCTGGTTAAGCAGCTGAGCAGCAACTTCCGCGCCATCAGTAGCGTGCTGAACGATATC
CTGAGCCGCTGGATCCACCAGAAGCCGAGGTGCAGATCGATCGCCTGATTACCGGACGCTGCAGTCCCTGCAGACCTA
TGTGACACAGCAGCTGATCCGAGCCGCGAGATTCGAGCTAGTGCTAATCTGGCCGCCACCAAGATGAGCGAATGTGTGC
TGGGACAGAGCAAGCGCGTGGACTTTTGGGCAAGGGATACCACCTGATGAGCTTCCACAGAGTGCTCCACACGGCGTG
GTGTTTCTGCATGTGACCTACGTGCCGCTCAAGAGAAGAAATTTACCACCGCTCCAGCCATCTGCCACGACGGAAGGC
CCATTTTCCACGCGAGGGCGTGTCTGTAGCAACGGCACTATTGGTTCTGTCACCCAGCGCAACTTCTACGAGCCCAAC
TCATCACCAACCGACAACACCTTCGTCAGCGGCAACTGCGACGTGATCGGCATTGTGAACAACACCGTGACGATCCA
CTGACGCCGAGCTGGACAGCTTCAAAGAGGAAGTGGACAAGTACTTTAAGAACCACACAAGCCCCGACGTGGACCTGGG
AGACATTAGCGGAATCAACGCCAGCGTGGTCAACATCCAGAAAGAGATTGACCGCTGAACGAGGTGGCCAAGAACTGTA
ACGAGAGCCTGATGACCTGCAAGAACTGGGCAATACGAGCAGTACATTAAAGTGGCCCTGGTACATCTGGCTGGGCTTC
ATTGCCGAGCTGATTGCCATCGTGATGGTCAACATTATGCTGTGCTGCATGACCAAGTTGCTGCAGCTGCCTGAAGGGATG
CTGCAGTTGCGGAAGCTGCTGCAAGTTGACGAGGATGATAGCGAGCCAGTGTGTAAGGGCGTCAAGCTGCACTACACCT
GATAACGAGCGCGCCTCGAGAATCCCGATAATCAACCTCTGGATTACAAAATTTGTGAAGATTGACTGGTATTCTTAA
CTATGTTGCTCCTTTTACGCTATGTGGATACGCTGCTTAAATGCCTTTGTATCATGCTATTGCTTCCCGTATGGCTTTCA
TTTTCTCTCCTTTGATAAATCCTGGTTGCTGTCTTTATGAGGAGTTGTGGCCGTTGTCAGGCAACGTGGCGTGGTG
TGCATGTGTTTGTGACGCAACCCCACTGTTGGGGCATTGCCACCACTGTACGCTCCTTTCCGGGACTTTCGCTTT
CCCCCTCCTATTGCCACGGCGGAACATATCGCCGCTGCTTGGCCGCTGCTGGACAGGGGCTCGGCTGTTGGGCACTG
ACAATTCGCTGGTGTGTCGGGGAAGCTGACGTCCTTTCGCGGCTGCTGCGCTGTGTTGCCACCTGGATTCTGCGCGGG
ACGTCCTTCTGTACGTCCTTCGCGCCTCAATCCAGCGGACCTTCTTCCCGCGGCTGCTGCCGGCTCTGCGGCTCT
TCCGCTCTTCCGCTTCGCTCAGACGAGTCCGATCTCCTTTGGGCGCCTCCCGCATCGGGGTACCTTTAAGACC
AATGACTTACAAGGCAGCTGTAGATCTTAGCCACTTTTTAAAGAAAAGGGGGGACTGGAAGGGCTAATCACTCCCAAC
GAAGACAAGATCGTCGAGAGATGCTGCATATAAGCAGCTGCTTTTGTGTTGACTGGGTCTCTGTTAGACCAGATCT
GAGCCTGGGAGCTCTGGCTAACTAGGGAACCACTGCTTAAGCCTCAATAAAGCTTGCTTGAGTGCTTCAAGTAGTG
TGTGCCCCTGCTGTTGTGTGACTCTGGTAAGTACGATCCCTCAGACCTTTTGTGCTGAGTGGAAGAACTCTAGCAGTTT
TAGAGGGCCGTTTAAACCGCTGATCAGCTCGACTTCTAGTTGCCAGCCATCTGTTGTTTGGCCCTCCCGG
TGCTTCTTACCCCTGGAAGGTGCCACTCCACTGCTTCTTCTAATAAAATGAGGAAATGATCGCATTGTCTGAGT
AGGTGTCATTCTATTCTGGGGGTGGGGTGGGGCAGGACAGCAAGGGGGAGGATTGGGAAGACAATAGCAGGCATGCTGG
GGATGCGGTGGGCTCTATGGCTTCTACTGGGCGTTTATGGACAGCAAGCGAACCAGGAAATGCCAGCTGGGGCGCCCTC
TGGTAAGGTTGGGAAGCCCTGCAAAGTAACTGGATGGCTTCTCGCCGCCAAGGATCTGATGGCGCAGGGGATCAAGCT
CTGATCAAGAGACAGGATGAGGATCGTTTCGCATGATTGAACAAGATGGATTGCACGCAGGTTCTCCGGCCGCTTGGGTG
GAGAGGCTATTGGCTATGACTGGGCACAACAGACAATCGGCTGCTGATGCCCGCTGTTCCGGCTGTCAGCGCAGGG
GCGCCCGGTTCTTTTGTCAAGACCGACCTGTCCGGTGCCCTGAATGAAGTCAAGACGAGGACGCGCGGCTATCGTGGC
TGGCCACGACGGGCTTCTTGCAGCTGTGCTGACGTTGTCACTGAAGCGGGAAGGGACTGGCTGCTATTGGGCGAA
GTGCCGGGGCAGGATCTCTGTATCTACCTTGTCTGCGGAGAAAGTATCCATCATGGCTGATGCAATGCGCGGCT
GCATACGCTTGATCCGGTACCTGCCATTGACACCAAGCGAAACATCGCATCGAGCGAGCAGTACTCGGATGGAAG

31/75
Figure 22

CCGGTCTTGTGATCAGGATGATCTGGACGAAGAGCATCAGGGGCTCGCGCCAGCCGAACGTTCGCCAGGCTCAAGGCG
AGCATGCCGACGGCGAGGATCTCGTCGTGACCCATGGCGATGCTGCTGCCGAATATCATGGTGAAAATGGCCGCTT
TTCTGGATTATCAGCTGTGGCCGGCTGGGTGTGGCGGACCGCTATCAGGACATAGCGTTGGCTACCCGTGATATTGCTG
AAGAGCTTGGCGGCAATGGGCTGACCGCTTCTCGTCTTTACGGTATCGCCGCTCCCGATTGCGAGCGCATCGCCTTC
TATCGCCTTCTTGACGAGTCTTCTGAATTATTACGCTTACAATTTCTGATGCGGTATTTCTCCTTACGCATCTGTG
CGGTATTTACACCCGCATACAGGTGGCAGCTTTTCGGGGAATGTGCGCGGAACCCCTATTTGTTTATTTTCTAAATACA
TTCAAATATGTATCCGCTCATGAGACAATAACCTGATAAATGCTTCAATAATAGCACGTGTAAAATTCATTTTTAAT
TTAAAAGGATCTAGGTGAAGATCCTTTTGTAAATCTCATGACCAAAATCCCTTAACGTGAGTTTTCTTCCACTGAGCG
TCAGACCCCGTAGAAAAGATCAAAGGATCTTCTTGAGATCCTTTTTCTGCGCGTAATCTGCTGCTTGCAACAAAAA
ACCACCGCTACCAGCGGTGGTTTGTGGCCGATCAAGAGCTACCAACTCTTTTCCGAAGGTAAGTGGCTTACGAGAG
CGCAGATACCAAATACTGCTTCTAGTGTAGCCGTAGTTAGGCCACCACTTCAAGAACTCTGTAGCACCAGCCTACATAC
CTCGCTCTGCTAATCTGTTACAGTGGCTGCTGCCAGTGGCGATAAGTCTGTCTTACCGGGTTGGACTCAAGACGATA
GTTACCGGATAAGGCGCAGCGGTGGGCTGAACGGGGGGTTCGTGCACACAGCCAGCTTGGAGCGAACGACCTACACCG
AACTGAGATACCTACAGCGTGAGCTATGAGAAAAGCGCCACGCTTCCGAAGGAGAAAAGCGGACAGGTATCCGGTAAGC
GGCAGGGTGGAAACAGGAGAGCGACGAGGGAGCTTCCAGGGGAAACGCTGTATCTTTATAGTCCTGTGGGTTTCG
CCACCTGACTTGAGCGTCGATTTTGTGATGCTGTCAGGGGGGCGGAGCCTATGAAAAACGCCAGCAACGCGGCT
TTTTACGGTCTCTGGGCTTTTGTGCGCTTTTGTCTACATGTTCTTGACTCTTCGCGATGTACGGGCCAGATATACGCG

Fig 22B: >S2P3F (3825pb) – SEQ ID No. 10

ATGTTTCGTGTTTCTGGTGCTGCTGCCACTGGTGCTCCAGTCAGTGCCTGAACCTGACCACACGAACACAGCTGCCACCAGC
CTACACCAATAGCTTACCCCGGAGTGTAATACTACCCGACAAGGTGTTCCGACGACGCTGCTGCATAGCACCAGGATC
TGTTTCTGCCCTTCTCAGCAACGTGACCTGTTCCACGCCATCCAGTGTCCGGCACCATGGCACCAGCGCTTCGAT
AATCCCGTCTGCCCTTCAACGATGGCGTGAATTTGCCAGCACGAGAAGTCAATATCATCCGCGCTGGATCTTCGG
CACCACACTGGATAGCAAGACCCAGAGCCTGCTGATCGTGAACAACGCCACCAACGTGGTATCAAAGTGTGCGAGTTCC
AGTTCTGCAACGACCCCTTCTGGGCGTCTACTACCACAAGAACAAGAGCTGGATGGAAAGCGAGTTCGCGGTGAC
AGCAGCGCAACAACTGCACCTTCGAGTACGTGTCCAGCCATTCTGATGGACCTGGAAGGCAAGCAGGGCAACTTCAA
GAACCTGCGCGAGTTCTGTTTCAAGAACATCGACGGCTACTTCAAATCTACAGCAAGCACACCCCAATCAACTCTGTC
GCGATCTGCCACAGGGATTAGTGTCTGGAACCCCTGGTGGATCTGCCATCGGCATCAACATTACCCGCTTTCAGACA
CTGCTGGCCCTGCACCGCAGTTACTTGACACCAGGCGATAGCAGCAGTGGATGGACAGCTGGTGCCGCGCTTACTACGT
TGGATATCTGCAGCCACGCACCTTCTGTGAAGTACAACGAGAACGGCACCATCACCAGCAGCGTGGATTGTGCTCTCG
ATCCCTGAGCGAGACAAAGTGACCCCTGAAGTCTTACCGTCGAGAAGGGCATCTACAGACCCAGCAATTTCCGCGTG
CAGCCACCGAGAGCATCGTGCGCTTCCCAATATACCAATCTGTGCCCTTCCGCGAGGTGTTCAATGCCACACGCTT
TGCCTCCGTGTACGCTTGAATCGCAAGCGCATTAGCAACTGCTGGCCGACTACTCCGTGCTGTACAATAGCGCCAGCT
TCAGCACCTTCAAGTGCTACGGCGTGTACCCACCAAGCTGAACGACCTGTGCTTACCAATGTGTACGCCGACAGCTTC
GTGATCCGCGGAGATGAAGTGCACAGATTGCCACAGGCCAGACCGGCAAGATCGCCGACTACAATTACAAGCTGCCCGA
CGACTTACCCGGCTGCGTGATCGCTGGAACAGCAACAACCTGGATTCCAAAGTCGGCGGCAACTACAATACCTGTACC
GCCTGTTCCGCAAGAGCAATCTGAAGCCCTTCGAGCGCGACATCAGCACCAGAAATCTACAGGCCGGAAGCACCCTATGC
AACGGCGTGGAAGGCTTCACTGCTACTTCCACTGCAGTCTACGGATTTAGCCCCAATAAGGCTGGGCTACACGCC
ATATCGAGTGGTGGTGCTGAGCTTCAACTGCTGATGCTCCAGCTACCGTGTGCGGCCCAAGAAGAGTACCAACCTGG
TCAAGAACAATGCGTGAACCTCAACTCAACGGCTGACCGGAACCGCGTGCTGACCGAGAGTAACAAGAAATTCCTG
CCATTCCAGCAGTTTGGCCGCGACATTGCCGATACAACCGATGCCGTTGCGATCCCCAGACCTTGGAGATCTGGATAT
TACCCCATGCTCTTCCGCGCGGTGTCCGTGATTACACAGGCACCAATACAGCAACAGGTGGCCGTTCTGTACCAGG
ATGTGAATTGCACAGAGGTGCCCGTGCCATTACGCCGATCAATTGACACCAACATGGCGCGTGTACTCCACCGGCGAGC
AATGTGTTTAAACCCGCGCTGGATGCTGATTGGAGCCGAGCAGTGAACAATAGCTACGAGTGCATATCCCATCGG
AGCCGGAATCTGCGCTTCTATCAGACCCAGACCAATAGTCCAGGATCCGCGGAAAGTGTGGCCAGCCAGTACCATTTG
CCTATACCATGAGCCTGGGCGCCGAGAATAGCGTGGCTACTTCAACAACAGCATTGCTATCCCCACCAACTTCAACAT
AGCGTGACCACCGAGATCTGCCAGTGTCCATGACCAAGACCAGCGTGGACTGCACCATGTACATCTGCGGAGATAGCAC
CGAGTGCAGCAACCTGCTGCTGAGTACGGAAGTTTCTGCACCCAGCTGAATCGCGCCCTGACAGGCATTGCCGTGGAAC
AGGATAAGAACACCCAAGAGGTGTTCCGCCAAGTGAAGCAAATCTACAAGACCCCAACCAATCAAGGATTTCCGCGGCTT
AATTCAGCCAGATTCTGCCGATCAAGCAAGCCAGCAAGCGCAGCTTATCGAGGACCTGCTGTTCAACAAAGTGAC
ACTGGCCGACGCCGATTATCAAGCAGTATGGCGATTGCTGGGCGATATTGCCGACGCGATCTGATTTGCGCCGAGA
AGTTTAACGGACTGACCGTCTGCCACCACTGCTGACAGATGAGATGATGCCAGTACACAAGTGCCCTGCTGGCCGGA
ACCATTACAGCGGATGGACATTTGGAGCCGGTGCCGCTCTGCAGATTCCCTTCTGCTATGCAGATGGCTACCGCTTCAA
TGGCATTGGCGTGACCCAGAATGTGCTGTACGAGAACCAGAAGCTGATCGCCAACAGTTCAACAGCGCCATCGGCAAGA
TTCAGGACAGCCTGAGTAGTACCGCCAGCGCTCTGGGAAAGCTGCAGGATGTGGTCAACCAGAACGCTCAGGCCCTGAAC

32/75
Figure 22

ACCCTGGTTAAGCAGCTGAGCAGCAACTTCGGCGCCATCAGTAGCGTGCTGAACGATATCCTGAGCCGCTGGATCCACC
AGAAGCCGAGGTGCAGATCGATCGCTGATTACCGGACGCCTGCAGTCCCTGCAGACCTATGTGACACAGCAGCTGATCC
GAGCCGCCGAGATTGAGCTAGTGCTAATCTGGCCGCCACCAAGATGAGCGAATGTGTGCTGGGACAGAGCAAGCGCGTG
GACTTTTGC GGCAAGGGATACCACCTGATGAGCTTCCACAGAGTGCTCCACACGGCGTGGTGTTCGTCATGTGACCTA
CGTGCCCGCTCAAGAGAAGAATTCACCACCGCTCCAGCCATCTGCCACGACGAAAGGCCCATTTTCCACGCGAGGGCG
TGTTCTGTAGCAACGGCACTCATTGGTTCGTACCCAGCGCAACTTCTACGAGCCCCAGATCATCACCACCGACAACACC
TTCGTGAGCGGCAACTGCGACGTCGTGATCGGCATTGTGAACAACACCGTGACGATCCACTGCAGCCCGAGCTGGACAG
CTTCAAAGAGGAACTGGACAAGTACTTTAAGAACCACACAAGCCCCGACGTGGACCTGGGAGACATTAGCGGAATCAACG
CCAGCGTGGTCAACATCCAGAAAGAGATTGACCGCCTGAACGAGGTGGCCAAGAATCTGAACGAGAGCCTGATCGACCTG
CAAGAACTGGGCAAATACGAGCAGTACATTAAGTGGCCCTGGTACATCTGGCTGGGCTTATTGCCGGACTGATTGCCAT
CGTGATGGTCACCATATGCTGTGCTGCATGACCAAGTGTGCTGCAGCTGCCTGAAGGGATGCTGCAGTTGCGGAAGCTGT
GCAAGTTCGACGAGGATGATAGCGAGCCAGTGCTGAAGGGCGTCAAGCTGCACTACACCTGATAA

Fig 22C: >S2P3F (1274aa) – SEQ ID No. 11

MFVFLVLLPLVSSQCVNLTRTQLPPAYTNSFTRGVVYPDKVFRSSVLHSTQDLFLPFFSNVTWFWHAIHVSGTNGTKRFD
NPVLPFNDGVYFASTEKSNIRGWIFGTTLDSKTQSLIVNNATNVVIVKCEFCNDPFLGVYYHKNNKSWMESEFRVY
SSANNCTFEYVSQPFLLMDLEGKQGNFKNLREFVFNIDGYFKIYKHTPINLVRDLPQGFSALEPLVDLPIGINITRFQT
LLALHRSYLTGPDSSSGWTAGAAAYVGYLQPRFTLLKYNENGTITDAVDCALDPLSETKCTLKSTFVEKGIYQTSNFRV
QPTESIVRFPNITNLCPFGEVFNATRFASVYAWNRRKRISNCVADYSVLVNSASFSTFKCYGVSPTKLNDLCFTNVYADSF
VIRGDEVRIAPGQTGKIADYNYKLDDFTGCVIAWNSNNLDSKVGGNVNYLYRLFRKSNLKPFERDISTEYQAGSTPC
NGVEGFNCYFPLQSYGFQPTNGVGYQPYRVVLSFELLHAPATVCGPKKSTNLVKNCVNFNFNGLTGTGVLTESNKKFL
PFQQFGRDIATDDAVRDPQTEILDITPCSFGGVSVITPGTNTSNQVAVLYQDVNCTEVPVAIHADQLTPTWRVYSTGS
NVFQTRAGCLIGAHEVNNSYECDIPIGAGICASYQTQTNSPGSAGSVASQSIIAYTMSLGAENSVAYSNNISIAIPTNFTI
SVTTEILPVSMTKTSVDCTMYICGDS TECSNLLLQYGSFCTQLNRALTGIAVEQDKNTQEVFAQVKQJYKTPPIKDFGGF
NFSQILPDPSPKSKRSFIEDLLFNKVTLADAGFIKQYGDCLGDIARDLICAQKFNGLTVLPPLTDEMIQAQYTSALLAG
TITSGWTFGAGAALQIPFAMQMAYRFNGIGVTQNVLYENQKLIANQFNSAIGKIQDSLSSTASALGKLQDVVNQNAQALN
TLVKQLSSNFGAISSVLNDILSRDPPEAEVQJDRITGRLQSLQTYVTQQLIRAAEIRASANLAATKMSECVLGQSKRV
DFCGKGYHLSFQPSAPHGVVFLHVTYVPAQEKNFHTTAPAICHDGKAHFPREGVFVSNGTHWVFTQRNFYEPQIITDNT
FVSGNCDVVIGIVNNTVYDPLQPELDSFKEELDKYFNHTSPDVLGDISGINASVNNIQKEIDRLNEVAKNLNESLIDL
QELGKYEQYIKWPWYIWLGFIAGLIAIVMTIMLCCMTSCCSCLKGCCSCGSCCKFDEDDSEPVLKGVKLHYT*

33/75
Figure 23

Fig 23A : >pFlap-ieCMV-S2P-deltaF-WPREm (10046pb) – SEQ ID No. 12

CGCGTTGGGAGCTTTTTGCAAAAGCCTAGGCCTCCAAAAAGCCTCCTCACTACTTCTGGAATAGCTCAGAGGCAGAGGC
GGCCTCGGCTCTGCATAATAAAAAAATTAGTCAGCCATGGGGCGGAGAATGGGCGGAAGTGGGCGGAGTTAGGGGCG
GGATGGGCGGAGTTAGGGGCGGACTATGGTTGCTGACTAATTGAGATGCCGACATTGATTATTGACTAGTTGGAAGGG
CTAATTCCTCCCAACGAAGACAAGATATCCTTGATCTGTGGATCTACCACACACAAGGCTACTTCCCTGATTAGCAGAA
CTACACACCAGGGCCAGGGATCAGATATCCACTGACCTTTGGATGGTGCTACAAGCTAGTACCAGTTGAGCCAGAGAAGT
TAGAAGAAGCCAAAGGAGAGAACCACAGCTTGTACAACCTGTGAGCCTGCATGGGATGGATGACCCGGAGAGAGAA
GTGTTAGAGTGAGGTTTACAGCCGCTAGCATTTTCATCACGGTGGCCGAGAGCTGCATCCGGAGTACTTCAAGAACT
GCTGATATCGAGCTTGCTACAAGGGACTTTCCGCTGGGGGACTTTCCAGGGAGGCGTGGCCTGGGCGGAGTGGGGAGTG
GCGAGCCCTCAGATCCTGCATATAAGCAGCTGCTTTTGCTGTACTGGGTCTCTCTGGTTAGACCAGATCTGAGCCTGG
GAGCTCTCTGGCTAACTAGGGAACCCACTGCTTAAGCCTCAATAAGGCTTGCTTGAAGTGTCAAGTAGTGTGTGCCCG
TCTGTTGTGTGACTCTGGTAAGTAGATCCCTCAGACCTTTTAGTCAGTGTGGAAAATCTCTAGCAGTGGCGCCCGAA
CAGGGACTTGAAAGCGAAAGGGAAACCAAGGAGCTCTCTGACGCGAGGACTCGGCTTGTGAAGCGCGACGGCAAGAG
GCGAGGGGCGGCGACTGGTGAGTACGCCAAAAATTTGACTAGCGGAGGCTAGAAGGAGAGAGATGGGTGCGAGAGCGTTC
AGTATTAAGCGGGGAGAATTAGATCGCGATGGGAAAAATTCGGTTAAGGCCAGGGGGAAGAAAAATATAAATTA
ACATATAGTATGGCAAGCAGGGAGCTAGAACGATTGCGAGTTAATCCTGGCTGTAGAAACATCAGAAGGCTGTAGAC
AAATACTGGGACAGCTACAACCATCCCTTCAGACAGATCAGAAGAACTTAGATCATTATATAATACAGTAGCAACCCCTC
TATTGTGTGCATCAAAGGATAGAGATAAAAGACACCAAGGAAGCTTACAGCAAGATAGAGGAAGAGCAAAACAAAAGTAA
GACCACCGCACAGCAAGCGGCGCTGATCTTCAGACCTGGAGGAGGAGATAGAGGGACAATTGGAGAAGTGAATTATAT
AAATATAAAGTAGTAAAAATTGAACCATTAGGAGTAGCACCACCAAGGCAAGGAGAGAGTGGTGCGAGAGAAAAAAG
AGCAGTGGGAATAGGAGCTTTGTTCTTGGGTTCTTGGGAGCAGCAGGAAGCACTATGGGCGCAGCGTCAATGACGCTGA
CGGTACAGGCCAGACAATTATTGTCTGGTATAGTGCAGCAGCAGAACAAATTTGCTGAGGGCTATTGAGGCGCAACAGCAT
CTGTTGCAACTCAGAGCTGGGGCATCAAGCAGCTCCAGGCAAGAATCCTGGCTGTGGAAGATACCTAAAGGATCAACA
GCTCCTGGGGATTGGGGTGTCTCTGGAAGCACTTTGCAACCACTGCTGTGCCTTGAATGCTAGTTGGAGTAATAAAT
CTCTGGAACAGATTTGGAATCACACGACCTGGATGGAGTGGGACAGAGAAATTAACAATTACACAAGCTTAATACACTCC
TTAATTGAAGAATCGAAAACCAAGCAAGAAAAAGAAATGAACAAGAAATTATTGGAATTAGATAAATGGGCAAGTTTGTGGAA
TTGGTTTAACATAACAAATTGGCTGTGGTATATAAAATTTATCATAATGATAGTAGGAGGCTTGGTAGGTTTAAGAATAG
TTTTGCTGTACTTTCTATAGTGAATAGAGTTAGGCAGGGATATTCACCATTATCGTTTCAGACCCACCTCCCAACCCCG
AGGGGACCCGACAGGCCGAAGGAATAGAAGAAGAAGGTGGAGAGAGAGACAGAGACAGATCCATTCGATTAGTGAACGG
ATCTCGACGGTATCGCCGAATTCACAAATGGCAGTATTCATCCACAATTTTAAAGAAAAGGGGGGATTGGGGGTACAG
TGCAGGGGAAAGAATAGTAGACATAATAGCAACAGACATACAACTAAAGAATTACAAAAACAAATACAAAAATTCAAA
ATTTTCGGGTTTATTACAGGGACAGCAGAGATCCACTTTGGCTGATACGCGTGGAGTTCCGCTTACATAACTTACGGTA
AATGGCCCGCTGGCTGACCGCCCAACGACCCCGCCCTTGACGTCAATAATGACGTATGTTCCCATAGTAAACGCCAAT
AGGGACTTTCCATTGACGTCAATGGGTGGAGTATTTACGGTAACTGCCCACTTGGCAGTACATCAAGTGTATCATATGC
CAAGTACGCCCCCTATTGACGTCAATGACGGTAAATGGCCGCTGGCATTATGCCAGTACATGACCTTATGGGACTTT
CCTACTTGGCAGTACATCTACGTATTAGTCATCGCTATTACCATGCTGATGCGGTTTTGGCAGTACATCAATGGGCGTGG
ATAGCGGTTTGACTACAGGGGATTTCCAAGTCTCCACCCATTGACGTCAATGGGAGTTTGTGGCCACCAAAATCAAC
GGGACTTTCCAAATGTCTGAACAACTCCGCCCCATTGACGCAATGGGCGGTAGGCGGTACGGTGGGAGGTCTATATA
AGCAGAGCTGTTTTAGTGAACCGTCAGATCGCTGGAGACGCCATCCACGCTGTTTTGACCTCCATAGAAGACACCCGCA
TCGGATCTCGTACGGCCACCATGTTCTGTGTTCTGGTGTGCTGCCACTGGTGTCCAGTCAGTGCCTGAACCTGACCACA
CGAACACAGCTGCCACAGCCTACACCAATAGCTTCACCCGCGGAGTGTACTACCCGACAAGGTGTTCCGCGAGCAGCGT
GCTGCATAGCACCAGGATCTGTTTCTGCCCTTCTCAGCAACGTGACCTGGTTCCACGCCATCCACGTGTCCGGCACCA
ATGGCACCAAGCGCTTCGATAATCCCGTGTGCCCTTCAACGATGGCGGTGACTTTGCCAGCACCGAGAAGTCCAATATC
ATCCGCGGCTGGATCTTCGGCACCACTGGATAGCAAGACCCAGAGCCTGCTGATCGTGAACAACGCCACCAACGTGGT
CATCAAAGTGTGCGAGTTCCAGTTCTGCAACGACCCCTTCTGGCGCTCTACTACCAACAAGAACAACAAGAGCTGGATGG
AAAGCGAGTTCCGCGTGTACAGCAGCGCCAACAACTGCACCTTCGAGTACGTGTCCAGCCATTCTGATGGACCTGGAA
GGCAAGCAGGGCAACTTCAAGAACCTGCGCGAGTTCTGTTCGAAGACATCGACGGCTACTTCAAAATCTACAGCAAGCA
CACCCCAATCAACCTCGTGCAGATCTGCCACAGGGATTAGTGTCTGGAACCCCTGGTGGATCTGCCATCGGCATCA
ACATTACCGCTTTCAGACACTGCTGGCCCTGCACCGCAGTTACTTGACACCAAGGCGATAGCAGCAGTGGATGGACAGCT
GGTGGCCGCGCTTACTACGTTGGATATCTGCAGCCACGCACCTTTCTGCTGAAGTACAACGAGAACGGCACCATCACCGA
CGCCGTGGATTGTCTCTGATCCCTGAGCGAGACAAAGTGCACCTGAAAGTCTTACCGTCGAGAAGGGCATCTACC
AGACCAGCAATTTCCGCGTGCAGCCACCGAGAGCATCGTGCCTTCCCAATATACCAATCTGTGCCCTTCGGCGAG
GTGTTCAATGCCACACGCTTTGCCTCGGTACGCTGGAATCGCAAGCGCATTAGCAACTGCGTGGCCGACTACTCCGT
GCTGTACAATAGCGCCAGCTTACGACCTTCAAGTGCTACGGCGTGTACCCACCAAGCTGAACGACCTGTGCTTACCA
ATGTGTACGCCGACAGCTTCGTGATCCGCGGAGATGAAGTGCACAGATTGCCACAGGCCAGCCGCAAGATCGCCGAG

34/75

Figure 23

TACAATTACAAGCTGCCCCGACGACTTCACCGGCTGCGTGATCGCCTGGAACAGCAACAACCTGGATTCCAAAGTCGGCGG
CAACTACAACCTACCTGTACCGCTGTTCCGCAAGAGCAATCTGAAGCCCTTCGAGCGCGACATCAGCACCGAAATCTACC
AGGCCGGAAGCAACCCATGCAACGCGCTGGAAGGCTTCAACTGCTACTTCCCACTGCAAGTCTACGGATTTTCAGCCACA
AATGGCGTGGGCTACCAGCCATATCGAGTGGTGGTGCTGAGCTTGAAGTCTGCTGCTCCAGCTACCGTGTGCGGCC
CAAGAAGAGTACCAACCTGGTCAAGAACAATGCGTGAACCTCAACTCAACGGCCTGACCGGAACCGGCTGCTGACCG
AGAGTAACAAGAAGTTCCTGCCATTCCAGCAGTTTGGCCGCGACATTGCCGATACAACCGATGCCGTTCCGCGATCCCCAG
ACCTTGGAGATCTGGATATTACCCCATGCTCCTTCGGCGGCGTGCTCGTGATTACACAGGCACCAATACCAGCAACCA
GGTGGCCGTTCTGTACAGGATGTGAATTGCACAGAGTGCCCGTGGCCATTACGCCGATCAATTGACACCAACATGGC
GCGTGTACTCCACCGGACGCAATGTGTTTCAAACCCGCGCTGGATGCCGTGATTGGAGCCGAGCACGTGAACAATAGCTAC
GAGTGCATATCCCCATCGGAGCCGGAATCTGCGCATCTATAGTGTGGCCAGCCAGAGCATATTGCCTATACCATGAG
CCTGGGCGCCGAGAATAGCTGGCTACTCCAACAACAGCATTGCTATCCCCACCAACTTACCATCAGCGTGACCACCG
AGATCCTGCCAGTGTCCATGACCAAGACCAGCGTGGACTGCACCATGTACATCTGCGGAGATAGACCGAGTGCAAGCAAC
CTGCTGCTGCAGTACGGAAGTTCTGCACCCAGCTGAATCGCGCCTGCAGGCATTGCCGTGGAACAGGATAAGAACAC
CCAAGAGGTGTTCCGCCAAGTGAAGCAAATCTACAAGACCCACCAATCAAGGATTTCCGCGGCTTCAATTCAGCCAGA
TTCTGCCGATCCAAGCAAGCCAGCAAGCGCAGCTTCATCGAGGACCTGCTGTTCAACAAAGTGACACTGGCCGACGCC
GGATTCATCAAGCAGTATGGCGATTGCTGGCGATATTGCCGACGCGATCTGATTTGCGCCAGAAAGTTTAAACGGACT
GACCGTCTGCCACCACTGCTGACAGATGAGATGATCGCCAGTACACAAGTGCCCTGCTGGCCGGAACCATACCAGCG
GATGGACATTTGGAGCCGGTGCCGCTCTGCAGATTCCCTTCGCTATGCAGATGGCTACCGCTTCAATGGCATTGGCGTG
ACCCAGAATGTGCTGTACGAGAACCAGAAGCTGATCGCAACCAAGTTCAACAGCGCCATCGGCAAGATTAGGACAGCCT
GAGTAGTACCGCCAGCGCTCTGGGAAAGCTGCAGGATGTGGTCAACAGAACGCTCAGGCCCTGAACACCTTGGTTAAGC
AGCTGAGCAGCAACTTCGGCGCCATCAGTAGCTGCTGAACGATATCTGAGCCGCTGGATCCACAGAAAGCCGAGGTG
CAGATCTGCTGCTGATTACCGGACGCTGCAAGTCCCTGCAGACCTATGTGACACAGCAGCTGATCCGAGCCCGAGAT
TCGAGCTAGTGCTAATCTGGCCGCCACCAAGATGAGCGAATGTGTGCTGGGACAGAGCAAGCGCGTGGACTTTTGGCGCA
AGGGATACCACCTGATGAGCTTCCACAGAGTCTCCACAGCGCGTGGTGTCTGCTATGTGACCTACGTGCCCGCTCAA
GAGAAGAATTTACCAACGCTCCAGCCATCTGCCACGACGGAAGGCCATTTTCCACGCGAGGGCGTGTTCTGTAGCAA
CGGCACTCATTGGTTCGTACCCAGCGCAACTTCTACGAGCCCCAGATCATCACCACCGACAACACCTTCGTGAGCGGCA
ACTGCGACGTCGTGATCGGCATTGTGAACAACACCGTGTACGATCCACTGCAGCCGAGCTGGACAGCTTCAAAGAGGAA
CTGGACAAGTACTTTAAGAACCAACACAAGCCCCGACGTGGACCTGGGAGACATTAGCGGAATCAACGCCAGCGTGGTCAA
CATCCAGAAAGAGATTGACCGCCTGAACGAGGTGGCCAAGAATCTGAACGAGAGCCTGATCGACCTGCAAGAAGTGGGCA
AATACGAGCAGTACATTAAGTGGCCCTGGTACATCTGGCTGGGCTTCAATGCCGACTGATTGCCATCGTGATGGTCAAC
ATTATGCTGTGCTGCATTGACCAAGTGTCTGCAGCTGCTGAAGGGATGCTGCAGTTGCGGAAGCTGCTGCAAGTTTCGACGA
GGATGATAGCGAGCCAGTGTGAAGGGCGTCAAGTGCCTACACCTGATAACGAGCGCGCCTCGAGAATTTCCCGATAAT
CAACCTCTGGATTACAAAATTTGTGAAGATTGACTGGTATTCTTAAGTATGTTGCTCCTTTTACGCTATGTGGATACGC
TGCTTTAATGCCTTTGTATCATGCTATTGCTTCCGATGGCTTTCATTTTCTCCTCTTGATAAATCCTGGTTGCTGT
CTCTTTATGAGGAGTTGTGGCCCGTGTGTCAGGCAACGTGGCGTGGTGTGACTGTGTTGCTGACGCAACCCCCACTGGT
TGGGGCATTGCCACCACTGTGACGCTCCTTCCGGGACTTTCGCTTTCCTTCCCTTATTGCCACGGCGGAACCTATCGC
CGCCTGCCTTGGCCGCTGCTGGACAGGGGCTCGGCTGTTGGGCACTGACAATTCGTGGTGTGTCGGGGAAGCTGACGT
CCTTTCGCGGCTGCTCGCCTGTGTTGCCACCTGGATTCTGCGCGGGACGTCTTCTGCTACGTCCCTTCGGCCCTCAAT
CCAGCGGACCTTCTTCCCGCGGCTGCTGCCGGCTCTGCGGCCTTTCGCGCTTTCGCTTCCGCTCAGACGAGTGC
GATCTCCCTTTGGGCGGCTCCCGCATCGGGGTACCTTTAAGACCAATGACTTACAAGGCAGCTGATAGATCTTAGCCA
CTTTTTAAAGAAAAGGGGGGACTGGAAGGCTAATTCCTCCCAACGAAGACAAGATCGTCGAGAGATGCTGCATATAA
GCAGTGCTTTTTGCTGTACTGGTCTCTCTGGTTAGACAGATCTGAGCCTGGGAGCTCTCTGGCTAACTAGGGAACC
CACTGCTTAAGCCTCAATAAAGCTTGCTTGAAGTCTCAAGTAGTGTGCGCGTCTGTTGTGACTCTGGTAAGTAG
AGATCCCTCAGACCTTTTAGTCAGTGTGAAAAATCTTAGCAGTTCTAGAGGGCCGTTTAAACCCGCTGATCAGCCTC
GACTGTGCCTTAGTTGCCAGCCATCTGTTGTTTGGCCCTCCCCGTCCTTCTGACCTGGAAGGTGCCACTCCCA
CTGTCTTTCTAATAAAATGAGGAATTCATCGCATTGTCTGAGTAGGTGCTATTCTATTCTGGGGGTGGGGTGGG
CAGGACAGCAAGGGGAGGATTGGGAAGACAATAGCAGCATGCTGGGATGCGGTGGGCTCTATGGCTTCTACTGGGCG
GTTTTATGGACAGCAAGCGAACCAGGAAATGCCAGCTGGGGCGCCTCTGGTAAGGTTGGGAAGCCCTGCAAGTAACTG
GATGGCTTTCTGCGGCCAAGGATCTGATGGCGCAGGGGATCAAGCTCTGATCAAGAGACAGGATGAGGATCGTTTCGCA
TGATTGAACAAGATGGATTGCACGCAAGTTCTCCGGCCGCTTGGGTGGAGAGGCTATTCCGGCTATGACTGGGCACAACAG
ACAATCGGCTGCTGATGCCGCCGTGTTCCGGCTGTACGCGCAGGGGCGCCCGTTCTTTTGTCAAGACCGACCTGTC
CGGTGCCCTGAATGAACTGCAAGACGAGGACGCGGCTATCTGGCTGGCCACGACGGGCGTTCTTTCGCGAGCTGTGC
TCGACGTTGTCTGAAAGCGGGAAGGGACTGGCTGCTATTGGGCGAAGTGCCGGGCGAGGATCTCCTGTCTATCTACCTT
GCTCTGCCGAGAAAGTATCCATCATGGCTGATGCAATGCGGCGGCTGCATACGCTTGTATCCGGCTACCTGCCATTCTGA
CCACCAAGCGAAACATCGCATCGAGCGAGCACGTACTCGGATGGAAGCCGGTCTTGTGATCAGGATGATCTGGACGAAG
AGCATCAGGGGCTCGCGCCAGCCGAAGTGTCCGAGGCTCAAGGCGAGCATGCCCGACGGCGAGGATCTCGTCTGAC

35/75
Figure 23

CATGGCGATGCGCTTCCGGAATATCATGGTGAAAAATGGCCGCTTTTCTGGATTTCGACTGTGGCCGGCTGGGTGT
GGCGGACCGCTATCAGGACATAGCGTTGGCTACCCGTGATATTGCTGAAGAGCTTGGCGGCGAATGGGCTGACCGCTTCC
TCGTGCTTTACGGTATCGCCGCTCCGATTGCGAGCGCATCGCCTTCTATCGCCTTCTTGACGAGTCTTCTGAATTATT
AACGCTTACAATTTCTGATGCGGTATTTCTCCTTACGCATCTGTGCGGTATTTACACCGCATACAGGTGGCACTTTT
CGGGGAAATGTGCGCGGAACCCCTATTTGTTTATTTTCTAAATACATTCAAATATGTATCCGCTCATGAGACAATAACC
CTGATAAATGCTTCAATAATAGCACGTGCTAAAACCTTATTTTAAATTTAAAAGGATCTAGGTGAAGATCCTTTTGATA
ATCTCATGACCAAAATCCCTTAACGTGAGTTTTGTTCCACTGAGCGTCAGACCCGTAGAAAAGATCAAAGGATCTTCT
TGAGATCCTTTTTTCTGCGCGTAATCTGCTGCTTGCAACAAAAAACCACCGCTACCAGCGGTGGTTTGTTTGGCGGA
TCAAGAGCTACCAACTCTTTTCCGAAGGTAACCTGGCTTCAGCAGAGCGCAGATACCAATACTGTCCTTCTAGTGATG
CGTAGTTAGGCCACCACTTCAAGAACTCTGTAGCACCGCTACATACCTCGCTCTGCTAATCCTGTTACAGTGGCTGCT
GCCAGTGGCGATAAGTCTGTCTTACCGGGTTGGACTCAAGACGATAGTTACCGGATAAGGCGCAGCGTCCGGCTGAAC
GGGGGGTTCGTGCACACAGCCAGCTTGGAGCGAACGACCTACCCGAAGTGAAGTACCTACAGCGTGAGCTATGAGAAA
GCGCCACGCTTCCGAAGGGAGAAAGGCGGACAGGTATCCGGTAAGCGGCGAGGTGCGAACAGGAGAGCGCAGGAGGAG
CTTCCAGGGGGAACGCGTGGTATCTTTATAGTCTGTGCGGTTTCGCCACCTCTGACTTGAGCGTCGATTTTGTGATG
CTCGTCAGGGGGGCGGAGCCTATGAAAAACGCCAGCAACCGGCCCTTTTACGGTTCCTGGGCTTTGCTGGCCTTTTG
CTCATATGTTCTGACTCTTCGCGATGTACGGGCCAGATATACGCG

Fig 22B: >S2P-deltaF (3792pb) – SEQ ID No. 13

ATGTTCTGTGTTTCTGGTGCTGCTGCCACTGGTGTCCAGTCAGTGCCTGAACCTGACCACACGAACACAGCTGCCACCAGC
CTACACCAATAGCTTACCCGCGGAGTGTAATACCCGACAAGGTGTTCCGCGAGCAGCGTGTGTCATAGCACCCAGGATC
TGTTCCTGCCCTTCTTACGCAACGTGACCTGGTTCCACGCGCATCCACGTGTCCGGCACCAATGGCACCAAGCGCTTCGAT
AATCCCGTGTGCCCTTCAACGATGGCGTGTACTTTGCCAGCACCGAGAAGTCCAATATCATCCGCGGCTGGATCTTCGG
CACCACACTGGATAGCAAGACCCAGAGCCTGCTGATCGTGAACAACGCCACCAACGTGGTCATCAAAGTGTGCGAGTTCC
AGTTCTGCAACGACCCCTTCTGCGGCTTACTACCAACAAGAACACAGAGCTGGATGGAAAGCGAGTTCCGCGTGTAC
AGCAGCGCAACAACTGCACCTTCGAGTACGTGTCCAGCCATTCTGATGGACCTGGAAGGCAAGCAGGGCAACTTCAA
GAACCTGCGCGAGTTCTGTGTTCAAGAACATCGACGGCTACTTCAAATCTACAGCAAGCACACCCCAATCAACCTCGTGC
GCGATCTGCCACAGGGATTCAGTGTCTGGAACCCCTGGTGGATCTGCCATCGGCATCAACATTACCCGCTTTCAGACA
CTGCTGGCCCTGCACCGCAGTTACTTGACACCAGGCGATAGCAGCAGTGGATGGACAGCTGGTGCCGCGCTTACTACGT
TGGATATCTGCAGCCACGCACTTTCTGCTGAAGTACAACGAGAACGGCACCATCACCGACGCCGTGGATTGTGCTCTCG
ATCCCTGAGCGAGACAAAGTGACCCCTGAAGTCTTACCGTGCAGAAAGGCATCTACAGACAGCAATTTCCGCGTG
CAGCCACCGAGAGCATCGTGCGCTTCCCAATATACCAATCTGTGCCCTTCGGCGAGGTGTTCAATGCCACACGCTT
TGCTCCGTGTACGCTGGAATCGAAGCGCATTAGCAACTGCGTGGCCGACTACTCCGTGCTGTACAATAGCGCCAGCT
TCAGCACCTTCAAGTGCTACGGCGTGTACCCACCAAGCTGAACGACCTGTGCTTACCAATGTGTACGCCGACAGCTTC
GTGATCCGCGGAGATGAAGTGCACAGATTGCCCCAGGCCAGACCGGCAAGATCGCCGACTACAATTACAAGCTGCCCGA
CGACTTACCCGGCTGCGTGATCGCTGGAACAGCAACAACCTGGATTCCAAAGTCGGCGGCAACTACAACCTGTACC
GCCTGTTCCGCAAGAGCAATCTGAAGCCCTTCGAGCGGACATCAGCACCGAAATCTACAGGCCGGAAGCACCCCATGC
AACGGCGTGGAAGGCTTCAACTGTACTTCCCACTGCAGTCTTACGGATTTACGCCACAAATGGCGTGGGCTACAGCC
ATATCGAGTGGTGGTGCTGAGCTTCAACTGCTGATGCTCCAGCTACCGTGTGCGGCCCAAGAAGAGTACCAACCTGG
TCAAGAACAAATGCGTGAACCTTCAACGGCTGACCGGAACCGGCTGTGCTGACCGAGAGTAACAAGAGTTCTCTG
CCATTCCAGAGTTTGGCCGCGACATTGCCGATACAACCGATGCCGTTGCGGATCCCGAGCCTTGAGATCTGGATAT
TACCCCATGCTCTTGGCGGCGTGTCCGTGATTACACAGGCACCAATACAGCAACAGGTGGCCGTTCTGTACCAGG
ATGTGAATTGCACAGAGGTGCCGTTGCCATTACGCCGATCAATTGACACCAACATGGCGCGTGTACTCCACCGGCAGC
AATGTGTTTCAAACCCGCGTGATGCTGATTGGAGCCGAGCAGCTGAACAATAGCTACGAGTGCGATATCCCATCGG
AGCCGGAATCTGCGCATCTATAGTGTGGCCAGCCAGAGCATATTGCCTATACCATGAGCCTGGGCGCGGAGAATAGCG
TGGCTACTCCAACAACAGCATTGCTATCCCAACCACTTACCATCAGCGTGACCACCGAGATCCTGCCAGTGTCATG
ACCAAGACCAAGCGTGGACTGCACCATGTACATCTGCGGAGATAGCACCGAGTGACAGCAACCTGCTGCTGACGTAAG
TTTCTGCACCCAGCTGAATCGCGCCCTGACAGGCATTGCCGTGGAACAGGATAAGAACACCCAAGAGGTGTTGCCCAAG
TGAAGCAAATCTACAAGACCCCAACCAATCAAGGATTTGGCGGCTTCAATTTACGCCAGATTCTGCCGATCCAAGCAAG
CCAGCAAGCGCAGCTTATCGAGGACCTGCTGTTCAACAAAGTGACACTGGCCGACGCCGATTATCAAGCAGTATGG
CGATTGCTGGGCGATATTGCCGCACGCGATCTGATTGCGCCAGAAAGTTAACGGACTGACCGTCTGCCACCACTGC
TGACAGATGAGATGATCGCCAGTACACAAGTGCCTGTGGCCGGAACCATACAGCGGATGGACATTTGGAGCCGGT
GCCGCTCTGCAGATTCCCTGCTATGCAAGTGGCTACCGCTTCAATGGCATTGGCGTGACCCAGAATGTGCTGACGA
GAACCAAGCTGATCGCAACCAAGTTCAACAGCGCCATCGGCAAGATTAGGACAGCCTGAGTAGTACCGCCAGCGCTC
TGGGAAAGCTGCAGGATGTGGTCAACCAGAACGCTCAGGCCCTGAACACCCTGGTTAAGCAGCTGAGCAGCAACTTCGG
GCCATCAGTAGCGTGCTGAACGATATCTGAGCCGCTGGATCCACCAGAAAGCGAGGTGCAGATCGATCGCTGATTAC

36/75
Figure 23

CGGACGCCTGCAGTCCCTGCAGACCTATGTGACACAGCAGCTGATCCGAGCCGCCGAGATTCGAGCTAGTGCTAATCTGG
CCGCCACCAAGATGAGCGAATGTGTGCTGGGACAGAGCAAGCGCTGGACTTTTGCGGCAAGGGATACCACCTGATGAGC
TTCCACAGAGTGCTCCACACGGCGTGGTGTCTGTCATGTGACCTACGTGCCCGCTCAAGAGAAGAATTCACCACCGC
TCCAGCCATCTGCCACGACGGAAGGCCATTTCCACGCGAGGGCGTGTTCTGTTAGCAACGGCACTATTGGTTCGTCA
CCCAGCGCAACTTCTACGAGCCCCAGATCATCACCACCGACAACACCTTCGTCAGCGGCAACTGCGACGTCGTGATCGGC
ATTGTGAACAACACCGTGTACGATCCACTGCAGCCGAGCTGGACAGCTTCAAAGAGGAACTGGACAAGTACTTTAAGAA
CCACACAAGCCCCGACGTGGACCTGGGAGACATTAGCGGAATCAACGCCAGCGTGTTCAACATCCAGAAAGAGATTGACC
GCCTGAACGAGGTGGCCAAGAATCTGAACGAGAGCCTGATCGACCTGCAAGAACTGGGCAAATACGAGCAGTACATTAAG
TGGCCCTGGTACATCTGGCTGGGCTTATTGCCGGACTGATTGCCATCGTGATGGTCACCATTATGCTGTGCTGCATGAC
CAGTTGCTGCAGCTGCCTGAAGGGATGCTGCAGTTGCGGAAGCTGCTGCAAGTTCGACGAGGATGATAGCGAGCCAGTGC
TGAAGGGCGTCAAGTGCCTACACCTGATAA

Fig 23C : >S2P-deltaF (1263aa) – SEQ ID No. 14

MFVFLVLLPLVSSQCVNLTRTQLPPAYTNSFTRGVYYPDKVFRSSVLHSTQDLFLPFFSNVTWFHAIHVSGTNGTKRFD
NPVLPFNDGVYFASTEKSNIRGWIFGTLDSTQSLIVNNATNVVIVKCEFCNDPFLGVYYHKNNKSWMESEFRVY
SSANNCTFEYVSQPFLLMDLEGKQGNFKNLREFVKNIDGYFKIYKHTPINLVRDLPQGFSALEPLVDLPIGINITRFQT
LLALHRSYLTGPDSSSGWTAGAAAYVGYLQPRFTLLKYNENGTITDAVDCALDPLSETKCTLSFTVEKGIYQTSNFRV
QPTESIVRFPNITNLCPFGEVFNATRFASVYAWNRRKRISNCVADYSVLYNSASFSTFKCYGVSPTKLNDLCFTNVYADSF
VIRGDEVQRQIAPGQTGKIADYNYKLPDDFTGCVIAWNSNNLDSKVGGNYNYLYRFRKSNLKPFERDISTEIQAGSTPC
NGVEGFNCYFPLQSYGFQPTNGVGYQPYRVVLSFELLHAPATVCGPKKSTNLVKNKCVNFNFNGLTGTGVLTESNKKFL
PFQQFGRDIADTTDAVRDPQTLEILDITPCSFGGVSVITPGTNTSNQVAVLYQDVNCTEVPVAIHADQLTPTWRVYSTGS
NVFQTRAGCLIGAHEVNNSYECDIPIGAGICASYSVASQSIIAYTMSLGAENSVAYSNNIAIPTNFTISVTTEILPVSM
TKTSVDCTMYICGDSTECNLLQYGSFCTQLNRALTGIAVEQDKNTQEVFAQVKQIYKTPPIKDFGGFNFSQILPDPSK
PSKRSFIEDLLFNKVTADAGFIKQYGDCLGDIAARDLCAQKFNGLTVPPLLTDEMIAQYTSALLAGTITSGWTFGAG
AALQIPFAMQMAYRFNGIGVTQNVLYENQKLIANQFNSAIGKIQDSLSTASALGKLQDVVNQNAQALNTLVKQLSSNFG
AISSVLNDILSRDPPAEVQJDRLLITGRLQSLQTYVTQQLIRAAEIRASANLAATKMSECVLGQSKRVDFCGKGYHLMS
FPQSAPHGVVFLHVTVYPAQEKNFTTAPAICHGDKAHFPREGVFSNGTHWFVTQRNFYEPQIITDNTFVSGNCDVVIG
IVNNTVYDPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQKEIDRLNEVAKNLNESLIDLQELGKYEQYIK
WPWYIWLGFIAGLIAIVMVTIMLCMTSCCCLKGCCSCGSCCKFDEDDSEPVKGVKLHYT*

37/75

Figure 24

Figure 24A: pFLAP K18-HACE2 WPRE - SEQ ID No.25

```

LOCUS       Exported                      11342 bp ds-DNA      circular SYN
DEFINITION  synthetic circular DNA
ACCESSION   pFLAP_CMV_EGFP_WPRE.xdna
SOURCE      synthetic DNA construct
            ORGANISM  synthetic DNA construct

REFERENCE   1  (bases 1 to 11342)
            COMMENT   Serial Cloner Genbank Format
                        SerialCloner_Type=DNA
                        SerialCloner_Comments=
                        SerialCloner_Ends=0,0,,0,
FEATURES             Location/Qualifiers
     source          1..11342
                     /organism="synthetic DNA construct"
                     /mol_type="other DNA"
     misc_feature    87..164
                     /label=SV40 ORI
     misc_feature    233..868
                     /label=HIV1-5LTR
     misc_feature    870..1086
                     /label=HIV-1 psi pack
     misc_feature    1533..1766
                     /label=RRE
     misc_feature    2288..2411
                     /label=cPPT-CTS
     primer_bind     2446..2476
                     /label=Primer 1
     misc_feature    2453..5701
                     /label=K18 promoter
     misc_feature    4961..4966
                     /label=Modified Splicing Donor Site
     misc_feature    5686..5697
                     /label=Modified Poly-pyrimidine tract
     misc_feature    5697..5701
                     /label=Modified Splicing acceptor site
     CDS             5714..8131
                     /codon_start=1
                     /label=hACE2
                     /note=""/type=CDS"
                     /note=""/vntifkey=4"
                     /translation (SEQ ID No. 26)

     misc_feature    8149..8753
                     /label=WPRE
                     /label=WPRE-WT
     misc_feature    8838..9099

```

38/75

Figure 24

```

                /label=LTR
terminator      9136..9363
                /label=bGH PA
CDS             9539..10330
                /codon_start=1
                /label=Kan/neoR
                /translation (SEQ ID No. 28)

rep_origin      10634..11262
                /label=ColE1 origin

```

SEQ ID No. 25:

```

1 cgcgttggga gctttttgca aaagcctagg cctccaaaaa agcctcctca ctacttctgg
61 aatagctcag aggagagggc ggcttcggcc tctgcataaa taaaaaaaat tagtcagcca
121 tggggcggag aatgggcgga actgggcgga gttagggcg ggatggcg agttaggggc
181 gggactatgg ttgtgacta attgagatgc ccgacattga ttattgacta gttggaaggg
241 ctaattcact cccaacgaag acaagatc cttgatctgt ggatctacca cacacaaggc
301 tacttcctg attagcagaa ctacacacca gggccaggga tcagatatcc actgaccttt
361 ggatgggtgct acaagctagt accagttgag ccagagaagt tagaagaagc caacaagga
421 gagaacacca gcttgttaca acctgtgagc ctgcatggga tggatgaccc ggagagagaa
481 gtgttagagt ggaggtttga cagccgccta gcatttcac acggtggccc gagagctgca
541 tccggagtac ttcaagaact gctgatatcg agcttgctac aagggaactt ccgtggggg
601 actttccagg gaggcgtggc ctggcgggga ctggggagtg gcgagccctc agatcctgca
661 tataagcagc tgctttttgc ctgtactggg tctctctggt tagaccagat ctgagcctgg
721 gagctctctg gtaactagg gaaccactg cttaagcctc aataaagctt gccttgagt
781 cttcaagtag tgtgtgcccg tctgttgtgt gactctgcta actagagatc cctcagaccc
841 ttttagtcag tgtggaaaat ctctagcagt ggcgcccga cagggaactt aaagcgaaag
901 ggaaaccaga ggagctctct cgacgcagga ctggttgc tgaagcgcgc acggaagag
961 gcgagggcg gcgactggtg agtacgcaa aaattttgac tagcgagagc tagaaggaga
1021 gagatgggtg cgagagcgtc agtattaagc gggggagaat tagatcgca tgggaaaaaa
1081 ttcggttaag gccaggggga aagaaaaaat ataaattaa acatatagta tgggcaagca
1141 gggagctaga acgattcgca gttaatcctg gcctgttaga aacatcagaa ggctgtagc
1201 aaatactggg acagctacaa ccatccctc agacaggatc agaagaactt agatcattat
1261 ataatacagt agcaaccctc tattgtgtgc atcaaaggat agagataaaa gacaccaagg
1321 aagctttaga caagatagag gaagagcaaa acaaaagtaa gaccaccgca cagcaagcgg
1381 ccgctgatct tcagacctgg aggaggagat atgagggaca attggagaag tgaattatat
1441 aaatataaag tagtaaaaat tgaaccatta ggagtagcac ccaccaaggc aaagagaaga
1501 gtggtgcaga gaaaaaaaag agcagtggga ataggagctt tgttccttgg gttcttggga
1561 gcagcaggaa gcactatggg cgagcgtca atgacgctga cggtacaggc cagacaatta
1621 ttgtctggta tagtcagca gcagaacaat ttgtgaggg ctattgaggc gcaacagcat
1681 ctgttgcaac tcacagtctg gggcatcaag cagctccagg caagaatcct ggctgtggaa
1741 agatacctaa aggatcaaca gctcctgggg atttgggggt gctctggaaa actcatttgc
1801 accactgctg tgccttgga tgctagtgg agtaataaat ctctggaaca gatttggaa

```

39/75

Figure 24

1861 cacacgacct ggatggagt ggacagagaa attaacaatt acacaagctt aatacactcc
1921 ttaattgaag aatcgcaaaa ccagcaagaa aagaatgaac aagaattatt ggaattagat
1981 aaatgggcaa gtttggtaa ttggttaac ataacaaatt ggctgtgta tataaaatta
2041 ttcataatga tagtaggagg ctggttaggt ttaagaatag ttttgcgt actttctata
2101 gtgaatagag ttaggcaggg atattcacca ttatcgttc agaccacct cccaacccg
2161 aggggacccg acaggccga aggaatagaa gaagaagtg gagagagaga cagagacaga
2221 tccattcgat tagtaacgg atctcgacgg tatcgccgaa ttcacaaatg gcagtattca
2281 tccacaattt taaaagaaaa ggggggattg ggggtacag tgcaggggaa agaatagtag
2341 acataatgc aacagacata caaactaaag aattacaaaa acaaattaca aaaattcaaa
2401 attttcgggt ttattacagg gacagcagag atccatttg gctgatacg gtatccagt
2461 ggggaatata aaggtgaaag caggagagac cctctgact ggaacctt acctccaga
2521 agccttgat gcaaacaccg tggcattca ttgtatgtt atttgcac ccgttgct
2581 cccagcctc agcaggcccc gacctcccc tggccagctt ccacctgac tgccccctg
2641 ctggtccca ttgactg tgggtctcc ccaccattag gtgacagatc aggaacaatc
2701 caggctcagg ctctttatct gtgctgccc tccacctgg caggctcact ggccaggctt
2761 ttccagggtc ctttctctcc caggtctgcc ctactattg tctccctt cccctcagc
2821 tggtagctcg ataagaatca ataggtccac tccagagcaa agaacacagc caaatgtgc
2881 ataccaggcc ctgccagaaa aacgagctgc tggagctgac aaactgaag gccaaacacc
2941 taagggtccc cccaacactt cattcagcag ggatggcat tcagcttcag ggggcaggca
3001 gcatgaaagc ctccctacct ccatcttct cacacagagg ctggggagag catcttgag
3061 gatgcagtcc cctggggcca ggcttcaat ccagacagcc ctacaaggg gggacagggg
3121 aaggactggc ttggagaaaa gtcctagaaa agaggggagg ggcactggcc accagggtg
3181 ggtcgctgct atgattgtcc taggagtgc tgctgtct ctcaggcccc atcgatgta
3241 ggacacatta tttttatta tttttatt tttttgagt cagagttcg ctctggtgc
3301 ccaggctgga gcgcgacggc acgatctgg ctactgcaa cctctgctc ctgggttcaa
3361 gcgattctc tgctcagcc tctgagtag ctgggattac aggcacacac tgtctggtt
3421 aatttttga ttttagtag agaaggggtg tcacatgtt ggtcaggctg gtctcaaat
3481 tttttttt tttttttt ttttgagac agagtcttg tctgtgtct aggttgagt
3541 gcagtggcat gcaactctt acctcaagt atccaccgc ctggcctcc caaagtgtt
3601 ggattacagg catgagccac tgtcccgcc gatgtgggac acattatcat ctctgtgaga
3661 gatttttgg ctctttgtc accgccctt tctccagct ctagaactg ggcctggctc
3721 acagtaggtg ctgaatgcat actggtgaa ttgtaaatgc tcaggatttg ttaattaag
3781 gatgcaggaa aggtgatata ccggtgtgca gaagtcagga tgcattccct gtccaaatca
3841 cagtgttcca ctgaggcaag gccctggga gtgaggtcgg gagaggggag ggtggtggag
3901 ggggtcaga gactgggtt gtttggga gtctgcacct attgctgag tgaatgatg
3961 tgtgtgtgca ttgagagca cacctctgta tgattcgggt gtgagtgtg gtgaggaaac
4021 gtgggcaggc gaggagtgt tgggagccag gtgcagctgg ggtgtgagt tgaagcaag
4081 cagctatgag gctgggcatt gcttctctc ctctctcca gctccagcc tttctccc
4141 gggactctg gggctcagg atgccccaa gatccctcc acaagtggat aattgggt
4201 gcaggttaag gacagctaga gggactcaca ggccattcca cccgcacacc accagacccc
4261 caaattctt tttctttt ttttgagac agagtctac tctgcgca ggctgcagt
4321 gcgcatctc ggctcactg aacctcgcc tccagggtc aagcgattcc cttctcag
4381 cctccaagt agctgagact acaggcgtg accatcacgt ccgctaatt tttgtatt
4441 tagtagagag gggtttacc atgttggtc ggatggtct gatctctga cctcgtgatc

Figure 24

4501 cgcccaccta ggctcccaa agtgctgaga ttacaggcgt gagccactgc gcccggtcaa
4561 gactcccaaa ttcaaaact gccagcacct cctccactg ggggagaaga gcataataac
4621 gtcatttctt gccctgaaag cagcctcgag ggccaacaac acctgtgtc cgtgtccatg
4681 cccggttggc caccctgtt ctggggggtg agcggggctt ggcagggtg cgcggagggc
4741 gcgggggtgg gggccggggc ggagcgggcc ggggcggagg gcgcgggctc cgagccgtcc
4801 acctgtggct ccgcttccg aagcggctcc ggggcggggg cggggcctca ctctcgata
4861 taactcgggt cgcgcggctc gcgcaggccg ccaccgtcgt ccgcaaagcc tgagtctgt
4921 cttttctct tccccgaca gcaatcgata gggctcagg aagtggtagg agggacctca
4981 actccagcc ttgttgacc ctcaattat acactcttt gcctcttcc gtcattccat
5041 aaccaccca accctactc caccgggagg ggggtgggca tacctggatt tccatccgcg
5101 cacctagcca cagggtccct aagagcagca gcagctaggc atgggagggc tcttccag
5161 gagagagggg gaaggggaca gggttgagag cttacagag gaagtggaca gcatggaggg
5221 aggtaaggaa aggctgtaa agaggaggag aactggctc tggcggaatg gggactattg
5281 gagggttaag cggatgtggc taaggctgag tcacttagga gtaacaaga ggccttctt
5341 tgggaggagc caatccaggg ttagggggc ccagagtac caggtgcact agggaaaaa
5401 tgccaggaga gggccaggaa gaggactgt tagtagcac tcactctgg gcaggcaggc
5461 cagccagcta gccagcctgc taggcttcc caagaggggc agagtgtgg gatctgggaa
5521 tccaggaaag gagggaatgg ggtggggcta gatgaaagg gataggtgtc cagggagagc
5581 ctctggctat tctgggacc aggaagttt cactaggata cataacactt ttacacact
5641 caccacccc atccctggct ttctattcat ggaacaacct ctctctttt tcttccagg
5701 tggatccgc accatgtcaa gctcttctg gctcttctc agccttgtg ctgtaactgc
5761 tgctcagtc accattgagg aacaggcca gacattttg gacaagtta accacgaagc
5821 cgaagacctg ttctatcaa gttcactgc ttcttgaat tataacacca atattactga
5881 agagaatgtc caaaacatga ataagtgg ggacaaatg tctgccttt taaaggaaca
5941 gtccacactt gcccaaatg atccactaca agaaattcag aatctcacag tcaagctca
6001 gctgcaggct ctcagcaaa atgggtctc agtgcttca gaagacaaga gcaaacggt
6061 gaacacaatt taaatacaa tagcaccat ctacagtact ggaagttt gtaaccaga
6121 taatcacaa gaatgctt atctgaacc aggttgaat gaaataatg caaacagtt
6181 agactacaat gagaggctt gggcttggga aagctggaga tctgaggtc gcaagcagct
6241 gaggccatta tatgaagat atgtgtctt gaaaatgag atggcaagag caaatcatta
6301 taggactat ggggattatt ggagaggaga ctatgaagta aatgggtag atggctatga
6361 ctacagccgc gggcagttga ttgaagatg ggaacatac ttgaagaga ttaaacatt
6421 atatgaacat cttcatgct atgtgaggc aaagttgat aatgcctatc cttctatat
6481 cagtccaat ggatgcctc ctgctcattt gcttggtgat atgtgggta gatttggac
6541 aaatctgtac tcttgacag ttcccttgg acagaaacca aacatagatg ttactgatgc
6601 aatggtggac caggcctgg atgcacagag aatattcaag gaggccgaga agttcttgt
6661 atctgttgt cttctaata tgactcaagg attctgggaa aattccatgc taacggacc
6721 aggaaatgt cagaaagcag tctccatcc cacagcttg gacctgggga agggcgactt
6781 caggatcct atgtgcaca aggtgacaat ggacgactc ctgacagctc atcatgagat
6841 ggggcatatc cagtatgata tggcatatgc gcacaacct tttctgtaa gaaatggagc
6901 taatgaagga ttccatgaag ctgttgggga aatcatgtca cttctgcag ccacaccta
6961 gcatttaaaa tccattggtc ttctgtacc cgatttcaa gaagacaatg aacagaaat
7021 aaactcctg ctcaacaag cactcacgat tgttgggact ctgccattta cttacatgtt
7081 agagaagtgg agtggtatg tcttaaaagg ggaattccc aaagaccagt ggaataaaa
7141 gtggtgggag atgaagcgag agatagttg ggtggtggaa cctgtcccc atgatgaac

Figure 24

7201 atactgtgac cccgcatctc tgttccatgt ttctaataatg tactcattca ttcgatatta
7261 cacaaggacc ctttaccat tccagtttca agaagcactt tgtcaagcag ctaaaccatga
7321 aggccctctg cacaatgtg acatctcaaa ctctacagaa gctggacaga aactgttcaa
7381 tatgctgagg ctggaaaaat cagaaccctg gaccctagca ttggaaaatg ttgtaggagc
7441 aaagaacatg aatgtaaggc cactgctcaa ctactttgag cccttattta cctggctgaa
7501 agaccagaac aagaattctt ttgtgggatg gaggaccgac tggagtccat atgcagacca
7561 aagcatcaaa gtgaggataa gcctaaaatc agctcttgga gataaagcat atgaatggaa
7621 cgacaatgaa atgtacctgt tccgatcatc tgttgcatat gctatgaggc agtactttt
7681 aaaagtaaaa aatcagatga ttcttttgg ggaggaggat gtgcgagtgg ctaatttgaa
7741 accaagaatc tcctttaatt tctttgtcac tgcacataa aatgtgtctg atatcattcc
7801 tagaactgaa gtgaaaagg ccatcaggat gtcccgagc cgtatcaatg atgcttccg
7861 tctgaatgac aacagcctag agtttctggg gatacagcca acacttggac ctctaacca
7921 gccccctgtt tccatatggc tgattgttt ttgagttgtg atgggagtga tagtggttg
7981 cattgtcatc ctgatcttca ctgggatcag agatcggaag aaaaaaata aagcaagaag
8041 tggagaaaaat ccttatgcct ccatcgatat tagcaaagga gaaaaataat caggattcca
8101 aaacactgat gatgttcaga cctcctttaa actcgagctc aagcttcgaa ttcccataa
8161 tcaacctctg gattacaaaa ttgtgaaag attgactggt attcttaact atgttgctcc
8221 ttttacgcta tgggatacgt ctgctttaat gcctttgtat catgctattg cttcccgtat
8281 ggctttcatt ttctcctct tgtataaatc ctggttgctg tctctttatg aggagtgtg
8341 gcccgttctc aggcaacgtg gcgtggtgtg cactgtgtt gctgacgcaa cccccactg
8401 ttggggcatt gccaccact gtcagctcct ttccgggact ttgctttcc cctccctat
8461 tgccacggcg gaactcatc ccgcctgcct tgcccgctgc tggacagggg ctgggctgtt
8521 gggcactgac aattccgtgg tgtgtcggg gaagctgacg tcctttccat ggctgctcgc
8581 ctgtgttccc acctggatc tgcgaggac gtcttctgc tacgtccctt cggccctcaa
8641 tcagcggac cttccttccc gcggcctgct gccggctctg cggccttct cgcgtcttcg
8701 ccttcgcct cagacgagtc ggatctcct ttgggcccgc tcccgcacg gggaattctg
8761 cagtgcagcg tacctttaag accaatgact tacaaggcag ctgtagatct tagccattt
8821 ttaaaagaaa aggggggact ggaagggcta attcactccc aacgaagaca agatcgtcga
8881 gagatgctgc atataagcag ctgcttttg ctgtactgg gtctctctgg ttgaccaga
8941 tctgagcctg ggagctctct ggctaactag ggaaccact gcttaagcct caataaagct
9001 tgcttgagt gttcaagta gtgtgtgccc gtctgttggt tgactctggt aactagagat
9061 cctcagacc cttttagtca gtgtgaaaa tctctagcag ttctagaggg cccgtttaa
9121 cccgctgac agcctcact gtgccttcta gttgccagcc atctgtgtt tgcccctcc
9181 ccgtgcctc cttgacctg gaagggtcca ctccactgt ctttcttaa taaaatgagg
9241 aaattgcatc gcattgtctg agtaggtgtc attctattt ggggggtggg gtggggcagg
9301 acagcaaggg ggaggattgg gaagacaata gcaggcatgc tggggatgcg gtgggtcta
9361 ttgcttctac tggcggttt tatggacagc aagcgaaccg gaattgccag ctggggcgcc
9421 ctctgtaag gttgggaagc cctgcaaagt aaactggatg gcttctcgc cgccaaggat
9481 ctgatggcg aggggatcaa gctctgatca agagacagga tgaggatcgt ttcgatgat
9541 tgaacaagat ggattgcag caggttctcc ggccgcttg gtggagaggc tattcggtc
9601 tgactgggca caacagacaa tcggctgctc tgatgccgc gtgttcggc gtgcagcga
9661 gggcgcccg gttcttttg tcaagaccga cctgtccgt gccctgaatg aactgaaga
9721 cgaggcagcg cggctatct ggctggcac gacggcggt cttgctcag ctgtgctga
9781 cgtgtcact gaagcggga gggactggct gctattggc gaagtccgg ggcaggatct
9841 cctgtcatc cacctgctc ctgccagaa agtatccatc atggctgatg caatcgcg

Figure 24

9901 gctgcatacg cttgatccgg ctacctgccc attcgaccac caagcgaaac atcgcatcga
9961 gcgagcacgt actcggatgg aagccggctt tctcgatcag gatgatctgg acgaagagca
10021 tcaggggctc gcgccagccg aactgttcgc caggctcaag gcgagcatgc ccgacggcga
10081 ggatctcgtc gtgacctatg gcgatgcctg cttgccgaat atcatggtgg aaaatggccg
10141 cttttctgga ttatcgact gtggccggct gggtgtggcg gaccgctatc aggacatagc
10201 gttggctacc cgtgatattg ctgaagagct tggcggcgaa tgggctgacc gttcctcgt
10261 gctttacggt atcgccgctc ccgattcgca gcgcatcgcc ttctatcgcc ttcttgacga
10321 gttcttctga attattaacg cttacaattt cctgatcgcg tattttctcc ttacgatct
10381 gtgcgggtatt tcacaccgca tacagggtggc acttttcggg gaaatgtgcg cggaaccct
10441 atttgtttat tttttaaata acattcaaat atgtatccgc tcatgagaca ataaccctga
10501 taaatgcttc aataatagca cgtgctaaaa cttcattttt aatttaaaag gatctagggtg
10561 aagatccttt ttgataatct catgacaaaa atccctaac gtgagtttc gttccactga
10621 gcgtcagacc ccgtagaaaa gatcaaagga tcttcttgag atcctttttt tctgcgcgta
10681 atctgctgct tgcaaacaaa aaaaccaccg ctaccagcgg tggtttgttt gccggatcaa
10741 gagctaccaa ctctttttcc gaaggtaact ggcttcagca gagcgcatg accaaatact
10801 gtccttctag ttagccgta gttaggccac cacttcaaga actctgtagc accgcctaca
10861 tacctcgtc tgctaatacct gttaccagt gctgctgcca gtggcgataa gtcgtgtctt
10921 accgggttgg actcaagacg atagttaccg gataaggcgc agcggtcggg ctgaacgggg
10981 ggttcgtgca cacagcccag cttggagcga acgacctaca ccgaactgag atacctacag
11041 cgtgagctat gagaaagcgc cagcttccc gaaggagaga aggcgacag gtatccggtg
11101 agcggcaggg tcggaacagg agagcgacg agggagcttc cagggggaaa cgcttggtat
11161 ctttatagtc ctgtcgggtt tcgccacctc tgacttgagc gtcgattttt gtgatgctcg
11221 tcaggggggc ggagcctatg gaaaaacgcc agcaacgcgg ctttttacg gttcctgggc
11281 ttttgctggc cttttgtca catgttctg actcttcgcg atgtacgggc cagatatacg
11341 cg

//

43/75

Figure 24

Figure 24B: K18 PROMOTER (SEQ ID No. 26) (**BOLD UNDERLINED** = MODIFIED SPLICING DONOR (SEQ ID No. 27) AND ACCEPTOR SITES (SEQ ID No. 28)) (nucleotides 2453 to 3249 in SEQ ID No. 25)

ATCCAGTGGGGGAATATAAAGGTGAAAGCAGGAGAGACCCCTCTGACTGGAACCTCTTACCTCCCAGAAGCCTTGTA
TGCAAAACCAGTGGGCATTCAATTTGTATGTTATTTTGCATCCCGTTTGCCTCCCAGCCTTCAGCAGGCCCCGACCCT
CCCCTGGCCAGCTTCCACCCTGACTGCCCCCTGGCTGGCTCCCATTGAGCACTGTGGGCTCTCCCCACCATTAGGTG
ACAGATCAGGAACAATCCAGGCTCAGGCTCTTTATCTGTGCTCTGCCTCCACCTGGCAGGTCCACTGGCCAGGCTT
TTCCAGGTCCCTTCTCTCCCAGGTCTGCCCTACTATTTGTCTCCCTTCCCCCTCAGCTGGTAGCTCGATAAGAA
TCAATAGGTCCACTCCAGAGCAAAGAACACAGCCAAATGTGTCTATACCAGGCCCTGCCAGAAAAACGAGCTGCTGGA
GCTGACAAACTTGAAGGCCAAACACCTAAGGTTCCCCCAACACTTCATTACAGCAGGGATGGTCATTTCAGCTTCAGG
GGGCAGGCAGCATGAAAGCCTCCCTACCTCCATCCTTCTCACACAGAGGCTGGGGAGAGCATCTTGGAGGATGCAGT
CCCCTGGGGCCAGGCTTCTAATCCAGACAGCCCTTACAAGGGGGGACAGGGGAAGGACTGGCTTGGAGAAAAGTCCT
AGAAAAGAGGGGAGGGGCACTGGCCACCAGGGCTGGGTGCTGCTATGATGGTCCTAGGAGTGCCTGCCTGTCTCT
CAGGCCCCATGCGATGTAGGACACATTACTTTTATTTATTTATTTATTTATTTGAGTCAGAGTTTCGCTCTGGTTG
CCCAGGCTGGAGCGCGACGGCACGATCTTGGCTCACTGCAACCTCTGCCTCCTGGGTTCAGCGATTCTCTGCCTC
AGCCTCCTGAGTAGCTGGGATTACAGGCACACACTGTGCTGGTTAATTTTGTATTTTGTAGAGAAAGGGGTGCA
CCATGTTGGTCAGGCTGGTCTCAAATTTTTTTTTTTTTTTTTTTTTTTTTTTTGAGACAGAGTCTTGCTCTGTTGTCT
AGGCTGGAGTGCAGTGGCATCGAACTCTTGACCTCAAGTGATCCACCGCCTCGGCCTCCCAAAGTGCTTGGATTAC
AGGCATGAGCCACTGTGCCCGCGATGTGGGACACATTATCATCTCTGTGAGAGATTTTGGTCTCTTTTGTACCCG
CCCTTCTCTCCAGCTCCTAGAACTGGGCCTGGCTCACAGTAGGTGCTGAATGCATACTGGTTGAATTGTAAATGCT
CAGGATTTGTTTAATTAAGGATGCAGGAAAGGTGATATACCGGTGTGCAGAAGTCAGGATGCATTCCCTGTCCAAAT
CACAGTGTTCCTGAGGCAAGGCCCTTGGGAGTGAGTCCGGAGAGGGGAGGGTGGTGGAGGGGGCTCAGAGACTG
GGTTTGTTTGGGGAGTCTGCACCTATTTGCTGAGTGAATGTATGTGTGTGTGCATTTGAGAGCACACCTCTGTATG
ATTCGGGTGTGAGTGTGTGTGAGGAAACGTGGGCAGGCGAGGAGTGTGTTGGGAGCCAGGTGCAGCTGGGGTGTGAGT
GTGTAAGCAAGCAGCTATGAGGCTGGGCATTGCTTCTCCTCTCTCTCCAGCTCCAGCCTTTCTTCCCCGGGACT
CCTGGGGCTCCAGGATGCCCCAAGATCCCCTCCACAAGTGGATAATTTGGGCTGCAGGTTAAGGACAGCTAGAGGG
ACTCACAGGCCATTCCACCCGCACACCACAGACCCCCAAATTTCTTTTTTCTTTTTTTTTTTGAGACAGAGTCTCAC
TCTGTGCGCCAGGTGCAGTGGCGCGATCTCGGCTCACTGCAACCTCCGCTCCAGGTTCAAGCGATTCCCCCTTCT
CAGCCTCCCAAGTAGCTGAGACTACAGGCGTGCACCATCACGTCCGGCTAATTTTTTGTATTTTAGTAGAGAGGGGT
TTCACCATGTTGGCTAGGATGGTCTCGATCTCCTGACCTCGTGATCCGCCACCTAGGCCCTCCCAAAGTGCTGAGAT
TACAGGCGTGAGCCACTGCGCCCGGTCAAGACTCCCAAATTTCAAACCTCGCCAGCACCTCCTCCACCTGGGGGAGAA
GAGCATAATAACGTCATTTCTGCCTGAAAGCAGCCTCGAGGGCCAACAACACCTGCTGTCCGTGTCCATGCCCGG
TTGGCCACCCGTTTCTGGGGGTGAGCGGGGCTTGGCAGGGCTGCGCGAGGGGCGGGGGTGGGGCCGGGGCGG
AGCGGCCCCGGGGCGAGGGCGGGCTCCGAGCCGTCCACCTGTGGCTCCGGCTTCCGAAGCGGCTCCGGGGCGGGG
GCGGGGCTCACTCTGCGATATAACTCGGGTGCAGCGGCTCGCGCAGGCCGCCACCGTCTCGCAAAGCCTGAGTC
CTGTCTTTCTCTCTCCCCGACAGCAATCGATAGGGCTCAGGT**AAGTGGTAG**GAGGGACCTCAACTCCCAGCCTTG
TCTGACCCTCCAATTATACACTCCTTTGCCTCTTTCCGTCATTCCATAACCAACCCCAACCCCTACTCCACGGGAGG
GGGTTGGGCATACCTGGATTTCCATCCGCGCACCTAGCCACAGGTCCTAAGAGCAGCAGCAGCTAGGCATGGGAG
GGCTCTTTCCAGGAGAGAGGGGGAGGGGACAGGGTTGAGAGCTTTACAGAGGAAGTGAGCAGCATGGAGGGAGGT
AAGGAAAGGCCTGTAAAGAGGAGGAGAC

44/75

Figure 24

ACTGGCTCTGGCGGAATGGGGACTATTGGAGGGTTAAGCGGATGTGGCTAAGGCTGAGTCATCTAGGAGTAAACAAGAGGCCTT
CCTTTGGGAGGAGCCAATCCAGGGTGTAGGGGGCCCCAGAGTGACCAAGGTGCACTAGGGAAAAAATGCCAGGAGAGGGCCAGGAA
GAGGACTTGTAGTAGCGACTCACTTCTGGGCAGGCAGGCCAGCCAGCTAGCCAGCCTGCTGAGGCTTCCCAAGAGGGGCAGAG
TGCTGGGATCTGGGAATCCAGGAAAGGAGGGAATGGGGTGGGGCTAGATGAAAAGGGATAGGTGTCCAGGGAGAGCCTCTGGCT
ATTCTGGGACCAGGAAGTTTTCTACTAGGATACATAACACTTTTTACACACTCACCCACCCATCCCTGGCTTTCTATTTCATGG
AACACCTCTCTCCTTTTCCTTCCAGGT

Figure 24C: hACE2- SEQ ID No.29 nucleotides 5714 to 8131 in SEQ ID No.25

ATGTCAAGCTCTTCTGGCTCCTTCTCAGCCTTGTGTCTGTAAGTCTGCTCAGTCCACCATTGAGGAACAGGCCAAGACATTT
TTGGACAAGTTTAACCACGAAGCCGAAGACCTGTTCTATCAAAGTTCACCTTGCTTCTTGGAATTATAACACCAATATTACTGAA
GAGAATGTCCAAAACATGAATAATGCTGGGGACAAATGGTCTGCCTTTTTAAAGGAACAGTCCACACTTGCCCAATGTATCCA
CTACAAGAAATTCAGAATCTCACAGTCAAGCTTCAGCTGCAGGCTCCTCAGCAAAATGGGTCTTCAGTGCTCTCAGAAGACAAG
AGCAAAACGGTTGAACACAATTTCTAAATACAAATGAGCACCATCTACAGTACTGGAAAAGTTTGTAAACCCAGATAATCCACAAGAA
TGCTTATTACTTGAACCAAGGTTTGAATGAAATAATGGCAACAGTTTACTACTACAATGAGAGGCTCTGGGCTTGGGAAAGCTGG
AGATCTGAGGTGGGCAAGCAGCTGAGGCCATTATATGAAGAGTATGTGGTCTTGAAAAATGAGATGGCAAGAGCAAAATCATTAT
GAGGACTATGGGGATTATTGGAGAGGAGACTATGAAGTAAATGGGGTAGATGGCTATGACTACAGCCGCGGCCAGTTGATTGAA
GATGTGGAACATACCTTTGAAGAGATTAAACCATTATATGAACATCTTCATGCCTATGTGAGGGCAAGTTGATGAATGCCTAT
CCTTCTATATCAGTCCAATTGGATGCCTCCCTGCTCATTTGCTTGGTGATATGTGGGGTAGATTTTGGACAAATCTGTACTCT
TTGACAGTTCCCTTTGGACAGAAACCAACATAGATGTTACTGATGCAATGGTGGACCAGGCTGGGATGCACAGAGAATATTC
AAGGAGGCCGAGAAGTTCTTTGTATCTGTTGGTCTTCTTAATATGACTCAAGGATTCTGGGAAAATTCATGCTAACGGACCCA
GGAAATGTTTCAGAAAGCAGTCTGCCATCCCACAGCTTGGGACCTGGGGAAGGGCGACTTCAGGATCCTTATGTGCACAAGGTG
ACAATGGACGACTTCTGACAGCTCATCATGAGATGGGGCATATCCAGTATGATATGGCATATGCTGCACAACCTTTTCTGCTA
AGAAATGGAGCTAATGAAGGATTCCATGAAGCTGTTGGGGAATCATGTCACCTTTCTGCAGCCACACCTAAGCATTTAAATCC
ATTGGTCTTCTGTCAACCGATTTTCAAGAAGACAATGAAACAGAAATAAACTTCTGCTCAAACAAGCACTCACGATTGTTGGG
ACTCTGCCATTTACTTACATGTTAGAGAAGTGGAGGTGGATGGTCTTTAAAGGGGAAATTCCTAAAGACCAGTGGATGAAAAAG
TGGTGGGAGATGAAGCGAGAGATAGTTGGGGTGGTGAACCTGTGCCCCATGATGAAACATACTGTGACCCCGCATCTCTGTTT
CATGTTTCTAATGATTACTCATTCATTTCGATATTACACAAGGACCCCTTTACCAATTCAGTTTCAAGAAGCACTTTGTCAAGCA
GCTAAACATGAAGGCCCTCTGCACAAATGTGACATCTCAAACTCTACAGAAGCTGGACAGAACTGTTCAATATGCTGAGGCTT
GGAAAATCAGAACCCCTGGACCTAGCATTGAAAAATGTTGTAGGAGCAAGAACATGAATGTAAGGCCACTGCTCAACTACTTT
GAGCCCTTATTTACCTGGCTGAAAGACCAGAACAAGAATTCCTTTGTGGGATGGAGTACCGACTGGAGTCCATATGCAGACCAA
AGCATCAAAGTGAGGATAAGCCTAAAATCAGCTCTTGGAGATAAAGCATATGAATGGAACGACAATGAAATGTACCTGTTCGGA
TCATCTGTTGCATATGCTATGAGGCAGTACTTTTTAAAGTAAAAAATCAGATGATTCTTTTGGGGAGGAGGATGTGCGAGTG
GCTAATTTGAAACCAAGAATCTCCTTTAATTTCTTTGTCACTGCACCTAAAAATGTGTCTGATATCATTCTTAGAACTGAAGTT
GAAAAGGCCATCAGGATGTCCCGGAGCCGTATCAATGATGCTTTCCGTCTGAATGACAACAGCCTAGAGTTTCTGGGGATACAG
CCAACACTTGGACCTCCTAACCAGCCCCCTGTTTCCATATGGCTGATTGTTTTTGGAGTTGTGATGGGAGTGATAGTGGTTGGC
ATTGTATCCTGATCTTCACTGGGATCAGAGATCGGAAGAAGAAAAATAAGCAAGAAGTGGAGAAAAATCCTTATGCCTCCATC
GATATTAGCAAAGGAGAAAATAATCCAGGATTCAAAACACTGATGATGTTTCAGACCTCCTTTTAA

Figure 24

Figure 24D: hACE2 protein (SEQ ID No.30)

MKRDRCPGRASGYSWDQEVFTRIHNFTYTLTPPIPGFLEMQPLSFFLPGGSATMSSSSWLLLSLVAVTAAQSTIEE
 QAKTFLDKFNHEAEDLFYQSSLASWNYNTNITEENVQNMNAGDKWSAFLKEQSTLAQMYPLQEIQNLTVKLQLQAL
 QQNGSSVLSSEDKSKRLNTILNTMSTIYSTGKVCNPDNPQECLLLEPGLNEIMANSLDYNERLWAWESWRSEVGKQLR
 PLYEEYVVLKNEMARANHYEDYGDYWRGDYEVNGVDGYDYSRQLIEDVEHTFEEIKPLYEHLHAYVRAKLMNAYPS
 YISPIGCLPAHLLGDMWGRFWTNLYSLTVPFQKPNIDVTDAMVDQAWDAQRIKFAEKFFVSVGLPNMTQGFWENS
 MLTDPGNVQKAVCHPTAWDLGKGDFRILMCTKVTMDDFLTAHHEMGHIQYDMAYAAQPFLLRNGANEGFHEAVGEIM
 SLSAATPKHLKSIGLLSPDFQEDNETEINFLLKQALTIVGTLPTMYLEKWRWMVFKGEIPKDQWMKKWEMKREIV
 GVVEPVPHDETYCDPASLFHVSNDYSFIRYYTRTLYQFQFQEAALCQAAKHEGPLHKCDISNSTEAGQKLFNMLRLGK
 SEPWTLALENVVGAKNMNVRLNLYFEPLFTWLKDQNKNSFVGWSTDWSPYADQSIKVRISLKSALGDKAYEWNENE
 MYLFRSSVAYAMRQYFLKVKNQMLFGEEDVRVANLKPRISFNFFVTAPKNVSDIIPRTEVEKAIRMSRSRINDAFR
 LNDNSLEFLGIQPTLGPNNQPPVSIWLIVFGVVMGVIVGVILIFTGIRDRKKKNKARSGENPYASIDISKGENNP
 GFQNTDDVQTSF*

Figure 24E: WPRE WT - SEQ ID No.31 nucleotides 8149 to 8753 in SEQ ID No.25

AATTCCTCGATAATCAACCTCTGGATTACAAAATTTGTGAAAGATTGACTGGTATTCTTAACATGTTGCTCCTTTTAA
 CGCTATGTGGATACGCTGCTTTAATGCCTTTGTATCATGCTATTGCTTCCCGTATGGCTTTTCATTTCTCCTCCTTG
 TATAAATCCTGGTGTCTCTTTATGAGGAGTTGTGGCCCGTTGTGAGGCAACGTGGCGTGGTGTGCACTGTGTG
 TGCTGACGCAACCCCCACTGGTTGGGGCATTGCCACCACCTGTGAGCTCCTTTCCGGGACTTTCGCTTTCCCCCTCC
 CTATTGCCACGCGGAACCTCATCGCCGCTGCCTTGCCCGCTGCTGGACAGGGGCTCGGCTGTTGGGCACTGACAAT
 TCCGTGGTGTGTGCGGGGAAGCTGACGTCCTTTCCATGGCTGCTCGCCTGTGTTGCCACCTGGATTCTGCGCGGGAC
 GTCCTTCTGCTAGCTCCCTTCGGCCCTCAATCCAGCGGACCTTCCTTCCCGCGGCCTGCTGCCGGCTCTGCGGCCTC
 TTCCGCGCTCTTCGCCCTTCGCCCTCAGACGAGTCGGATCTCCCTTTGGGCCGCTCCCCGCATCGGG

Figure 24F: polypeptide encoded by Kan/neoR gene (SEQ ID No. 33)

IEQDGLHAGSPAAWVERLFGYDWAQQTIGCSDAAVFRLSAQGRPV
 LFVKTDLSGALNELQDEAARLSWLATTGVPCA AVL DVVTEAGRDWLLLGEPVPGQDLLSS
 HLAPAEKVSIMADAMRRLHTLDPATCFPDHQAHRIERARTRMEAGLVDQDDLDEEHQG
 LAPAELFARLKASMPDGEDLVVTHGDACLPNIMVENGRFSGFIDCGR LGVADRYQDIAL
 ATRDIAEELGGEWADRFLVLYGIAAPDSQRIAFYRLLEFF"

Figure 24G: WPREm - SEQ ID No.98

aattcccgataatcaacctctggattacaaaatgtgaaagattgactggatctttaaactatgttgctccttttacgc
 tatgtggataacgctgctttaatgcctttgtatcatgctattgcttcccgatggctttcatcttctcctccttgataaaa
 tcctggttgctgtctctttatgaggagttgtggcccggtgtgagcgaacgtggcggtgtgcaactgtgtttgctgacgc
 aacccccactggttggggcattgccaccacgtgtcagctcctttccgggactttcgctttccccctccctattgccacgg
 cggaactcatcgccgctgcttgcctgcccgtgctggaacgggctcggtgtgtggcactgacaattccgtggtgtgtcg
 gggaagctgacgtcctttccgggctgctgcctgtgttgccacctggattctgcgcgggacgtccttctgctacgtccc
 ttccggcctcaatccagcggaccttccctcccgcgctgctgcccggctctgcggcctcttcgcgctcttcgcttcgccc
 ctgagacgagtcggatctccctttgggcccgcctccccgcacatcggg

Figure 25

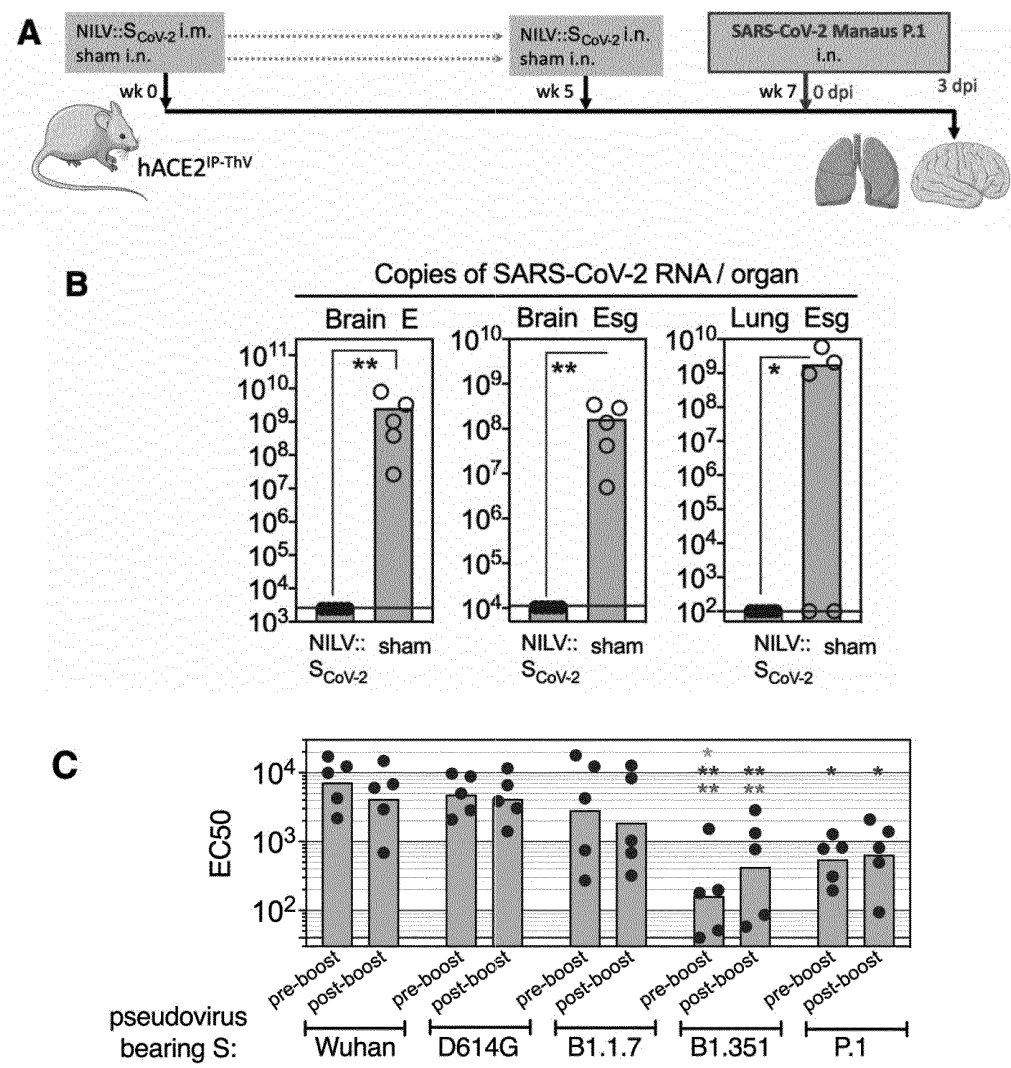


Figure 26

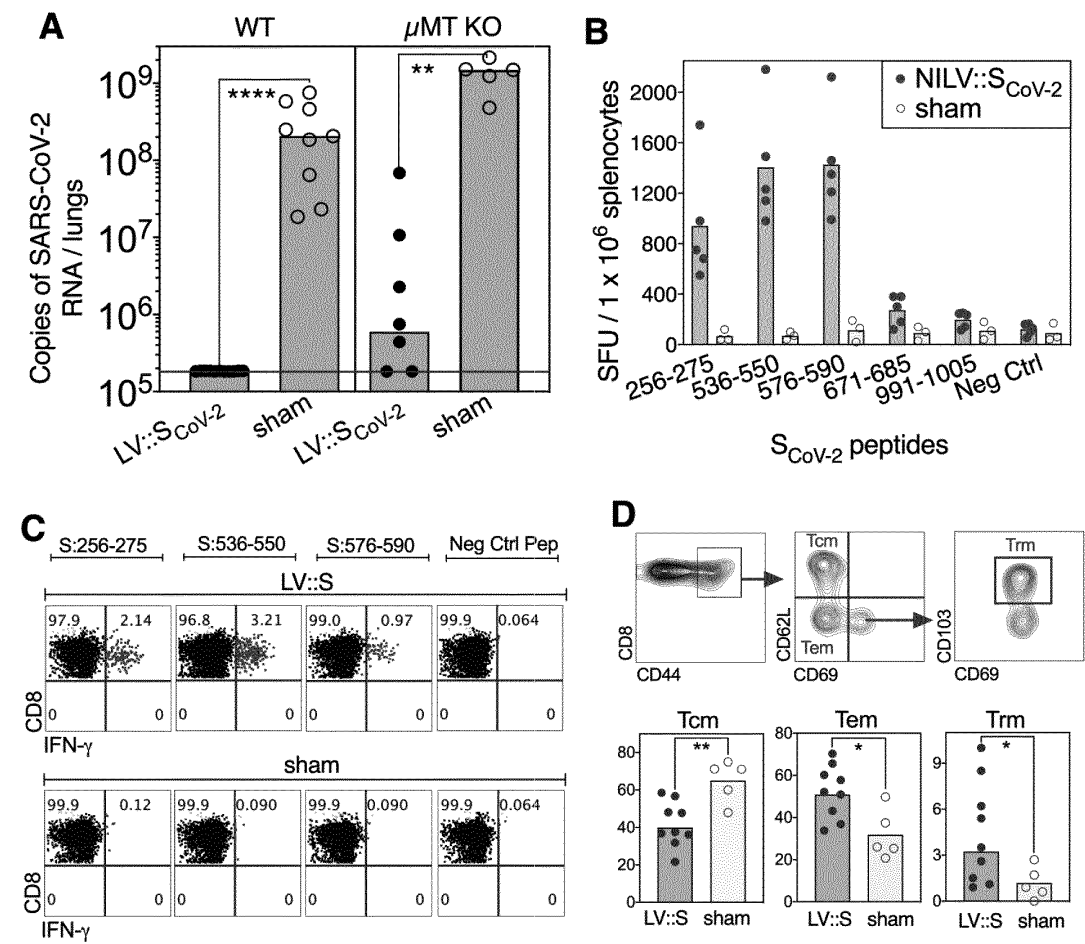


Figure 27

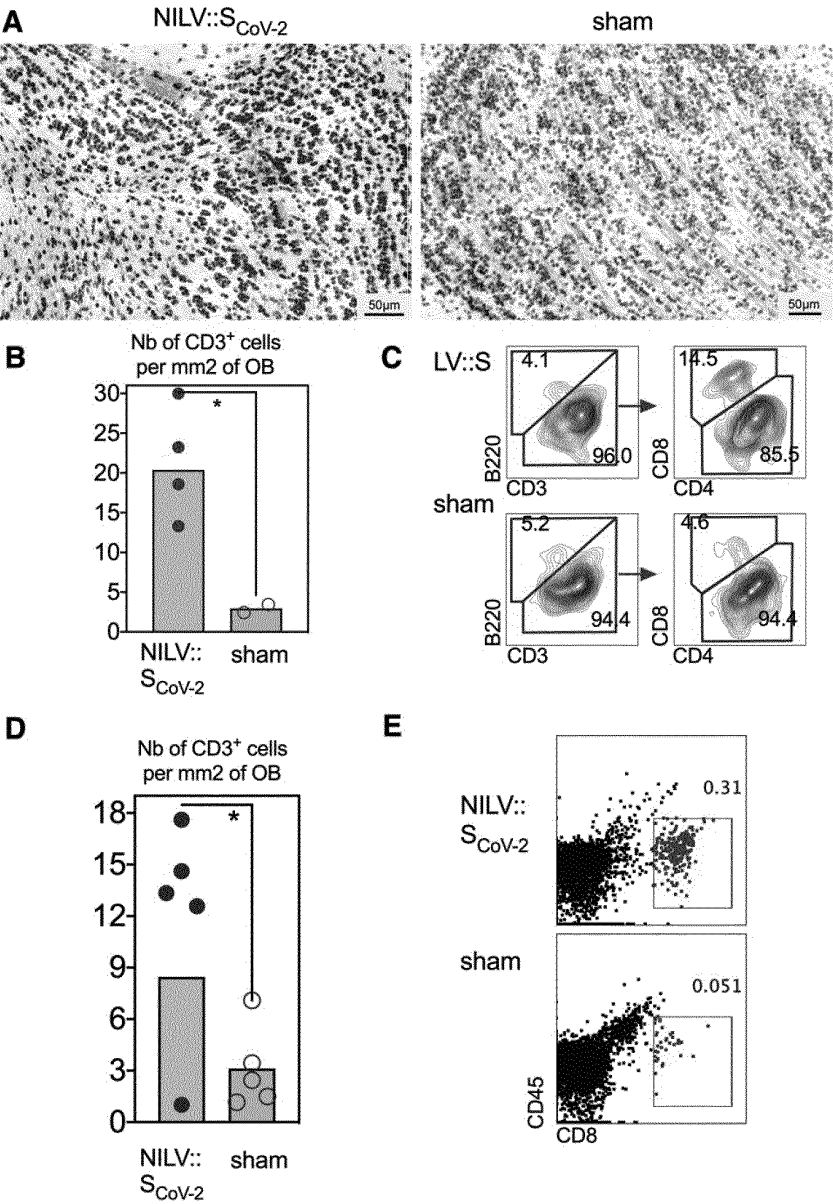


Figure 28

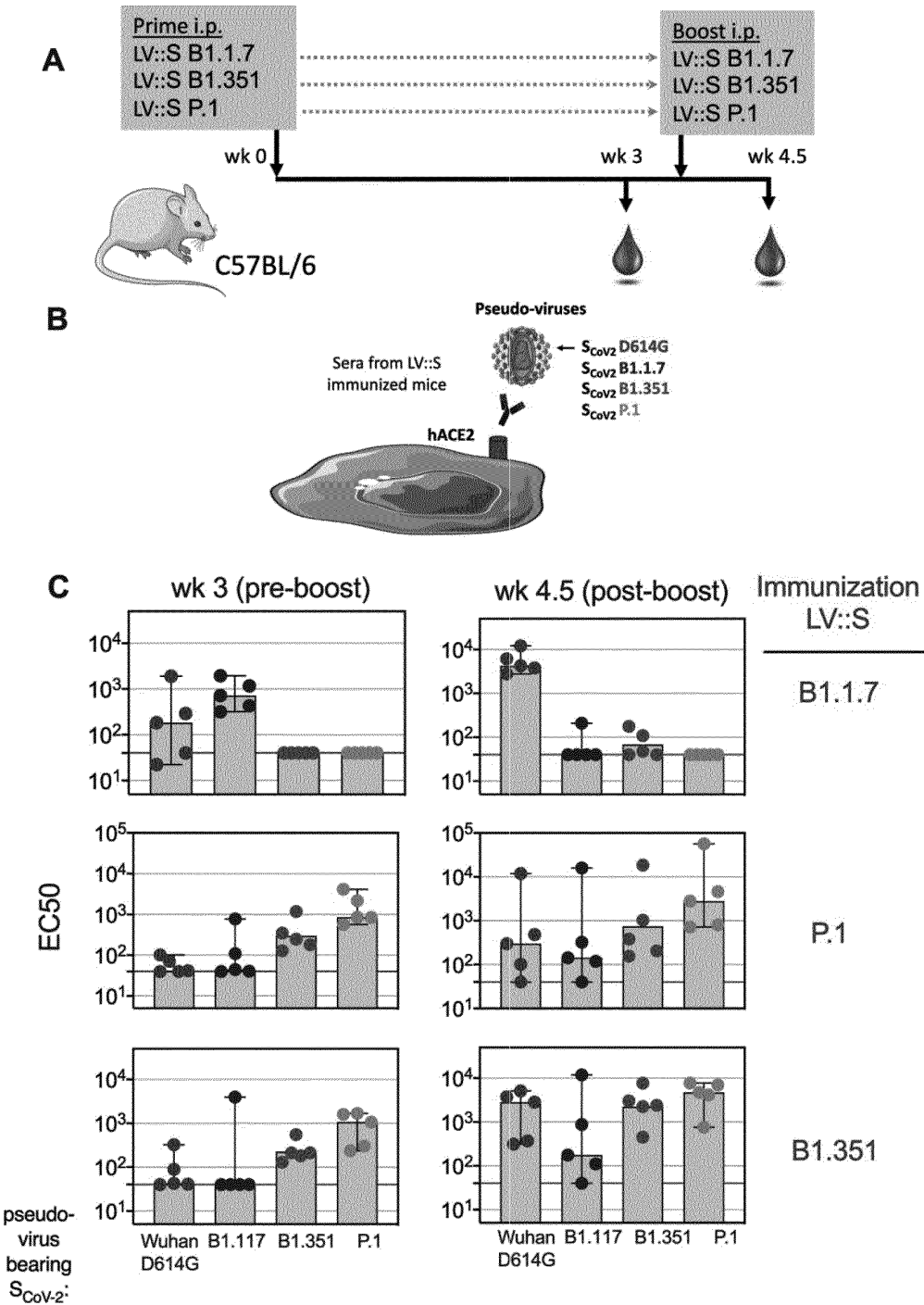


Figure 29

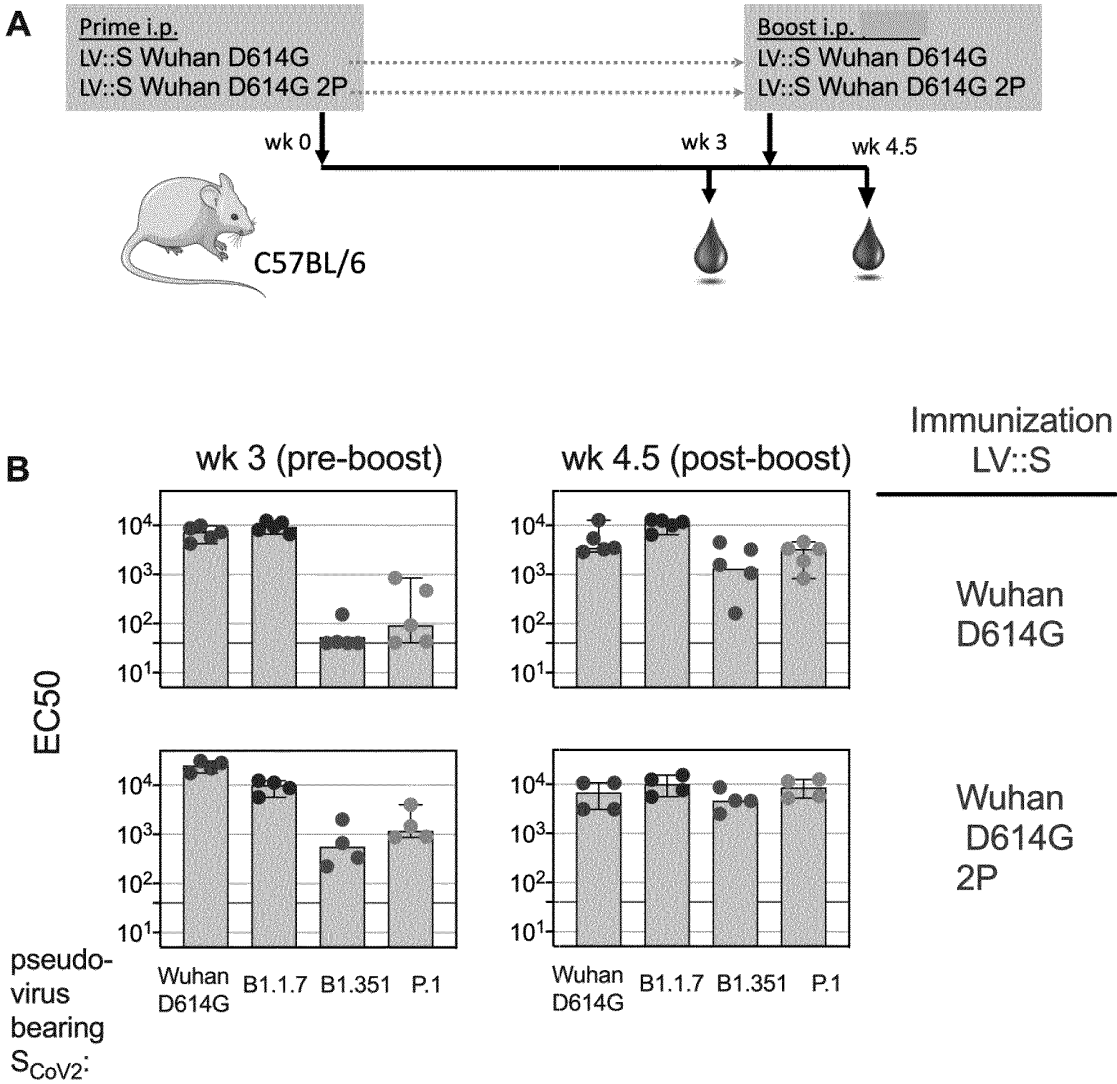


Figure 30

pFlap-ieCMV-S-B117-WPREm

Fig. 30A: Complete nucleotide sequence of pFlap-ieCMV-S-B117-WPREm (10077pb) (SEQ ID NO: 106)

```
ggcggtgggagctttttgcaaaagcctagggcctccaaaaagcctcctactacttctggaatagctcagaggcagaggc
ggcctcggcctctgcataataaaaaaaattagtcagccatggggcggaatgggcggaactgggcggagttagggcg
ggatgggcggagttagggcgggactatggttgctgactaattgagatgcccgcattgattattgactagtgtggaagg
ctaattcactcccaaagaagacaagatatccttgatctgtggaatctaccacacacaaggctacttcctgattagcagaa
ctacacaccaggggccagggtcagatatccactgaccttggatggtgctacaagctagtaccagttgagccagataagg
tagaagaggccaataaaggagagaaacaccagcttggttacacctgtgagcctgcatgggatggatgacccggagagagaa
gtgttgtagtgactctggaactagagatccctcagacccttttagtcagtggtgaaaatctctagcagtgggcgccgaaca
ctgatatcgagcttgctacaagggaactttccgctggggactttccaggaggcgtggcctgggcgggactggggagtggc
gagccctcagatcctgcatataagcagctgctttttgcctgtactgggtctctctggttagaccagatctgagcctggga
gctctctggctaactaggaaccactgcttaagcctcaataaagcttgcccttgagtgttcaagtagtgtgtgcccgtc
tgtgtgtgactctggaactagagatccctcagacccttttagtcagtggtgaaaatctctagcagtgggcgccgaaca
gggacttgaaagcgaaagggaaccagaggagctctctcgacgcaggactcggcttgctgaagcgcgacggcaagggc
gagggcgcgactggtgagtacgcaaaaaatttgactagcggaggctagaaggagagagatgggtgcgagagcgctcag
tattaagcgggggagaatttagatcgcatgggaaaaatctcggttaagggcggggaagaaaaataaaattaaaaac
atatagtatgggcaagcaggagctagaacgattcgagttaatcctggcctgttagaaaatcagaaggctgtagacaa
atactgggacagctacaaccatcccttcagacaggatcagaagaacttagatcattatataatacagtagcaaccctcta
ttgtgtgcatcaaaagtagagataaaagacaccaaggaagctttagacaagatagaggaagagcaaaaaaaagtaaga
ccaccgcacagcaagcgccgctgatcttcagacctggaggaggagatagagggacaattggagaagtgaattatataa
atataaagtagtaaaaaattgaaccattaggagtagcaccaccaaggcaagagagaagagtggtgcagagagaaaaaag
cagtggggaataggagctttgttccttgggttcttgggagcagcaggaagcactatgggcgcagcgtcaatgacgctgacg
gtacaggccagacaattattgtctggtatagtgcagcagcagaacaatttgcgtgagggctattgaggcgcaacagcatct
gttgcaactcacagctctgggcatcaagcagctccaggcaagaatcctggctgtggaagatacctaaggatcaacagc
tcctggggatttggggttgcctctgaaaaactcatttgcaccactgctgtgccttggaaatgctagttggagtaataaatct
ctggaacagatttggaaatcacacgacctggatggagtgggacagagaaattacaattacacaagcttaatacactcctt
aattgaagaatcgcaaaaccagcaagaaaaagaattgaacaagaattattggaattagataaatgggcaagtttgtggaatt
gggttaacatacaaaattggctgtggtatataaaattattcataatgatagtagagggttggtaggtttaagaatagtt
tttgctgtactttctatagtgaatagagttaggcaggagatattcaccattatcgtttcagacccacctcccaaccccgag
gggacccgcagagcccggaaggaatagaagaagaagtgaggagagagacagagacagatccattcgattagtgaacggat
ctcgacggttatcgccgaattcacaattggcagttattcatccacaatttttaaagaaaagggggatttgggggtacagt
caggggaaagaatagtagacataatagcaacagacatacaactaaagaattacaaaaacaaattacaaaaattcacaatt
tttcgggtttattacagggacagcagagatccactttggctgatacgcgtggagtcccggttacataacttacggtaaa
tgcccgccctggtgacgcgccccacgacccccgccattgacgtcaataatgacgtatgttcccatagtaacgccaatag
ggactttccattgacgtcaatgggtggagattttacggtaaaactgcccacttggcagtagcatcaagtgtatcatatgcc
agtacgccccctattgacgtcaatgacgttaaatggccgctggcattatgccagtagacatgaccttatgggactttcc
tacttggcagtagacatctacgtattagtcatcgctattaccatgggtgatgcgggttttggcagtagacatcaatgggcgtggat
agcggtttgactcacggggatttccaaagtctccacccattgacgtcaatgggagtttggtttggcaccacaaatcaacgg
gactttccaaaaatgtcgttaacaactccgccccattgacgcaaatgggcggtaggcgtgtacgggtgggaggtctatataag
cagagcttcgcctggagacgcatccacgctgttttgacctccatagaagacaccgcgatcggatccacaagtttgtaca
aaaaagcagggtgccaccatgttctgtgttctggtgctgtgcccactgggtgtccagtcaagtgcgtgaacctgaccacag
aacacagctgccaccagcctacaccaatagcttcacccgcggagtgtagtactacccgcagaaggtgttccgcagcagcgtgc
tgcatagcaaccaggatctgtttctgcccctcttcagcaacgtgacctggttccacgccaatctccggcaccacatggcacc
aagcgttcgataatcccgctgctgcccttcaacgatggcgtgtactttgccagcaccgagaagtcacaaatcatccgcgg
ctggatcttcggcaccacactggatagcaagacccagagcctgctgatcgtgaacaacgccaccaacgtggtcatcaaaag
tgtgcgagttccagttctgcaacgaccccttctggtgcttaccacaagaacaacaagagctggatggaaagcgagttc
cgcgtgtacagcagcgccaacaactgcaccttcgagtacgtgtccagccattcctgatggacctggaaggcaagcagg
caacttcaagaacctgcgcgagttcgtgttcaagaacctgcacggctacttcaaaatctacagcaagcacacccaatca
acctcgtgcgcgatctgccacagggaattcagtgctctggaacccttgggtggtatctgcccacggcatcaacattaccgcg
tttcagacactgctggccctgcaccgcagttactttgacaccaggcgatagcagcagtggtggacagctggtgccgcgcg
ttactacgttggtatctgcagccacgcacctttctgctgaagtacaacgagaacggcaccatcacccgacgcggtgatt
gtgctctcgatcccctgagcgagacaaagtgcacccctgaagtccttcaccgtcgagaaggcatctaccagaccagcaat
ttccgcgtgcagcccaccgagagcatcgtgcgttccccaatatcaccaatctgtgccccttcggcgaggtgttcaatgc
cacacgttttgcctcgtgtacgcctggaatcgcaagcgcattagcaactgcgtggccgactactcctgctgtacataa
gcgcagcttcagcaccttcaagtgtacggcgtgtcacccaccaagctgaacgacgtgtgttcccaatgtgtacgcc
gacagcttcgtgatccgcggagatgaagtgcacagattgcccaggccagacccgcaagatcgccgactacaattacaa
```

Figure 30A (CONT)

gctgcccagcagacttcacccggctgctgtagcctggaacagcaacaacctggattccaaagtgcggcggaactacaact
acctgtaccgcctgttccgcaagagcaatctgaagcccttcgagcgcgacatcagcaccgaaatctaccaggccggaagc
accccatgcaacggcgtggaaggcttcaactgctacttcccactgcagtcctacggatttcagcccacatattggcgtggg
ctaccagccatattcgagtggtggtgctgagcttcgaactgctgcatgctccagctaccgtgtgcggcccaagaagagta
ccaacctggtcaagaacaaatgctgtaacttcaacttcaacggcctgaccggaacggcgctgctgaccgagagtaacaag
aagttcctgccattccagcagtttggcgcgacattgacgatacaaccgatgcggttcgcatccccagaccttgagat
cctggatattacccccatgctccttcggcggtgctccgtgattacaccaggcaccaataccagcaaccagggtggccgttc
tgtaccaggcggtgaattgcacagaggtgcccgtggccattcacgcgcatcaattgacaccaacatggcgctgtactcc
accggcagcaatgtgtttcaaaccgcgctggatgcctgattggagccgagcacgtgaacaatagctacgagtgcgatat
ccccatcggagccggaatctgcgcctcctatcagacccagaccaatagtcaccgacgagccgaagtgtggccagccaga
gcatcattgcctataccatgagcctggcgccgagaatagcgtggcctactccaacaacagcattgctatccccatcaac
ttcaccatcagcgtgacccagagatcctggcagtgccatgaccaagaccagcgtggactgcaccatgtacatctgcg
agatagcaccgagtgacgaacctgctgctgcagtagcgaagtcttgcacccagctgaatcgcgccctgacaggcattg
ccgtggaacaggataagaacacccaagaggtgttcgcccaagtgaagcaaatctacaagacccaccaatcaaggatttc
ggcggcttcaatttcagccagattctgcccgatccaagcaagccagcaagcgcagcttcacaggaacctgctgttcaa
caaagtgcactggccgacgcggattcatcaagcagtagtggcgattgctggcgcatattgcgcacgcgcatctgattt
gcgccagaagttaacggactgacgctcctgccaccactgctgcagatgagatgatcgccagtagacaaagtgcctgt
ctggccggaaccattaccagcggatggacatttggaggcgggtgcgcctctgcagattcccttcgctatgcagatggccta
ccgcttcaatggcattggcgtgaccagaatgtgctgtacgagaaccagaagctgatcgccaaccagttcaacagcgcca
tcggcaagattcaggacagcctgagtagtaccgcagcgcctctgggaaagctgcaggatgtggtcaaccagaacgctcag
gccctgaacacccctgttaagcagctgagcagcaacttcggcgccatcagtagcgtgctgaacgatattcctggcccgct
ggataaggtggaagccgaggtgcagatcgatcgctgattaccggacgcctgcagtccttcgagacctatgtgacacagc
agctgatccgagccgcgagattcgagctagtgtcaatctggccgccaccaagatgagcgaatgtgtgctgggacagagc
aagcgcgtggacttttgcgcaaggataccacactgatgagcttcccacagagtgctccacacggcggtgttcttgcga
tgtgacctacgtgccgctcaagagaagaatttcaccacgcctccagccatctgccacgacggaaaggccattttccac
gcgagggcggttctgttagcaacggcactcattgggttcgtcaccacagcgcaacttctacgagccccagatcatcaccac
cacaacaccttcgtcagcggcaactgcgacgtcgtgatcggcattgtgaacaacacccgtgtacgatccactgcagccga
gctggacagcttcaaaaggaactggacaagtactttaagaaccacacaagccccgacgtggacctgggagacattagcg
gaatcaacgcagcgtggtcaacatccagaaagagattgacgcctgaacgaggtggccaagaatctgaacgagagcctg
atcgactgcagaactgggcaaatcagagcagtagacattgaagtgcccttggtacatctggctgggttctattgcggact
gattgccatcgtgatggtcaccattatgctgtgctgcatgaccagttgctgcagctgctgaagggatgctgcagttgcg
gaagctgctgcaagttcgacgaggtgatagcagccagtgctgaagggcgcaagctgcactacacctgatagtaaac
cagctttctgtacaaagtggctcctgagttcccgcataatcaacctctggattacaaaatttgtgaaagattgactggtat
tcttaactatgttgctccttttacgctatgtggatacgtgctttaatgcctttgtatcatgctattgcttcccgtatgg
ctttcatttctcctccttctgtataaatcctgggtgctgtctcttattagaggattgtggcccggttctcaggcaacgtggc
gtggtgtgactgtgttgcagcgaacccccactggttggggcattggccaccacctgtcagctccttccgggacttt
cgctttccccctcctattggccacggcggaactcatgcgcgctgccttgcgcgctgctggacaggggctcggtgttgg
gcactgacaattccgtggtgttgcgggaagctgacgtccttccgcggctgctgcctgtgttggccacctggattctg
cgcggaagcgtccttctgctacgtccttcggcctcaatccagcggacctccttcccgcggcctgctgcggctctgcg
gccttctccgcgtcttcgccttcgcctcagacagtgctgctccttggggcgcctccccgcgggtacctttaagacc
aatgactacaagcgagctgtagatcttagcactttttaaaagaaaggggactggaagggctaatcactcccaac
gaagcaaaaatcgcgagatgctgcatataagcagctgcttttgcctgtactgggtctctctggttagaccagatct
gagcctgggagctctctggctaactagggaacccactgcttaagcctcaataaagcttgcccttgagtgttcaagtagtg
tgtgccgctctgttgtgtgactctggttaactagagatccctcagacccttttagtcagtggtgaaaatctctagcagttc
tagagggcccggttaaacccgctgatcagcctcagctgtgccttctagttgccagccatctgttgtttgcccctccccg
tgcttctccttgacctggaaggtgcaactcccactgtccttccctaataaaatgaggaaattgcatcgcatgtgtgag
aggtgtcattctattctgggggtgggtggggcaggacagcaaggggaggttgggaagacaatagcagcgatgctgg
ggatgcggtgggctctatggcttctactggcggttttatggacagcaagcgaacgggaattgccagctggggcgccctc
tggttaaggttgggaagccctgcaaagtaactggatggcttcttgcgcgaaggtatctgatggcgaggggatcaagct
ctgatcaagagacaggatgaggatcgtttcgcatgattgaacaagatggattgcacgcaggttctccggccgcttgggtg
gagaggtattcggctatgactgggcacaacagacaatcggtgctctgatgcgcgctgttccggctgtcagcgcaggg
gcgcccgggttcttttgcgaagaccgacctgtccggtgcctgaatgaactgcaagacgagcagcgcggtatcgtggc
tgccacgacggggcgttcccttgcgagctgtgctcgagttgtcactgaagcgggaaggaggtgctgtattggcgaa
gtgcccggggcaggatctcctgtcatctcaccttgcctcgcgagaaagtatccatcatggtgatgcaatgcggcggt
gcatacgttgatccggctacctgcccattcgaccaaccaagcgaacatcgcatcgagcagcagctactcggtggaag
ccggtcttgcgatcaggatgatctggacgaagacatcaggggctcgcgcagccgaactgttcgccaggtcaaggcg
agcatgcccgcagcggcaggatctcgtcgtgacctggcgatgcctgcttgcgaatatcatggtggaatggccgctt
ttctgattcatcgactgtggccggtgggtgtggcgacgctatcaggacatagcgttggctaccgctgatattgctg
aagagcttggcggcgaaatggcgtgacgccttctcgtgcttccaggtatcgcgctcccgtatccgagctcgccttc
tatcgcttcttgacgagttcttctgaattattaacgcttacaatttctgatgcggtattttctccttacgcatctgtg
cggtatttcacaccgcatcaggtggcacttttcggggaaatgtgcgcggaacccctatttgtttatttttctaaatacat
tcaaatatgtatccgctcatgagacaataaccctgataaatgttcaataatagcagctgctaaaacttcatttttaatt
taaaaggatctaggtgaagatccttttggataatctcatgacaaaatcccttaacgtgagtttctgctccactgagcgt

Figure 30A (CON'T)

cagaccccgtagaaaagatcaaaggatcttcttgagatccttttttctgcgcgtaatctgctgcttgcaaacaaaaaa
ccaccgctaccagcgggtggtttgttgccggatcaagagctaccaactctttttccgaaggtaactggcttcagcagagc
gcagataccaaatactgttcttctagtgtagccgtagttaggccaccacttcaagaactctgtagcaccgcctacatacc
tcgctctgctaatactgttaccagtggctgctgccagtggcgataagtcgtgtcttaccgggttggaactcaagacgatac
ttaccggataaggcgcagcggctcgggtgaacggggggttcgtgcacacagcccagcttggagcgaacgacctacaccga
actgagatacctacagcgtgagctatgagaaaagcgccacgcttccgaaggagaaaaggcgacaggtatccggtaagcg
gcagggtcggaacaggagagcgcacgagggagcttccagggggaaacgcctggtatctttatagtcctgtcgggttcgc
cacctctgacttgagcgtcgatttttgtgatgctcgtcagggggcgagcctatggaaaaacgccagcaacgcggcctt
tttacggttcctggccttttgccttttgcctcacaatgttcttgctgcttcgcgatgtacgggacagataacgc

atgttctggtgtttctggtgctgtgtgccactggtgtgccagtcagtcgctgaacctgaccacacgaacacagctgccaccagc
ctacaccaaatagcttcaccgcgagtgactaccgccacaagtggttccgcagcagcgtgtcgcatagcacccaggatc
tggtttctgccccttcttcagcaacgtgacctggtttccacgccactctccggcaccaatggcaccacagcgtctcgataatccc
gtgctgccttcaacagatggcgtgtacttttgcagcacggagaagttcaatcatctccggctggatcttcggcaccac
acttgatagcaagaccgagcctgctgatcgtgaacaacgccaccaacgtggtcatcaaaagttgtgcaggttccagttct
gcaacgaccccttctctgggctgtaccacaagaacaacaagagctggatggaagcgagttccgcgtgtacagcagcgcc
aacaactgcaccttcgagtacgtgtcccgaccattcctgatggacctggaaggcaagcagggcaacttcaagaacctgcg
cgagttcgtggttcaagaacatcgacgctacttcaaaatctacagacaagcacaccccaactcaacctctgtgcgcgtatgc
cacaggatctcagtgctctggaacccctggtgatctgcccactgcgcatacaactaacccgtttcagacatctgtgcgg
ctgcaccgcgattacttgacacaggcgatagcagcagtggtggacagctggtgcccgcgcttactacgttggatatct
gcagccacgcacctttctgctgaagtacaacgagaacggcaccatcacccagcgccgtggattgtgctctcgatccctga
gcgagacaaagtcacccctgaagtctctccacgtcgagaaggcgatctacagaccagcaatttccgcgtgcagccacc
gagagcatcgtgcgcttccccaatatccaactctgtgccccttcggcgaggtgttcaaatgacacacgctttgctccgt
tgacgctggaatcgaaagcgattagcaactgcgtgtgcgcactccgtgtgttcaaatagcggcagcttcgacacct
tcaagtgtcacggcgtgtcaccaccaagctgaacgacctgtgcttccaatgtgtacgcgcagcagcttcgtgatccg
ggagatgaagtgcgacagattgccccaggccagaccggcaagatcgccgactacaattacaagctgcccgcagacttcac
cggtcgtgatcgctggaacagcaacaacctggattccaagtctggcggaactacaactacctgtaccgcctgttcc
gcaagagcaattgaagcccttcgagcgcgacatcagcacccgaatctaccagggcgggaagcaccctgcaacggcgct
gaaggttcaactgcgtacttcccactgcgtctcaggtattcagccacatattggcgtggctaccagccatcgagtg
ggtggtgctgagcttcgaactgctgatgctccagctaccgtgtgcggccccaagaagagtaccaacctggtcaagaaca
aatgctggaacttcaactcaacggcctgaccggaaacggcgctgtgaccgagagtaacaagaagttcttgccattccag
cagtttggccgcgacattgacgatacaaccgatgccgttcgcgatccccagaccttggagatcctggatatatccccatg
ctccttcggcgcgctgctgctgattacacaggcaccnaatcacagcaacacaggtggccgttctgtaccagggcgatgaatt
gcacagagtgccgctggccattcacggcgatcaattgacaccaactggcgctgtatccaccggcgcaatgtgtt
taaacccgcgctggatgctgattggagcgcgacgtgaacaatagctacgagtgcgatatccccatcggagccggaat
ctgcgcctcctatcagaccagaccaatagtcacccagcagccgaagtggtgccagccagagcatcattgccatatcca
tgagcctggggcgccgagatagcgtggcctactccaacaacacgattgtctatccccatcggcttcaacctcagcgtgacc
accgagatcctgcagcttccatgaccaaagcagctggactgcaccatgtacatctgcggagatagcaccagtgcgag
caacctgctgctgcagtacggaagtttctgcacccagctgaatcgcgccctgacaggcattgacctggaacaggataaga
acacccaagaggtgttcgcccgaagtgaagcaaatctacaagaccccccaaatcaaggatttcggcggttcaatttcagc
cagattctgcccgatccaagcaagccagcaagcgcagcttcacgaggacctgctgttcaacaaagtgacactggccga
cgccggtatcatcaagcagtatggcgattgctgtggcgatatattgccgcacgcgactgtgatttgcgccagaagtttaacg
gactgacctctgcgcacctgctgcacgatgagatgacgccagtcacaaagtgccctgctggccggaaccttac
acgggatggacatttggagccgggtgcgctgtgcagattcccttcgctatgcagatggcctaccgcttcaattggattgg
cgtgaccagaatgtgctgtacgagaaccagaagctgatcgccaaccagttcaacagcgccatcggaagattcaggaca
gcctgagtagtacgccagcgctctgggaaagctgcaggatgtggtcaaccagaacgctcaggcctgaacacctggtt
aagcagctgagcagcaacttcggcgccatcagtagcgtgtgtaacgatattcctggcccgctggataaggtggaagccga
ggtgcagatcgatgcctgattaccggcagcgtgcagtcctgcgacacctatgtgacacagcagctgatcgagccgcg
gatttcgagctagtgtctaattcggcgccaccaagatgagcgaatgtgtgctgggacagagcaagcgcgtggactttgc
ggcaagggataccacctgatgagcttcccacagagtgctccacacggcggtggtgtttctgcatgtgacctacgtgccgc
tcaagagaagaatttcaacaaccgctccagccatctgcacgacggaaagccatttccacgcgaggggcggtgttcgtta
gcaacggcactcattggtctgctcaccagcgcaactctacgagccccagatcatcaccaccacaacaccttcgtcagc
ggcaactgcgacgttgtgtatcggtattgtgaacaacaccgtgtgacatccactgcagccgagctggacagcttcaaga
ggaactggacaagtactttaagaaccacacaagccccgacgtggacattgggagacatttagcgaatcaacgcgacgctgg
tcaacatccagaaaagagattgaccgcctgaacgaggtggccaagaatctgaacgagagcctgatcgacctgcaagaactg
ggcaaatacgagcagtagatatagtggtccctgtgtacatctggctgggttcatcgcgagctgattgcatcgtgatgtg
caccattatgctgtgctgatgaccagttctgctgacgtgctgagggatgctgcagttgcggaaagctgctgcaagttcg
acgaggtatgtagcagcagcagctgaaggcctcaagctgacatcaccttga

Fig. 30C: Amino-Acid sequence of Spike SARS-Cov2 B.1.1.7 gene (codon optimized) (SEQ ID NO: 108)

S-B117 (1270aa)

MFVFLVLLPLVSSQCVNLTRTQLPPAYTNSFTRGVYYPDKVFRSSVLHSTQDLFLPFFSNVTWFHAISGTNGTKRFDNP
VLPFNDGVYFASTEKSNIIRGWIFGTTLDSTQSLIVNNATNVVIKVEFQFCNDPFLGVYHKNNKSWMESEFRVYSSA
NNCTFEYVSQPFLMDLEGKQGNFKNLREFVFNIDGYFKIYSKHTPINLVRDLPGGFSALEPLVDLPIGINITRFQTLLA
LHRSYLTGDSSSGWTAGAAAYYGYLQPRTFLLKYNENGITDAVDCALDPLSETKCTLKSFTVEKGIYQTSNFRVQPT
ESIVRFPNITNLCFFGEVFNATRFASVYAWNRRKRISNCVADYSVLVNSASFSTFKCYGVSPTKLNDLCFTNVYADSFVIR
GDEVQRQIAPGQTGKIADYNYKLPDDFTGCVIAWNSNNLDSKVGNGYNYLYRLFRKSNLKPFERDISTEIQAGSTPCNGV
EGFNCYFPLQSYGFQPTYGVGYQPYRVVLSFELLHAPATVCGPKKSTNLVKNKCVNFNFNGLTGTGVLTESNKKFLPFQ
QFGRDIDDDTTDAVRDPQTEILDITPCSFGGVSVITPGTNTSNQVAVLYQGVNCTEVPVAIHADQLTPTWRVYSTGSNVF
QTRAGCLIGAETHVNNSECDIPIGAGICASYQTQTNSHRRARSVASQSI IAYTMSLGAENSVAYSNNIAIPINFITISVT
TEILPVSMTKTSVDCTMYICGDSSTECNLLLQYGSFCTQLNRALTGIAVEQDKNTQEVFAQVKQIYKTPPIKDFGGFNFS
QILPDPSKPSKRSFIEDLLFNKVTADAGFIKQYGDCLGDIAARDLICAQKFNGLTVLPPLLTDEMQYTSALLAGTIT
SGWTFGAGAAALQIPFAMQMAYRFNGIGVTQNVLYENQKLIANQFNSAIGKIQDSLSTASALGKLQDVVNQNAQALNTLV
KQLSSNFGAISSVLNDILARLDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASANLAATKMSECVLGQSKRVDFC
GKGYHLSMFPQSAPHGVVFLHVTYVPAQEKNFHTTAPAI CHDGAHFPPREGVFVSNGTHWFVTQRNFYEPQIIITHNTFVS
GNCDVVGIVNNTVYDPLQPELDSFKEELDKYFKNHTSPDVDLGDISGINASVVNIQKEIDRLNEVAKNLNESLIDLQEL
GKYEQYIKWPWYIWLGFIAGLIAIVMTIMLCCMTSCCSCLGCCSCGSCCKFDEDDSEPVLGKVKLHYT

Figure 31

pFlap-ieCMV-S-B351-WPREm

Fig. 31A: Complete nucleotide sequence of pFlap-ieCMV-S-B351-WPREm (10077pb) (SEQ ID NO: 109)

```
ggcggttgggagcttttttgcataaataaaaaaattagtcagccatggggcgagagaatgggagggaactgggagggttaggggag
ggcctcggcctctgcataaataaaaaaattagtcagccatggggcgagagaatgggagggaactgggagggttaggggag
ggatgggagggttaggggagggttaggttgctgactaattgagatgcccagacattgattattgactagttggaagg
ctaattcactccaaagaagacaagatatccttgatctgtggtactaccacacacaaggctacttccctgatttagcagaa
ctacacaccaggggcagggttagatataccactgacctttggatgggtgctacaagctagtaccagttgagccagataagg
tagaaggaggccaataaaaggagagaaacaccagcttggttacaccctgtgagcctgcatgggatggatgacccggagagagaa
gtgttagagtggagggttagacagccgcttagcatttcatcagctggcccgagagctgcatccggagtagcttcaagaactg
ctgatatcgagcttgctacaagggaactttccgctggggactttccaggggaggcgtggcctgggagggttaggggagtg
gagccctcagatcctgcataaagcagctgctttttgctgtactgggtctctctggttagaccagatctgagcctggga
gctctctggcctaactaggggaaccactgcttaagcctcaataaagccttgcttgagtgcttcaagtagtggctgcccgtc
tggtgtgtgactctggttaactagagatccctcagacccttttagtcagtggtggaaaatctctagcagtggtggccgaca
gggacttgaaagcgaaagggaaccagaggagctctctcgacgcaggactcggcttgctgaagcgcgacggcaagaggc
gagggcgaggcagctggtgagtagcgcataaaatattgactagcggaggctagaaggagagagatgggtgagagagcgtcag
tattaagcgggggagaattagatcgcgatgggaaaaatctcggttaaggccagggggaaagaaaaataaaattaaaaa
atagtagtatgggcaagcaggagctagaacgattcgcagtttaacctggcctgttagaaacatcagaaggctgtagacaa
atactgggacagctacaaccatcccttcagacaggatcagaagaacttagatcattatataatacagtagcaaccctcta
ttgtgtgcatcaaggatagagataaaagacaccaagggaagctttagacaagatagagggaagagcaaaacaaagtaaga
ccaccgcacagcaagcgccgctgatcttcagacctggaggaggagatatgagggacaattggagaagtgaattatataa
atataaagtagtaaaaaattgaaccattagagtagcaccaccaaggcaagagaagagtgggtgcagagagaaaaaagag
cagtgagggaatagggagcttggctcctgggttcttgggagcagcaggaagcactatgggagcagcgtcaatgacgctgacg
gtacaggccagacaattattgtctggtatagtgacgagcagaacaatttgcaggggtattgaggcgcaacagcatct
gttgcaactcacagctctgggcatcaagcagctccaggcaagaatcctggctgtgaaagatacctaaggatcaacagc
tcctggggatttggggtgctctggaaaaactcatttgcaccactgctgtgccttggaaatgctagttggagtaataaatct
ctggaacagatttgggaatcacacgacctggatggagtgggacagagaaaattaaacaattacacaagcttaatacactcctt
aattgaagaatcgcaaaaccagcaagaaaagaatgaacaagaattatttgaattagataaatgggcaagtttgggaatt
ggtttaacatacaaaattggctgtggtatataaaattattcataatgatagtaggaggcttggtaggtttaagaatagtt
tttgctgtactttctatagtgaaatagagtttaggcagggtatctcaccattatcgcttcagacccacctcccaaccccgag
gggacccgcagagcccgcaaggaatagaagaagagtgaggagagagacagagacagatccattcgattagtgaaaggat
ctcgacgggtatcgccgaattcacaaatggcagttatccacaattttaaagaaaagggggatttggggggtacagtg
caggggaaagaatagtagacataatagcaacagacatacaaaactaaagaattacaaaaacaaattacaaaaattcaaaat
tttcgggtttattacagggacagcagagatccacttggctgatacgcgtggagtccgcgttacataaactacggtaaa
tgcccgccctggctgaccgcccacgaccccgccattgacgtcaataatgacgtatgttcccatagtaaacgccaatag
ggactttccattgagctgaatgggtggagtattttaggttaaaactggcacttggcagtagacatcaagtgtagtatgcca
agtagcccccctattgacgtcaatgacgggttaaatggccgctggcattatgcccagtagacatgacctatgggactttcc
tacttggcagtagacatctacgtattagtcacgtattaccatgggtgatgcgggttttggcagtagacatcaatggcggtggat
agcggtttgactcacggggtttccaagctccacccattgacgtcaatgggagtttgggttggcaccacaaatcaacgg
gactttccaaaatgtcgtaaaactccgccccattgacgcacaaatgggaggtaggcgtgtacgggtgggaggtctatataag
cagagcttcgctggagacgcccacacgctgttttgacctccatagaagacaccgcatcggtatccacaagtttgtaca
aaaaagcagggtgccaccatgttcgtgtttctgggtgctgctgccactgggtgtccagtcagtgcggtgaacttcaccacacg
aacacagctgccaccagcctacaccaatagcttcaccccgagtagtgactacccgcagaagtggttcgcgacgagcgtgc
tgcatagcaccaggatctgtttctgcccctcttcagcaacgtgacctggttccacgcatccacgtgtccggcaccaat
ggcaccagcgcttcgctaatacccgctgctgcccctcaacgatggcgtgtactttgcccagcaccgagaaagtcacaaatcat
ccgcggtggatcttcggcaccacactggatagcaagaccagagcctgctgtatcgtgaacaacgcatccaaactggttca
tcaaagtgtgcaggttccagttctgcaacgacccctctctggcgcttactaccacaagaacaacaagagctggatggaa
agcaggttccgctgtacagcagcgccaaacactgcaccttcgagtagctgtccagccattcctgatggacctggaagg
caagcaggggcaacttcaagaacctgcgcgagttcgtgttcaagaacatcgacggctacttcaaaatctacagcaagcaca
ccccaatcaacctcgtgcgcggcctgccacagggttcagtgctctggaacccctgggtggatctgcccacggcatcaac
attacccgcttttcagacactgcaccgagttacttgacaccaggcgatagcagcagtggtggacagctggtgccgcccgc
ttactacgttggatctctgcagccacgcacctttctgctgaagtacaacgagaaacggcaccatcacgcagcgcgtggatt
gtgctctcgatcccctgagcgagacaaagtgcacccctgaagtccttcacgcgtcgagaaggcatctaccagaccagcaat
ttccgctgtagcccccagagagcatcgtgcgcttcccccaatatcaccaatctgtgccccttcggcgaggtgttcaatgc
cacagcttttgcctcgtgtacgcctggaatcgcaagcgtattagcaactgcgtgcccagactactccgtgctgtacaata
gcccagcttcagcaccttcaagtgtacggcgtgtcacccaccaagctgaacgacgtgtgttcccaatgtgtacgccc
gacagcttcgtgatccgcggagatgaagtgcgacagattgcccaggccagaccggcaacatcgccgactacaattacaa
```

WO 2022/013405
Figure 31A (CON'T)

57/75

PCT/EP2021/069890

gctgcccgcagacttcacccggctgctgtagcctggaacagcaacaacctggattccaaagtgcggcggaactacaact
acctgtaccgcctgttccgcaagagcaatctgaagcccttcgagcgcgacatcagcaccgaaatctaccaggccggaagc
accccatgcaacggcgtgaaaggcttcaactgctacttcccactgcagtcctacggatttcagcccacatatggcgtggg
ctaccagccatatcgagtggtggtgctgagcttcgaactgctgcatgctccagctaccgtgtgcggcccaagaagagta
ccaacctggtcaagaacaatgctgtaacttcaacttcaacggcctgaccggaaccggcgtgctgaccgagagtaacaag
aagttcctgccattccagcagtttggcgcgacattgcccatacaaccgatgcccgttcgcgacccccagaccttgagat
cctggatattacccccatgctccttcggcggtgctccgtgattacaccaggcaccaataccagcaaccagggtggcgttc
tgtaccaggcggtgaattgcacagaggtgcccgtggccattcacgcgatcaattgacaccaacatggcgcgtgtactcc
accggcagcaatgtgttccaaaccgcgctggatgctgattggagccgagcagtgaaacaatagctacgagtgcgatat
ccccatcggagccggaatctgcgcctcctatcagaccagaccaatagtcacacgacgagcccgaggtgtggccagccaga
gcatcattgctataccatgagcctggcggtggagaatagcgtggcctactccaacaacagcattgctatccccaccaac
ttcaccatcagcgtgaccacccagatcctgcccagtgtccatgaccaagaccagcgtggactgcaccatgtacatctgcg
agatagcaccgagtgacgaacctgctgctgcagtagcgaagtcttgcacccagctgaatcgccctgacaggcattg
ccgtggaacaggataagaacacccaagaggtgttcgcccaagtgaagcaaatctacaagacccaccaatcaaggatttc
ggcggcttcaatttcagccagattctgcccgatccaagcaagccagcaagcgcagcttcatcgaggacctgctgttcaa
caaagtgcactggccgacgcgggattcatcaagcagtagtggcgattgctggcgatattgcgcgacgcgatctgattt
gcgccagaagttaacggactgacgctcctgccaccactgctgcagatgagatgatgcgccagtacacaagtgccctg
ctggccggaaccattaccagcggatggacatttggagcgggtgcgcgtctgcagattcccttcgctatgcagatggccta
ccgcttcaatggcattggcgtgaccagaatgtgctgtacgagaaccagaagctgatcgccaaccagttcaacagcgcca
tcggcaagattcaggacagcctgagtagtaccgcagcgtctggaagctgcaggatgtggtcaaccagaacgctcag
gccctgaacacccctgttaagcagctgagcagcaacttcggcgccatcagtagcgtgctgaacgatctctgagccgct
ggataaggtggaagccgaggtgcagatcgatcgctgattaccggagcctcgcagtccttcgagacctatgtgacacagc
agctgatccgagccgcgagattcgagctagtgtcaatctggccgccaccaagatgagcgaatgtgtgctgggacagagc
aagcgcgtggacttttgcggcaaggataccacactgatgagcttcccacagagtgctccacacggcgtgtgttctgca
tgtgacctacgtgccgctcaagagaagaatttcaccacccgctccagccatctgccacgacggaaaggcccattttccac
gcgagggcggttctgttagcaacggcactcattgggttcgtcaccacgcgcaacttctacgagccccagatcatcaccac
gacaacaccttcgtcagcggcaactgcgacgtcgtgatcgccattgtgaacaacacccgtgtacgatccactgcagccga
gctggacagcttcaaaaggaactggacaagtactttaagaaccacacaagccccgacgtggacacctgggagacattagcg
gaatcaacgcgcagcgtgtgtaacatccagaaagagattgacgcctgaacgaggtggccaagaatctgaacgagagcctg
atcgactcgcaagaactgggcaaatcagagcagtagacatttggccttggtacatctggctgggttctattgcccgaat
gattgccatcgtgatgggtcaccattatgctgtgctgcatgaccagttgctgcagctgctgaagggatgctgcagttgcg
gaagctgctgcaagttcgacgaggtgatagcgagccagtgctgaagggcgctcaagctgactacacctgatagtaaac
cagcttcttgtaaaagtggctctcgagttcccgcataatcaacctctggattacaaaatttgtaaaagattgactggtat
tcttaactatgttgccttctttagctatgtggatacgtgctttaaagccttctgtatcatgctattgcttcccgtatgg
ctttcatttctcctccttctgtataaatcctgggtgctgctcttctttagagagttgtggcccggttcttcaggcaacgtggc
gtggtgtgactgtgttctgacgcaacccccactgggtggggcatttgcacacacctgtcagctccttccgggacttt
cgcttccccctcctatttgccacggcggaactcatgcgcctgccttgcgcgtgctggacaggggctcggtgttgg
gcactgacaattccgtggtgttgcgggaagctgacgtccttccgcggctgctgcctgtgttgccacctggattctg
cgcggaacgtccttctgctacgtccttccgcctcaatccagcggaccttcttcccgcggcctgctgcggcctctgcg
gccttctccgcgtcttgccttccgcctcagacgagtgctgctccttgggcgcctccccgcggtagctttaaagacc
aatgacttacaggcagctgtagatcttagcactttttaaagaaaaggggactggaagggtctaatctcactcccaac
gaagacaaaatcgctcgagatgctgcatataagcagctgcttttgccttgactgggtctctctggttagaccagatct
gagcctgggagctctctggctaactaggaacccactgcttaagcctcaataaagcttgcttgagtgcttcaagtagtg
tgtgccgctctgttgtgactctggttaactagagatccctcagaccctttagtcagtggtgaaaatctctagcagttc
tagagggcccggtttaaaccgcgtgatcagcctcagctgtgcttctagttgccagccatctgtgttggccctccccg
tgcttctccttgacctggaaggtgcaactcccactgtccttccctaataaaatgaggaaattgcatcgcatgtctgagt
aggtgtcattctattctgggggtgggtggggcaggacagcaagggggaggattgggaagacaatagcagcagctggtg
ggatgcggtgggctctatggcttctactggcggttttatggacagcaagcgaaccggaattgccagctggggcgccctc
tggttaaggttggaagccctgcaaagtaaaactggatggcttcttgcgcgaaggtatctgatggcgaggggatcaagct
ctgatcaagagacaggatgaggatcgttccgatgattgaacaagatggattgcacgcaggttctccgcgcgcttggtg
gagaggtattcggctatgactgggcacaacagacaatcggtgctctgatgcgcgcgtgttccggctgtcagcgcaggg
gcgcgcggttcttttgcgaagaccgacctgtccggtgcctgaatgaactgcaagacgagcagcgcggtatctgtggc
tgccacgacggcggttcccttgcgagctgtgctcgagttgtcactgaagcgggaaggactggctgtattggcgcaa
gtgcggggcaggatctcctgtcatctcaccttgcctcgcgagaaagtatccatcatggctgatgcaatgcggcggt
gcatacgttgatccggctacctgcccattcgaccaccaagcgaacatcgcatcgagcagcagctactcgatggaag
ccggtcttgatcaggtgatctggacgaagagcatcaggggtcgcgcgcagccgaactgttcgccaggtcaaggcg
agcatgcccgcagcggaggtatctcgtgacccatggcgatgcctgcttgcgaatatcatgggtggaatggccgctt
ttctgattcatcgactgtggcggtgggtgtggcgaccgctatcaggacatagcgttggtaccgctgatattgctg
aagagcttggcggcgaaatggcgttccgtgcttccgttatcgcgctccgctccgattccgagcagcagccttcc
tatcgcttcttgacgagttcttctgaattattaacgcttacaatttctgatgcggtatttctccttacgcatctgtg
cggtatttcacaccgcatcaggtggcacttttcggggaaatgtgcgcggaacccctattgtttattttctaaatacat
tcaaatatgtatccgctcatgagacaataaccctgataaatgttcaataatagcagctgctaaaacttcatttttaatt
taaaaggatctaggtgaagatccttttggataatctcatgacaaaatcccttaacgtgagtttctgttccactgagcgt

WO 2022/013405

58/75

PCT/EP2021/069890

Figure 31A (CON'T)

cagaccccgtagaaaagatcaaaggatcttcttgagatccttttttctgcgcgtaatctgctgcttgcaaacaaaaaa
ccaccgctaccagcgggtggtttgttgccggatcaagagctaccaactctttttccgaaggtaactggcttcagcagagc
gcagataccaaatactgttcttctagtgtagccgtagttaggccaccacttcaagaactctgtagcaccgcctacatacc
tcgctctgctaatactgttaccagtggctgctgccagtggcgataagtctgtcttaccgggttggaactcaagacgatag
ttaccggataaggcgcagcggctcgggtgaacggggggttcgtgcacacagcccagcttggagcgaacgacctacaccga
actgagatacctacagcgtgagctatgagaaaagcgccacgcttccgaaggagaaaaggcgacaggtatccggtaagcg
gcagggtcggaacaggagagcgcacgagggagcttccagggggaaacgcctgggtatctttatagtcctgtcgggttcgc
cacctctgacttgagcgtcgatttttgtgatgctcgtcagggggcgagcctatggaaaaacgccagcaacgcggcctt
tttacggttcctggccttttgccttttgcctcaccatgttcttgctgcttcgcgatgtacgggcagatatacgc

cagaccccgtagaaaagatcaaaggatcttcttgagatccttttttctgcgcgtaatctgctgcttgcaaacaaaaaa
ccaccgctaccagcgggtggtttgtttgccggatcaagagctaccaactctttttccgaaggtaactggcttcagcagagc
gcagataccaaatactgttcttctagtgtagccgtagttaggccaccacttcaagaactctgtagcaccgcctacatacc
tcgctctgctaatactgttaccagtggctgctgccagtgccgataagtcgtgtcttaccgggttgactcaagacgatag
ttaccggataaaggcgcagcggtcgggctgaacggggggttcgtgcacacagcccagcttgagcgaacgacctacaccga
actgagatacctacagcgtgagctatgagaaagcgccacgcttcccgaaggagaaaggcggacaggtatccggtaagcg
gcagggtcggaacaggagagcgcacgagggagcttccaggggaaacgcctggtatctttatagtcctgtcgggtttcgc
cacctctgacttgagcgtcgatttttgtgatgctcgtcagggggcgagcctatggaaaaacgccagcaacgcggcctt
ttacgggtcctggccttttgctggccttttgctcacatgttcttgctgcttcgcgatgtacgggccagatatagc

Fig. 31B: Nucleotide sequence of Spike SARS-Cov2 B.351 gene (codon optimized) (SEQ ID NO: 110)

S-B351 (3813pb)

atgttctgtgtttctggtgctgctgccactggtgtccagtcagtgcggtgaacttcaccacacgaacacagctgccaccagc
ctacaccaatagcttcacccgcggagtgactaccccgacaaggtgttccgcagcagcgctgctgcatagcaccacaggatc
tggtttctgccccttcttcagcaactgacctggttccacgccatccacgtgtccggcaccacaaatggcaccacagcgcttcgct
aatcccgctgctgccccttaacgatggcggtgacttttgccagcaccgagaaagtcacatcatccgcggtggatcttcgg
caccacactggatagcaagaccagagcctgctgctgctgaacaacgccaccaacgtggtcatcaaagtgtgcgagttcc
agttctgcaacgaccccttctctggcggtctactaccacaagaacaacagagctggatggaaagcaggttccgctgtac
agcagcgccaacactgcaccttcgagtagctgtccagccattcctgatggacctggaaggcaagcaggggaacttcaa
gaacctgcgcgaggttcgtgttcaagaacatcgacggctacttcaaaatctacagcaagcacaccccaatcaacctcgtcg
cgccgtgcccacagggattcagtgctctggaacccctgggtggtatcgccatcgccatcaacattaccgcttccagaca
ctgcaccgcagttacttgacaccagggcagatagcagcagtggtggacagctggtgcccgcgttactacgttggtatct
gcagccacgcacctttctgctgaagtacacagagaacggcaccatcaccgacgcccgtggattgtgctctcgatcccctga
gagagacaaagtgcacccctgaagtccttcacccgtcgagaagggcatctaccagaccagcaatttccgctgacagcccac
gagagcatcgctgccccttcccaatatcaccacatctgtgccccttcggcgaggtgttcaatgccacacgctttgctccgt
gtacgcctggaatcgcaagcgcattagcaactgctggcgactactcctgctgtacaatagcgcagcttcagcacct
tcaagtgtacggcggtgtcaccacccaagctgaacgacctgtgcttccaccaatgtgtacggcgacagcttcgtgatccgc
ggagatgaagtcgacagattgccccagggcagaccggcaacatcgccgactacaattacaagctgcccgcagcacttcac
cggctgctgctgacgctggaacagcaacaacctggattccaaagtgcggcggaactacaactacctgtaccgctgttcc
gcaagagcaatctgaagcccttcgagcgcgacatcagcaccgaaatctaccagcgcggaagcaccacatgcaacggcgctg
aaaggcttcaactgctacttcccactgcagtcctacggatttcagcccacatatggcggtgggtaccagccatatcgagt
ggtggtgctgagccttgaactgctgcatgtctccagctacccgtgtgcccgcacaaagagtagcaacctggtaagaaca
aatgctggaacttcaacttcaacggcctgaccggaaacggcgctgctgacggagagtaacaagaagtctcctgccattccag
cagtttggccgcgacattgcccagataaacagatgcccgttccgagatccccagaccttgagatcctggatattaccctcgt
ctccttcggcgcgctgtccgtgattacaccaggcaccacatccagcaaccaggtggcgcttctgtaccagggcggtgaatt
gcacagaggtgcccgtggccattcacgcccagatcaattgacaccaacatggcgctgtactccaccggcagcaatgtgttt
caaaccgcgctggatgctgattggagccgagcagctgaacaatagctacagtgatgcgatatccccatcgagccggaat
ctgcccctctatcagaccagaccaatagtcacagcagagcccgaagtgtggccagccagagcatcattgcctatacca
tgagcctggcgctggagaatagcgtggcctactccaacaacagcattgtctatccccaccaacttcaccatcagcgtgacc
accgagatcctgccagtgctcatgaccaagaccagcgtggactgcacatgtacatctgcggagatagcaccaggtgcag
caacctgctgctgcagtagcgaagtcttctgcacccagctgaatcgccgctgacagggattgcccgtggaacaggataaga
acaccaagaggtgttcgcccgaagtgaagcaaatctacaagaccccccaatcaaggatttcggcggttcaatttcagc
cagattctgcccagatccaagcaagccagcaagcgcagcttcatcgaggacctgctgttcaacaaagtgaactggccga
cgccgattcatcaagcagtagtgcgattgctggcgcatattgcccgcagcgcgactgatttgcgcccagaagttaacg
gactgacgctcctgccaccactgctgacagatgagatgacgcccagtagcaagtgccctgctggccggaaccattacc
agcggatggacatttgagcgggtgcccgtctgcagattcccttcgctatgcagatggcctaccgcttcaatggcattgg
cgtgacccagaatgtgctgtacgagaaccagaagctgacgccaaccagttcaacagcggcatcggaagattcaggaca
gctgagtagtagccgcccagcgtctggaagagctgcaggatgtggtcaaccagaacgctcaggccctgaacaccctggtt
aagcagctgagcagcaacttcggcgccatcagtagcgtgctgaacgatatcctgagccgctggataaggtggaagccga
ggtgcagatcgatcgccgtgattaccggacgctgagctccctgcagacctatgtgacacagcagctgatccgagccgcg
agattcgagctagtgctaatctggccgccaccaagtagcgcaatgtgtgctgggacagagcaagcgcgtggacttttgc
ggcaagggataaccactgatgagcttcccacagagtgctccacacggcggtggtgttctgcatgtgacctacgtgcccgc
tcaagagaagaatttcaccacgctccagccatctgccacgacggaaaggccattttccacgcgagggcggtgttcgtta
gcaacggcactcattggttcgtcaccacagcgaacttctacagaccccagatcatcaccaccgacaacaccttcgtcagc
ggcaactgcgacgtcgtgatcgccattgtgaacaacacccgtgtacgatccactgcagcccagctggacagcttcaaaaga
ggaactggacaagtactttaagaaccacacaagccccgacgtggacctgggagacattagcggaaatcaacgccagcgtgg
tcaacatccagaagaagattgaccgctgaacgaggtggccaagaatctgaacgagagcctgatcgacctgaagaactg
ggcaaatcagcagcagtagacatttaagtggccctggtacatctggtgggcttcattgccggactgattgccatcgtgatgt
caccattatgctgtgctgcatgaccagttgctgcagctgctgaaggatgctgcagttgcggaagctgctgcaagttcg
acgaggtatgtagcgagccagtgctgaaggcgctcaagctgcactacacctga

Fig. 31C: Amino-Acid sequence of Spike SARS-Cov2 B.351 gene (codon optimized) (SEQ ID NO: 111)

S-B351 (1270aa)

MFVFLVLLPLVSSQCVNFTTRTQLPPAYTNSFTRGVYYPDKVFRSSVLHSTQDLFLPFFSNVTWFHAIHVSNGTNGTKRFA
NPVLPFNDGVYFASTEKSNIIRGWIFGTTLDSTQSLIVNNATNVVIVKCEFCNDPFLGVYYHKNNKSWMESEFRVY
SSANNCTFEYVSQPFLLMDLEGKQGNFKNLREFVFKNIDGYFKIYSKHTPINLVRGLPQGFSALEPLVDLPIGINITRFQT
LHRSYLTGDSGSSGWTAGAAAYYGYLQPRTFLLKYNENGITIDAVDCALDPLSETKCTLSFTVEKGIYQTSNFRVQPT
ESIVRFPNITNLCFFGEVFNATRFASVYAWNRRKRISNCVADYSVLNSASFSTFKCYGVSPTKLNDLCFTNVYADSFVIR
GDEVRIAPGQTGNIADYNYKLPDDFTGCVIAWNSNNLDSKVGNGYNYLYRLFRKSNLKPFERDISTEIQAGSTPCNGV
KGFNCYFPLQSYGFQPTYGVGYQPYRVVLSFELLHAPATVCGPKKSTNLVKNKCVNFNFNGLTGTGVLTESNKKFLPFQ
QFGRDIADTTDAVRDPQTEILDITPCSFGGVSVITPGTNTSNQVAVLYQGVNCTEVPVAIHADQLTPTWRVYSTGSNVF
QTRAGCLIGAEHVNNSECDIPIGAGICASYQTQTNPRRARSVASQSI IAYTMSLGVENSVAYSNNIAIPTNFTISVT
TEILPVSMTKTSVDCTMYICGDSSTECNLLLQYGSFCTQLNRALTGIAVEQDKNTQEVFAQVKQIYKTPPIKDFGGFNFS
QILPDPSPKSKRSFIEDLLFNKVTADAGFIKQYGDCLGDIAARDLICAQKFNGLTVLPPLLTDEMIAQYTSALLAGTIT
SGWTFGAGAAALQIPFAMQMAYRFNGIGVTONVLYENQKLIANQFNSAIGKIQDSLSTASALGKLQDVVNQNAQALNTLV
KQLSSNFGAISSVLNDILSRDLKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASANLAATKMSECVLGQSKRVDFC
GKGYHLSMFPQSAPHGVVFLHVTVPAQEKNFTTAPAI CHDGAHFPPREGVFVSNGTHWFVTQRNFYEPQIIITDNTFVS
GNCDVVIGIVNNTVYDPLQPELDSFKEELDKYFKNHTSPDVDLGDISGINASVVNIQKEIDRLNEVAKNLNESLIDLQEL
GKYEQYIKWPWYIWLGFIAGLIAIVMTIMLCCMTSCCSCLGCCSCGSCCKFDEDDSEPVLGKVKLHYT

Figure 32

pFlap-ieCMV-S-B351-2P-WPREm

Fig. 32A: Complete nucleotide sequence of pFlap-ieCMV-S-B351-2P-WPREm (10096pb)
K986P-V987P = 2P (SEQ ID NO: 112)

```
ggcggtgggagctttttgcaaaagcctagccctccaaaaagcctcctcactacttctggaatagctcagaggcagaggc
ggcctcggcctctgcataaataaaaaaattagtcagccatggggcggagaatgggcggaactgggcggagttaggggcg
ggatgggaggagttaggggggggactatggttgctgactaattgagatgcccgcacattgattattgactagttggaagg
ctaattcactcccaagaagacaagatatccttgatctgtggatctaccacacacaaggctacttcctgattagcagaa
ctacacaccaggccagggtcagatatccactgacctttggatggtgctacaagctagtaccagttgagccagataagg
tagaaggaggcaataaaggagagaaacaccagcttgttacacccctgtgagcctgcatgggatggatgacccggagagagaa
gtgttagagtgagggtttgacagcgcctagcatttcatcagctggcccgagagctgcatccggagtacttcaagaactg
ctgatatcgagcttgctacaagggaactttccgctgggagctttccaggaggcgtggcctgggcgggactggggagtggc
gagccctcagatcctgcatataaagcagctgcttttgcctgactactgggtctctctggttagaccagatctgagcctggga
gctctctggctaacttaggaacccactgcttaagcctcaataaagcttgcccttgagtgttcaagtagtggtgtgccctgc
tgtttgtgactctggttaactagagatccctcagacccttttagtcagtggtgaaaatctctagcagtgggcgccgaaca
gggacttgaaagcgaaagggaacccagaggagctctctcgacgcaggactcggcttgctgaagcgcgacggcaaggcg
gagggcgggcagctggtgagtagcgcacaaaattttgactagcggaggctagaaggagagagatgggtgcgagagcgtcag
tattaagcgggggagaattagatcgcatgggaaaaattcggttaaggccagggggaaagaaaaataaaattaaac
atatagtagtggaagcaggagctagaacgattcgcagtttaactcctggcctgttagaaacatcagaaggctgtagacaa
atactgggacagctacaacccatcccttcagacaggaatcagaagaacttagatcattatataatacagtagcaacccctta
ttgtgtgcatcaaaggatagagataaaagacaccaaggaagctttagacaagatagaggaagagcaaaacaaaagtaaga
ccaccgcacagcaagcgccgctgactcttcagaccctggaggagagatatgagggacaattggagaagtgaattatataa
atataaagtagtaaaaaattgaaccattaggagtagcaccaccaaaggcaagagaagagtggtgcagagagaaaaagag
cagtggaatagagagctttgttcttgggttcttgggagcagcaggaagcactatgggcgcagcgtcaatgacgctgacg
gtacaggccagacaattattgtctggtatagtgacgagcagaacaatttgcctgagggctattgagggcgcaacagcatct
gttgcaactcagctctgggcatcaagcagctccaggcaagaatcctggctgtggaagataacctaaaggatcaacagc
tcctggggatttggggttgcctctgaaaaactcatttgcaccactgctgtgccttggaatgctagttggagtaataaatct
ctggaacagatttgaatcacacgacctggatggagtgaggacagagaaattaacaattacacaagcttaatacactcctt
aattgaagaatcgcaaaaccagcaagaaaaagaatgaacaagaattattggaattagataaatgggcaagtttgtggaatt
ggtttaacatacaaaattggctgtggtatataaaattattcataatgtagtaggaggcttggtaggtttaagaatagtt
tttgctgtactttctatagtgaaatagagttaggcagggatattcaccattatcgtttcagacccacctcccaaccccgag
gggacccgcagagcccggaaggaatagaagaagtgaggagagagacagagacagatccattcgattagtgaacggat
ctcgacgggtatcgccgaattcacaaatggcagtatccacaaattttaaagaaaagggggatttgggggtacagtg
caggggaaagaatagtagacataatagcaacagacatacaaaactaaagaattacaaaaacaaattacaaaaattcaaaat
tttggggtttattacaggagcagcagagatccactttggctgatacgggtggagtcccggttacataactacgggttaa
tgcccgctgctgctgacgcgccaacgaccccgccattgacgtcaataatgacgtatgttcccatagtaacgccaatag
ggactttccattgacgtcaatgggtggagtatttacggtaaactgcccacttggcagtagcatcaagtgtatcatatgcca
agtacgccccctattgacgtcaatgacggtaaatggccgctggcattatgccagtagcatgaccttatgggactttcc
tacttggcagtagcatctacgtattagtcacgtattaccatgggtgatgcgggttttggcagtagcatcaatgggcgtggat
agcggtttgactcaggggatttccaagtctccacccattgacgtcaatggagtttgttttggcaccacaaatcaacgg
gactttccaaaatgtcgtaaacactccgccccattgacgcaaatgggcggtaggcgtgtacgggtgggaggtctatataag
cagagctcggttagtgaaacggtcagatcgctggagacgcatccacgctgttttgacctccatagaagacaccgcatc
ggatccacaagtttgtacaaaaaagcagggtgccaccatgttcgtgtttctggtgctgctgccactggtgtccagtcagt
gogtgaacttcaccacagcaacacagctgcccaccagcctacaccaatagcttcacccgcggagtgtactaccccgacaag
gtgttcgcagcagcgtgctgcatagcaccaggatctgtttctgcccctcttcagcaacgtgacctgggttcacgccc
ccacgtgtccggcaccatggcaccagcgttcgctaattccgctgctgccccttcaacgatggcgtgtactttgccagca
ccgagaagtccaatatcatccgctggtgacttcggcaccacactggatagcaagaccagagcctgctgctgctgaac
aacgccaccaacgtggtcatcaaagtgtgcgagttccagttctgcaacgaccccttccctgggcgtctactaccacaagaa
caacaagagctggatgaaagcgagttccgctgttacagcagcgccaaacaaactgcaccttcgagtagctgtcccagccat
tcctgatggacctggaaggcaagcagggaacttcaagaacctgcccagagttcgtgttcaagaacatcgacggctacttc
aaaatctacagcaagcacaccccaatcaacctcgtgcgcggtgccacagggattcagtgctctggaacccctggtgga
tctgcccacgcatcaacattaccgcttccagacactgcaccgcagttacttgacaccaggcgatagcagcagtggt
ggacagctggtgcccgcgttactacgttggatatctgcagccacgcacctttctgctgaagtacaacgagaacggcacc
atcacgcgcgctggattgtgctctcgatcccctgagcagagacaaagtgcacctgaagtccctcaccgtcgagaagg
catctaccagaccagcaatttccgctgcagcccaccgagagcatcgtgcgcttcccaatatcaccaatctgtgccct
tcggcgaggtgttcaatgcacacgctttgctcctggtgtacgctggaatcgcaagcgcattagcaactgctggtggcgac
tactcgtgctgtacaatagcgccagcttcagcaccttcaagtgtacggcgtgtacccaccaagctgaacgacctgtg
cttccacaatgtgtacgcccagagcttctgtatccgagagatgaagtgcgacagattgccccaggccagaccggcaaca
```

WO 2022/013405

62/75

PCT/EP2021/069890

Figure 32A (CON'T)

tcgccgactacaattacaagctgcccgacgacttcaccggctgcgtgatcgctggaacagcaacaacctggattccaaa
gtcggcggaactacaactacctgtaccgcctgttccgcaagagcaatctgaagcccttcgagcgcgacatcagcaccga
aatctaccaggccggaagcaccctcatgcaacggcgtgaaaggcttcaactgtacttccactgcagtcctacggatttc
agccacatatggcgtgggtaccagccatcatcgagtgggtggtgctgagcttcgaactgctgcatgctccagctaccgtg
tgcggccccaagaagagtaccaacctgggtcaagaacaaatgcgtgaacttcaacttcaacggcctgaccggaaccggcgt
gctgaccgagagtaacaagaagttcctgccattccagcagtttgcccgacattggcgatacaaccgatgccgttcgcg
atccccagaccttgagatcctggatattaccccatgctccttcggcggtgctcgtgattacaccaggcaccaatacc
agcaaccaggtggccgttctgtaccagggcgtgaattgcacagaggtgcccggtggccattcacggcgatcaattgacacc
aacatggcgctgtactccaccggcagcaatgtgtttcaaacccgcgctggatgcctgattggagccgagcagctgaaca
atagctacgagtgcatatccccatcgagccggaatctgcgcctcctatcagaccagaccaatagtccacgacgagcc
cgaagtgtggccagccagagcatcattgcctataccatgagcctggcggtggagaatagcgtggcctactccaacaacag
cattgtctatccccaccaacttcaccatcagcgtgaccaccgagatcctgccagtgtccatgaccaagaccagcgtggact
gcacatgtacatctgcggagatagcaccgagtgacgcaacctgctgctgagtagcgaagtcttgcacccagctgaat
cgcgcctgacaggcattgccgtggaacaggataagaacacccaagaggtgttcgccaagtgaagcaaatctacaagac
cccaccaatcaaggatttcggcggttcaatttcagccagattctgccgatccaagcaagccagcaagcgcagcttca
tcgaggacctgctgttcaacaaagtgcactggccgacgcggattcatcaagcagtagtgccgattgctggcgatatt
gccgcacgcgatctgatttgcgccagaagtttaacggactgaccgtcctgccaccactgctgacagatgagatgatcgc
ccagtacacaagtgcctgctggccggaaccattaccagcgagtggaacatttgagccggtgccgtctgcagattccct
tcgctatgcagatggcctaccgcttcaatggcattggcgtgacccagaatgtgctgtacgagaaccagaagctgatcgcc
aaccagttcaacagcgccatcggaagattcaggacagcctgagtagtaccgccagcgctctgggaaagctgcaggatgt
ggtcaaccagaacgctcaggccctgaacaccctggttaagcagctgagcagcaacttcggcgccatcagtagcgtgctga
acgatatcctgagccgctggatccgcgggaagccgaggtgcagatcgatcgctgattaccggagcctgcagtcctg
cagacctatgtgacacagcagctgatccgagccgagcagattcgagctagtgtctaatctggccgccaccaagatgagcga
atgtgtgctgggacagagcaagcgcgtggacttttcggcgaaggatataccacctgatgagcttcccacagagtgctccac
acggcgtggtgttctgcatgtgacctacgtgcccgtcaagagaagaatttcaccaccgctccagccatctgccacgac
ggaaaggcccattttccacgagggcgtgttctgttagcaacggcactcattggttcgtcaccagcgcaacttctacga
gccccagatcatcaccaccgacaacaccttcgtcagcggcaactgcgacgtcgtgatcgccattgtgaacaacacctgt
acgatccactgcagcccgagctggacagcttcaagaggaactggacaagtaactttaagaaccacacaagccccgacgtg
gacctgggagacattagcggaatcaacgcagcgtggtcaacatccagaaagagattgaccgctgaacgaggtggccaa
gaatctgaacgagagcctgatcgacctgaagaactgggcaaatagcagcagtagacattaaagtggccctggtacatctggc
tgggcttcatgtgccgactgattgccatcgtgatggtcaccattatgctgtgctgcatgaccagttgctgcagctgctg
aagggtgctgcagttgcgaagctgctgcaagttcgacgaggtgatagcgagccagtgctgaagggcgtcaagctgca
ctacacctgatagtaaacccagcttcttctgtacaaagtgtctcgagttcccgataatcaacctctggattacaaaattt
gtgaaagattgagctggtattcttaactatgttgcctctttacgctatgtggatacgtgctttaatgcctttgtatcat
gctattgtctcccgatggttcttcttctcctctcttcttaataatcctggttgcgtctcttctttaggaggtgtggcc
cgttgcaggaacgtggcgtggtgtgcaactgttctgctgacgcaacccccactgggtggggcattggcaccacctgtc
agctcctttccgggactttcgttttccccctcctatttgccacggcggaactcatcgccgctgcttgcgcgctgctgg
acaggggctcggctgttgggcaactgacaattccgtggtgttgcggggaagctgacgtcctttccgcggtgctcgcctg
tggtgcaacctggattctgcgggacgtccttctgctacgtccttcggccctcaatccagcggaacttctctcccgcg
gctgctgcccgtctgcggcctcttccgcgtcttgcctctgcctcagacgagtcggatctccttttgggcccgtctcc
ccgctgacctttaagacattgacttaacaggcagctgtagccttagccactttttaaagaaaggggaggtggaa
gggctaattcactcccaacgaagacaaaatcgtcgagagatgtgcatataagcagctgcttttgcctgtactgggtct
ctctggttagaccagatctgagcctgggagctctctggctaactagggaaacccactgcttaagcctcaataaagcttgcc
ttgagtgcttcaagtagtggtgctgctgttctgtagctctggttaactagagatccctcagacccttttagtcagtg
ggaaaatctctagcagttctagaggcccggtttaaaccgcgtgatcagcctcgactgtgccttctagtgtccagccatct
gttgtttgcccctccccgtgcttcttgcacctggaagtgccactccactgtcctttcctaataaaatgaggaaat
tgcacgcattgtctgagtaggtgtcattctattctgggggtggtgggtgggagcaggaaggggaggttgggaag
acaatagcaggcatgtcggggtgctggtggtctatggcttctactggcggttttatggacagcaagcgaaccggaat
tgccagctggggcgccctctggttaaggttgggaagcctgcaagtaaaactggatggcttcttgcgcgaaggatctga
tggcgaggggatcaagctctgatcaagagacaggtgaggtcggttcgatgattgaacaagatggattgcacgcagg
ttctccggcgcgttgggtggagaggtattcggctatgactgggcacaacagacaatcggtgctctgatgcgcgctgt
tccggctgtcagcgcagggcgcccggttcttttgcagaccgacctgtccgggtgcctgaatgaactgcaagacgag
gcagcgcggtatctgtgctggccacgagggcgttcttgcgcagctgtgctcgacgttgcactgaagcgggaaggga
ctggctgctattggcggaagtgcggggcaggatctcctgtcatctcacctgtcctcgcgagaaagtatccatcatgg
ctgatgcaatgcggcggtgcatacgttgatccggctacctgcccattcgaccaccaagcgaacatcgcatcgagcga
gcacgtactcggtggaagccggtcttgcgatcaggtgatctggacgaagagcatcaggggtcgcgcgacccgaact
gttcgccaggtcaaggcgagcatgcccgacggcgaggatctcgtcgtgacccatggcgatgctgcttgcgaatatca
tggtggaaaatggccgcttttctgattcatcgactgtggcggtggtggtggcggaaccgctatcaggacatagcgttg
gctaccgctgatattgtcgaagagcttggcgcggaatggcgtagcgcgttctcgtgcttcaaggatccgcgtccga
ttcgcagcgcacgtccttctatgccttcttgcagagttcttctgaattattaaacgcttacaatttctctgatgcggtatt
ttctccttacgcacgtgtgcggtatttccacccgcacaggtggcacttttcggggaatgtgcgcggaacccctatttg
ttatttttctaaatacattcaaatatgtatccgctcatgagacaataacctgataaagtcttcaataatagcagctgc
taaaacttcatttttaatttaaaaggatctaggtgaagatccttttgataatctcatgacaaaaatcccttaacgtgag

WO 2022/013405

63/75

PCT/EP2021/069890

Figure 32A (CON'T)

ttttcgttccactgagcgtcagaccccgtagaaaagatcaaaggatcttcttgagatccttttttctgcgcgtaactctg
ctgcttgcaaacacaccccgctaccagcgggtggtttgtttgccggatcaagagctaccaactctttttccgaagg
taactggcttcagcagagcgcagataccaatactgttcttctagtgtagccgtagttaggccaccacttcaagaactct
gtagcaccgcctacatacctcgctctgctaatacctgttaccagtggctgctgccagtgccgataagtcgtgtcttaccgg
gttggactcaagacgatagttaccggataaggcgcagcggctcgggctgaacggggggttcgtgcacacagcccagcttgg
agcgaacgacctacaccgaactgagatacctacagcgtgagctatgagaaaagcgccacgcttcccgaaggagaaaaggcg
gacaggtatccggtaagcggcagggctcggaacaggagagcgcacgagggagcttccaggggaaacgcctggtatcttta
tagtcctgtcgggtttcggcacctctgacttgagcgtcgatttttgtgatgctcgtcagggggcgaggcctatggaaaa
acgccagcaacgcggcctttttacggttcctggccttttgctggccttttgctcacatgttcttgctgcttcgcgatgta
cgggccagatatacgc

64/75

Fig. 32B: Nucleotide sequence of Spike SARS-Cov2 B.351-2P gene (codon optimized)
(SEQ ID NO: 113)

S-B351-2P (3813pb)

K986P-V987P = 2P

atgttcgtgtttctggtgctgctgccactggtgtccagtcagtgcgtaacttcaccacacgaacacagctgccaccagc
ctacaccaatagcttcacccgcggagtgtagtactaccccgacaaggtgttccgcagcagcggtgctgcatagcaccagcagatc
tgtttctgcccttcttcagcaacgtgacctggttccacgccatccacgtgtccggcaccatggcaccagcgcttccgt
aatcccggtgctgcccttcaacgatggcggtgtactttgccagcaccgagaagtccaatatcatccgcggctggatcttcgg
caccacactggatagcaagacccagagcctgctgatcgtgaacaacgccaccaacgtggtcatcaaagtgtgcgagttcc
agttctgcaacgaccccttccctggcgcttactaccacaagaacaacaagagctggatggaaagcgagttcccgctgtac
agcagcgccaacaactgcaccttcgagtagctgtccagccattcctgatggacctggaaggcaagcagggcaacttcaa
gaacctgcgcgagttcgtgttcaagaacatcgacggctacttcaaaatctacagcaagcacaccccaatcaacctcgtgc
gcggtcctgccacagggattcagtgctctggaacccctgggtggatctgcccacgcgcatcaacattaccgcgtttcagaca
ctgcaccgcagttacttgacaccagggcagtagcagcagtggtggacagctggtgccgccgttactacgttgatattct
gcagccacgcacctttctgctgaagtacaacgagaacggcaccatcaccgacgcggtggtgctctcgatccccctga
gcgagacaaaagtgcacctgaaagtccctcacgctcgagaaggcgatctaccagaccagcaatttccgcgtgcagccccac
gagagcatcgtgcgcttccccaatatcaccaatctgtgccccttcggcgaggtgttcaatgccacacgctttgcctccgt
gtacgcctggaatcgaaagcgcattagcaactgcgtggcgactactccgtgctgtacaatagcgccagcttcagcacct
tcaagtgtctacggcggtgtcaccaccaagctgaacgacctgtgcttcaccaatgtgtacgcgcagagcttcgtgatccgc
ggagatgaagtgcgacagattgccccaggccagaccggcaacatcgccgactacaattacaagctgccgcagcagcttccac
cggctgcgtgatcgcttgaacagcaacaacctggattccaaagtgcggcggaactacaactacctgtaccgcctgttcc
gcaagagcaatctgaagcccttcgagcgcgacatcagcaccgaaatctaccaggccggaagcaccatgcaacggcggtg
aaagccttcaactgctacttcccactgcagtcctacggatttcagcccacatatggcggtgggtaccagccatatcgagt
ggtggtgctgagcttgaactgctgcatgctccagctaccgtgtgcgcccccaagaagagtaccaacctggtcaagaaca
aatgcgtgaacttcaacttcaacggcctgacgggaacggcgctgctgacgcgagagtaacaagaagtctcgtccattccag
cagtttggcgcgacattgccgatacaaccgatgcccgtcgcgatccccagacctggagatcctggatattaccccatg
ctccttcggcgcggtgtccgtgattacaccaggcaccaataaccagcaaccaggtggccgttctgtaccagggcggtgaatt
gcacagaggtgcccggtgcccattcacgccgatcaattgacaccaacatggcgctgtactccaccgagcaatgtgttt
caaaccgcgctggatgcctgattggagccgagcagtgaaacaatagctacgagtgcgatatccccatcggaagccggaat
ctgcgctcctatcagacccagaccaatagtcacgacgagccggaagtgtggtggcagccagagcatattgcctatacca
tgagcctggcggtggagaatagcgtggcctactccaacaacagcattgctatccccaccaacttcaccatcagcgtgacc
accgagatcctgccagtgccatgaccaagaccagcgtggactgcaccatgtacatctgcggagatagcaccgagtgacg
caacctgctgctgcagtaggaagtcttctgcacccagctgaatcgcgccctgacagggcattgccgtggaacaggataaga
acacccaagaggtgttcgcccagtgaaagcaaatctacaagacccaccaatcaaggatttcggcggttcaatttcagc
cagattctgcccgatccaagcaagccagcaagcgagcttcatcgaggacctgctgttcaacaaagtgcactggccga
cgccgattcatcaagcagtagtgccgattgctggcgcatattgcccgcacgcgatctgatttgccgccagaagttaacg
gactgaccgtcctgccaccactgctgacagatgagatgatcgccagtagacaaagtgcctgctggcggaaccattacc
agcggatggacatttgagcgggtgcccgtctgcagattcccttcgctatgcagatggcctaccgcttcaatggcattgg
cgtgaccagaatgtgctgtacgagaaccagaagctgatcgccaaccagttcaacagcgccatcggaagattcaggaca
gcctgagtagtagccgcagcgtctgggaaagctgcaggatgtggtcaaccagaacgctcaggccctgaacacctggtt
aagcagctgagcagcaacttcggcgccatcagtagcgtgctgaacgatattcctgagccgctggatccgcccgaagccga
ggtgcagatcgatcgctgattacccgagcctgacgtccctgcagacctatgtgacacagcagctgatccgagccgcg
agattcgagctagtgctaatctggccgcccacaaagtagcgaatgtgtgctgggacagagcaagcgcggtggacttttgc
ggcaagggataccacctgatgagcttcccacagagtgctccacacggcggtggtgttctgcatgtgacctacgtgcccgc
tcaagagaagaatttcaccaccgctccagccatctgccacgacggaaaggccattttccacgcgagggcggtgttcgtta
gcaacggcactcattggttcgtcaccagcgcaactctacgagccccagatcatcaccaccgacaacaccttcgtcagc
ggcaactgcgacgtcgtgatcggtattgtgaacaacacggtgtacgatccactgcagccccagctggacagcttcaaga
ggaaactggacaagtactttaagaaccacacaagccccgacgtggacctgggagacattagcggaatcaacggcagcgtgg
tcaacatccagaagagattgaccgcctgaacgaggtggccaagaatctgaacgagagcctgatcgacctgcaagaactg
ggcaaatacgagcagtagacattaagtggccctggtacatctggctgggcttcattgcggactgattgccatcgtgatggt
caccattatgctgtgctgcatgaccagttgctgcagctgacctgaaggatgctgcagttgcggaagctgctgcaagttcg
acgaggtgatagcgagccagtgctgaaggcgctcaagctgcactacacctga

65/75

Fig. 32C: Amino-Acid sequence of Spike SARS-Cov2 B.351-2P gene (codon optimized)
(SEQ ID NO: 114)

S-B351-2P (1270aa)

K986P-V987P = 2P

MFVFLVLLPLVSSQCVNFTTRTQLPPAYTNSFTRGVYYPDKVFRSSVLHSTQDLFLPFFSNVTWTFHAIHVSGTNGTKRFA
NPVLPFNDGVYFASTEKSNIIRGWIFGTTLDSKTQSLIVNNATNVVIKVEFQFCNDPFLGVYYHKNNKSWMESSEFRVY
SSANNCTFEYVSQPFLMDLEGKQGNFKNLREFVFKNIDGYFKIYSKHTPINLVRLPQGFSALEPLVDLPIGINITRFQT
LHRSYLTPGDSSSGWTAGAAAYYVGYLQPRTFLLKYNENGTITDAVDCALDPLSETKCTLKSFTVEKGIYQTSNFRVQPT
ESIVRFPNITNLCPFGEVFNATRFASVYAWNRRKRISNCVADYSVLYNSASFSTFKCYGVSPTKLNDLCFTNVYADSFVIR
GDEVQRQIAPGQTGNIADYNYKLDDFTGCVIAWNSNNLDSKVGGNYNLYRLFRKSNLKPFERDISTEIIYQAGSTPCNGV
KGFNCYFPLQSYGFQPTYGVGYQPYRVVLSFELLHAPATVCGPKKSTNLVKNKCVNFNFNGLTGTGVLTESNKKFLPFQ
QFGRDIADTTDAVRDPQTLEILDITPCSFSGGVSVITPGTNTSNQVAVLYQGVNCTEVPVAIHADQLTPTWRVYSTGSNVF
QTRAGCLIGAHEVNNSYECDIPIGAGICASYQTQTSNPRRARSVASQSI IAYTMSLGVENSVAYSNNIAIPTNFTISVT
TEILPVSMTKTSVDCTMYICGDSTECNLLLQYGSFCTQLNRALTGIAVEQDKNTQEVFAQVKQIYKTPPIKDFGGFNFS
QILPDPSKPSKRSFIEDLLFNKVTADAGFIKQYGDCLGDIAARDLICAQKFNGLTVLPPLLTDEMI AQYTSALLAGTIT
SGWTFGAGAALQIPFAMQMAYRFNGIGVTQNVLYENQKLIANQFNSAIGKIQDSLSTASALGKLQDVVNQNAQALNTLV
KQLSSNFGAISSVLNDILSRDLPPAEVQIDRLITGRLQSLQTYVTQQILIRAAEIRASANLAATKMSECVLGQSKRVDFC
GKGYHLSMFPQSAPHGVVFLHVTYVPAQEKNFTTAPAICHGKAHFPREGVFVSNGTHWFVTQRNFYEPQIITDNTFVS
GNCDVVIGIVNNTVYDPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVVNIQKEIDRLNEVAKNLNESLIDLQEL
GKYEQYIKWPWYIWLGFIAGLIAIVMVTIMLCCMTSCCSCCLKGCCSCGSCCKFDEDDSEPV LKGVKLHYT

Figure 33**pFlap-ieCMV-S_{FL}-D614G-WPREm**

Fig. 33A: Complete nucleotide sequence of pFlap-ieCMV-S_{FL}-D614G-WPREm (10064pb) (SEQ ID NO: 115)

D614G

```
cgcggttgggagctttttgcaaaagcctagggcctccaaaaagcctcctcactacttctggaatagctcagaggcagaggc
ggcctcggcctctgcataaataaaaaaattagtcagccatggggcgagagaatgggcggaactgggcggagttagggggcg
ggatggcgaggtagggcgggactatggttgctgactaattgagatgcccacattgattattgactagttggaaggc
ctaattcactcccaacgaagacaagatatccttgatctgtggatctaccacacacaaggctacttccctgattagcagaa
ctacacaccagggcgagatcagatatccactgacctttggatgggtgctacaagctagtagccagttgagccagagaa
tagaagaagccaacaaaggagagaaacaccagcttgttacaaacctgtgagcctgcatgggatggatgacccggagagaa
gtgttagagtgagggtttgacagccgcttagcatttcatcacggtggcccgagagctgcatccggagtagtctcaagaact
gctgatatcgagcttgctacaagggactttccgctgggggactttccaggaggcgtggcctgggcgggactggggagtg
gagagccctcagatcctgcatataagcagctgcttttggctgtactgggtctctctggttagaccagatctgagcctgg
gagctctctggctaactaggggaacccactgcttaagcctcaataaaagcttgcttgagtgctcaagtagtgtgtgccc
tctgtgtgtgactctggttaactagagatccctcagacccttttagtcagtggtggaatctctagcagtgccgcccga
cagggacttgaaagcgaaagggaacccagaggagctctctcgacgcaggactcggcttgctgaagcgccacggcaagag
gagggggggcgactggtgagtagcgcacaaatatttgactagcggaggttagaaggagagagatgggtgagagagcgtc
agtattaaagcggggagaaattagatcgcgatgggaaaaaattcgggttaaggccaggggaaagaaaaatataaattaaa
acatatagtagtgggcaagcagggagctagaacgattcgcagtagtaattcctggcctgttagaaacatcagaaggctgtagac
aaatactgggacagctacaacatcccttcagacaggatcagaagaacttagatcattatataatacagtagcaaccctc
tattgtgtgcatcaaggatagagataaaagacaccaaggaagctttagacaagatagaggaagagcaaaacaaagtaa
gaccaccgcacagcaagcgccgctgatcttcagacctggaggaggagatagagggacaattggagaagtgaattatat
aaatataaagttagtataaaattgaaccattaggagtagcacccaccaaggcaaaagagaagagtggtgcagagagaaaaag
agcagtggggaataggagctttgttccctgggttcttgggagcagcagggaagcactatgggcgcagcgtcaatgacgctga
cggtagcaggccagacaattattgtctggtatagtgacgagcagacaatttgctgagggctatttaggcgcacacagcat
ctgttgcaactcacagctctggggcatcaagcagctccaggcaagaatcctggctgtggaaagatacctaaaggatcaaca
gctcctggggatttgggtgtgctctggaaaaactcatttgcaccactgctgtgccttggaatgctagttggagtaataaat
ctctggaacagatttggaatcacacgacctggatggagtgggagcagagaaattaaacaattacacaagcttaatacactcc
ttaattgaagaatcgcaaaaccagcaagaaaagaatgaacaagaattattggaattagataaatgggcaagtttgtggaa
ttggtttaacataacaaatttggtgtggtatataaaattattcataatgatagtaggaggttggtagggtttaagaatag
tttttgcgtgactttctatagtgaaatagagtttaggcaggatattcaccattatcggttcagaccacccctcccaaccccg
aggggaccccgacagggccgaaggaaatagaagaagggtggagagagagacagagacagatccattcgattagtgaaagg
atctcgacggtagcgcgaattcacaaatggcagtagttcatccacaattttaaaagaaaagggggattggggggtacag
tgaggggaaagaatagtagacataatagcaacagacatacaaaactaaagaattacaaaaaaattacaaaaattcaaaa
attttcgggtttattacagggacagcagagatccactttggctgatacgcgtggaagtcccgcttacataacttacggtta
aatggcccgctggctgaccgccaacgacccccgcccatttgacgtcaataatgacgtatgttcccatagtaacgccaat
agggactttccattgacgtcaatgggtggagtagtttacggtaaactgcccacttggcagtagcatcaagtgtatcatatgc
caagtacgccccctattgacgtcaatgacggtaaatggccgcctggcattatgcccagtagacatgaccttatgggacttt
cctacttggcagtagacatctacgtatttagtcatcgctattaccatgggtgatgcggttttggcagtagacatcaatggcggtg
atagcgggttgactcacgggatttccaagtctccacccatttgacgtcaatgggagtttgttttggcaccacaaatcaac
gggactttccaaaatgtcgtatacaactccgccccatttgacgcaaatggcggttaggcgtgtacggtgggaggtctatata
agcagagctcggttagtgaaccgtcagatgcctggagacgcatccacgctgttttgacctccatagaagacaccgga
tcggatccgcccacatgttcgtgtttctggtgctgctgccactgggtgtccagtcagtgctgaacctgaccacagcaaca
cagctgccaccagcctacaccaatagcttcaccccgagggtgtagtactaccccgacaagggtgtccgcagcagcgtgctgca
tagcaccaggatctgtttctgccttcttcagcaacgtgacctgggtccacgcatccacgtgtccggcaccacaaatggca
ccaagcgcttcgataatcccggtgctgccttcaacgatggcggtgtagtcttgccagcaccgagaagtcacaaatcatccgc
ggctggatcttcggcaccacactggatagcaagaccagagcctgctgatcgtgaacaacgccacacacgtggtcatcaa
agtgtgcgagttccagttctgcaacgaccccttccctggcgcttactaccacaagaacaacaagagctggatggaaagcg
agttccgcgtgtacagcagcgccaacactgcaccttcgagtagcgtgtccagccatttctgatggacctggaggcaag
cagggcaacttcaagaacctgcgcgagttcgtgttcaagaacatcgacggctacttcaaaatctacagcaagcacacccc
aatcaacctcgtgcgcgatctgcacagggtattcagtgctctggaacccctgggtggatctgccccatcgccatcaacatta
cccgcttccagacactgctggcctgcacccgagttacttgacaccagcgcatagcagcagtggtggacagctggtgcc
gccgcttactacgttggatatctgcagccacgcacctttctgctgaagtacaacgagaaacggcaccatcaccgacgcggt
ggattgtgctctcgatccctgagcgagacaaagtgacacctgaagtccttcaccgctcgagaagggcacatctaccagacca
gcaatttcgcgctgcagcccaccgagagcatcgctgcgcttcccaatatcaccacatctgtgccccttcggcgagggtgttc
```

aatgccacacgcttttgctccgtgtacgcctggaatcgcaagcgattagcaactgcgtggccgactactccgtgctgta
caatagcgcagctttcagcaccttcaagtgtctacggcgtgtcaccaccaagctgaacgacctgtgcttccaatgtgt
acgccgacagctttcgtgatccgcgagatgaagtgcgacagattgccccaggccagaccggcaagatcgccgactacaat
tacaagctgcccagcactttaccggctgctgtatgcctggaacagcaacaacctggattccaaagtgcggcggaacta
caactacctgtaccgcctgttccgcaagagcaatctgaagcccttcgagcgcgacatcagcaccgaaatctaccaggccg
gaagcaccocatgcaacggcggtggaaggcttcaactgtacttcccactgcagtccctacggatttcagccccacaaatggc
gtgggtaccagccatctcgagtgggtgctgagcttcgaactgctgcatgctccagctaccgtgtgcggcccccaagaa
gagtaccaacctgggtcaagaacaaatgcgtgaacttcaacttcaacggcctgaccggaaccggcggtgtgacccgagagta
acaagaagtctcctgccattccagcagtttggccgagacattgcccatacaaccgatgccgttcgcgatcccagacctg
gagatcctggatattaccccatgctccttcggcggtgctcctgtattacaccaggcaccataaccagcaaccagggtggc
cgttctgtaccaggcggtgaattgcacagagggtgccgtggccattcacgcccgatcaattgacaccaacatggcgctgt
actccaccggcagcaatgtgtttcaaacccgcgtggatgctgattggagccgagcagctgaacaatagctacagagtgc
gatatcccatcgagccggaatctgcgcctcctatcagaccagaccaatagtccacgacgagcccgaaagtgtggccag
ccagagcatcattgctataccatgagcctgggcccgcgagaatagcgtggcctactccaacaacagcattgctatcccca
ccaacttcaccatcagcgtgaccaccgagatcctgccagtgtccatgaccaagaccagcgtggactgcaccatgtacatc
tgccgagatagcaccgagtgacgaacctgctgctgcagtacggaagtttctgcacccagctgaatcgcgccctgacagg
cattgcccgtggaacaggataagaacaccccaagaggtgttcgcccaagtgaagcaaatctacaagacccccaccaatcaagg
ctcagccctgaacacctgtgttaaacagcgtgacgagcaacttcggcgccatcagtagcgtgctgaacgatatcctgagc
ttcaacaaagtgcactggccgacgcccggattcatcaagcagtatggcgattgctggcgatattgcccgcacgcatct
gatttgcgcccagaagtttaacggactgaccgtcctgccaccactgctgacagatgagatgacgcccagtagacaaagt
ccctgctggccggaaccattaccagcggatggacatttggagccggtgccgtctgcagattcccttcgctatgcagatg
gcctaccgcttcaatggcattggcgtgaccagaaatgtgctgtacgagaaccagaagctgatcgccaaccagttcaacag
cgccatcggaagattcaggacagcctgagtagtacccgacagcgtctggaagagctgcaggatgtgtgtaaccagaaag
ctcagccctgaacacctgtgttaaacgagctgacgagcaacttcggcgccatcagtagcgtgctgaacgatatcctgagc
cgctggataaggtggaagccgaggtgcagatcgatcgctgattacgggacgcctgcagtcctgcagacctatgtgac
acagcagctgatccgagccgagatttcgagctagtgtctaatctggccgccaacaaagatgagcgaatgtgtgctgggac
agagcaagcgctggacttttgcggcaagggataccacctgatgagcttccacagagtgctccacacggcggtgtgtt
ctgcatgtgacctacgtgcccgtcaagagaagaatttcaccaccgctccagccatctgccacgacggaaggccctatt
tccacgagggcggtgttcgttagcaacggcactcattggttcgtcaccagcgcaacttctacgagccccagatcatca
ccaccgacaacaccttcgtcagcggaactgcgcgctgctgacggttcggcattgtgaacaacacccgtgacgatccatgcag
cccgagctggacagcttcaaagaggaactggacaagtactttaagaaccacacaagccccgacgtggacctgggagacat
tagcggaatcaacgccagcgtgggtcaacatccagaaagagattgaccgcctgaacgaggtggccaagaatctgaacgaga
gcctgatcgacctgcaagaactggcgaatacagagcagtagcattaagtggccctggtacatctggctgggcttcattgcc
ggactgattgccatcgtgatggtcaccattatgctgtgctgcatgaccagttgctgcagctgectgaagggatgctgcag
tggcggaagctgctgcaagttcgcagaggtatgacgagcagtgctgaaggcgctcaagctgacatcacatcagctgac
tcgagaattcccgataatcaacctctggattacaaaatttggaaagattgactgggtattcttaactatgttgctccttt
tacgctatgtggatacgtgctttaaattgcctttgtatcatgctattgcttcccgataggctttcattttctcctcctgt
ataaatcctggttgctgtctctttatgaggagttgtggccgctgtgcaggcaacgtggcggtgtgtgactgtgtttgt
gacgcaacccccactggttggggcattgccaccacctgtcagctccttccgggactttcgctttccccctccctattgc
cacggcggaactcatcgccgctgcttgcgcgctgctggacaggggctcggtgttgggactgacaattccgtggtgt
tgtcggggaagctcagctccttccgcgctgctgcgctgtgttgcacactggattctgcgcgggacgtccttctac
gtccttcggccctcaatccagcggaccttccctcccgcgctgctgcggtctgcggtccttccgcttctgcct
tcgcccctcagacgagtcggatctccttgggcccgcctccccgcacgggggtacctttaagaccaatgacttacaaggc
agctgtagatcttagccactttttaaagaaaagggggactggaagggtcaattcactcccaacgaagacaagatcgtc
gagagatgctgcatataagcagctgcttttgcctgtactgggtctctctggttagaccagatctgagcctgggagctct
ctggctaactagggaaaccactgcttaagcctcaataaagcttgccctgagtgcttcaagtagtgtgtgccgctctgtt
tgtactctggtaactagagatccctcagacccttttagtcagtggtggaataatctctagcagttctagagggcccgttta
aaccgctgatcagcctcgactgtgccttctagtggcagccatctgttgtttgccctcccccgctgccttccctgaccc
tggaaggtgccactcccactgtccttcttaataaaaatgaggaaattgcatcgcatgtctgagtaggtgtcattctatt
ctgggggtggggtgggagagcaagggggaggttgggaagacaatagcaggcatgctgggatgaggggtggcctc
tatggctctactggcggttttatggacagcaagcgaaccggaattgccagctggggcgccctctggttaaggttgggaa
gcctgcaaagtaactggatggcttctgcgcgccaaggatctgatggcgaggggatcaagctctgatcaagagacag
gatgaggatcgtttcgatgattgaacaagatggattgcacgcaggttctccggccgcttgggtggagaggtctattcggc
tatgactgggcacacagacaatcggtgctctgatgccgctgttccggctgtcagcgcagggggcgcccggttctttt
tgtcaagaccgacctgtccggtgcctgaatgaactgcaagacgaggcagcgcggtatcggtggctggccacgacgggcg
ttccttgcgagctgtgctgcagcttgtcactgaagcgggaaggagactggctgctattggcggaagtgcggggcaggat
ctcctgtcatctcaccttgcctcctgccgagaaagtatccatcatggctgatgcaatggcgcggtgcatacgtctgatcc
ggctacctgcccattcgaccaccaagcgaaacatcgcatcgagcgagcagctactcggtggaagccggtcttctgcgatc
aggatctggaacgaagcatcaggggtcgccgcagcgcaactgttcgccaggtcaaggcgagctcagggcgagcgcg
gaggatctcgtcgtgacccatggcgatgcctgcttgcgaatatcatgggtggaaaatggccgcttttctggattcatcga
ctgtggccggctgggtgtggcgaccgctatcaggacatagcgttggctaccgctgatattgctgaagagcttggcggcg
aatgggtgacgccttctcgtgctttacggtatcgccgctccgattcgacgcgcatcgcttctatcgcttcttgac
gagttcttctgaattattaacgcttacaatttctgatgcggtattttctccttacgcatctgtgcggtattttcacaccg

Figure 33A (CON'T)

catacaggtggcacttttcggggaaatgtgcgcggaacccctatttgtttatttttctaaatacattcaaataatgtatcc
gctcatgagacaataaccctgataaatgcttcaataatagcacgtgctaaaaacttcatttttaattttaaaaggatctagg
tgaagatccttttttgataatctcatgacaaaaatcccttaacgtgagttttcgttccactgagcgtcagaccccgtagaa
aagatcaaaggatcttcttgagatccttttttctgcgcgtaatctgctgcttgcaaacaaaaaaaccacgctaccagc
ggtggtttgtttgccggatcaagagctaccaactctttttccgaaggtaactggcttcagcagagcgagataccaata
ctgtccttctagtgtagccgtagtttaggccaccacttcaagaactctgtagcacgcctacatacctcgctctgctaatac
ctgttaccagtggtgctgctgccagtggcgataagtcgtgtcttacggggttgactcaagacgatagttaccggataaggc
gcagcggtcgggctgaacggggggttcgtgcacacagcccagcttgagcgaaacgacctacaccgaactgagatacctac
agcgtgagctatgagaaagcgccacgcttcccgaagggagaaaaggcgacagggtatccggtaaagcggcagggtcggaaca
ggagagcgacagaggagcttccaggggaaacgcctggtatctttatagtcctgtcgggttcgccacctctgacttga
gcgtcgatttttgtgatgctcgtcagggggcgagcctatggaaaaacgccagcaacgcggcctttttacgggttcctgg
gcttttgctggccttttgctcacatgttcttgactcttcgcgatgtacgggccagatatacgcg

69/75

Fig 33B: Nucleotide sequence of Spike (Wuhan) SARS-Cov2 D614G gene (codon optimized) (SEQ ID NO: 116)

S_{FL}-D614G (3825pb)

D614G

atgttcgtgtttctggtgctgctgccactggtgtccagtcagtgcggtgaacctgaccacacgaacacagctgccaccagc
ctacaccaatagcttcaccgcgagtgactactacccgacaaggtgttccgcagcagcggtgctgcatagcaccaggatc
tgtttctgcccttcttcagcaacgtgacctggttccacgccatccacgtgtccggcaccatggcaccagcgcttcgat
aatcccggtgctgcccttcaacgatggcggtgacttttgcagcaccgagaaagtccaatatcatccgcggttgatcttcgg
caccacactggatagcaagaccagagcctgctgatcgtgaacaacgccaccaacgtggtcatcaaagtgtgcgagttcc
agttctgcaacgaccccttccctggcgcttactaccacaagaacaacaagagctggatggaaagcgagttcccgctgtac
agcagcgccacaactgcaccttcgagtagctgtcccagccattcctgatggacctggaaggcaagcagggcaacttcaa
gaacctgcgcgagttcgtgttcaagaacatcgacggctacttcaaaatctacagcaagcacaccccaatcaacctcgctg
gcatctgccacagggattcagtgctctggaacccctgggtggatctgcccacgcatcaacattaccgcgtttcagaca
ctgctggccctgcaccgcagttacttgacaccaggcgatagcagcagtggtggacagctggtgcccgcgcttactacgt
tgatattctgcagccacgcaccttctgctgaagtacaacgagaacggcaccatcacgcagcgctggattgtgctctcg
atccctgagcgagacaaagtgcacccctgaagtccctcaccgtcgagaaggcgatctaccagaccagcaatttccgcgtg
cagcccaccgagagcatcgctgcgttccccaatatcaccaatctgtgccccttcggcgaggtgttcaatgccacacgctt
tgcctccgtgtacgcctggaatcgcaagcgattagcaactgcgtggccgactactccgtgctgtacaatagcgccagct
tcagcaccttcaagtgtcagcgctgtcaccaccaagctgaacgacctgtgcttcaccaatgtgtacgcgcgacagcttc
gtgatccgcggagatgaagtgcacagattgccccaggccagaccggcaagatcgccgactacaattacaagctgccga
cgacttcacccgctgcgtgatcgctggaacagcaacaacctggattccaaagtccggcgcaactacaactacctgtacc
gcctgttccgcaagagcaatctgaagcccttcgagcgcgacatcagcaccgaaatctaccaggccggaagcaccatgc
aacggcggtggaaggcttcaactgtacttcccactgcagtcctacggatttcagcccacaaatggcggtgggctaccagcc
atatcgagtggtggtgctgagcttcgaactgctgcatgctccagctaccgtgtgcccgaagaagagtaccaacctgg
tcaagaacaaatgcgtgaacttcaacttcaacggcctgaccggaaacggcgctgacccgagagtaacaagaagtccctg
ccattccagcagtttggccgcgacattgccgatacaaccgatgccgttccgcatccccagaccttgagatcctggat
taccocatgctccttcggcgcgctgtccgtgattacaccaggcaccaataccagcaaccaggtggcgcttctgtaccag
gcgtgaattgcacagaggtgcccgtggccattcacgcgcatcaattgacaccaacatggcgctgtactccaccggcagc
aatgtgtttcaaacccgcgctggatgcctgattggagccgagcagctgaacaatagctacgagtgcatatccccatcgg
agccggaatctgcgcctctatcagacccagaccaatagtccacgacgagcccgaaagtgtggccagccagagcatcattg
cctataccatgagcctggcgccgagaatagcgtggcctactccaacaacagcattgctatccccaccaacttcaccatc
agcgtgaccaccgagatcctgccagtgctcatgaccaagaccagcggtgactgcaccatgtacatctgcggagatagcac
cgagtgacgcaacctgctgctgcagtagcgaagtttctgcaccagctgaatcgccctgacaggcattgcccgtggaac
aggataagaacaccacagaggtgttcgccaaagtgaagcaaatctacaagaccaccaaataaggtatttcggcggttc
aatttcagccagatttctgccgatccaagcaagccagcaagcgagcttcatcgaggacctgctgttcaacaagaatgac
actggccgacgcccggattcatcaagcagtagtggcgattgcctggcgatattgccgcacgcgatctgatttgcgccaga
agtttaacggactgaccgtcctgccaccactgctgacagatgagatgatgcccaagtacacaagtgcctgctgcccga
accattaccagcgatggacatttggagccgggtgccgctctgcagattcccttcgctatgcagatggcctaccgcttcaa
tggcattggcgtagaccagaatgtgctgtacgagaaccagaagctgatcgccaaccagttcaacagcgccatcggaaga
ttcaggacagcctgagtagtaccgccagcgctctgggaaagctgcaggatgtggtcaaccagaacgctcaggccctgaac
accctggttaagcagctgagcagcaacttcggcgccatcagtagcgctgctgaacgatatcctgagccgctggataaggt
ggaagccgaggtgcagatcgatcgctgattaccggacgctcgagtccttcgagacctatgtgacacagcagctgatcc
gagccgagagattcgagctagtgtctaatctggccgccaccaagatgagcgaatgtgtgctgggacagagcaagcgctg
gacttttgcggcaagggtataccacctgatgagcttccacagagtgctccacacggcggtggtgttctgcatgtgacct
cgtgcccgtcaagagaagaatttaccaccgctccagccatctgccacgacggaaggccatttccacgcgagggcg
tgttcgttagcaacggcactcattggttcgtcaccagcgcaacttctacgagccccagatcatcaccacggacaacacc
ttcgtcaggggcaactgcgacgtcgtgatcggcattgtgaacaacacgctgtacgatccactgcagcccagctggacag
cttcaagaggaactggacaagtactttaagaaccacacaagccccgacgtggacctgggagacattagcggaatcaacg
ccagcggtgtcaacatccagaaagagattgacgcctgaacgaggtggccaagaatctgaacgagagcctgatcgacctg
caagaactgggcaaatagcagcagtagcattaaagtggcctggtacatctggctgggcttcattgcccgactgattgccat
cgtgatggtcaccattatgctgtgctgcatgaccagttgctgcagctgctgaagggtgctgacgttgcggaagctgct
gcaagttcgacgaggtgatagcgagccagtgctgaaggcgctcaagctgcactacacctgataa

70/75

Figure 33C: Amino-Acid sequence of Spike (Wuhan) SARS-Cov2 D614G gene (codon optimized) (SEQ ID NO: 117)

S_{FL}-D614G (1274aa)

D614G

MFVFLVLLPLVSSQCVNLTRTQLPPAYTNSFTRGVYYPDKVFRSSVLHSTQDLFLPFFSNVTWFWHAIHVSGTNGTKRFD
NPVLPFNDGVYFASTEKSNIIRGWIFGTTLDSKTQSLIVNNATNVVIKVECFQFCNDPFLGVYYHKNNKSWMESSEFRVY
SSANNCTFEYVSQPFLMDLEGKQGNFKNLREFVFKNIDGYFKIYSKHTPINLVRLDPQGFSALEPLVDLPIGINITRFQT
LLALHRSYLT PGDSSSGWTAGAAAYVGYLQPRFTLLKYNENGTITDAVDCALDPLSETKCTLKSFTEKGIYQTSNFRV
QPTESIVRFPNITNLCPFGVFNATRFASVYAWNRKRISNCVADYSVLYNSASFSTFKCYGVSPTKLNDLCFTNVYADSF
VIRGDEVQRQIAPGQTGKIADYNYKLPDDFTGCVIAWNSNNLDSKVGNGYNYLYRLFRKSNLKPFFERDISTEIIYQAGSTPC
NGVEGFNCYFPLQSYGFQPTNGVGYQPYRVVLSFELLHAPATVCGPKKSTNLVKNKCVNFNFNGLTGTGVLTESNKKFL
PFQQFGRDIADTTDAVRDPQTLEILDITPCSFGGVSVITPGTNTSNQVAVLYQGVNCTEVPVAIHADQLTPTWRVYSTGS
NVFQTRAGCLIGAEHVNNSYECDIPIGAGICASYQTQTN SPRRARSVASQSIIAYTMSLGAENSVAYSNNNSIAIPTNFTI
SVTTEILPVSMTKTSVDCTMYICGDSTECSNLLQYGSFCTQLNRALTGIAVEQDKNTQEVFAQVKQIYKTPPIKDFGGF
NFSQILPDPSKPSKRSFIEDLLFNKVTLADAGFIKQYGDCLGDIAARDLICAQKFNGLTVLPLLTDEMIQYTSALLAG
TITSGWTFGAGAALQIPFAMQMAYRFNGIGVTQNVLYENQKLIANQFNSAIGKIQDSLSTASALGKLQDVVNQNAQALN
TLVKQLSSNFGAIISSVLNDILSRLDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRASANLAATKMSECVLGQSKRV
DFCGKGYHLMSFPQSAPHGVVFLHVTYVPAQEKNFTTAPAICHGKAHFPREGVFVSNGTHWFTQRFYEPQIIITDNT
FVSGNCDVVIGIVNNTVYDPLQPELDSFKEELDKYFKNHTSPDVLGDISGINASVUNIQKEIDRLNEVAKNLNESLIDL
QELGKYEQYIKWPWYIWLGFIAGLIAIVMVTIMLCMTSCCSCLKGCCSCGSCCKFDEDDSEPVLGVKLHYT*

Figure 34**pFlap-ieCMV-S-P1-WPREm****Fig. 34A: Complete nucleotide sequence of pFlap-ieCMV-S-P1-WPREm (10086pb) (SEQ ID NO: 118)**

```
ggcggtgggagctttttgcaaaagcctaggcctccaaaaagcctcctactacttctggaatagctcagaggcagaggc
ggcctcggcctctgcataaataaaaaaattagtcagccatggggcggaagaatgggcggaactgggcgaggttaggggcg
ggatgggcgagttaggggcgggactatggttgctgactaattgagatgcccgaattgattattgactagttggaagg
ctaattcactcccaagaagacaagatatccttgatctgtggatctaccacacacaaggctacttccctgattagcagaa
ctacacaccaggggcagggtcagatatccactgacctttggatgggtgctacaagctagtaccagttgagccagataagg
tagaaggaggccaataaaggagagaaacaccagcttgttacacccctgtgagcctgcatgggatggatgaccggagagagaa
gtgttagagtggaggtttgacagccgcctagcatttcatcactggtggccgagagctgcatccggagtacttcaagaactg
ctgatatcgagcttgctacaaggactttccgctgggactttccaggaggcgctggcctgggcggaactggggagtggtc
gagccctcagatcctgcataataagcagctgctttttcctgtactgggtctctctgggttagaccagatctgagcctggga
gctctctggctaacttaggaacccactgcttaagcctcaataaagcttgctttagtgcttcaagtagtggtgtgcccgctc
tgttgtgtgactctggttaactagagatccctcagaccccttttagtcagtggtggaatactctagcagtggtggcgccgaaca
gggacttgaaagcgaaagggaacacagaggagctctctcgacgcaggactcggcttgctgaagcgcgacggcaagaggc
gagggcgggcagctggtgagtagcagcctttttgactagcggaggctagaaggagagagatgggtgcgagagcgtcag
tattaagcgggggagaattagatcgcgatgggaaaaaattcggttaaggccagggggaaagaaaaataaaattaaaac
atatagtatgggcaagcagggagctagaacgattcgcagttaatcctggcctgttagaaacatcagaaggctgtagacaa
atactgggacagctacaacccatcccttcagacaggatcagaagaacttagatcattatataataacagtagcaacccctcta
ttgtgtgcatcaaaggatagagataaaagacaccaaggaagctttagacaagatagaggaagagcaaaacaaaagtaaga
ccaccgcacagcaagcgccgctgactctcagacctggaggagagatagagggacaattgggagaaagtgaattatataa
atataaagtagtaaaaattgaaccattaggagtagcaccaccaaaggcaagagaagagtggtgcagagagaaaaaagag
cagtggaataggagctttgttccctgggttcttgggagcagcaggaagcactatgggcgagcgtcaatgacgctgacg
gtacaggccagacaattattgtctggtatagtcagcagcagaacaatttgcctgagggctattgagggcgcaacagcatct
gttgcaactcagctctggggcatcaagcagctccaggcaagaatcctggctgtggaaagataacctaaaggatcaacagc
tcctggggatttggggttgcctctggaaaactcatttgcaccactgctgtgccttggaaatgctagttggagtaataaatct
ctggaacagatttggaaatcacacgacctggatggagtgggacagagaaattaacaattacacaagcttaatacactcctt
aattgaagaatcgcaaaaccagcaagaaaagaatgaacaagaattattggaattagataaaatgggcaagtttgggaatt
gggttaacataacaaattggctgtggtatataaaattattcataatgatagtaggaggttggtaggtttaagaatagtt
tttgcgtactttctatagtgaaatagagttaggcagggatattcaccattatcgtttcagacccacctcccaaccccgag
gggacccgcagagcccgaaaggaatagaagaagaagtgaggagagagacagagacagatccattcgattagtgaacggat
ctcgacggtatcgccgaattcacaaatggcagtatccacaaattttaaagaaaagggggatttgggggtacagtg
caggggaaagaatagtagacataatagcaacagacatacaaaactaaagaattacaaaaacaaattacaaaaattcaaaa
tttcgggtttatttacaggcagcagagatccactttggctgatacgcgtggagtccgcgttacataactacgggtaaa
tggcccgctggtgacgcgcccaacgaccccgccattgacgtcaataatgacgtatgttcccatagtaaacgccaatag
ggactttccattgacgtcaatgggtggagttttacggtaaacctggcacttggcagtagcatcaagtgtatcatatgcca
agtacgccccctattgacgtcaatgacggtaaatggccgctggcattatgccagtagcatgaccttatgggactttcc
tacttggcagtagcatctacgtattagtcacgtattaccatgggtgatcggttttggcagtagcatcaatgggctggat
agcggtttgactcacggggattttccaaagtctccacccattgacgtcaatgggagtttgttttggcaccaaaatcaacgg
gactttccaaaatgtcgtaaacactccgccccattgacgcaaatgggcggtaggcgtgtacggtgggaggtctatataag
cagagcttcgcctggagacgcatccacgctgttttgacctccatagaagacaccgcatcgatccacaagtttgtaca
aaaaagcagggtgccaccatgttcgtgtttctggtgctgctgccactggtgtccagtcagtgcggtgaacttcaccaaccg
aacacagctgccatccgctacaccaatagcttcacccggagtgtagtactacccgacaaggtgttccgcagcagcgtgc
tgcatagcaccaggtatgtttctgcccctcttcagcaacgtgacctgggttccacgcatccacgtgtccggcaccat
ggcaccagcgcttcgataatcccggtgctgccccttcaacgatggcgtgtactttgccagcaccgagaagtccaatatcat
ccgcggttggtatcttcggcaccacactggatagcaagacccagagcctgctgatcgtgaacaacgcacccaactgggtca
tcaaagtgtgaggttccagttctgcaactaccccttctgggctgctactaccacaagaacaacaagagctggatggaa
agcgagttccgctgtgacagcagcgccaacaactgcaccttcgagtagctgtccagccattcctgatggacctggaagg
caagcagggcaacttcaagaacctgtccgagttcgtgttcaagaacatcgacggctacttcaaaatctacagcaagcaca
ccccaatcaacctcgtgcgcatctgccacagggattcagtgctctggaacccctgggtgatctgcccatcgccatcaac
attacccgctttcagacactgctggccctgcaccgagttacttgacaccaggcgatagcagcagtggttgacagctgg
tgcccgcgcttactacgttggatatctgcagccacgcacctttctgctgaagtacaacgagaacggcaccatcacgcagc
ccgtgatttgtctctgacccctgagcagagacaagtgacacctgaagtccttcacgctcgagaagggtcattaccag
accagcaatttccgctgcagcccaccgagagcatcgtgcgttccccaatatcaccaatctgtgcccccttcggcgaggt
gttcaatgccacacgctttgcctccgtgtacgcctggaatcgcaagcgattagcaactgcgtggcgactactccgtgc
tgtacaatagcgccagcttcagcaccttcaagtgctacggcgtgtcaccaccaaagctgaacgacctgtgcttccaat
gtgtacgcccagcagcttcgtgatccgcgagatgaagtgccacagattgccccaggccagacggcaccatcgccgacta
```

caattacaagctgcccagcacttcacgggctgctgtagcctggaacagcaacaacctggattccaaagtgcggcgga
actacaactacctgtaccgcctgttccgcaagagcaatctgaagcccttcgagcgcgacatcagcaccgaaatctaccag
gccggaagcaccatgcaacggcgtgaaaggcttcaactgctacttcccactgcagtcctacggatttcagcccacata
tggcgtgggctaccagccatctcagtggtggtgctgagcttcgaactgctgcatgctccagctaccgtgtgcggcccca
agaagagtaccaacctggtcaagaacaaatgcgtgaacttcaacttcaacggcctgaccggaacggcgctgctgaccgag
agtaacaagaagtctcctgccattccagcagctttggcgcgacattggcgatacaaccgatgcggttcgctgacccccagac
cttgagatcctggatattacccccatgctccttcggcggtgctgcctgattacaccaggcaccaataccagcaaccagg
tggccgttctgtaccaggcggtgaattgcacagagggtgcccgtggccattcacgcctgacatttgacaccaacatggcgc
gtgtactccaccggcagcaatgtgttcaaaccgcgctggatgcctgattggagccgagtagctgaacaatagctacga
gtgcgatatccccatcggagccggaatctgcgcctcctatcagacccagaccaatagtcacacgacgagcccgaaagtgtgg
ccagccagagcatcattgcctataccatgagcctgggcgcgagaaatagcgtggcctactccaacaacagcattgctatc
cccaccaacttcaccatcagcgtgaccaccgagatcctgccagtgtccatgaccaagaccagcgtggactgcaccatgta
catctgcggagatagcaccgagtgacgaacctgctgctgcagtagcgaagtcttctgcacccagctgaatcgcgccctga
caggcattgcccgtggaacaggataaagaacacccaagaggtgttgcaccaagtgaagcaaatctacaagacccccaccaatc
aaggatttcggcggttcaatttcagccagattctgcccgatccaagcaagccagcaagcgcagcttcacgaggacct
gctgttcaaaaagtgcactggccgacgcgggattcatcaagcagtagtggcgattgctggcgatattgcgcgacgcg
atctgatttgcgccagaagttaacggactgaccgtcctgccaccactgctgacagatgagatgatcgccagtagaca
agtgcctgctggccggaaccattaccagcggatggacatttggagccggtgcgctctgcagattcccttcgctatgca
gatggcctaccgcttcaatggcattggcgtgaccagaatgtgctgtacgagaaccagaagctgatcgccaaccagttca
acagcgcctacggcaagattcaggacagcctgagtagtaccgcgagcgtctgggaaagctgcaggatgtggtcaaccag
aacgctcaggccctgaacacccctggttaagcagctgagcagcaacttcggcgccatcagtagcgtgctgaacgatatcct
gagccgctggataaggtggaagccgaggtgcagatcgatcgctgattaccggagcctcgcagtccttcgagacctatg
tgacacagcagctgatccgagccgcgagattcgagctagtgtcaatctggccgcatcaagatgagcgaatgtgtgctg
ggacagagcaagcgtggacttttgcggcaaggataccaccctgatgagcttcccacagagtgctccacacggcgctgtg
gttctgcatgtgacctacgtgcccgtcaagagaagaatttcaccacccgctccagccatctgccacgacggaaaggccc
attttccacgcgagggcggtgttctgttagcaacggcactcattgggttcgtcaccacgcgcaacttctacgagccccagatc
atcaccacgcgacaacaccttcgtcagcggcaactgcgacgtcgtgatcggcattgtgaacaacacccgtgtacgatccact
gcagcccgagctggacagcttcaaaagaggaactggacaagtactttaagaaccacacaagccccgacgtggacctgggag
acattagcgaatcaacgccagcgtggtcaacatccagaaagagattgaccgcctgaacgaggtggccaagaatctgaac
gagagcctgatcgactgcaagaactgggcaaatcagcagcagtagacattaaagtggccctggtacatctggctgggctcat
tgccggactgattgccatcgtgatggtcaccattatgctgtgctgcatgaccagttgctgcagctgctgaagggatgct
gcagttgcggaagctgctgcaagttcgacgaggatgatagcgagccagtgctgaagggcgtaagctgcactacacctga
tagtaaacccagcttcttgtacaaagtgggtctcgagttcccagataatcaacctctggattacaaaatttgtgaaagatt
gactggtattcttaactatgttgcctctttacgctatgttgatacgtgctttaaagcctttgtatcatgctattgctt
ccgtagtgcttcttctcctccttctgtataaaactcgttgcctgtcttctttaggaggtgtgtggcccggttcttcagg
caacgtggcggtgtgactgtgttgcagcaacccccactgggtggggcattgcccacacctgcagctccttcttc
cgggactttcgctttccccctcctattgccacggcggaactcatgcgcctgccttgcgcgtgctggacaggggctc
ggctgttgggactgacaattccgtggtgttgcgggaagctgacgtccttccgcggtgctgcctgtgttggcacc
tggattctgcgcgggacgtccttctgctacgtccttcggcctcaatccagcggaccttcttcccgcggtgctgccc
ggctctgcggcctcttccgcgtcttcgccttcgcctcagacagctcggtatccttcttgggcgcctccccgcggtacc
tttaagaccaatgacttaaacggcagctgtagatcttagccttctttaaagaaaaggggactggaagggtgtaattc
actcccaacgaagacaaaatcgtcgagagatgctgcatataagcagctgcttttgcctgtactgggtctctctggttag
accagatctgagcctgggagctctctggctaactaggaacccactgcttaagcctcaataaagcttgccctgagtgctt
caagtagtgtgtgccgctctgttgtgtgactctggttaactagagatccctcagacccttttagtcagtggtgaaaatctc
tagcagttctagagggcccggtttaaaccgcgtgatcagcctcgactgtgccttctagttgccagccatctgttgttggc
cctcccccgctccttgcacctggaaggtgccaactcccactgtccttccctaataaaaatgaggaaattgcatcgcat
tgtctgagtaggtgtcattctattctgtgggggtgggtggggcaggacagcaaggggaggttgggaagacaatagcag
gcatgctggggatgcggtgggctctatggcttctactggcggttttatggacagcaagcgaacgggaattgccagctgg
ggcgccctctggttaaggttgggaagccctgcaaagtaaaactggatggcttcttgcgcgaaggtatctgatggcgaggg
gatcaagctctgatcaagagacaggatgaggatcgtttcgcatgattgaacaagatggattgcacgcaggttctccggcc
gcttgggtggagaggctattcggtatgactgggcacaacagacaatcggtgctctgatgcgcgcgtgttccgggctgc
agcgcagggggcgcgggttcttttgtcaagaccgacctgtccggtgcctgaatgaactgcaagacgagcagcgcggc
tatcgtggctggccacgacggcgctccttgcgcagctgtgctgcagcttgcactgaagcgggaagggaactggctgcta
ttggcgaaagtgcggggcaggatctcctgtcatctcaccttgcctcgcgagaaagtatccatcatggtgatgcaat
ggggcggtgcatacgttgatccggctacctgccattcgaccaaccaagcgaacatcgcatcgagcagcagcgtactc
ggatggaagccggtcttgcgatcaggatgatctggacgaagagcatcaggggctcgcgccagccgaactgttccgcagg
ctcaaggcgagcatgcccagcggcaggatctcgtcgtgacctggcgatgcctgcttgcgaatatcatggtggaaaa
tggccgcttttctgattcatcgactgtggcggtgggtgtggcggaacgctatcaggacatagcgttggctaccgctg
atattctgaagagcttggcggaatgggctgacgcttctcgtgctttaaaggatcgcgctccgctcggatcgagcgc
atcgcttctatcgcttcttgacgagttcttctgaattattaacgcttacaatttctgatgcggtattttctccttac
gcatctgtgcggtatttcacaccgcatcaggtggcacttttcggggaaatgtgcgcggaacccctatttgtttattttc
taaatacattcaaatatgtatccgctcatgagacaataaccctgataaatgttcaataatagcagctgctaaaacttca
tttttaatttaaaaggatctaggtgaagatccttttggataatctcatgacaaaatcccttaacgtgagtttctgcttc

Figure 34A (CON'T)

actgagcgtcagaccccgtagaaaagatcaaaggatcttcttgagatccttttttctgcgcgtaatctgctgcttgcaa
acaaaaaaaaaccaccgctaccagcgggtggtttgtttgccggatcaagagctaccaactctttttccgaaggtaactggctt
cagcagagcgcagataccaaatactgttcttctagtgtagccgtagttaggccaccacttcaagaactctgtagcaccgc
ctacatacctcgctctgctaatactgttaccagtggctgctgccagtggcgataagtctgtgtcttaccgggttggaactca
agacgatagttaccggataaggcgcagcggctcgggctgaacggggggttcgtgcacacagcccagcttggagcgaacgac
ctacaccgaactgagatacctacagcgtgagctatgagaaagcgccacgcttcccgaaggagaaaggcggacaggtatc
cggttaagcggcagggtcggaacaggagagcgcacgagggagcttccagggggaaacgcctgggtatctttatagtcctgtc
gggtttcgccacctctgacttgagcgtcgatttttgtgatgctcgtcagggggcgaggcctatggaaaaacgccagcaa
cgcggcctttttacgggttcttggccttttgctggccttttgctcacatgttcttgctgcttcgcgatgtacgggacagat
atacgc

atgttctggtgtttctggtgctgtgtgccactggtgttcagtcagtcgctggaacttcaccaaccgaacacagctgccatccg
ctacaccaatagcttcaccgcgagtgactaccgcgacaagtggttcgcgagcagcgtgtcgcgatagacccaggatc
tggtttctgccccttcttcagcaacgtgacctggtttccagcccatccagctgtccgcgaccaattggcacaagcgcttcgat
aatcccgctgtgccttcaacgattgcggtactcttgcgacgcagagaagtcgaatcatctccgcggtgtgattcttcg
caccacactggatagcaagaccagagcctgctgtatcgtgaacaacgccaccaacgtggtcatcaaaagtgctgcaggttcc
agttctgcaactacccttctctggcgcttactaccacaagaacaacaagagctggatggaaagcgagttccgcgtgtac
agcagcgccaacaactgcaccttcgagtagctgtcccagccattcctgatggacctggaagcgcaagcagggcaactcaa
gaacctgtccgagttcgtgttcaagaacatcgacggctacttcaaaatctacagcaagcacaccccaatcaacctcgtgcg
cgatctgccacagggattcagtgcttcggaacccctggtggtatgcgcactcggaatcaacatcaccgctttcagacg
ctgctggccctgcaccgcagttacttgacaccaggcgatagcagcagtggtggacagctggtgcccgcgcttactacgt
tggatatctgcagccacgcacctttctgctgaagtacaacgagaacggcaccatcaccgacgccgtggattgtgctctcg
atccccctgagcgagacaaagtgcacctggaagtccctcaccgtcgagaaggcgatctaccagaccagcaatttcgcgctg
cagcccaaccgagagcatcgtgcgtctcccgaatacacaactctgtgccccttcggcgaggtgttcaattgccacagctt
tgcttcgctgtacgcctggaatcgcaactcgcaacttagcaactgctgtggcgactactcgtgctgtacaattagccgcagct
tcagcaccttcaagtgtctacggcggtgtcaccaccaagctgaacgacctgtgcttaccaaatgtgtacgccgacagcttc
gtgatccgoggagatgaagtgcgacagattgcccagggccagaccggcaccatcgccgactacaattacaagctgccga
cgacttcaccggctgctgtagtcgcttgaacagcaacaacctggattccaagtgcggcggaactacaactacctgtacc
gctgttccgcgaagagcaattgaagcccttcgagcgcgacatcagcaccgaaatctacaggccggaagcaccctatgc
aacggctgtgaagggttcaactgctacttcccactgcagctccactcgattcagccacatatggcgtgggctaccagcg
atatcgagtggtggtgctgagcttcgaactgctgcatgctccagctaccgtgtgcgggcccaagaagagtaccaacctgg
tcaagaacaaatgctggaacttcaacttcaacggcctgaccggaacggcgctgctgaccgagagtaacaagaagttcctg
ccattccagcagtttggccgcgacattggccgatacaaacgatggcgttcgcgatccccagacacttggagatctcggtgat
taccctatgctccttcggcgcgctgtccgtgattacacaggcaccataccagcaaacagggtggcgcttctgtaccagg
gcgtgaattgcacagaggtgcccgtggccattcacgcgcatcaattgacacaacatggcgctgtactccaccgagcagc
aatgtgtttcaaacccgcgctggatgctgattggagccgagtagctgaacaatagctacgagtgcgatatccccatcgg
agccggaatctgcgcctctatcagaccagaccaatagtcacgacgagccgaagtgtggccagccagagcatcattg
cctataccatgagcctgggcgcgcgagaatagcgtggcctactccaacaacagcattgctatccccaccaacttaccatc
agcgtaccaccagagatctgcgcagatgtccatgaccaagacagcgtggaatgcacatgtacatctcggagatagcac
cgagtcagcaactgctgctgcagtagcgaagtcttctgaccagcgtgaatcgcgcctgacaggcatttgcgttgaac
aggataagaacacccaagaggtgttcgcccgaagtgaagcaaatctacaagacccaccaatcaaggatttcggcgcgcttc
aatttcagccagattctgcccgatcaagcaagcccgcaagcgcagcttcatcgaggacctgctgttcaaaaagtgc
actggccgacgcccggattcatcaagcagtagtggcgattgctctggcgatattggccacgcgcatctgatttggcccca
agtttaacggactgacgcttctgcccaccactgctgacagatgagatgatcgccagtacacaagtcgctgtgcccgg
accattaccagcgatggacatttggagcggctgcgctctgcgatcccttcgctacgagatggcctaccgcttcaa
tggcatggcgtagaccagaatgtgctgtacgagaaccagaagctgatcgccaaccagttcaacagcgccatcggcaaga
ttcaggacagcctgagtagtaccgcagcgctctgggaagctgcaggatgtggtcaaccagaacgctcaggccctgaac
accctggttaagcagctgagcagcaacttcggcgccatcagtagcgtgctgaacgatctctgagcgcctggataaggt
ggaagccgaggtgcagatcgatcgctgattaccggacgcctgacgtccctgcagacctatctgacacagcagatgcac
gagcgcgcgagatttcgagctagtgtctaattcggccgcatcaagatgagcgaatgtgtgctgggacagagaagcgctg
gacttttggcggaaggataaccacctgatgagcttcccacagagtgctccacacggcggtggtgtttctgcatgtgacct
cgtgcccgctcaagagaagaatttcaaccacgctccagccatctgccacgacggaaggccatttccacgcgagggcg
tggttctgttagcaacgcgcatcattggttcgtcaccagcgcaacttctacgagcccagatcatcaccaccgacaacac
ttcgtcagcggcaactgcagctgctgtagtcgcatgtggaacaacacgctgtagctcactgcagccgagctgtagag
cttcaaaagaggaactggacaagtagctttaagaaccacacaagccccgcagctgggaacctgggagacattagcggaatcaacg
ccagcgtggtcaacatccagaagaagattgaccgcctgaacgaggtggccaagaatctgaacgagagcctgatcgacctg
caagaactgggcaaatcagacgagtagacattaagtggccttggtacatctggttggccttcatgtccggactgattgccat
cgtgattggtcaccattatgctgtgctgtagcaggaattgctgacgtgctggaaggatgctgcagttcggaagctgct
cgaagttcagcagagatgatagcagcagcagctgtagaaggcgctcaagctgcactacacctga

75/75

Fig. 34C: Amino-Acid sequence of Spike SARS-Cov2 P.1 gene (codon optimized) (SEQ ID NO: 120)

S-B351 (1273aa)

MFVFLVLLPLVSSQCVNFTNRTQLPSAYTNSFTRGVYYPDKVFRSSVLHSTQDLFLPFFSNVTWFHAIHVS GTNGTKRFD
NPVLPFNDGVYFASTEKSNIRGWIFGTTLD SKTQSL LIVNNATNVV IKVCEFCNYPFLGVYYHKNNKSWMES EFRVY
SSANNCTFEYVSQPFLLMDLEGKQGNFKNLSEFVFKNIDGYFKIYSKHTPINLVRDLPQGFSALEPLVDLP IGINITRFQT
LLALHRSYLT PGDSSSGW TAGAAAYVGYLQPRTFLLKY NENG TI TDAVDCALDPLSETKCTLKSFTVEKGIYQTSNFRV
QPTESIVRFPNITNLCPFGGEVFNATRFASVYAWNRRKRSNCVADYSVLVNSASFSTFKCYGVSPTKLN DL CFTNVYADSF
VIRGDEV RQIAPGQTGTIADYNYKL PDDFTGCVIAWNSNNLDSKVGGNYNYLYRLFRKSNLKPFERDISTE IYQAGSTPC
NGVKGFNCYFPLQSYGFGQPTYGVGYQPYRVVLSFELLHAPATVCGPKKSTNLVKNKCVNFNFNGLTGTGVLTESNKKFL
PFQQFGRDIADTTDAVRDPQTLEILDITPCSFGGVSVITPGTNTSNQVAVLYQGVNCTEVPVAIHADQLTPTWRVYSTGS
NVFQTRAGCLIGA EYVNNSYECDIPIGAGICASYQTQTN SPRRARSVASQSI IAYTMSLGAENSVAYSNN SIAIPTNFTI
SVTTEILPVSMTKTSVDCTMYICGDSTEC SNLLQYGSFCTQLNRALTGIAVEQDKNTQEVFAQVKQIYKTPPIKDFGGF
NFSQILPDPSKPSKRSFIEDLLFNKVT LADAGFIKQYGDCLGDIAARDLICAQKFNGLT VLPPLLTDEMI AQYTSALLAG
TITSGWTFGAGAALQIPFAMQMAYRFNGIGVTONVLYENQKLIANQFN SAIGKIQDSLSTASALGKLQDVVNQNAQALN
TLVKQLSSNFGAISSVLNDILSRLDKVEAEVQIDRLITGR LQSLQTYVTQQLIRAAEIRASANLAAIKMSECVLGQSKRV
DFCGKGYHLM SFPQSAPHGVVFLHVTVYVPAQEKNFTTAPAICHGKAHFPREGVFVSNGTHWFVTQRNFYEPQIITDNT
FVSGNCDVVIGIVNNTVYDPLQPELDSFKEELDKYFKNHTSPDVDLGDISGINASVVNIQKEIDRLNEVAKNLNESLIDL
QELGKYEQYIKWPWYIWLGFIAGLIAIVMVTIMLCCMTSCC SCLKGCCSCGSCCKFDEDDSEPV LKGVKLHYT