

Fig. 1

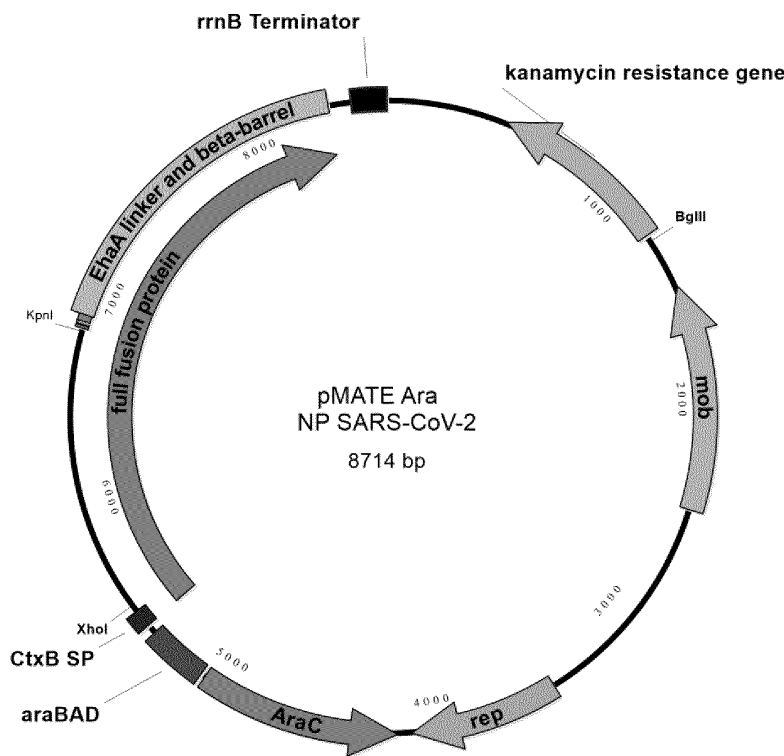


Fig. 2

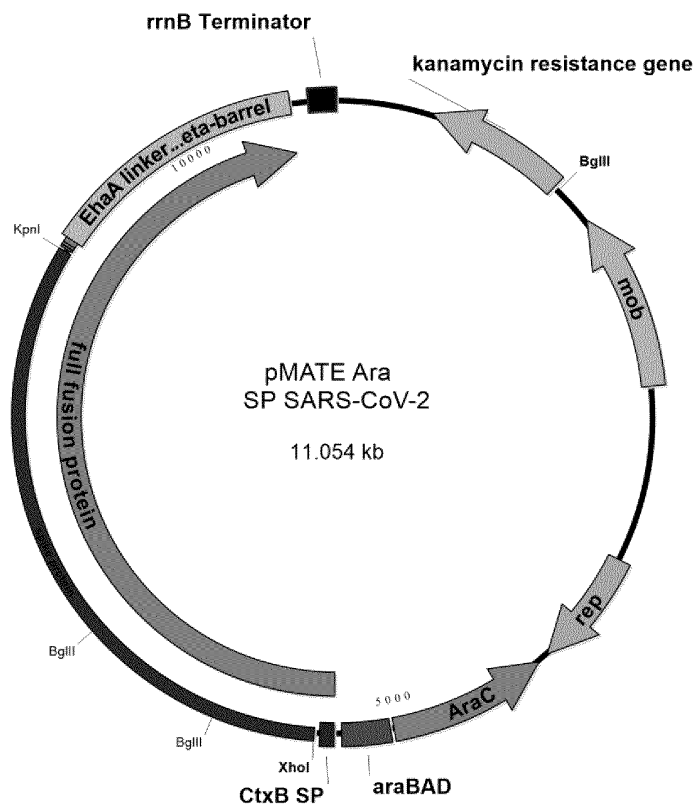


Fig. 3

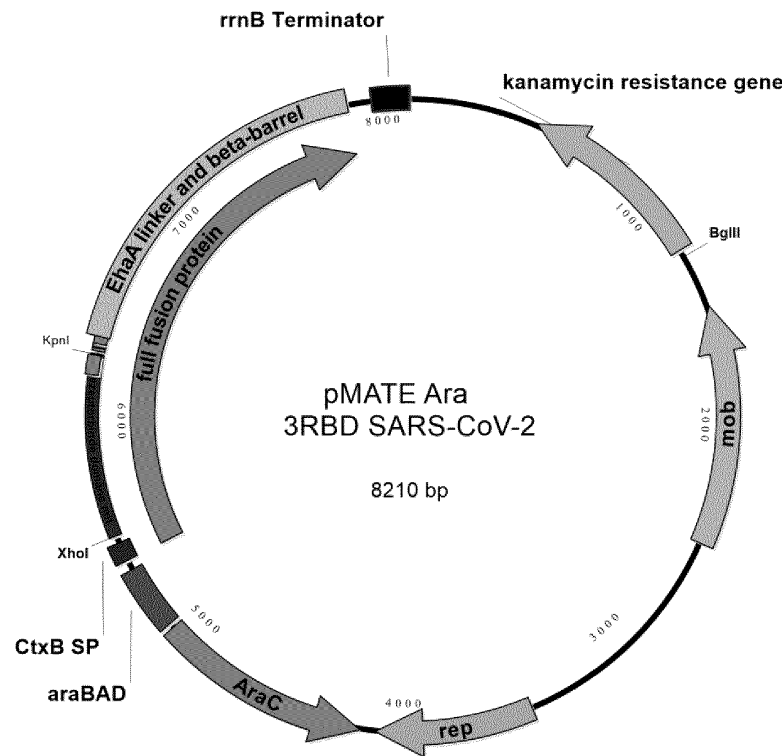


Fig. 4

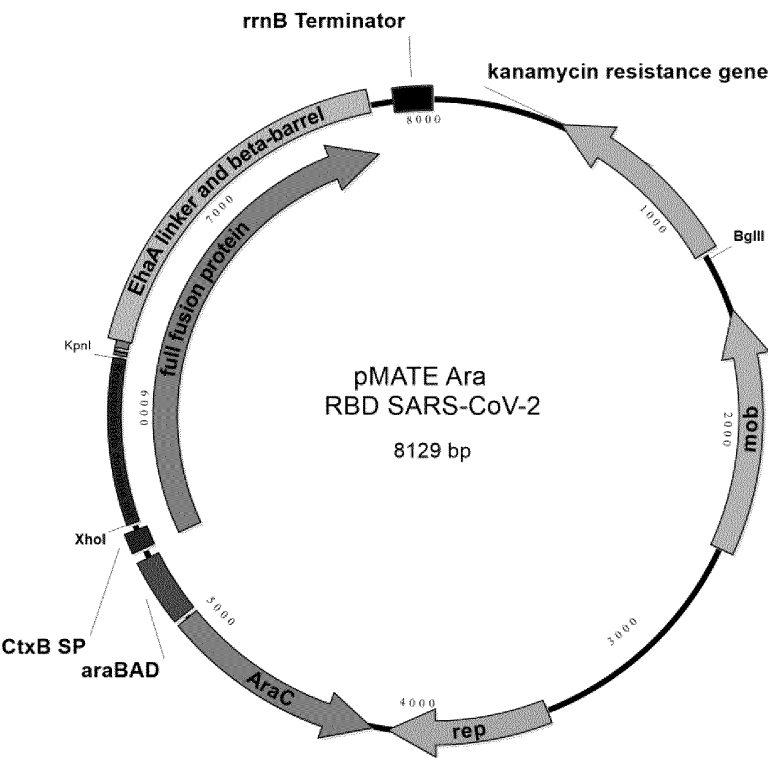


Fig.5A

DNA sequence encoding a nucleocapsid autotransporter fusion protein

10	20	30	40	50	60
ATGATCAAAC	TGAAATTCGG	CGTCTTCTTC	ACCGTACTGC	TGTCCTCTGC	TTACGCTCAC
70	80	90	100	110	120
GGTACTCCGC	AGAACATCAC	CCACCACCAT	CACCATCATA	TCGAAGGTCG	TCTCGAGTCG
130	140	150	160	170	180
GACAATGGTC	CCCAAAATCA	ACGTAATGCT	CCCCGTATCA	CTTTCGGTGG	GCCATCAGAC
190	200	210	220	230	240
TCTACAGGGA	GTAATCAAAA	TGGAGAGCGT	TCTGGTGCCC	GTTCCAAGCA	ACGTCGTCCT
250	260	270	280	290	300
CAAGGTCTTC	CTAATAATAC	GGCATCCTGG	TTCACGGCCT	TGACACAACA	CGGTAAGGAA
310	320	330	340	350	360
GACTTGAAGT	TCCCCCGTGG	TCAAGGAGTA	CCAATCAATA	CGAATTCATC	TCCAGACGAC
370	380	390	400	410	420
CAAATCGGTT	ACTACCGTCG	TGCCACGCGT	CGTATCCGTG	GTGGGGACGG	TAAGATGAAG
430	440	450	460	470	480
GACTTGTCGC	CTCGTTGGTA	CTTCTACTAC	CTCGGAACTG	GTCCTGAGGC	CGGTTTGCCT
490	500	510	520	530	540
TACGGAGCAA	ATAAGGACGG	GATCATCTGG	GTCGCAACAG	AGGGAGCATT	AAATACACCA
550	560	570	580	590	600
AAGGACCACA	TCGGAACGCG	TAATCCAGCA	AATAATGCCG	CCATCGTACT	CCAATTACCT
610	620	630	640	650	660
CAAGGAACAA	CGTTGCCAAA	GGGATTCTAC	GCCGAGGGAT	CCCGTGGTGG	GTCTCAAGCA
670	680	690	700	710	720
AGTAGTCGTT	CATCAAGTCG	TTCGCGTAAT	TCTTCCCGTA	ATAGTACACC	TGGATCCAGT
730	740	750	760	770	780
CGTGGTACAT	CGCCTGCCCG	TATGGCCGGT	AATGGTGGTG	ACGCCGCATT	AGCCTTGCTT
790	800	810	820	830	840
TTGTTAGACC	GTCTCAATCA	ATTAGAGTCA	AAGATGTCGG	GTAAGGGTCA	ACAACAACAA
850	860	870	880	890	900
GGACAAACAG	TAACATAAGAA	GTCCGCCGCC	GAGGCCTCTA	AGAAGCCCCG	TCAAAAGCGT
910	920	930	940	950	960
ACGGCTACTA	AGGCATACAA	TGTCACACAA	GCCTTCGGAC	GTCGTGGGCC	CGAGCAAACCT
970	980	990	1000	1010	1020
CAAGGTAATT	TCGGGGACCA	AGAGTTGATC	CGTCAAGGAA	CTGACTACAA	GCACTGGCCA
1030	1040	1050	1060	1070	1080
CAAATCGCAC	AATTCGCCCC	ATCCGCCTCT	GCCTTCTTCG	GTATGTCACG	TATCGGTATG
1090	1100	1110	1120	1130	1140
GAAGTTACTC	CCTCGGGAAC	GTGGTTAACG	TACACGGGTG	CCATCAAGCT	CGACGACAAG
1150	1160	1170	1180	1190	1200
GACCCAAATT	TCAAGGACCA	AGTCATCCTT	CTCAATAAGC	ACATCGACGC	CTACAAGACT
1210	1220	1230	1240	1250	1260
TTCCCACCCA	CTGAGCCTAA	GAAGGACAAG	AAGAAGAAGG	CAGACGAGAC	ACAAGCTTTA
1270	1280	1290	1300	1310	1320
CCCCAACGTC	AAAAGAAGCA	ACAAACTGTT	ACTCTCTTGC	CCGCCGCCGA	CTTGGACGAC
1330	1340	1350	1360	1370	1380
TTCTCGAAGC	AATTACAACA	AAGTATGTCG	TCAGCTGACT	CCACGCAAGC	TGGTACCGCT
1390	1400	1410	1420	1430	1440
CGTCGTGCTA	TTGAGGGCCG	CATCCCGGAA	TACTTTAAAG	AACAAAAACT	CATCTCAGAA
1450	1460	1470	1480	1490	1500
GAGGATCTGC	TGACCAACAA	TGGCACGCTG	ATGACGGGTA	TGAGCGGTCA	ACAAGCGGGT
1510	1520	1530	1540	1550	1560
AACGTTCTGG	TTGTTAAGGG	CAATTACCAT	GGCAATAACG	GCCAGCTGGT	CATGAACACG
1570	1580	1590	1600	1610	1620
GTTCTGAACG	GCGATGATAG	CGTGACCGAC	AAGCTGGTGG	TCGAGGGCGA	CACCTCTGGT
1630	1640	1650	1660	1670	1680
ACGACCGCAG	TGACGGTGAA	TAATGCAGGC	GGTACGGGTG	CCAAAACCCT	GAACGGTATT

Fig. 5A (continued - 1)

1690	1700	1710	1720	1730	1740
GAGTTGATCC	ACGTTGACGG	TAAGAGCGAG	GGCGAGTTTG	TGCAGGCAGG	CCGCATTGTT
1750	1760	1770	1780	1790	1800
GCTGGCGCTT	ATGACTATAC	GCTGGCCCGT	GGTCAGGGCG	CGAATAGCGG	TAACTGGTAT
1810	1820	1830	1840	1850	1860
CTGACCAGCG	GCTCCGACTC	CCCGGAAGTG	CAACCGGAGC	CTGATCCGAT	GCCGAATCCG
1870	1880	1890	1900	1910	1920
GAGCCAAACC	CGAACCCGGA	ACCGAACCCA	AATCCGACCC	CGACTCCGGG	TCCGGACTTG
1930	1940	1950	1960	1970	1980
AACGTTGATA	ACGACCTGCG	TCCGGAGGCC	GGTTCGTACA	TCGCGAACCT	GGCAGCGGCC
1990	2000	2010	2020	2030	2040
AATACGATGT	TTACGACCCG	TCTGCACGAA	CGCCTGGGTG	ATACCTACTA	TACCGATATG
2050	2060	2070	2080	2090	2100
GTCACCTGGT	AACAGAAACA	AACCACCATG	TGGATGCGCC	ACGAGGGTGG	TCACAATAAG
2110	2120	2130	2140	2150	2160
TGGCGCGACG	GTAGCGGCCA	GTTGAAAACC	CAGAGCAATC	GCTACGTTCT	GCAATTGGGC
2170	2180	2190	2200	2210	2220
GGTGATGTGG	CGCAATGGAG	CCAAAACGGC	AGCGACCGTT	GGCATGTCGG	TGTGATGGCA
2230	2240	2250	2260	2270	2280
GGTTACGGCA	ACAGCGACAG	CAAGACCATC	TCCAGCCGTA	CCGGTTACCG	TGCGAAGGCA
2290	2300	2310	2320	2330	2340
AGCGTCAACG	GTTACAGCAC	CGGCCGTGAT	GCCACCTGGT	ATGCTGATGA	TGAGAGCCGC
2350	2360	2370	2380	2390	2400
AACGGTGCTT	ACTTGGACAG	CTGGGCACAG	TATTCTTGGT	TCGATAATAC	GGTGAAAGGC
2410	2420	2430	2440	2450	2460
GACGACCTGC	AGAGCGAAAG	CTACAAATCG	AAAGGTTTCA	CCGCGAGCCT	GGAAGCCGGC
2470	2480	2490	2500	2510	2520
TATAAGCACA	AACTGGCGGA	ATTCAATGGC	AGCCAGGGTA	CTCGTAACGA	ATGGTACGTT
2530	2540	2550	2560	2570	2580
CAACCGCAGG	CGCAAGTCAC	TTGGATGGGC	GTTAAGGCGG	ATAAACACCG	TGAGAGCAAC
2590	2600	2610	2620	2630	2640
GGTACGTTGG	TGCATAGCAA	CGGTGATGGT	AATGTCCAAA	CCCGTCTGGG	TGTGAAAACG
2650	2660	2670	2680	2690	2700
TGGCTGAAGT	CCCATCACAA	AATGGACGAC	GGTAAATCTC	GTGAATTTCA	GCCGTTCGTG
2710	2720	2730	2740	2750	2760
GAAGTTAACT	GGCTGCATAA	TAGCAAGGAT	TTCAGCACGA	GCATGGATGG	TGTCTCCGTT
2770	2780	2790	2800	2810	2820
ACCCAGGACG	GCGCACGTAA	CATTGCGGAG	ATCAAGACCG	GCGTCGAGGG	TCAGCTGAAT
2830	2840	2850	2860	2870	2880
GCGAATCTGA	ATGTTTGGGG	TAACGTGGGT	GTTCAAGTAG	CGGACCGTGG	TTACAATGAT
2890	2900	2910			
ACCAGCGCGA	TGGTGGGTAT	TAAGTGCCAG	TTTTAA		

Fig. 55

Amino acid sequence of a nucleocapsid autotransporter fusion protein

10	20	30	40	50	60
MIKCLKFGVFF	TVLLSSAYAH	GTPQNITHHH	HHHIEGRLES	DNGFPQNQRNA	PRITFGGSPD
70	80	90	100	110	120
STGSNQNGER	SGARSKQRRF	QGLPNNTASW	FTALTQHGKE	DLKFPRGQGV	PINTNSSPDD
130	140	150	160	170	180
QIGYYRRATR	RIRGGDGKMK	DLSPRWYFYY	LGTGPEAGLP	YGANKDGI IW	VATEGALNTP
190	200	210	220	230	240
KDHIGTRNPA	NNAAIVLQLP	QGTTLPKGFY	AEGSRGGSQA	SSRSSSRSRN	SSRNSTPGSS
250	260	270	280	290	300
RGTSPARMAG	NGGDAALALL	LLDRLNQLES	KMSGKGQQQQ	GQTVTKKSAA	EASKKPRQKR
310	320	330	340	350	360
TATKAYNVTQ	AFGRRGPET	QGNFGDQELI	RQGTDYKHWP	QIAQFAPSAS	AFFGMSRIGM
370	380	390	400	410	420
EVTPSGTWLT	YTGAIKLDDK	DPNFKDQVIL	LNKHIDAYKT	FPPTPEPKDK	KKKADETQAL
430	440	450	460	470	480
PQRQKKQQT	TLLPAADLDD	FSKQLQQSMS	SADSTQAGTA	RRAIEGRIPE	YFKEQKLISE
490	500	510	520	530	540
EDLLTNNGT	MTGMSGQQAG	NVLVVKGN YH	GNNGQLVMNT	VLNGDDSVTD	KLVVEGDTSG
550	560	570	580	590	600
TTAVTVNNAG	GTGAKTLNGI	ELIHVDGKSE	GEFVQAGRIV	AGAYDYTLAR	GQGANSNGN WY
610	620	630	640	650	660
LTSGSDSPEL	QPEPDMPNPF	EPNPNPEPNP	NPTPTPGPDL	NVDNDLRPEA	GSYIANLAAA
670	680	690	700	710	720
NTMFTTRLHE	RLGNTYYTDM	VTGEQKQTTM	WMRHEGGH NK	WRDGSGLK T	QSNRYVLQLG
730	740	750	760	770	780
GDVAQWSQNG	SDRWHVGVMA	GYGNSDSKTI	SSRTGYRAKA	SVNGYSTGLY	ATWYADDES R
790	800	810	820	830	840
NGAYLDSWAQ	YSWFDNTVKG	DDLQSESYKS	KGFTASLEAG	YKHKLAEFNG	SQGTRNEWYV
850	860	870	880	890	900
QPQAQVTWMG	VKADKHRESN	GTLVHSNGDG	NVQTRLGVKT	WLKSHHKMDD	GKSREFQPFV
910	920	930	940	950	960
EVNWLHNSKD	FSTSMGVS V	TQDGARNIAE	IKTGVEGQLN	ANLNVWGNVG	VQVADRGYND
970					
TSAMVGIKWQ	F-				

Fig. 6A

DNA sequence encoding a spike protein autotransporter fusion protein

10	20	30	40	50	60
ATGATCAAAC	TGAAATTCGG	CGTCTTCTTC	ACCGTACTGC	TGTCCTCTGC	TTACGCTCAC
70	80	90	100	110	120
GGTACTCCGC	AGAACATCAC	CCACCACCAT	CACCATCATA	TCGAAGGTCG	TCTCGAGGTT
130	140	150	160	170	180
AATTTAACTA	CGCGTACGCA	ACTCCCGCCA	GCCTACACAA	ATTCCCTTCA	GCGTGGGGTC
190	200	210	220	230	240
TACTACCCCG	ACAAGGTATT	CCGTTCCAGT	GTTTGTGACT	CGACGCAAGA	CCTTTTCTTG
250	260	270	280	290	300
CCCTTCTTCT	CGAATGTCAC	ATGGTTCCAC	GCCATCCACG	TATCTGGTAC	AAATGGAAC
310	320	330	340	350	360
AAGCGTTTCG	ACAATCCCGT	CTTGCCTTTC	AATGACGGAG	TCTACTTCGC	CAGTACGGAG
370	380	390	400	410	420
AAGTCCAATA	TCATCCGTGG	TTGGATCTTC	GGTACAACAT	TAGACTCGAA	GACTCAATCG
430	440	450	460	470	480
TTACTTATCG	TCAATAATGC	TACTAATGTT	GTTATCAAGG	TATGTGAGTT	CCAATTCTGT
490	500	510	520	530	540
AATGACCCCT	TCTTGGGTGT	CTACTACCAC	AAGAATAATA	AGTCTTGGAT	GGAGTCAGAG
550	560	570	580	590	600
TTCCGTGTTT	ACTCATCAGC	CAATAATTGT	ACATTGAGT	ACGTATCCCA	ACCTTTCTTA
610	620	630	640	650	660
ATGGACTTAG	AGGGAAAGCA	AGGGAAATTC	AAGAATTTAC	GTGAGTTCGT	TTTCAAGAA
670	680	690	700	710	720
ATCGACGGAT	ACTTCAAGAT	CTACTCGAAG	CACACACCTA	TCAATTTGGT	CCGTGACCTT
730	740	750	760	770	780
CCCCAAGGTT	TCTCAGCTTT	GGAGCCCTTA	GTTGACCTGC	CCATCGGAAT	CAATATCAGC
790	800	810	820	830	840
CGTTTCCAAA	CGCTTCTCGC	ACTTACCGGT	TCGTACTTGA	CGCCCGGTGA	CTCCTCATCG
850	860	870	880	890	900
GGTTGGACGG	CAGGAGCAGC	AGCCTACTAC	GTTGGATACC	TTCAACCTCG	TACGTTCTTG
910	920	930	940	950	960
TTAAAGTACA	ATGAGAATGG	TACTATCACA	GACGCTGTAG	ACTGTGCTTT	AGACCCATTA
970	980	990	1000	1010	1020
TCGGAGACAA	AGTGTAACCT	CAAGTCTTTC	ACGGTAGAGA	AGGGGATCTA	CCAAACGAGT
1030	1040	1050	1060	1070	1080
AATTTCCGTG	TTCAACCAAC	TGAGTCTATC	GTTTCGTTTC	CAAATATCAC	TAATTTGTGT
1090	1100	1110	1120	1130	1140
CCATTGCGGT	AGGTCTTCAA	TGCCACACGT	TTTCGCAAGT	TTTACGCCTG	GAATCGTAAG
1150	1160	1170	1180	1190	1200
CGTATCTCAA	ATTGTGTCGC	CGACTACTCA	GTTCTCTACA	ATTACAGCAT	ATTCTCAACG
1210	1220	1230	1240	1250	1260
TTCAAGTGTT	ACGGAGTTTC	ACCTACGAAG	TTAAATGACT	TGTGTTTCAC	TAATGTATAC
1270	1280	1290	1300	1310	1320
GCAGACAGTT	TCGTATCCCG	TGGAGACGAG	GTTTCGTCAA	TCGCTCCAGG	ACAAACAGGA
1330	1340	1350	1360	1370	1380
AAGATCGCCG	ACTACAATTA	CAAGTTGCCA	GACGACTTCA	CTGGGTGTGT	TATCGCATGG
1390	1400	1410	1420	1430	1440
AATTCTAATA	ATCTTGACTC	GAAGGTCGGT	GGTAATTACA	ATTACCTTTA	CCGTCTCTTC
1450	1460	1470	1480	1490	1500
CGTAAGTCGA	ATTTGAAGCC	TTTCGAGCGT	GACATCTCAA	CTGAGATCTA	CCAAGCTGGG
1510	1520	1530	1540	1550	1560
TCGACGCCAT	GTAATGGTGT	AGAGGGGTTC	AATTGTTACT	TCCCCTTACA	ATCATACGGG
1570	1580	1590	1600	1610	1620
TTCCAACCCA	CTAATGGAGT	AGGTTACCAA	CCATACCGTG	TAGTAGTTTT	GTCGTTCCAG
1630	1640	1650	1660	1670	1680
TTACTTCACG	CCCCCGCTAC	GGTTTGTGGT	CCTAAGAAGT	CGACTAATCT	CGTCAAGAAT

Fig. 6A (continued - 1)

1690	1700	1710	1720	1730	1740
AAGTGTGTCA	ATTTCAATTT	CAATGGACTC	ACGGGTACAG	GTGTCCTTAC	GGAGAGTAAT
1750	1760	1770	1780	1790	1800
AAGAAGTTCT	TGCCATTCCA	ACAATTCGGT	CGTGACATCG	CCGACACTAC	TGACGCAGTT
1810	1820	1830	1840	1850	1860
CGTGACCCAC	AAACTTTGGA	GATCCTCGAC	ATCACACCAT	GTTCCTTTCGG	CGGTGTATCC
1870	1880	1890	1900	1910	1920
GTCATCACTC	CCGGAACAAA	TACGTGCAAT	CAAGTAGCAG	TACTCTACCA	AGACGTAAAT
1930	1940	1950	1960	1970	1980
TGTACGGAAG	TTCCC GTTGC	CATCCACGCT	GACCAATTAA	CTCCAACGTG	GCGTGTTTAC
1990	2000	2010	2020	2030	2040
TCAACAGGGA	GTAATGTATT	CCAAACGCGT	GCCGGTTGTT	TGATCGGAGC	CGAGCACGTC
2050	2060	2070	2080	2090	2100
AATAATTCAT	ACGAGTGTGA	CATCCCTATC	GGGGCCGGAA	TCTGTGCCAG	TTACCAAACG
2110	2120	2130	2140	2150	2160
CAAACGAATA	GTCCACGTCG	TGCACGTTTC	GTCGCCTCTC	AATCAATCAT	CGCCTACACG
2170	2180	2190	2200	2210	2220
ATGTGCGCTCG	GGGCCGAGAA	TTCGGTAGCC	TACTCGAATA	ATTTCGATCG	AATCCCTACG
2230	2240	2250	2260	2270	2280
AATTTTCACGA	TCTCAGTTAC	AACTGAGATC	CTTCCAGTTT	CAATGACGAA	GACATCGGTC
2290	2300	2310	2320	2330	2340
GACTGTACGA	TGTACATCTG	TGGGGACTCG	ACTGAGTGTT	CGAATCTTTT	ATTGCAATAC
2350	2360	2370	2380	2390	2400
GGTTCATTCT	GTACTCAATT	GAATCGTGCC	TTAACTGGAA	TCGCAGTAGA	GCAAGACAAG
2410	2420	2430	2440	2450	2460
AATACGCAAG	AGGTTTTTCGC	TCAAGTAAAG	CAAATCTACA	AGACACCACC	TATCAAGGAC
2470	2480	2490	2500	2510	2520
TTCGGTGTTT	TCAATTTCTC	CCAAATCTTA	CCTGACCCTT	CGAAGCCATC	AAAGCGTTCA
2530	2540	2550	2560	2570	2580
TTCATCGAGG	ACCTTTTGTG	CAATAAGGTC	ACTTTGGCTG	ACGCCGGTTT	CATCAAGCAA
2590	2600	2610	2620	2630	2640
TACGGAGACT	GTCTTGGAGA	CATCGCAGCC	CGTGACCTTA	TCTGTGCACA	AAAGTTCAAT
2650	2660	2670	2680	2690	2700
GGTTTAACAG	TACTCCCGCC	TTTATTGACG	GACGAGATGA	TCGCACAATA	CACCTTCTGCT
2710	2720	2730	2740	2750	2760
CTTCTTGCA	GGACGATCAC	GTCAGGTGG	ACTTTCGGTG	CCGGTGCAGC	CTTACAAATC
2770	2780	2790	2800	2810	2820
CCTTTCGCCA	TGCAAATGGC	CTACCGTTTC	AATGGTATCG	GTGTTACGCA	AAATGTATTA
2830	2840	2850	2860	2870	2880
TACGAGAATC	AAAAGTTGAT	CGCTAATCAA	TTCAATTCTG	CTATCGGCAA	GATCCAAGAC
2890	2900	2910	2920	2930	2940
TCATTATCCA	GCACTGCTTC	CGCCTTGGGA	AAGCTCCAAG	ACGTCGTCAA	TCAAAATGCC
2950	2960	2970	2980	2990	3000
CAAGCATTGA	ATACATTGGT	TAAGCAACTC	AGTTCGAATT	TCGGAGCAAT	CTCGTCAGTT
3010	3020	3030	3040	3050	3060
TTAAATGACA	TCTTGTGCGG	TCTCGACCCG	CCTGAGGCAG	AGGTCCAAAT	CGACCGTTTA
3070	3080	3090	3100	3110	3120
ATCACAGGTC	GTCTTCAATC	GTTGCAAACT	TACGTCACAC	AACAACATCAT	CCGTGCCGCA
3130	3140	3150	3160	3170	3180
GAGATCCGTG	CATCCGCTAA	TCTTGCCGCC	ACGAAGATGT	CGGAGTGTGT	CCTCGGTCAA
3190	3200	3210	3220	3230	3240
TCGAAGCGTG	TAGACTTCTG	TGGTAAGGGT	TACCACCTTA	TGTCCTTCCC	CCAATCCGCA
3250	3260	3270	3280	3290	3300
CCTCACGGTG	TTGTTTTCTT	ACACGTAACG	TACGTACCTG	CCCAAGAGAA	GAATTTCACT

Fig. 6A (continued – 2)

3310	3320	3330	3340	3350	3360
ACTGCACCTG	CCATCTGTCA	CGACGGAAAG	GCCCACTTCC	CTCGTGAGGG	TGTTTTCGTC
3370	3380	3390	3400	3410	3420
TCCAATGGGA	CACACTGGTT	CGTTACACAA	CGTAATTTCT	ACGAGCCTCA	AATCATCACT
3430	3440	3450	3460	3470	3480
ACTGACAATA	CATTTCGTTT	TGGTAATTGT	GACGTAGTTA	TCGGGATCGT	AAATAATACT
3490	3500	3510	3520	3530	3540
GTTTACGACC	CTTTACAACC	AGAGTTGGAC	AGTTTCAAAG	AGGAGTTAGA	CAAGTACTTC
3550	3560	3570	3580	3590	3600
AAGAATCACA	CGTCACCTGA	CGTCGACCTT	GGTGACATCT	CGGGTATCAA	TGCCTCAGTA
3610	3620	3630	3640	3650	3660
GTTAATATCC	AAAAGGAGAT	CGACCGTTTG	AATGAGGTAG	CCAAGAATTT	GAATGAGTCC
3670	3680	3690	3700	3710	3720
CTTATCGACC	TTCAAGAGCT	CGGTAAGTAC	GAGCAATACA	TCAAGTGGCC	TGGTACCGCT
3730	3740	3750	3760	3770	3780
CGTCGTGCTA	TTGAGGGCCG	CATCCCGGAA	TACTTTAAAG	AACAAAAACT	CATCTCAGAA
3790	3800	3810	3820	3830	3840
GAGGATCTGC	TGACCAACAA	TGGCACGCTG	ATGACGGGTG	TGAGCGGTCA	ACAAGCGGGT
3850	3860	3870	3880	3890	3900
AACGTTCTGG	TTGTTAAGGG	CAATTACCAT	GGCAATAACG	GCCAGCTGGT	CATGAACACG
3910	3920	3930	3940	3950	3960
GTTCTGAACG	GCGATGATAG	CGTGACCGAC	AAGCTGGTGG	TCGAGGGCGA	CACCTCTGGT
3970	3980	3990	4000	4010	4020
ACGACCGCAG	TGACGGTGAA	TAATGCAGGC	GGTACGGGTG	CCAAAACCCCT	GAACGGTATT
4030	4040	4050	4060	4070	4080
GAGTTGATCC	ACGTTGACGG	TAAGAGCGAG	GGCGAGTTTG	TGCAGGCAGG	CCGCATTGTT
4090	4100	4110	4120	4130	4140
GCTGGCGCTT	ATGACTATAC	GCTGGCCCGT	GGTCAGGGCG	CGAATAGCGG	TAACCTGGTAT
4150	4160	4170	4180	4190	4200
CTGACCAGCG	GCTCCGACTC	CCCGGAACTG	CAACCGGAGC	CTGATCCGAT	GCCGAATCCG
4210	4220	4230	4240	4250	4260
GAGCCAAACC	CGAACCCGGA	ACCGAACCCA	AATCCGACCC	CGACTCCGGG	TCCGGACTTG
4270	4280	4290	4300	4310	4320
AACGTTGATA	ACGACCTGCG	TCCGGAGGCC	GGTTCGTACA	TCGCGAACCT	GGCAGCGGCC
4330	4340	4350	4360	4370	4380
AATACGATGT	TTACGACCCG	TCTGCACGAA	CGCCTGGGTA	ATACCTACTA	TACCGATATG
4390	4400	4410	4420	4430	4440
GTCACCTGGT	AACAGAAACA	AACCACCATG	TGGATGCGCC	ACGAGGGTGG	TCACAATAAG
4450	4460	4470	4480	4490	4500
TGGCGCGACG	GTAGCGGCCA	GTTGAAAACC	CAGAGCAATC	GCTACGTTCT	GCAATTGGGC
4510	4520	4530	4540	4550	4560
GGTGATGTGG	CGCAATGGAG	CCAAAACGGC	AGCGACCGTT	GGCATGTCCG	TGTGATGGCA
4570	4580	4590	4600	4610	4620
GGTTACGGCA	ACAGCGACAG	CAAGACCATC	TCCAGCCGTA	CCGGTTACCG	TGCGAAGGCA
4630	4640	4650	4660	4670	4680
AGCGTCAACG	GTTACAGCAC	CGGCCTGTAT	GCCACCTGGT	ATGCTGATGA	TGAGAGCCGC
4690	4700	4710	4720	4730	4740
AACGGTGCTT	ACTTGGACAG	CTGGGCACAG	TATTCTTGGT	TCGATAATAC	GGTGAAAGGC
4750	4760	4770	4780	4790	4800
GACGACCTGC	AGAGCGAAAG	CTACAAATCG	AAAGGTTTCA	CCGCGAGCCT	GGAAGCCGGC
4810	4820	4830	4840	4850	4860
TATAAGCACA	AACTGGCGGA	ATTCAATGGC	AGCCAGGGTA	CTCGTAACGA	ATGGTACGTT
4870	4880	4890	4900	4910	4920
CAACCGCAGG	CGCAAGTCAC	TTGGATGGGC	GTAAAGGCGG	ATAAACACCG	TGAGAGCAAC

Fig. 6A (continued - 3)

4930	4940	4950	4960	4970	4980
GGTACGTTGG	TGCATAGCAA	CGGTGATGGT	AATGTCCAAA	CCCGTCTGGG	TGTGAAAACG
4990	5000	5010	5020	5030	5040
TGGCTGAAGT	CCCATCACAA	AATGGACGAC	GGTAAATCTC	GTGAATTTCA	GCCGTTCGTG
5050	5060	5070	5080	5090	5100
GAAGTTAACT	GGCTGCATAA	TAGCAAGGAT	TTCAGCACGA	GCATGGATGG	TGTCTCCGTT
5110	5120	5130	5140	5150	5160
ACCCAGGACG	GCGCACGTAA	CATTGCGGAG	ATCAAGACCG	GCGTCGAGGG	TCAGCTGAAT
5170	5180	5190	5200	5210	5220
GCGAATCTGA	ATGTTTGGGG	TAACGTGGGT	GTTCAAGTAG	CGGACCGTGG	TTACAATGAT
5230	5240	5250			
ACCAGCGCGA	TGGTGGGTAT	TAAGTGGCAG	TTTTAA		

Fig. 6B

Amino acid sequence of a spike protein autotransporter fusion protein					
10	20	30	40	50	60
MIKCLKGVFF	TVLLSSAYAH	GTPQNITHHH	HHHIEGRLEV	NLTTRTQLPP	AYTNSFTRGV
70	80	90	100	110	120
YYPDKVFRSS	VLHSTQDLFL	PPFSNVTWFH	AIHVSQTNGT	KRFDNPVLPF	NDGVYFASTE
130	140	150	160	170	180
KSNIIRGWIF	GTTLDSKTQS	LLIVNNATNV	VIKVCEQFC	NDPFLGVYYH	KNNKSWMESE
190	200	210	220	230	240
FRVYSSANNC	TFEYVSQPF	MDLEGKQGNF	KNLREFVFKN	IDGYFKIYSK	HTPINLVRDL
250	260	270	280	290	300
PQGFSALEPL	VDLPIGINIT	RFQTLALHR	SYLTPGDSSS	GWTAGAAAY	VGYLQPRFL
310	320	330	340	350	360
LKYNENGTIT	DAVDCALDPL	SETKCTLKSF	TVEKGIYQTS	NFRVQPTESI	VRFPNITNLC
370	380	390	400	410	420
PFGEVFNATR	FASVYAWNRR	RISNCVADYS	VLVNSASFST	FKCYGVSPTK	LNDLCFTNVY
430	440	450	460	470	480
ADSFVIRGDE	VRQIAPGQTG	KIADYNYKLP	DDFTGCVIAW	NSNNLDSKVG	GNVNYLYRLF
490	500	510	520	530	540
RKSNLKPFER	DISTEIQAG	STPCNGVEGF	NCYFPLQSYG	FQPTNGVGQY	PYRVVLSFE
550	560	570	580	590	600
LLHAPATVCG	PKKSTNLVKN	KCVNFNENGL	TGTGVLTESN	KKFLPFQQFG	RDIADTTDAV
610	620	630	640	650	660
RDPQTLIELD	ITPCSFQGV	VITPGTNTSN	QVAVLYQDVN	CTEVPVAIHA	DQLTPTWRVY
670	680	690	700	710	720
STGSNVFQTR	AGCLIGAEHV	NNSYECDIPI	GAGICASYQT	QTNSPRRARS	VASQSIIAYT
730	740	750	760	770	780
MSLGAENSVA	YSNNSIAIPT	NFTISVTTEI	LPVSMTKTSV	DCTMYICGDS	TECSNLLQY
790	800	810	820	830	840
GSFCTQLNRA	LTGIAVEQDK	NTQEVFAQVK	QIYKTPPIKD	FGGFNFSQIL	PDPSKPSKRS
850	860	870	880	890	900
FIEDLLFNKV	TLADAGFIKQ	YGDCLGDIAA	RDLICAQKFN	GLTVLPPLLT	DEMIAQYTS
910	920	930	940	950	960
LLAGTITSGW	TFGAGAALQI	PFAMQMAYRF	NGIGVTQNVL	YENQKLIANQ	FNSAIGKIQD
970	980	990	1000	1010	1020
SLSSTASALG	KLQDVVNQNA	QALNTLVKQL	SSNFGAISSV	LNDILSRDLP	PEAEVQIDRL
1030	1040	1050	1060	1070	1080
ITGRLQSLQT	YVTQQLIRAA	EIRASANLAA	TKMSECVLGQ	SKRVDFCGKG	YHLMSFPQSA
1090	1100	1110	1120	1130	1140
PHGVVFLHVT	YVPAQEKNT	TAPAICHGDK	AHFPREGVVF	SNGTHWVFVTQ	RNFYEPQIIT
1150	1160	1170	1180	1190	1200
TDNTFVSGNC	DVVIGIVNNT	VYDPLQPELD	SFKEELDKYF	KNHTSPDVDL	GDISGINASV
1210	1220	1230	1240	1250	1260
VNIQKEIDRL	NEVAKNLNES	LIDLQELGKY	EQYIKWPGTA	RRAIEGRIPE	YFKEQKLISE
1270	1280	1290	1300	1310	1320
EDLLTNNGT	MTGMSGQQAG	NVLVVKGNH	GNNGQLVMNT	VLNGDDSVTD	KLVVEGDTSG
1330	1340	1350	1360	1370	1380
TTAVTVNNAG	GTGAKTLNGI	ELIHVDGKSE	GEFVQAGRIV	AGAYDYTLAR	GQGANSNWN
1390	1400	1410	1420	1430	1440
LTSGSDSPEL	QPEPDMPNP	EPNPNPEPNP	NPTPTPGPDL	NVDNDRPEA	GSYIANLAAA
1450	1460	1470	1480	1490	1500
NTMFTTRLHE	RLGNTYYTDM	VTGEQKQTTM	WMRHEGGHKN	WRDGSQGLKT	QSNRYVLQLG
1510	1520	1530	1540	1550	1560
GDVAQWSQNG	SDRWHVGVMA	GYGNSDSKTI	SSRTGYRAKA	SVNGYSTGLY	ATWYADDES
1570	1580	1590	1600	1610	1620
NGAYLDSWAQ	YSWFDNTVK	DDLQSESYKS	KGFTASLEAG	YKHKLAEFNG	SQGTRNEWYV
1630	1640	1650	1660	1670	1680
QPQAQVTWMG	VKADKHRESN	GTLVHNSGDG	NVQTRLGVKT	WLKSHHKMDD	GKSREFQPFV
1690	1700	1710	1720	1730	1740
EVNWLHNSKD	FSTSMGVS	TQDGARNIAE	IKTGVEGQLN	ANLNVWGNVG	VQVADRGYND
1750					
TSAMVGIKWQ	F-				

Fig. 7A

DNA sequence encoding a receptor binding domain autotransporter fusion protein with trimerization domain

10	20	30	40	50	60
ATGATCAAAC	TGAAATTCGG	CGTCTTCTTC	ACCGTACTGC	TGTCCTCTGC	TTACGCTCAC
70	80	90	100	110	120
GGTACTCCGC	AGAACATCAC	CCACCACCAT	CACCATCATA	TCGAAGGTCG	TCTCGAGCGC
130	140	150	160	170	180
GTGCAACCTA	CAGAATCGAT	TGTGCGTTTC	CCAAATATTA	CCAATTTGTG	TCCTTTTGGG
190	200	210	220	230	240
GAGGTGTTTA	ATGCGACTCG	CTTTGCGAGT	GTGTATGCGT	GGAATCGCAA	GCGCATTAGC
250	260	270	280	290	300
AATTGTGTGG	CAGATTATAG	CGTCTTATAT	AATTCAGCCA	GTTTTCAGCAC	GTTTAAGTGT
310	320	330	340	350	360
TATGGAGTGT	CACCTACGAA	GCTTAATGAT	CTCTGTTTTA	CGAATGTGTA	TGCCGATAGT
370	380	390	400	410	420
TTTGTAATTC	GCGGTGATGA	GGTACGCCAA	ATTGCGCCTG	GCCAAACGGG	CAAGATTGCG
430	440	450	460	470	480
GATTATAATT	ATAAGTTACC	AGATGATTTT	ACTGGCTGTG	TGATTGCGTG	GAATAGCAAT
490	500	510	520	530	540
AATCTCGATT	CCAAGGTCGG	CGGCAATTAT	AATTATCTCT	ATCGCCTGTT	TCGCAAGTCA
550	560	570	580	590	600
AATCTCAAGC	CTTTTGAGCG	CGATATTAGT	ACGGAGATTT	ATCAAGCAGG	CAGTACACCA
610	620	630	640	650	660
TGTAACGGCG	TAGAGGGTTT	CAACTGTTAT	TTTCCCTTAC	AAAGCTATGG	TTTTCAACCT
670	680	690	700	710	720
ACTAACGGCG	TCGGCTATCA	ACCATATCGC	GTGGTAGTGC	TTTCGTTTGA	GTTACTTCAT
730	740	750	760	770	780
GCGCCCGCGA	CAGTGTGTGG	ACCTAAGAAG	TCCACGAATT	TAGTGAAGAA	TAAGTGTGTG
790	800	810	820	830	840
AATTTTGGCT	ATATTCCGGA	AGCGCCGCGC	GATGGCCAGG	CGTATGTGCG	CAAAGATGGC
850	860	870	880	890	900
GAATGGGTGC	TGCTGAGCAC	CTTTCTGGGT	ACCGCTCGTC	GTGCTATTGA	GGGCCGCGATC
910	920	930	940	950	960
CCGGAATACT	TTAAGAACA	AAAACATCATC	TCAGAAGAGG	ATCTGCTGAC	CAACAATGGC
970	980	990	1000	1010	1020
ACGCTGATGA	CGGGTATGAG	CGGTCAACAA	GCGGGTAACG	TTCTGGTTGT	TAAGGGCAAT
1030	1040	1050	1060	1070	1080
TACCATGGCA	ATAACGGCCA	GCTGGTCATG	AACACGGTTC	TGAACGGCGA	TGATAGCGTG
1090	1100	1110	1120	1130	1140
ACCGACAAGC	TGGTGGTCGA	GGGCGACACC	TCTGGTACGA	CCGCAGTGAC	GGTGAATAAT
1150	1160	1170	1180	1190	1200
GCAGGCGGTA	CGGGTGCCAA	AACCTGAAC	GGTATTGAGT	TGATCCACGT	TGACGGTAAG
1210	1220	1230	1240	1250	1260
AGCGAGGGCG	AGTTTGTGCA	GGCAGGCCGC	ATTGTTGCTG	GCGCTTATGA	CTATACGCTG
1270	1280	1290	1300	1310	1320
GCCCGTGGTC	AGGGCGCGAA	TAGCGGTAAC	TGGTATCTGA	CCAGCGGCTC	CGACTCCCCG
1330	1340	1350	1360	1370	1380
GAACTGCAAC	CGGAGCCTGA	TCCGATGCCG	AATCCGGAGC	CAAACCCGAA	CCCGGAACCG
1390	1400	1410	1420	1430	1440
AACCCAAATC	CGACCCCGAC	TCCGGGTCCG	GACTTGAACG	TTGATAACGA	CCTGCGTCCG
1450	1460	1470	1480	1490	1500
GAGGCCGGTT	CGTACATCGC	GAACCTGGCA	GCGGCCAATA	CGATGTTTAC	GACCCGTCTG
1510	1520	1530	1540	1550	1560
CACGAACGCC	TGGGTAATAC	CTACTATACC	GATATGGTCA	CTGGTGAACA	GAAACAAACC

Fig. 7A (continued -1)

1570	1580	1590	1600	1610	1620
ACCATGTGGA	TGCGCCACGA	GGGTGGTCAC	AATAAGTGGC	GCGACGGTAG	CGGCCAGTTG
1630	1640	1650	1660	1670	1680
AAAACCCAGA	GCAATCGCTA	CGTTCTGCAA	TTGGGCGGTG	ATGTGGCGCA	ATGGAGCCAA
1690	1700	1710	1720	1730	1740
AACGGCAGCG	ACCGTTGGCA	TGTCGGTGTG	ATGGCAGGTT	ACGGCAACAG	CGACAGCAA
1750	1760	1770	1780	1790	1800
ACCATCTCCA	GCCGTACCGG	TTACCGTGCG	AAGGCAAGCG	TCAACGGTTA	CAGCACCAGC
1810	1820	1830	1840	1850	1860
CTGTATGCCA	CCTGGTATGC	TGATGATGAG	AGCCGCAACG	GTGCTTACTT	GGACAGCTGG
1870	1880	1890	1900	1910	1920
GCACAGTATT	CTTGGTTCGA	TAATACGGTG	AAAGGCGACG	ACCTGCAGAG	CGAAAGCTAC
1930	1940	1950	1960	1970	1980
AAATCGAAAG	GTTTCACCGC	GAGCCTGGAA	GCCGGCTATA	AGCACAAACT	GGCGGAATTC
1990	2000	2010	2020	2030	2040
AATGGCAGCC	AGGGTACTCG	TAACGAATGG	TACGTTCAAC	CGCAGGCGCA	AGTCACTTGG
2050	2060	2070	2080	2090	2100
ATGGGCGTTA	AGGCGGATAA	ACACCGTGAG	AGCAACGGTA	CGTTGGTGCA	TAGCAACGGT
2110	2120	2130	2140	2150	2160
GATGGTAATG	TCCAAACCCG	TCTGGGTGTG	AAAACGTGGC	TGAAGTCCCA	TCACAAAATG
2170	2180	2190	2200	2210	2220
GACGACGGTA	AATCTCGTGA	ATTTACAGCCG	TTCGTGGAAG	TTAACTGGCT	GCATAATAGC
2230	2240	2250	2260	2270	2280
AAGGATTTCA	GCACGAGCAT	GGATGGTGTC	TCCGTTACCC	AGGACGGCGC	ACGTAACATT
2290	2300	2310	2320	2330	2340
GCGGAGATCA	AGACCGGCGT	CGAGGGTCAG	CTGAATGCGA	ATCTGAATGT	TTGGGGTAAC
2350	2360	2370	2380	2390	2400
GTGGGTGTTT	AAGTAGCGGA	CCGTGGTTAC	AATGATACCA	GCGCGATGGT	GGGTATTAAAG
2410					
TGGCAGTTTT	AA				

Fig. 7B

Amino acid sequence of a receptor binding domain autotransporter fusion protein with trimerization domain

10	20	30	40	50	60
MIKLLKFGVFF	TVLLSSAYAH	GTPQNITHHH	HHHIEGRLE	VQPTESIVRF	PNITNLCPFG
70	80	90	100	110	120
EVFNATRFAS	VYAWNRRKRI	NCVADYSVLY	NSASFSTFKC	YGVSP TKLND	LCFTNVYADS
130	140	150	160	170	180
FVIRGDEVQR	IAPGQTGKIA	DYNYKL PDDF	TGCVIAWNSN	NLDSKVGGNY	NYLYRLFRKS
190	200	210	220	230	240
NLKPFERDIS	TEIYQAGSTP	CNGVEGFNCY	FPLQSYGFQP	TNGVGYQPYR	VVVL SFELLH
250	260	270	280	290	300
APATVCGPKK	STNLVKNKCV	NFGYIPEAPR	DGQAYVRKDG	EWVLLSTFLG	TARRAIEGRI
310	320	330	340	350	360
PEYFKEQKLI	SEEDLLTNNG	TLMTGMSGQQ	AGNVLVVKGN	YHGNNQLVM	NTVLNGDDSV
370	380	390	400	410	420
TDKLVVEGDT	SGTTAVTVNN	AGGTGAKTLN	GIELIHVDGK	SEGEFVQAGR	IVAGAYDYTL
430	440	450	460	470	480
ARGQGANSNG	WYLTSGSDSP	ELQPEPDMP	NPEPNENPEP	NPNPTPTPGP	DLNVDNDLRP
490	500	510	520	530	540
EAGSYIANLA	AANTMFTTRL	HERLGNTYYT	DMVTGEQKQT	TMWMRHEGGH	NKWRDGGGQL
550	560	570	580	590	600
KTQSNRYVLQ	LGGDVAQWSQ	NGSDRWHVGV	MAGYGNSDSK	TISSRTGYRA	KASVNGYSTG
610	620	630	640	650	660
LYATWYADDE	SRNGAYLDSW	AQYSWFDNTV	KGDDLQSESY	KSKGFTASLE	AGYKHKLAEF
670	680	690	700	710	720
NGSQGTRNEW	YVQPQAQVTW	MGVKADKHRE	SNGTLVHSNG	DGNVQTRLGV	KTWLKSHHKM
730	740	750	760	770	780
DDGKSREFQP	FVEVNWLNHS	KDFSTSM DGV	SVTQDGARNI	AEIKTGVEGQ	LNANLNVWGN
790	800				
VG VQVADRGY	NDTSAMVG I K	WQF-			

Fig. 8A

DNA sequence encoding a receptor binding domain autotransporter fusion protein

10	20	30	40	50	60
ATGATCAAAC	TGAAATTCGG	CGTCTTCTTC	ACCGTACTGC	TGTCCTCTGC	TTACGCTCAC
70	80	90	100	110	120
GGTACTCCGC	AGAACATCAC	CCACCACCAT	CACCATCATA	TCGAAGGTCG	TCTCGAGCGC
130	140	150	160	170	180
GTGCAACCTA	CAGAATCGAT	TGTGCGTTTC	CCAAATATTA	CCAATTTGTG	TCCTTTTGGA
190	200	210	220	230	240
GAGGTGTTTT	ATGCGACTCG	CTTTGCGAGT	GTGTATGCGT	GGAATCGCAA	GCGCATTAGC
250	260	270	280	290	300
AATTGTGTGG	CAGATTATAG	CGTCTTATAT	AATTCAGCCA	GTTTTAGCAC	GTTTAAGTGT
310	320	330	340	350	360
TATGGAGTGT	CACCTACGAA	GCTTAATGAT	CTCTGTTTTA	CGAATGTGTA	TGCCGATAGT
370	380	390	400	410	420
TTTGTAAATC	GCGGTGATGA	GGTACGCCAA	ATTGCGCCTG	GCCAAACGGG	CAAGATTGCG
430	440	450	460	470	480
GATTATAATT	ATAAGTTACC	AGATGATTTT	ACTGGCTGTG	TGATTGCGTG	GAATAGCAAT
490	500	510	520	530	540
AATCTCGATT	CCAAGGTCGG	CGGCAATTAT	AATTATCTCT	ATCGCCTGTT	TCGCAAGTCA
550	560	570	580	590	600
AATCTCAAGC	CTTTTGAGCG	CGATATTAGT	ACGGAGATTT	ATCAAGCAGG	CAGTACACCA
610	620	630	640	650	660
TGTAACGGCG	TAGAGGGTTT	CAACTGTTAT	TTTCCCTTAC	AAAGCTATGG	TTTTCAACCT
670	680	690	700	710	720
ACTAACGGCG	TCGGCTATCA	ACCATATCGC	GTGGTAGTGC	TTTCGTTTGA	GTTACTTCAT
730	740	750	760	770	780
GCGCCCGCGA	CAGTGTGTGG	ACCTAAGAAG	TCCACGAATT	TAGTGAAGAA	TAAGTGTGTG
790	800	810	820	830	840
AATTTTGGTA	CCGCTCGTCG	TGCTATTGAG	GGCCGCATCC	CGGAATACTT	TAAAGAACAA
850	860	870	880	890	900
AAACTCATCT	CAGAAGAGGA	TCTGCTGACC	AACAATGGCA	CGCTGATGAC	GGGTATGAGC
910	920	930	940	950	960
GGTCAACAAG	CGGGTAACGT	TCTGGTTGTT	AAGGGCAATT	ACCATGGCAA	TAACGGCCAG
970	980	990	1000	1010	1020
CTGGTCATGA	ACACGGTTCT	GAACGGCGAT	GATAGCGTGA	CCGACAAGCT	GGTGGTCGAG
1030	1040	1050	1060	1070	1080
GGCGACACCT	CTGGTACGAC	CGCAGTGACG	GTGAATAATG	CAGGCGGTAC	GGGTGCCAAA
1090	1100	1110	1120	1130	1140
ACCCTGAACG	GTATTGAGTT	GATCCACGTT	GACGGTAAGA	GCGAGGGCGA	GTTTGTGCAG
1150	1160	1170	1180	1190	1200
GCAGGCCGCA	TTGTTGCTGG	CGCTTATGAC	TATACGCTGG	CCCGTGGTCA	GGGCGCGAAT
1210	1220	1230	1240	1250	1260
AGCGGTAACT	GGTATCTGAC	CAGCGGCTCC	GACTCCCCGG	AACTGCAACC	GGAGCCTGAT
1270	1280	1290	1300	1310	1320
CCGATGCCGA	ATCCGGAGCC	AAACCCGAAC	CCGGAACCGA	ACCCAAATCC	GACCCCGACT
1330	1340	1350	1360	1370	1380
CCGGGTCCGG	ACTTGAACGT	TGATAACGAC	CTGCGTCCGG	AGGCCGGTTC	GTACATCGCG
1390	1400	1410	1420	1430	1440
AACCTGGCAG	CGGCCAATAC	GATGTTTACG	ACCCGTCTGC	ACGAACGCCT	GGGTAATACC
1450	1460	1470	1480	1490	1500
TACTATACCG	ATATGGTCAC	TGGTGAACAG	AAACAAACCA	CCATGTGGAT	GCGCCACGAG
1510	1520	1530	1540	1550	1560
GGTGGTCACA	ATAAGTGGCG	CGACGGTAGC	GGCCAGTTGA	AAACCCAGAG	CAATCGCTAC
1570	1580	1590	1600	1610	1620
GTTCTGCAAT	TGGGCGGTGA	TGTGGCGCAA	TGGAGCCAAA	ACGGCAGCGA	CCGTTGGCAT
1630	1640	1650	1660	1670	1680
GTCGGTGTGA	TGGCAGGTTA	CGGCAACAGC	GACAGCAAGA	CCATCTCCAG	CCGTACCGGT

Fig. 8A (continued - 1)

1690	1700	1710	1720	1730	1740
TACCGTGCGA	AGGCAAGCGT	CAACGGTTAC	AGCACCGGCC	TGTATGCCAC	CTGGTATGCT
1750	1760	1770	1780	1790	1800
GATGATGAGA	GCCGCAACGG	TGCTTACTTG	GACAGCTGGG	CACAGTATTC	TTGGTTCGAT
1810	1820	1830	1840	1850	1860
AATACGGTGA	AAGGCGACGA	CCTGCAGAGC	GAAAGCTACA	AATCGAAAGG	TTTCACCGCG
1870	1880	1890	1900	1910	1920
AGCCTGGAAG	CCGGCTATAA	GCACAACTG	GCGGAATTCA	ATGGCAGCCA	GGGTACTCGT
1930	1940	1950	1960	1970	1980
AACGAATGGT	ACGTTCAACC	GCAGGCGCAA	GTCACCTTGA	TGGGCGTTAA	GGCGGATAAA
1990	2000	2010	2020	2030	2040
CACCGTGAGA	GCAACGGTAC	GTTGGTGCAT	AGCAACGGTG	ATGGTAATGT	CCAAACCCGT
2050	2060	2070	2080	2090	2100
CTGGGTGTGA	AAACGTGGCT	GAAGTCCCAT	CACAAAATGG	ACGACGGTAA	ATCTCGTGAA
2110	2120	2130	2140	2150	2160
TTTCAGCCGT	TCGTGGAAGT	TAACTGGCTG	CATAATAGCA	AGGATTTTCAG	CACGAGCATG
2170	2180	2190	2200	2210	2220
GATGGTGTCT	CCGTTACCCA	GGACGGCGCA	CGTAACATTG	CGGAGATCAA	GACCGGCGTC
2230	2240	2250	2260	2270	2280
GAGGGTCAGC	TGAATGCGAA	TCTGAATGTT	TGGGGTAACG	TGGGTGTTCA	AGTAGCGGAC
2290	2300	2310	2320	2330	
CGTGGTTACA	ATGATACCAG	CGCGATGGTG	GGTATTAAGT	GGCAGTTTTA	A

Fig. 8B

Amino acid sequence of a receptor binding domain autotransporter fusion protein with trimerization domain

10	20	30	40	50	60
MIKLKFGVFF	TVLLSSAYAH	GTPQNITHHH	HHHIEGRLE	VQPTESIVRF	PNITNLCPFG
70	80	90	100	110	120
EVFNATRFAS	VYAWNRRKIS	NCVADYSVL	NSASFSTFKC	YGVSPTKLND	LCFTNVYADS
130	140	150	160	170	180
FVIRGDEVRR	IAPGQTGKIA	DYNYKLDDF	TGCVIAWNSN	NLDSKVGNGY	NYLYRLFRKS
190	200	210	220	230	240
NLKPFERDIS	TEIYQAGSTP	CNGVEGFNCY	FPLQSYGFQP	TNGVGYPYR	VVLSFELLH
250	260	270	280	290	300
APATVCGPKK	STNLVKNKCV	NFGTARRAIE	GRIPEYFKEQ	KLISEEDLLT	NNGTLMTGMS
310	320	330	340	350	360
GQQAGNVLVV	KGNYHGNGQ	LVMNTVLNGD	DSVTDKLVVE	GDTSGTTAVT	VNNAGGTGAK
370	380	390	400	410	420
TLNGIELIHV	DGKSEGEFVQ	AGRIVAGAYD	YTLARGQGAN	SGNWYLTSGS	DSPELQPEPD
430	440	450	460	470	480
PMPNPEPNPN	PEPNPNPTPT	PGPDLNVDND	LRPEAGSYIA	NLAAANTMFT	TRLHERLGNT
490	500	510	520	530	540
YYTDMVTGEQ	KQTTMWMRHE	GGHNKWRDGS	GQLKTQSNRY	VLQLGGDVAQ	WSQNGSDRWH
550	560	570	580	590	600
VGVMAGYGN	DSKTISSRTG	YRAKASVNGY	STGLYATWYA	DDESRNGAYL	DSWAQYSWFD
610	620	630	640	650	660
NTVKGDDLQS	ESYKSKGFTA	SLEAGYKHKL	AEFNGSQGTR	NEWYVQPQAQ	VTWMGVKADK
670	680	690	700	710	720
HRESNGTLVH	SNGDGNVQTR	LGVKTWLKSH	HKMDDGKSRE	FQPFVEVNWL	HNSKDFSTSM
730	740	750	760	770	
DGVSVTQDGA	RNIAEIKTGV	EGQLNANLNV	WGNVGVQVAD	RGYNDTSAMV	GIKWQF-

Fig. 9

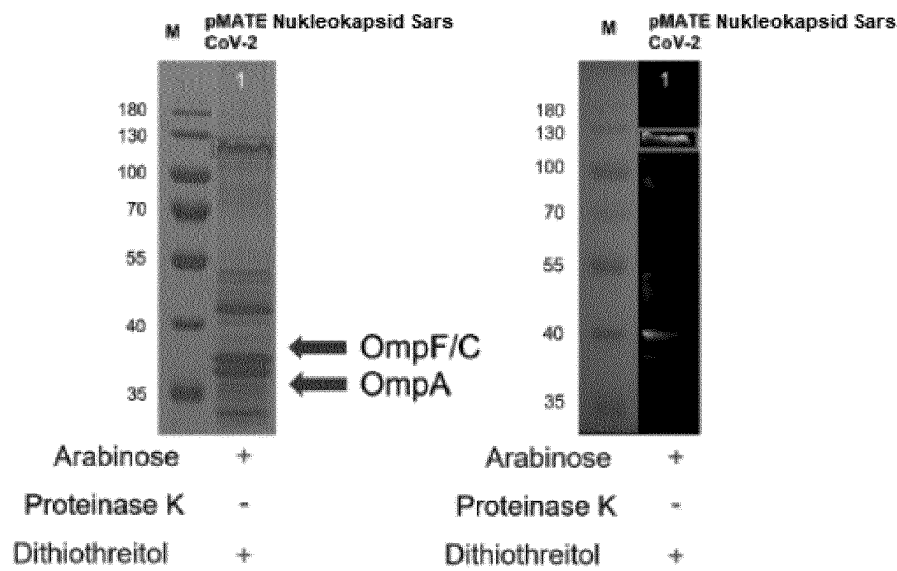


Fig. 10

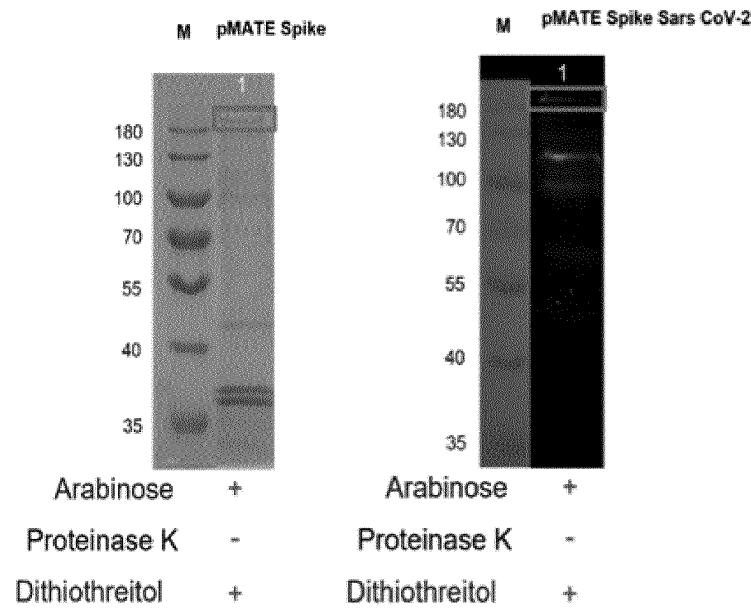


Fig.11

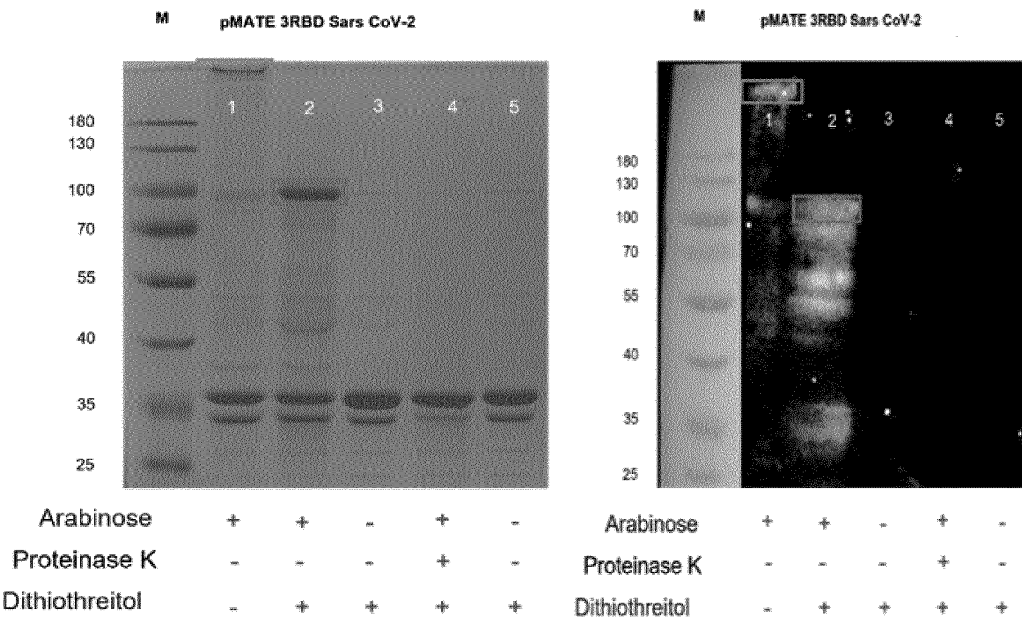


Fig.13A

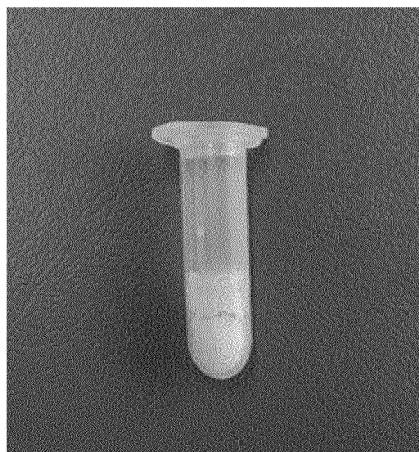


Fig. 13B

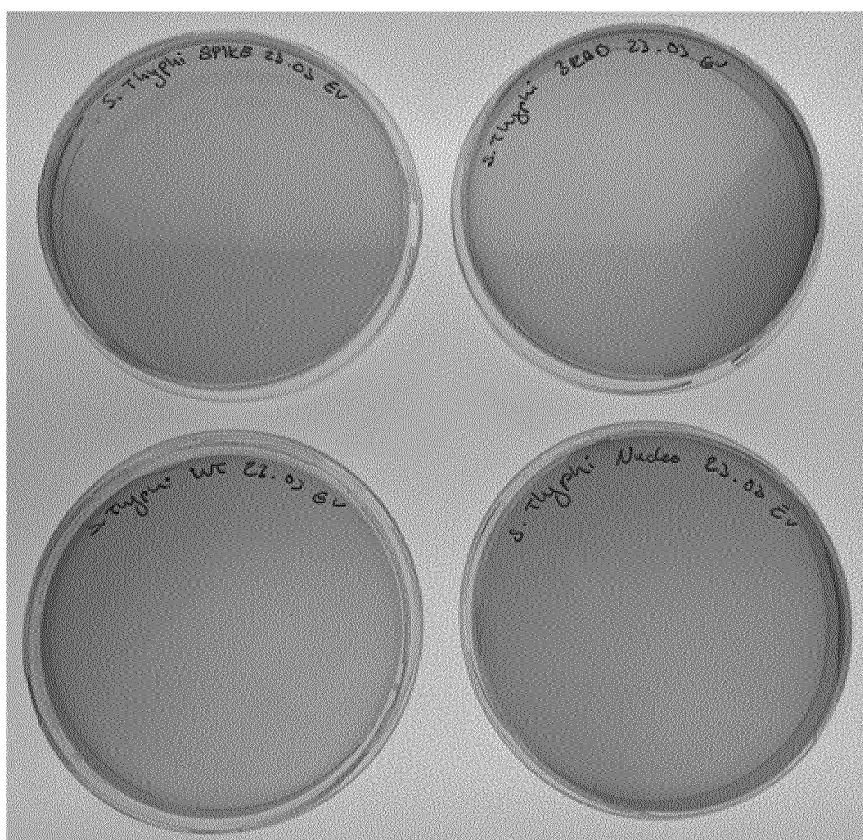


Fig. 14

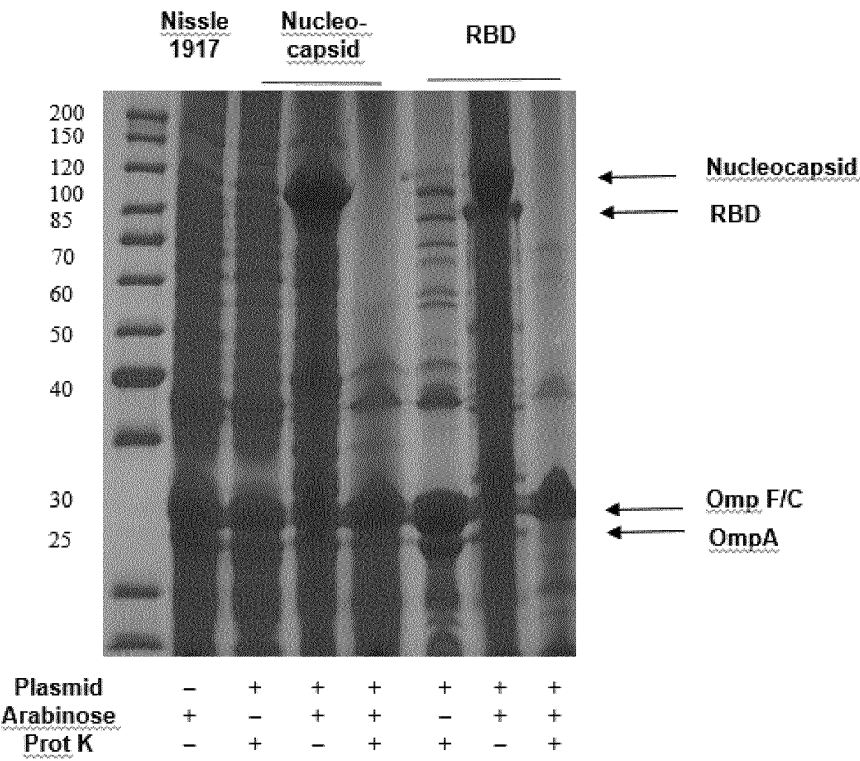


Fig. 15A

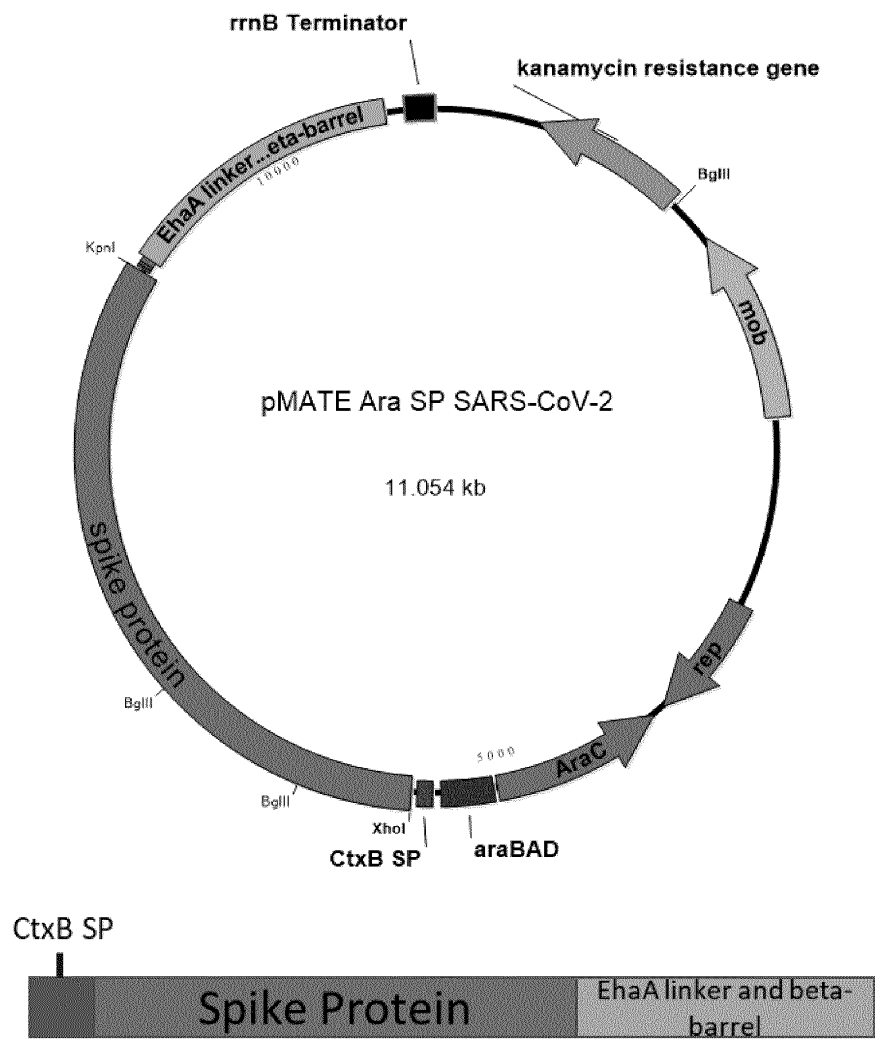


Fig. 15B

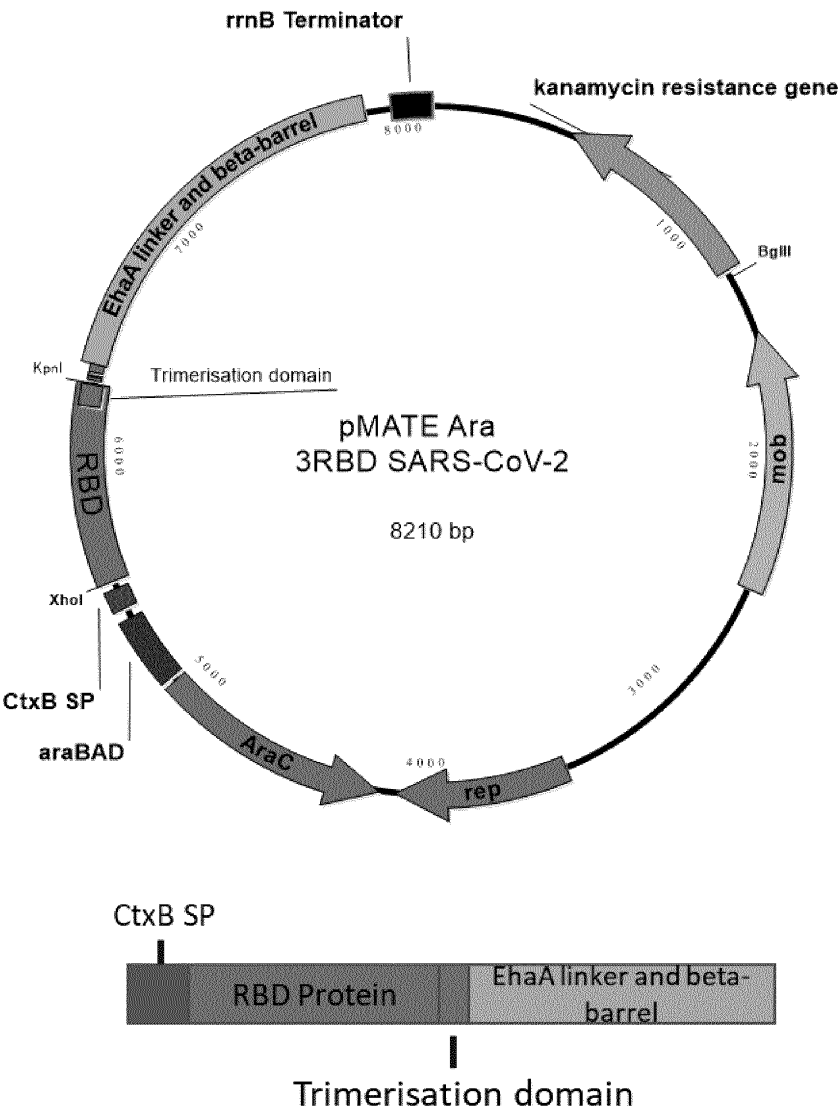


Fig. 15C

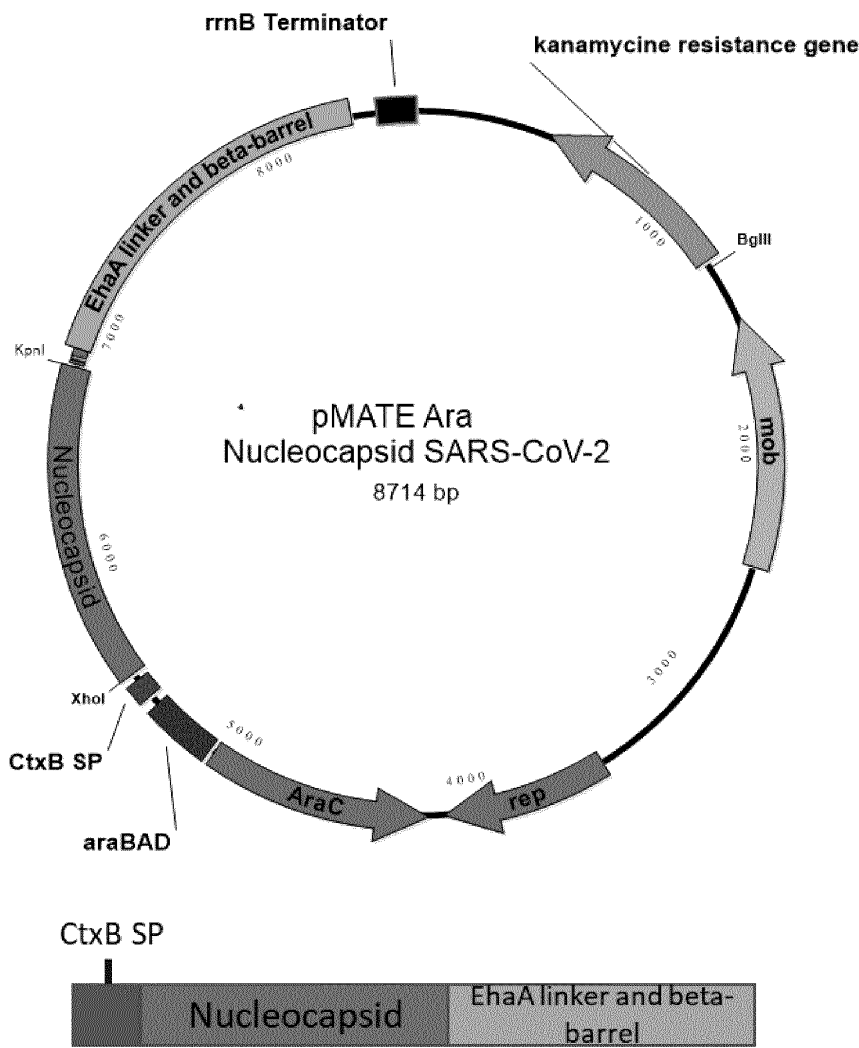


Fig. 16

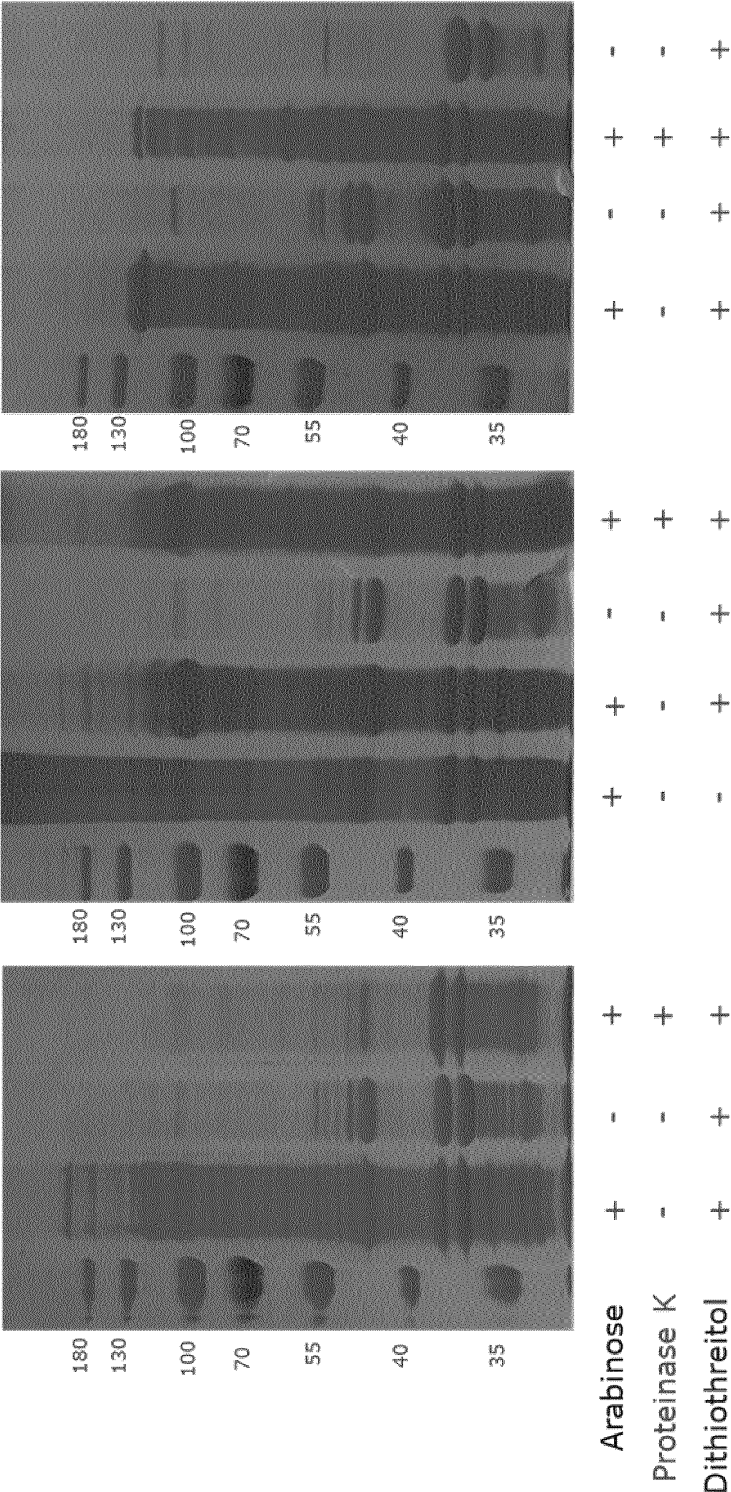


Fig. 17A

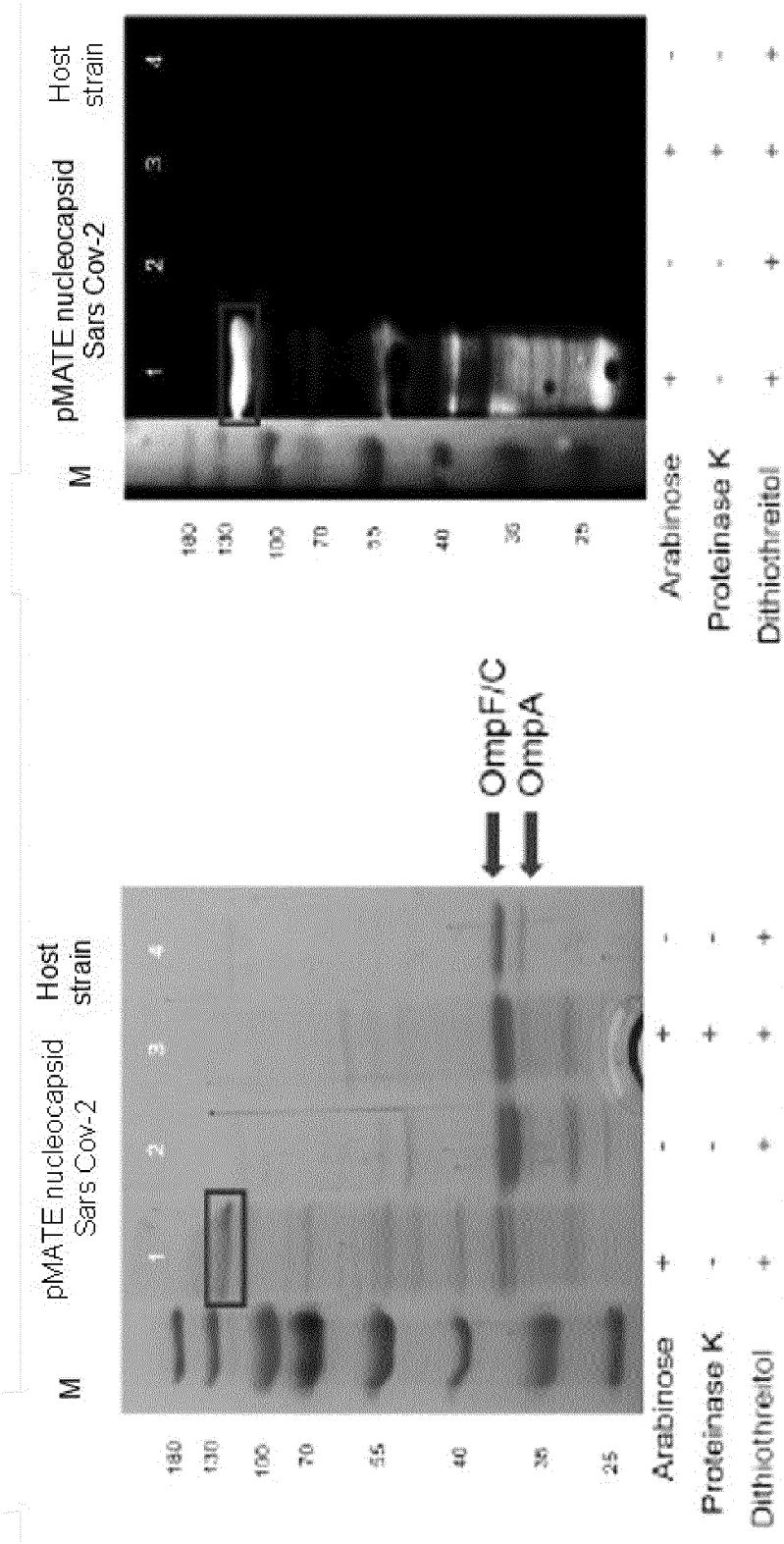


Fig. 17B

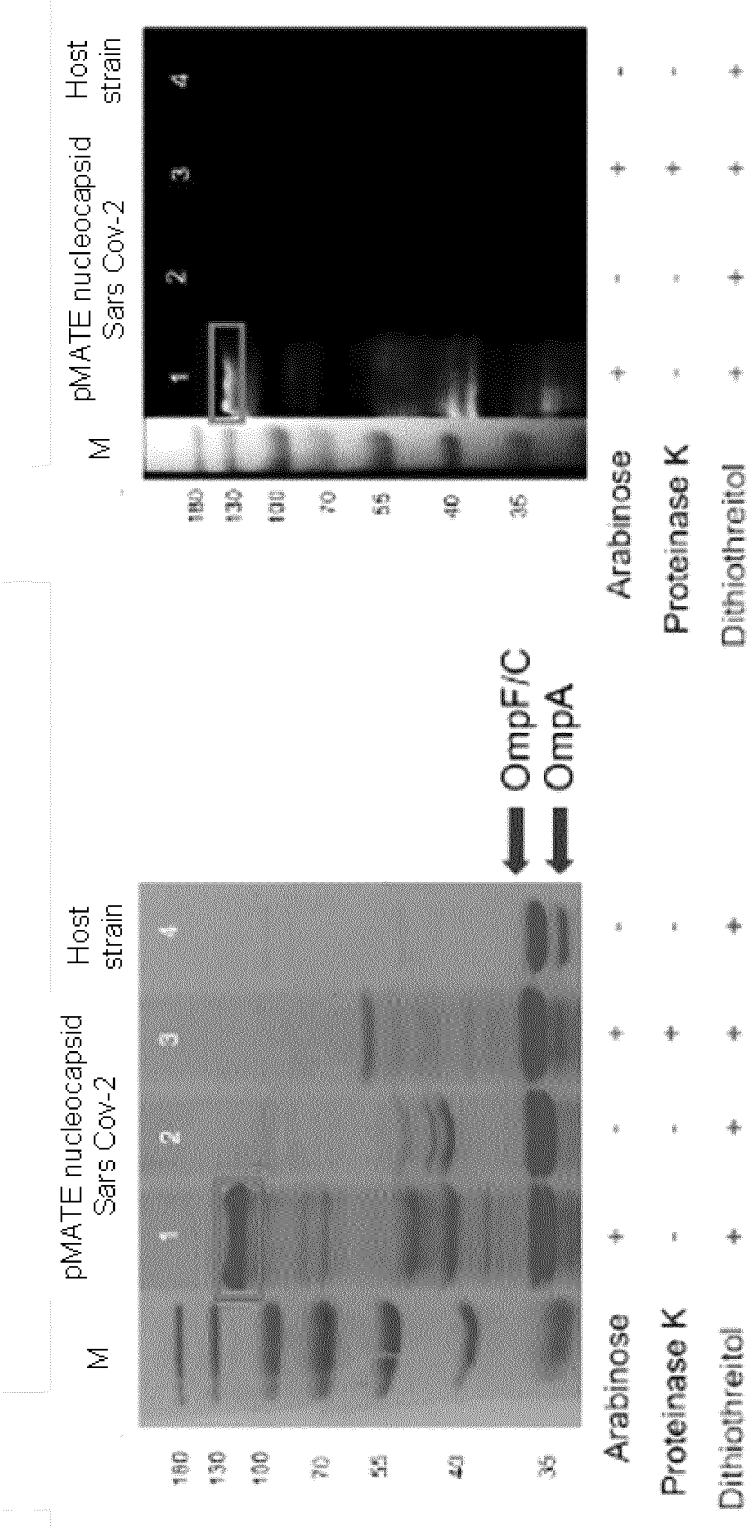


Fig. 17C

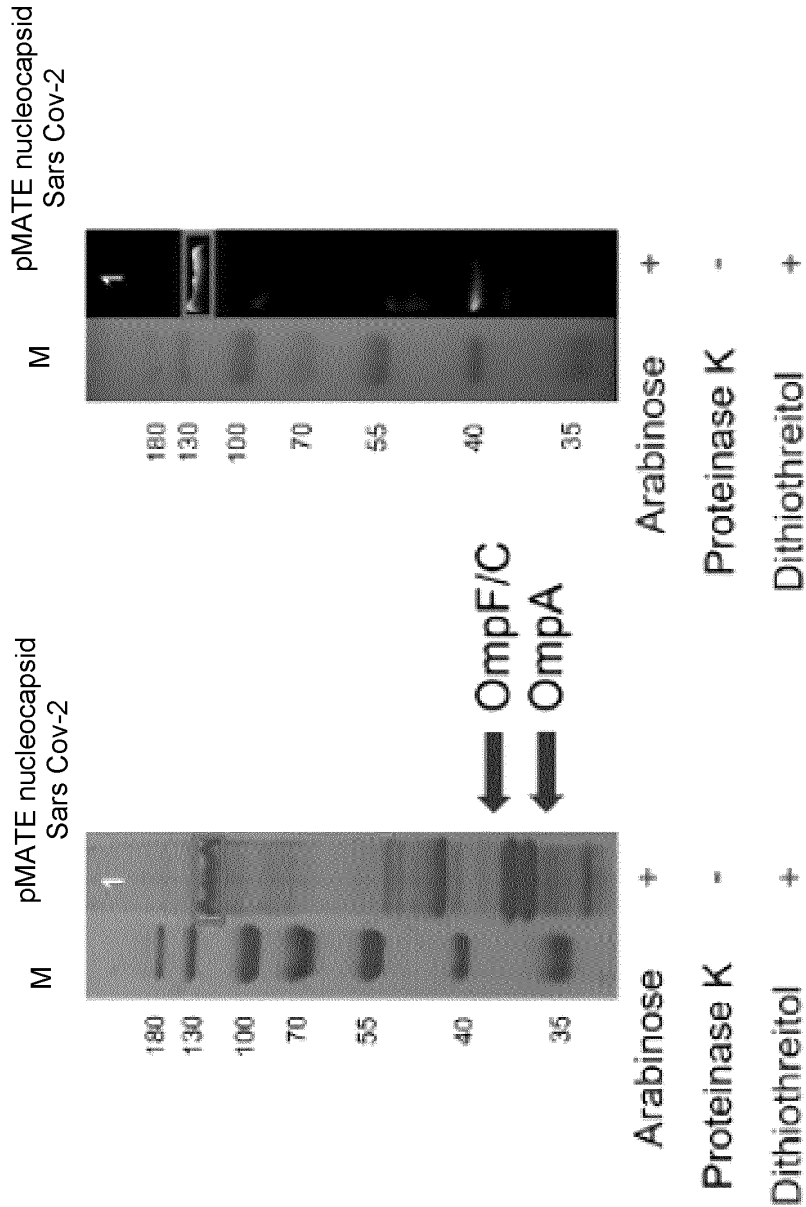


Fig. 17D

S. typhi Ty21a pMATE Nucleocapsid n. i.

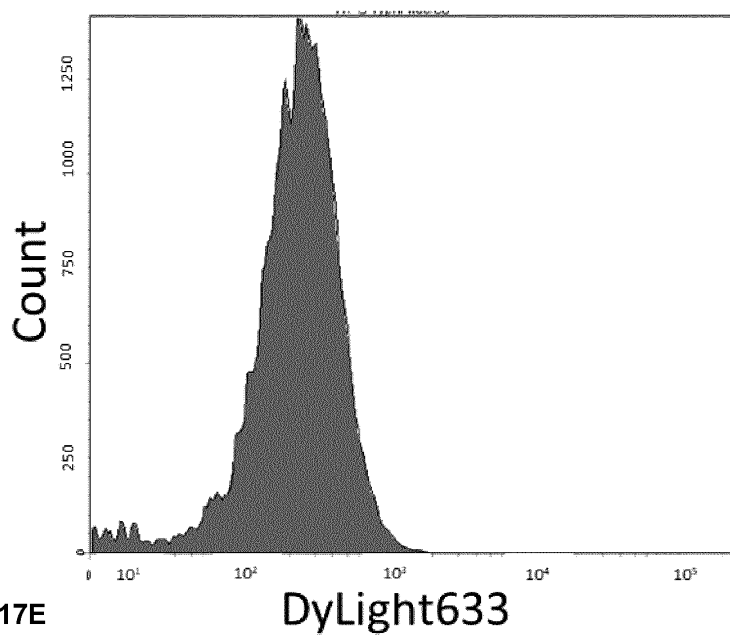
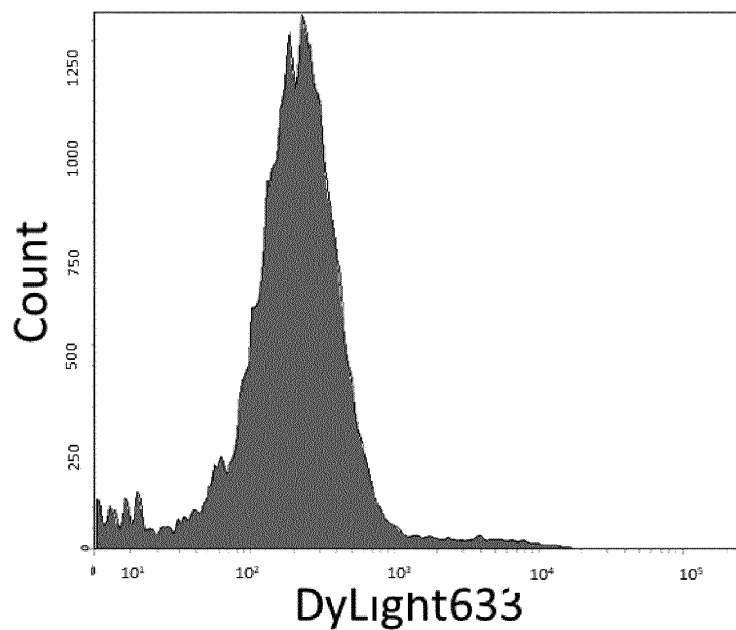


Fig. 17E

S. typhi Ty21a pMATE Nucleocapsid + Prot. K



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Fig. 17F

S. typhi Ty21a pMATE Nucleocapsid ind.

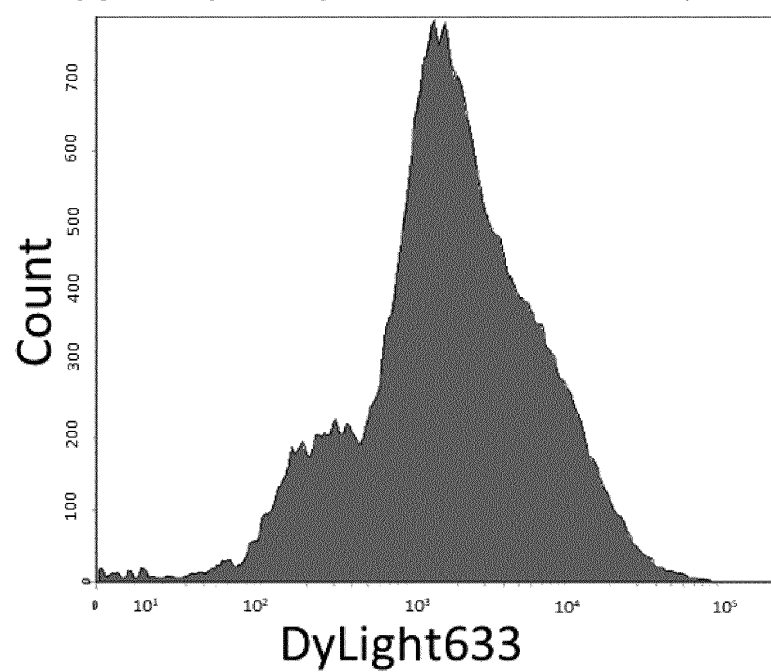


Fig. 18A

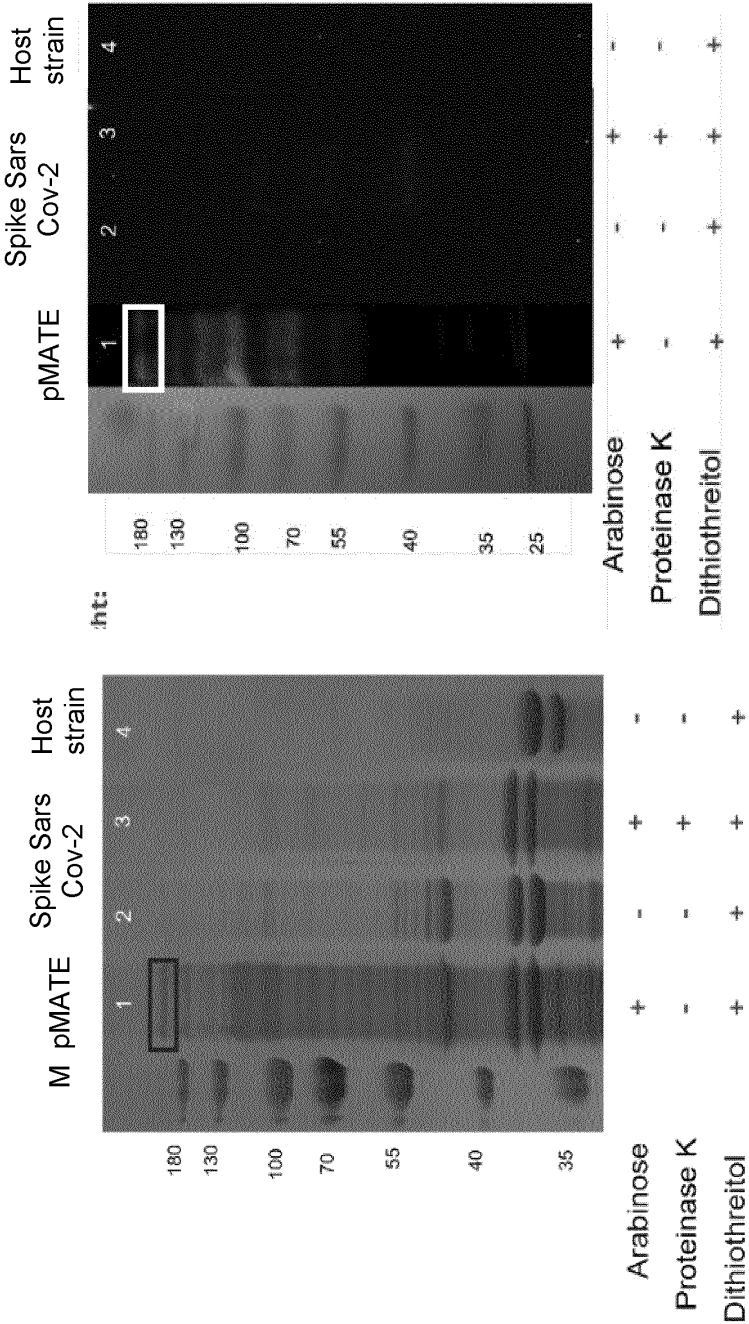


Fig. 18B

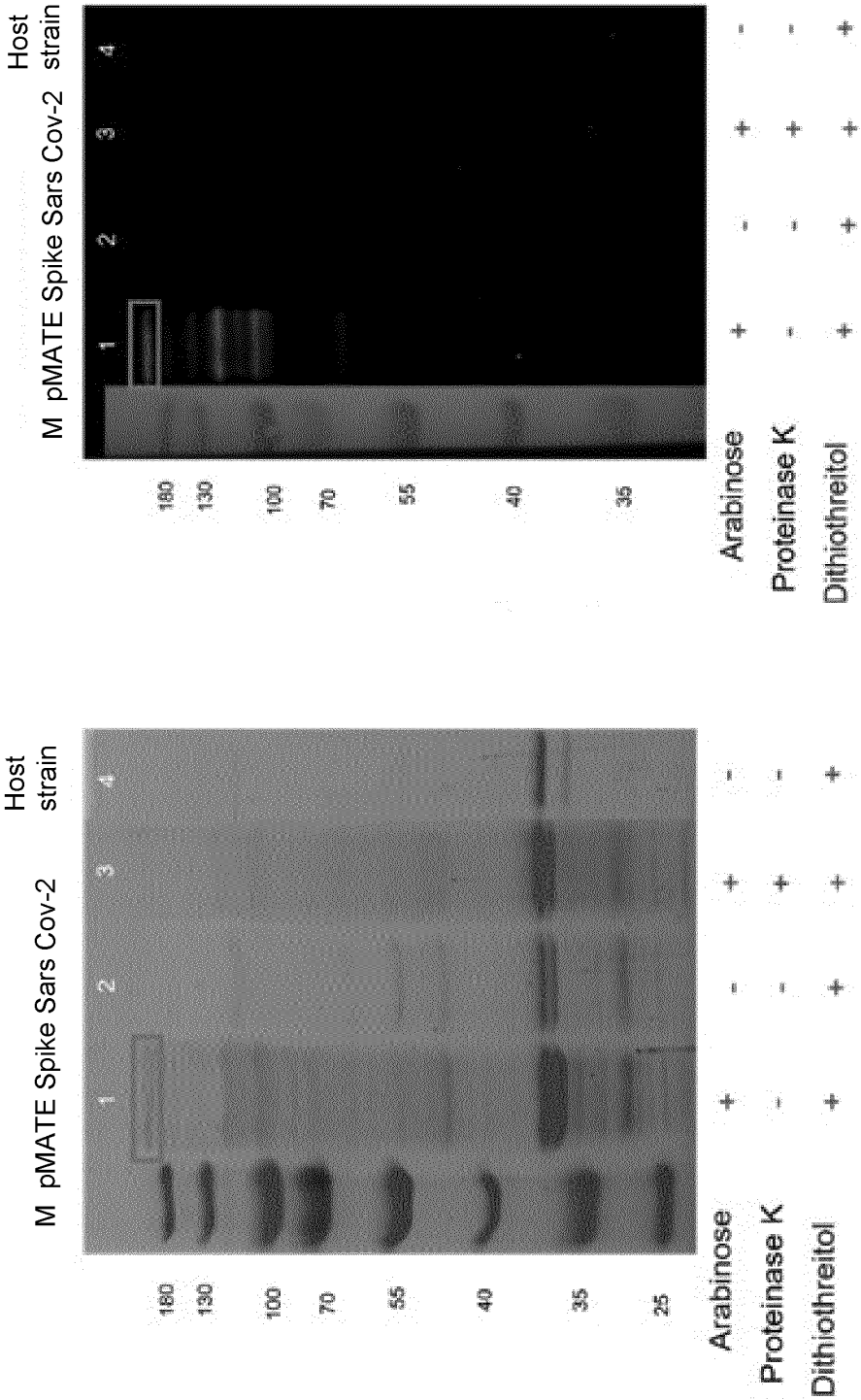


Fig. 18C

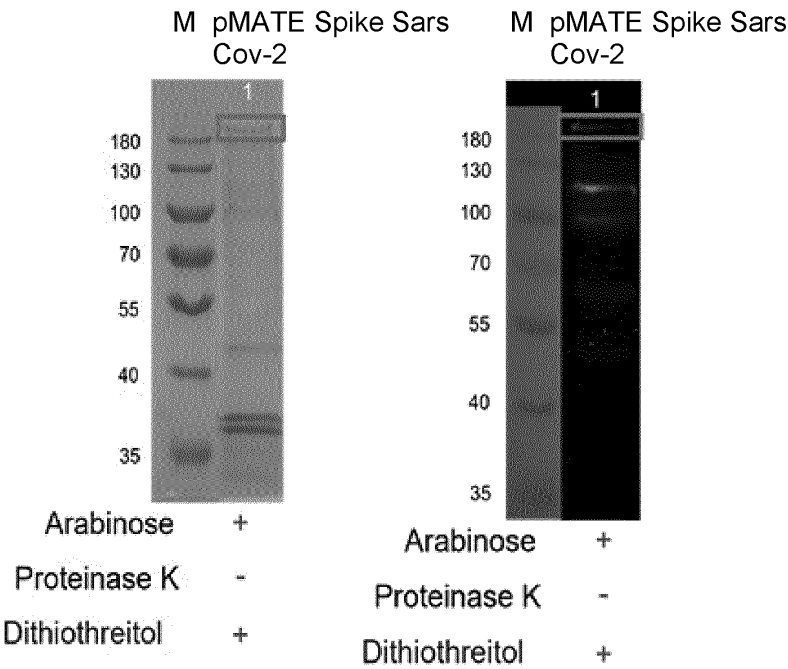


Fig. 18D

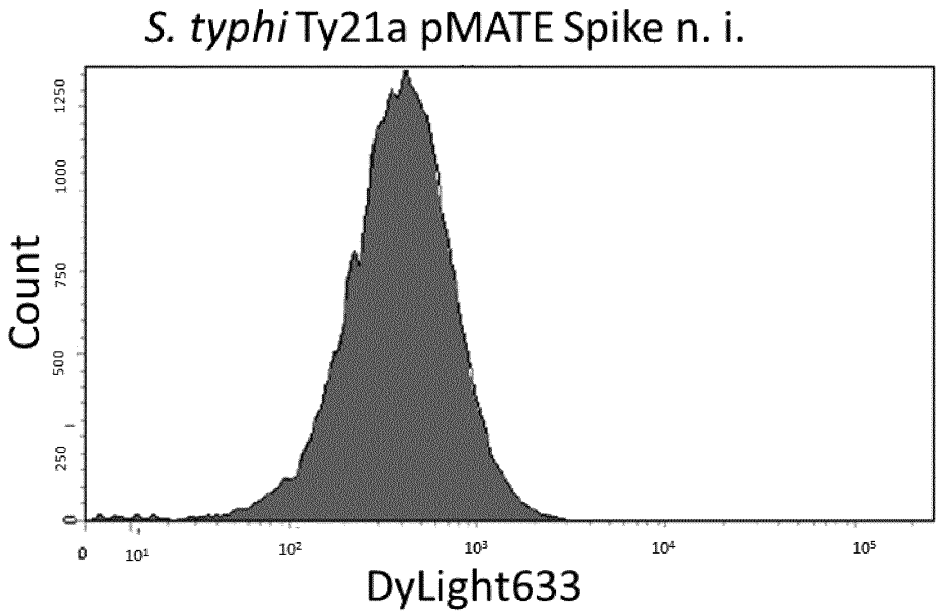


Fig. 18E

S. typhi Ty21a pMATE Spike + Prot. K

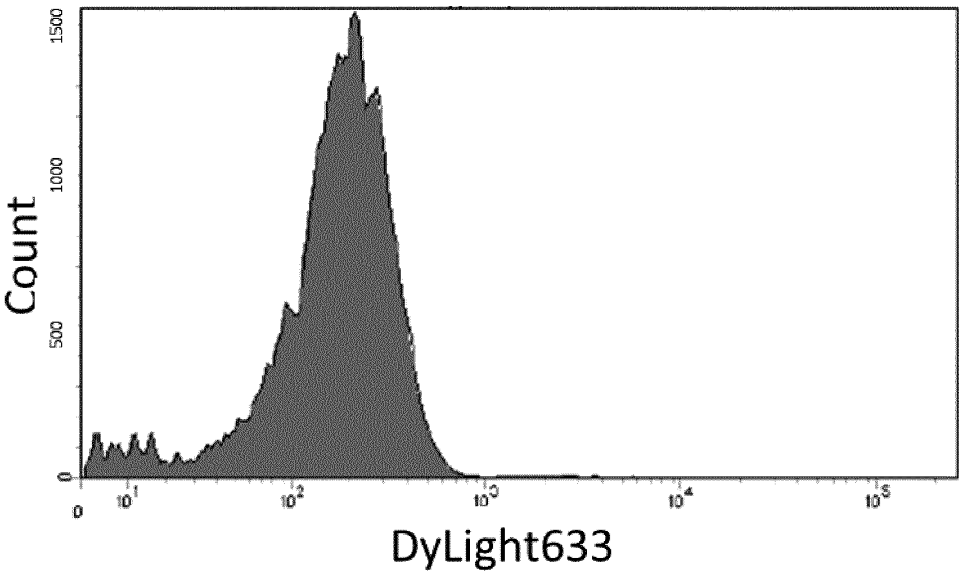


Fig. 18F

S. typhi Ty21a pMATE Spike ind.

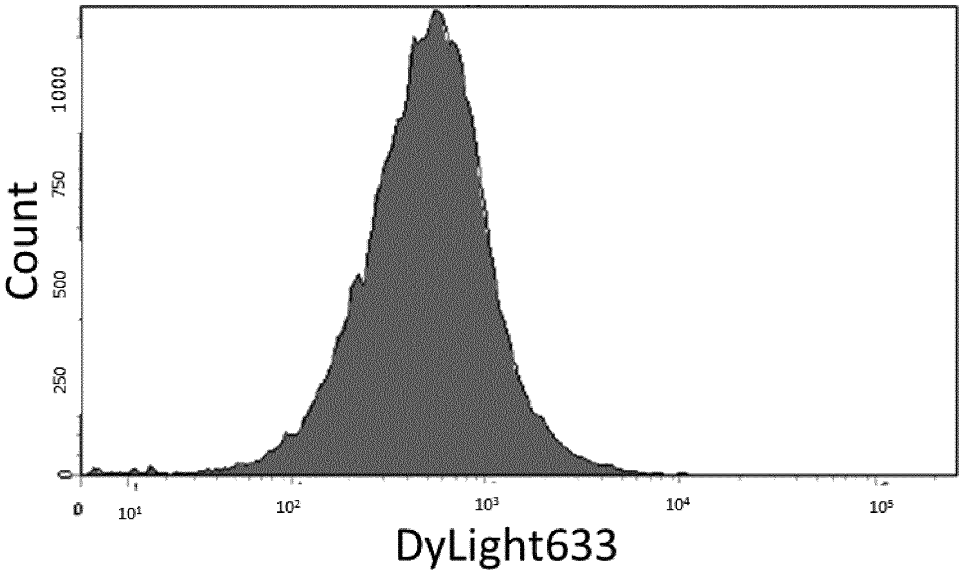


Fig. 19A

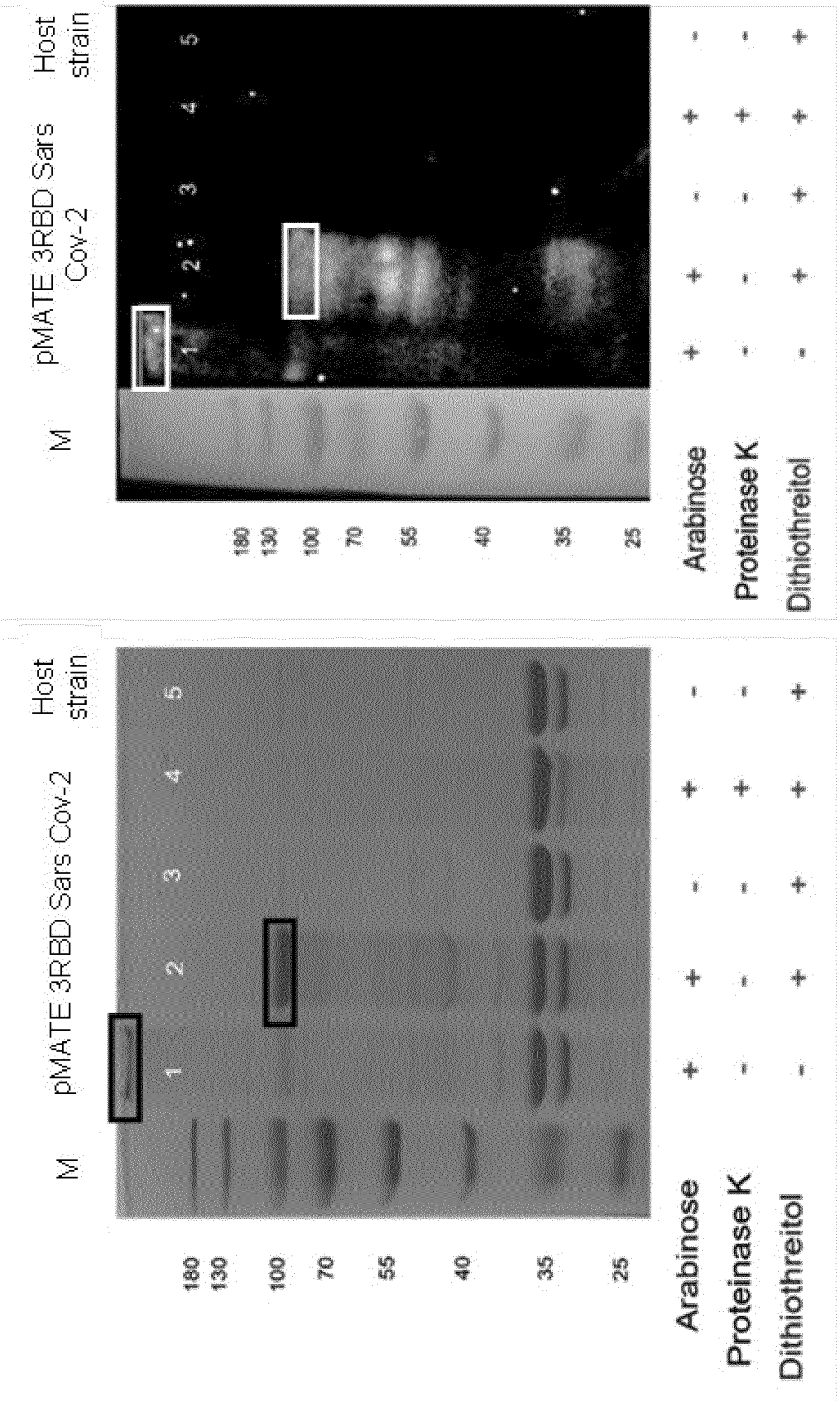


Fig. 19B

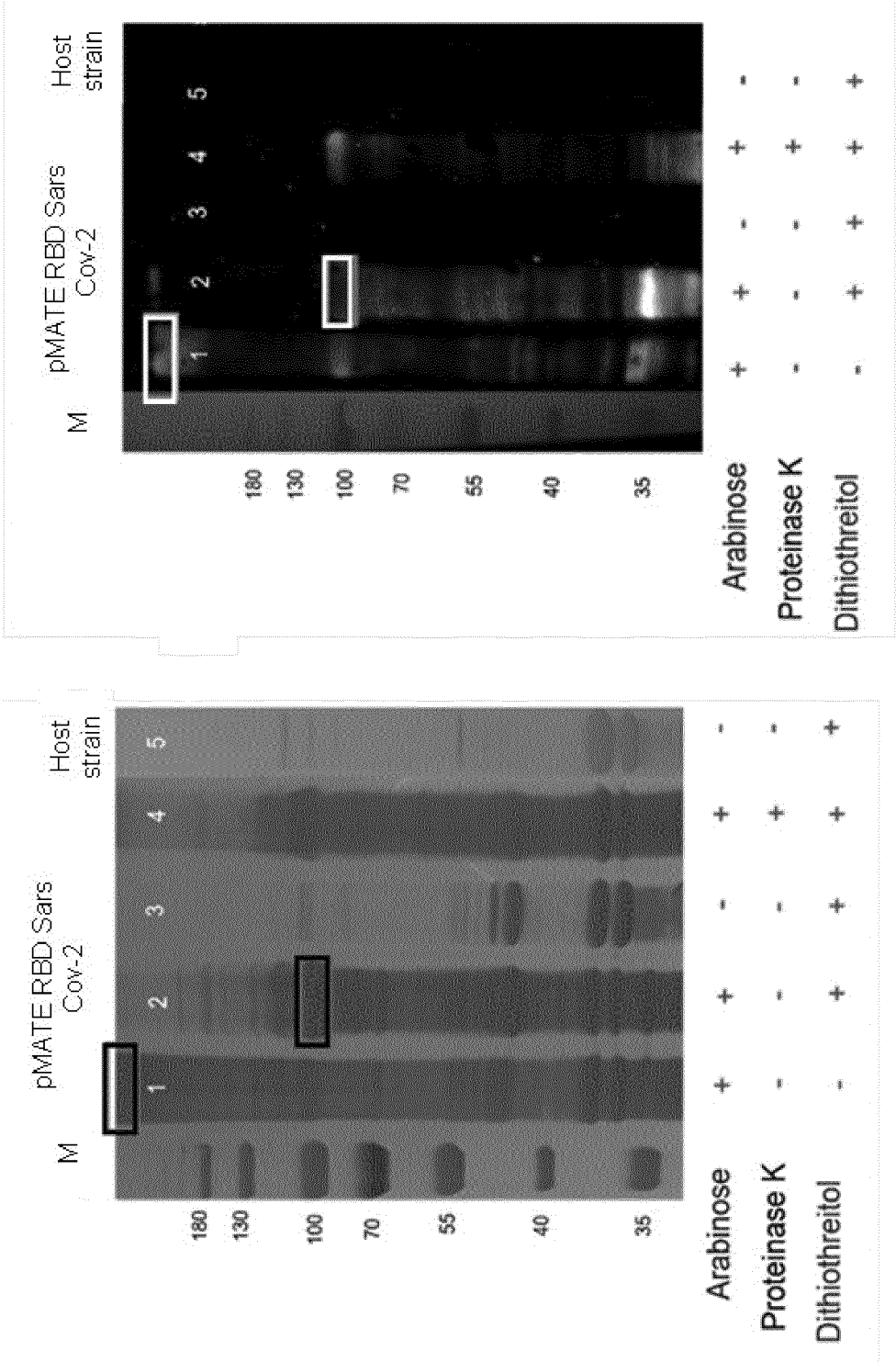


Fig. 19C

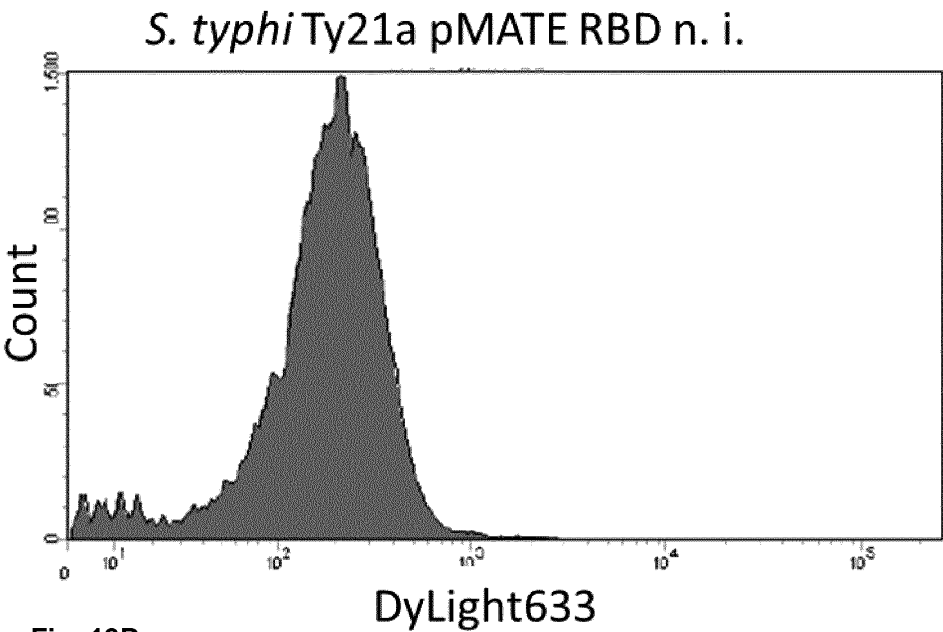
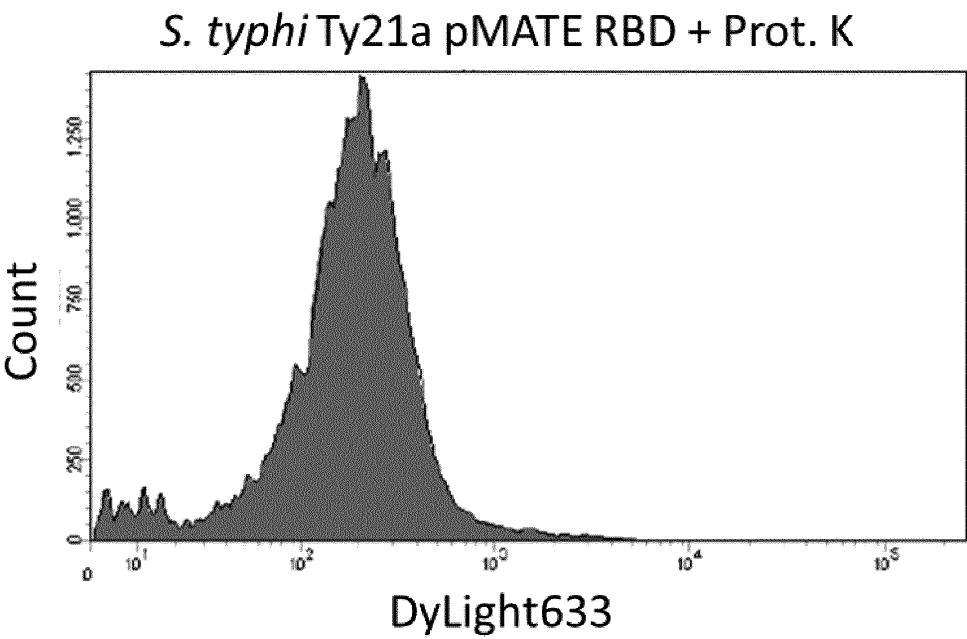
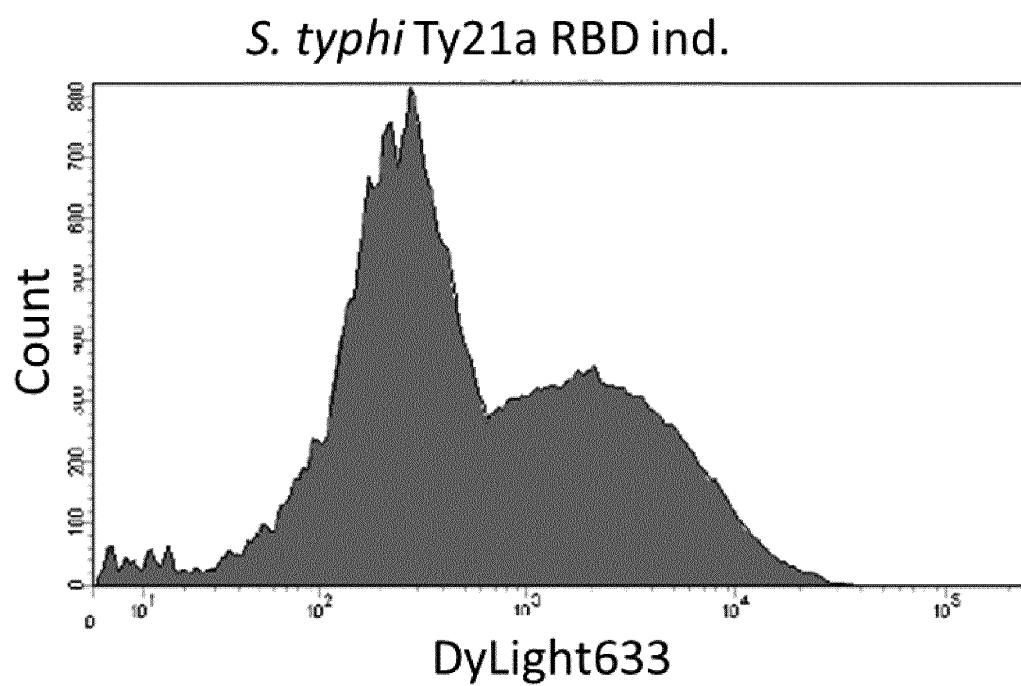


Fig. 19D



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Fig. 19E



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Fig. 20A

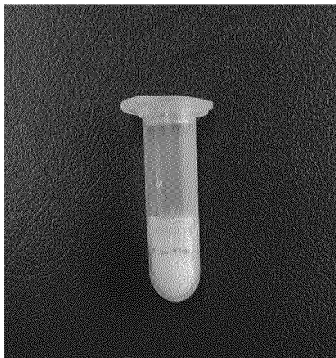


Fig. 20B

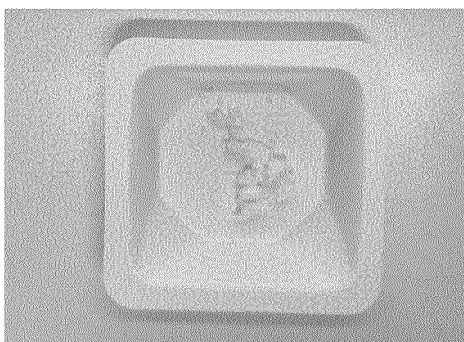


Fig. 20C



Fig. 21

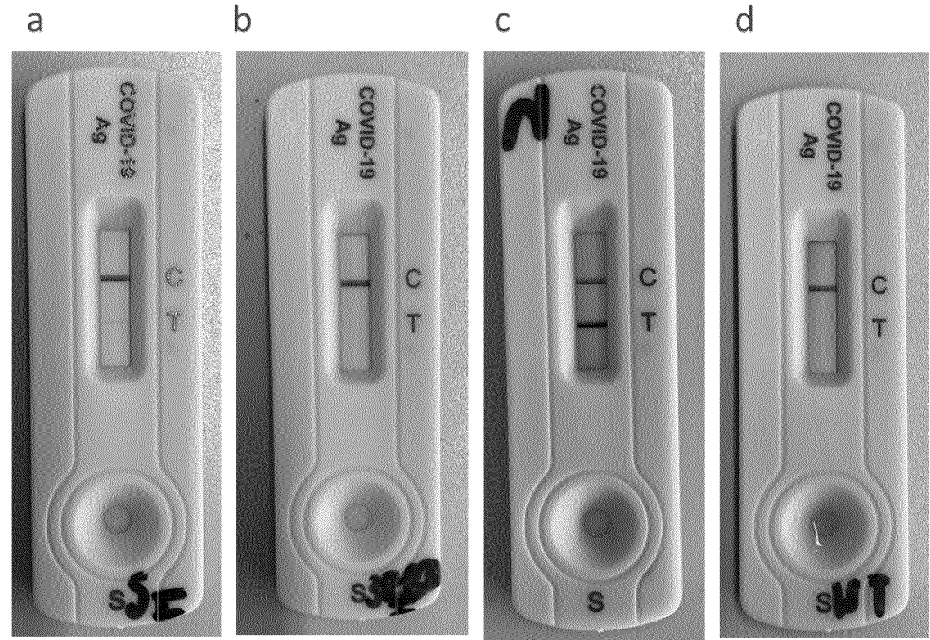


Fig. 22

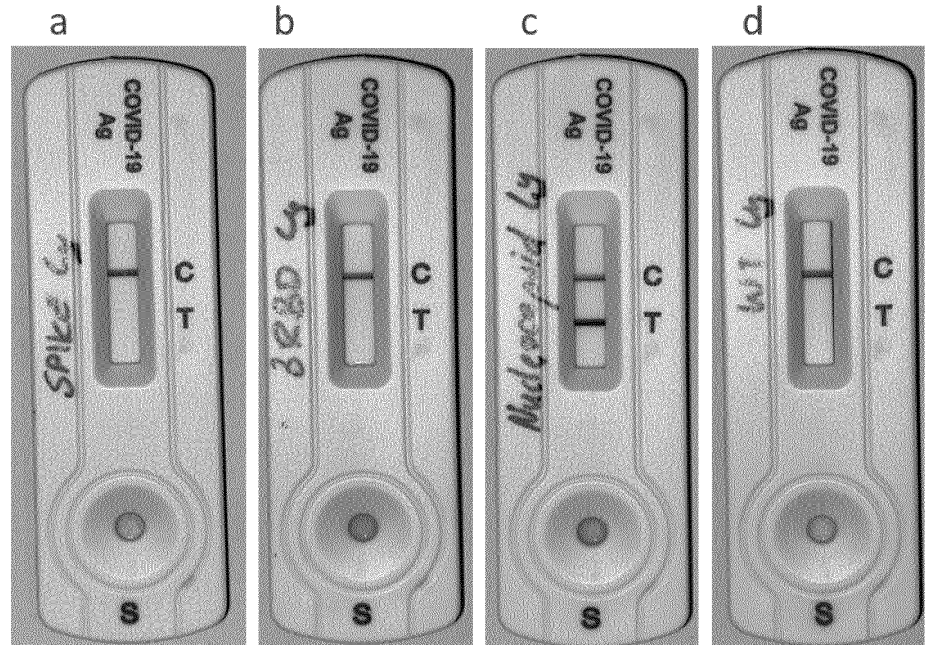


Fig. 23A

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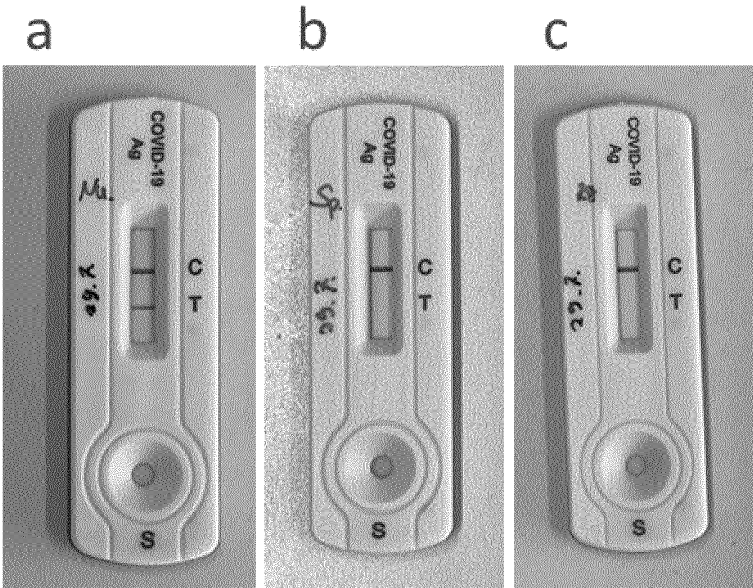


Fig. 23B

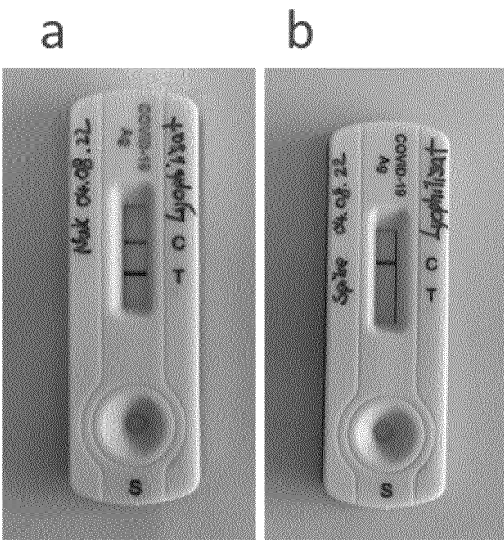


Fig. 24

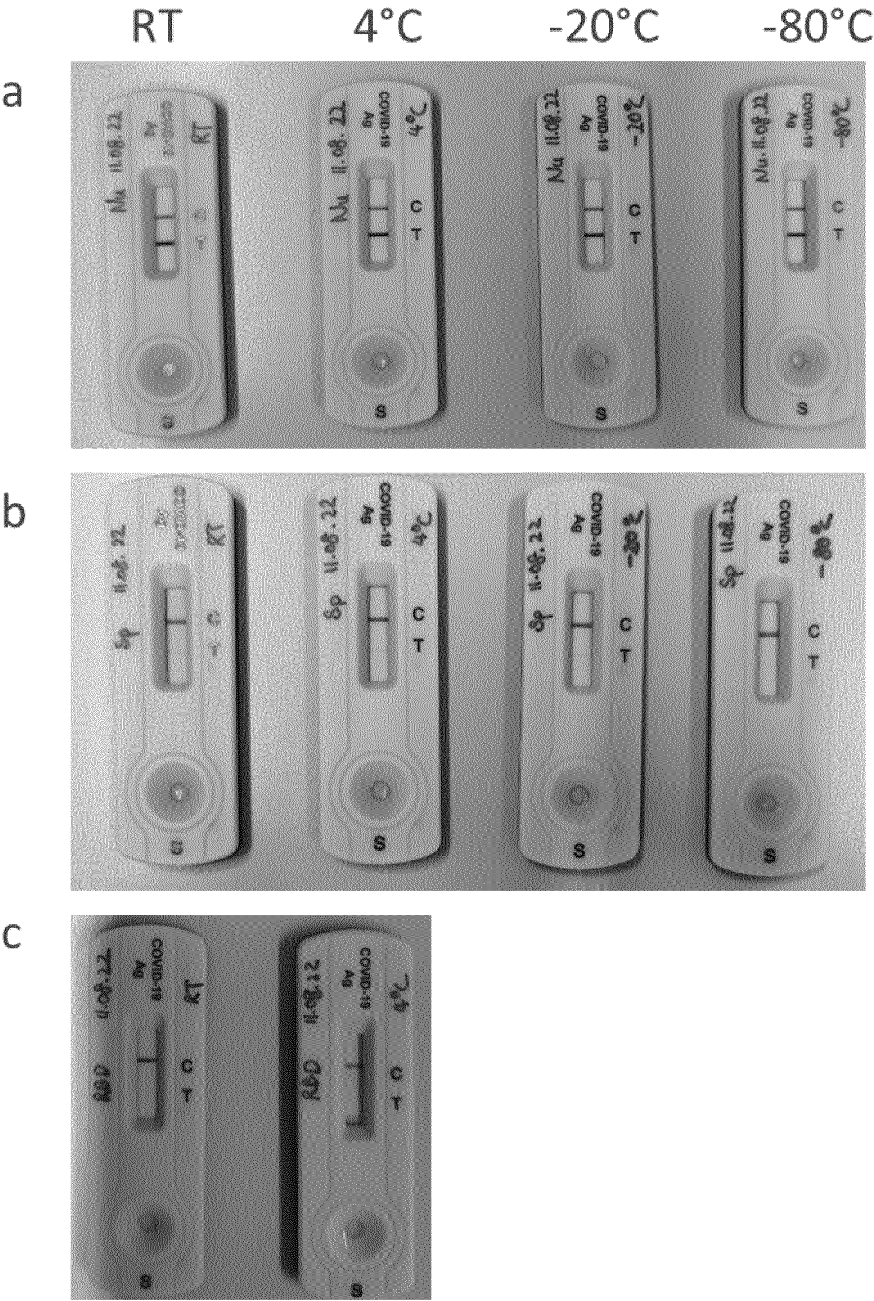


Fig. 25

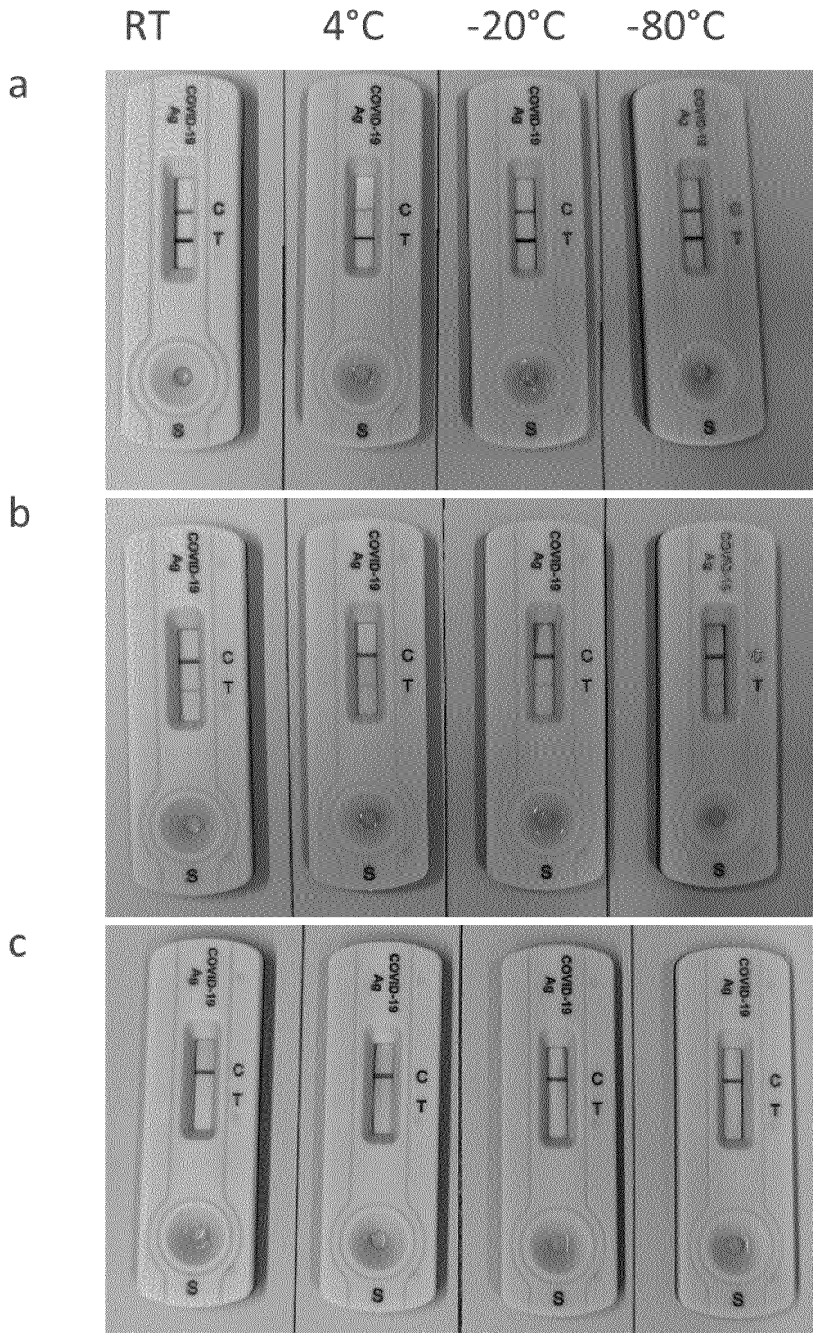


Fig. 26

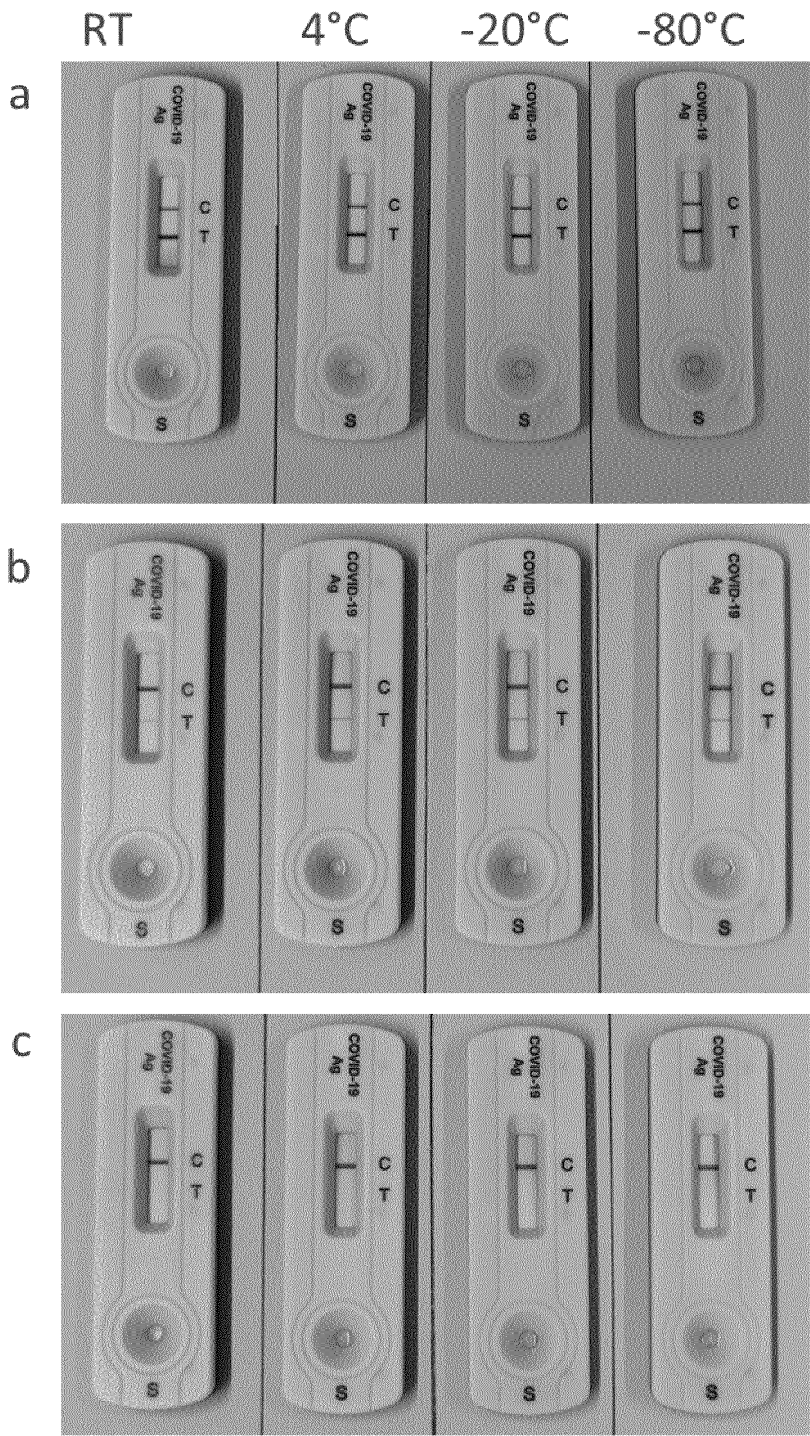


Fig. 27

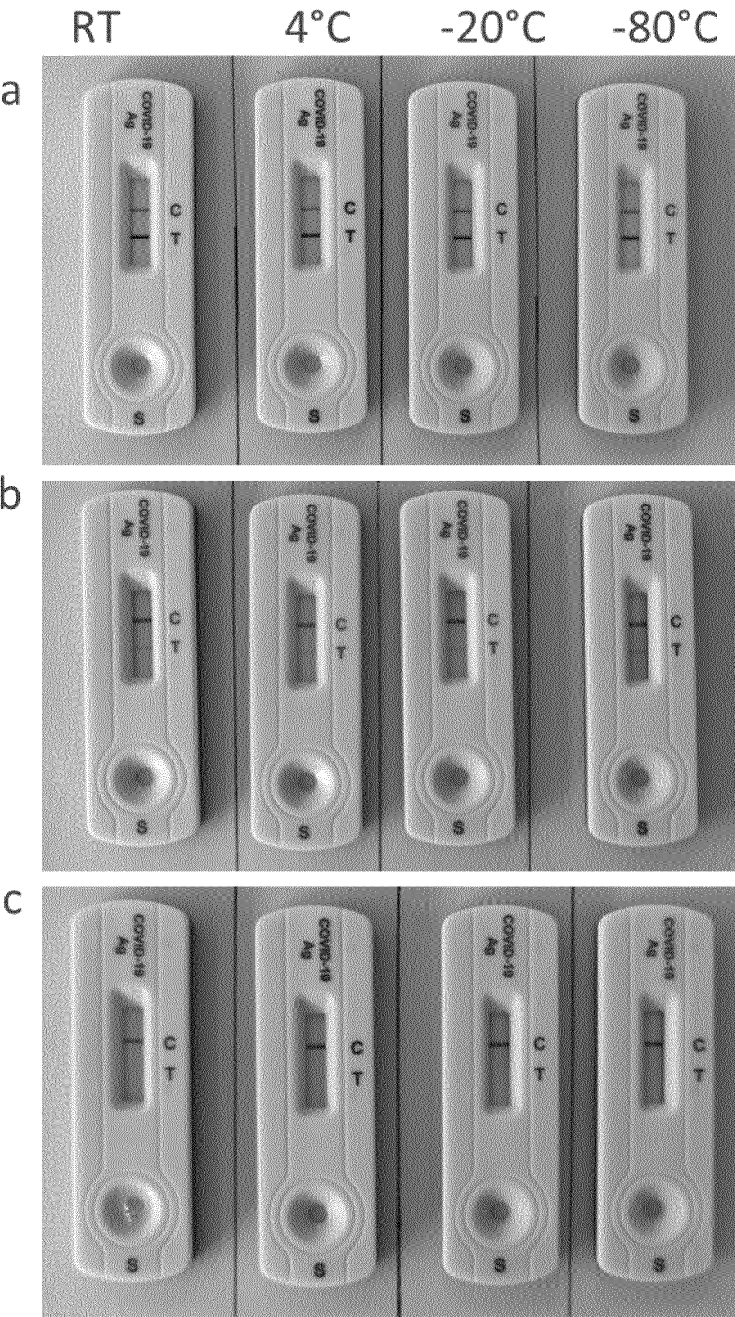
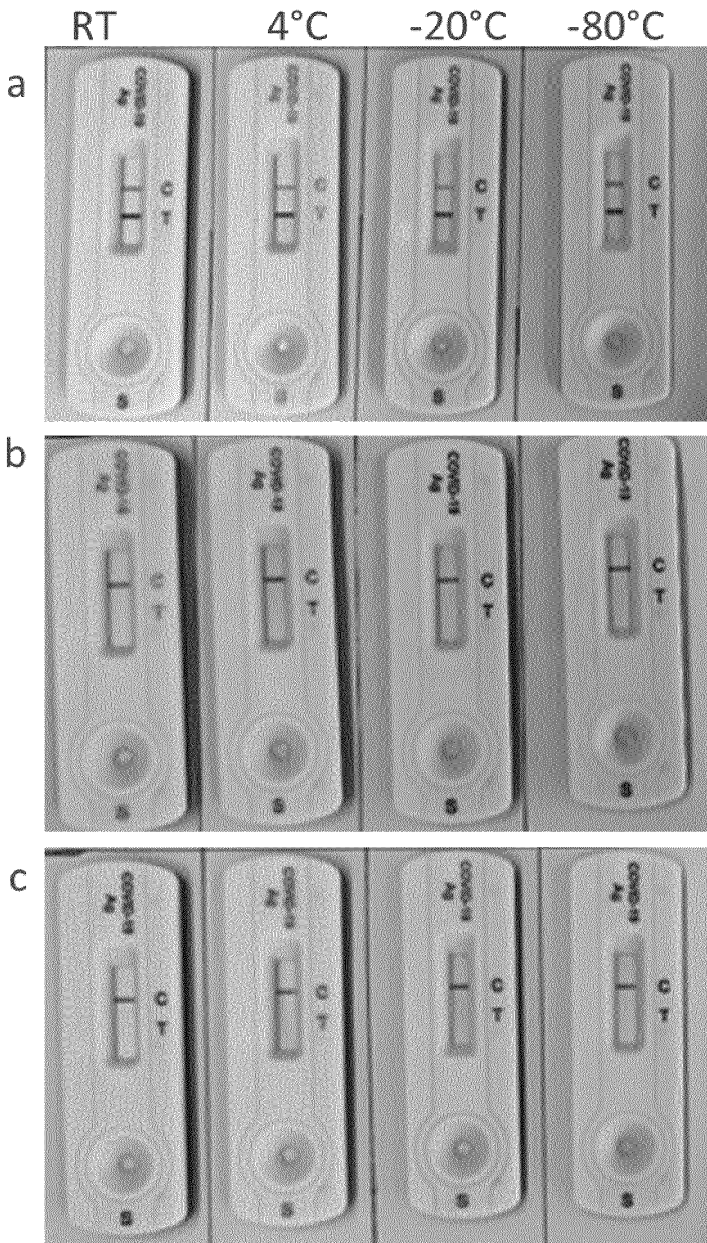


Fig. 28



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Fig. 29

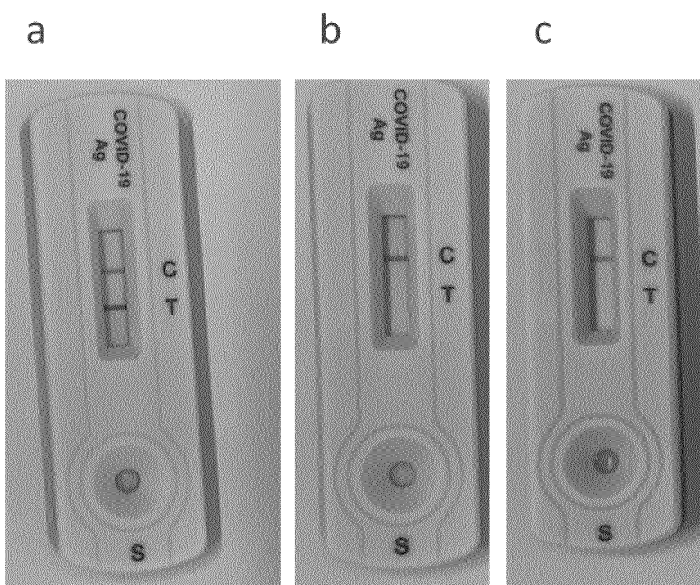


Fig. 30

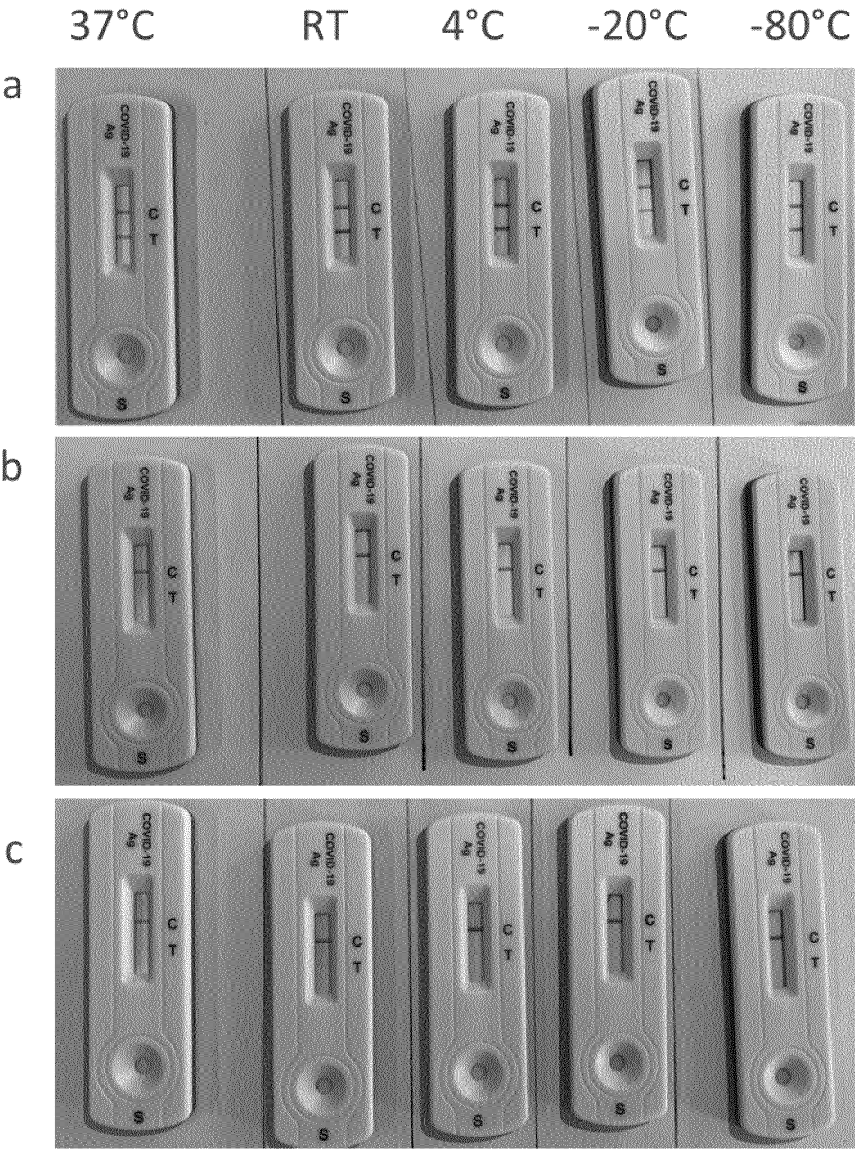


Fig. 31A

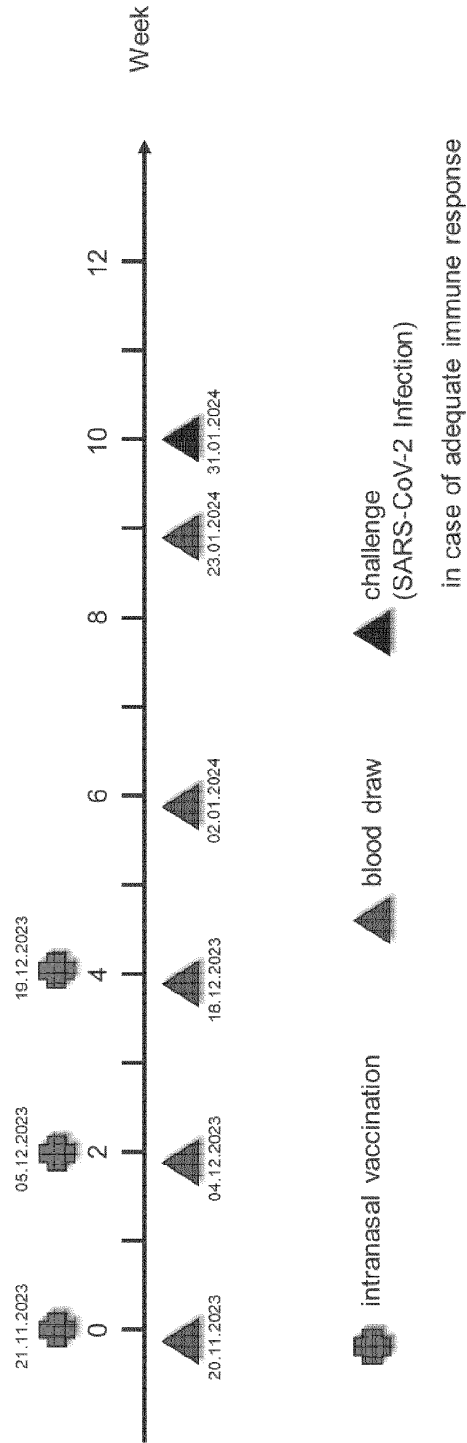
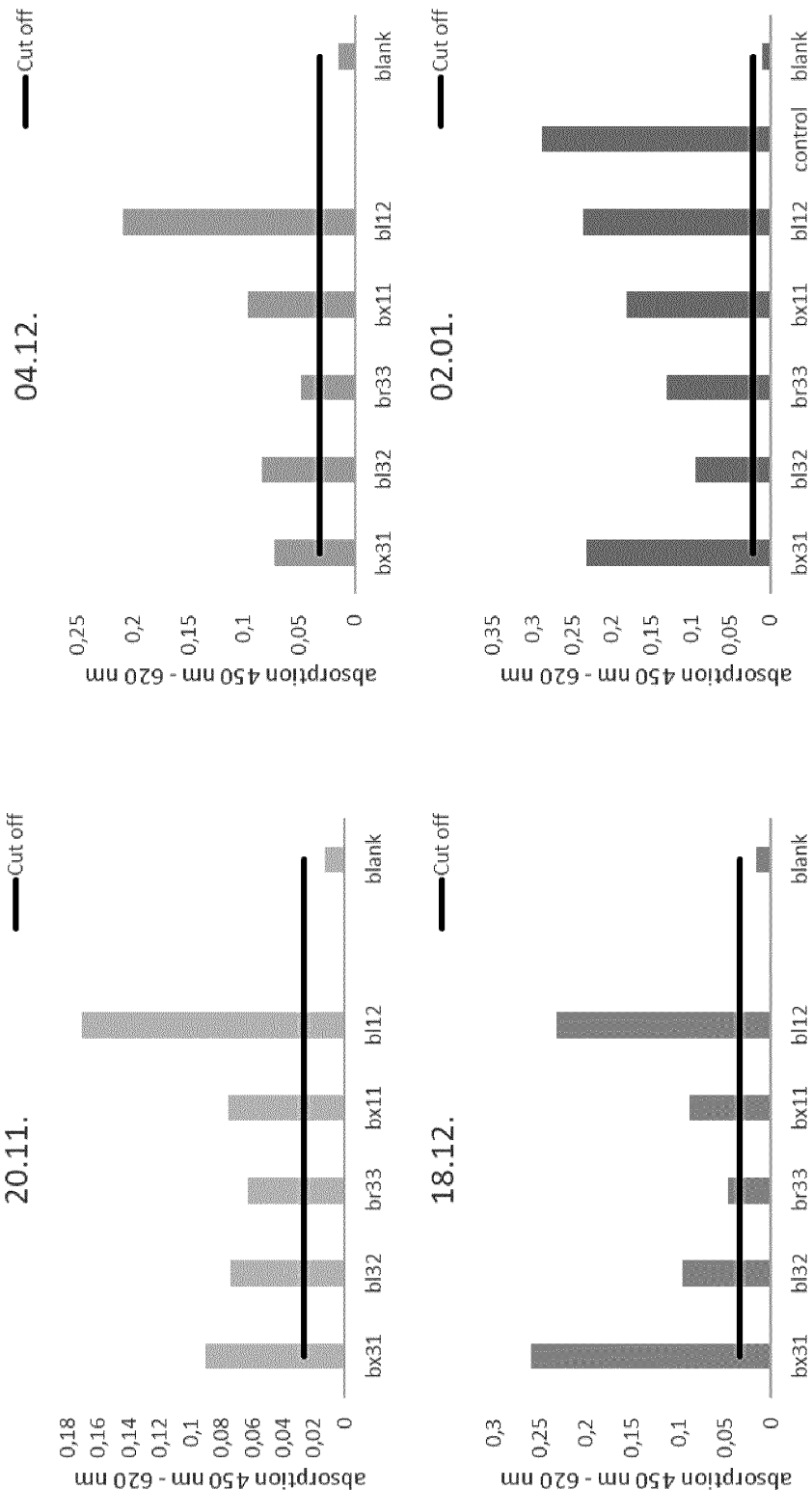
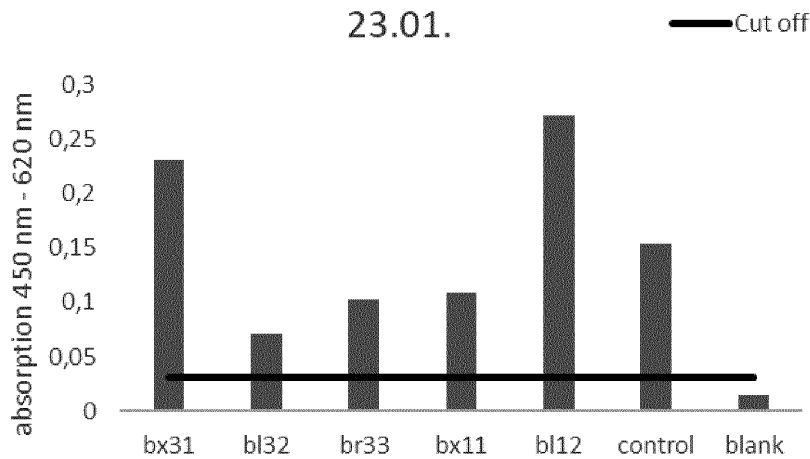


Fig. 31B



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Fig. 31B (continued-1)



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Fig. 31C

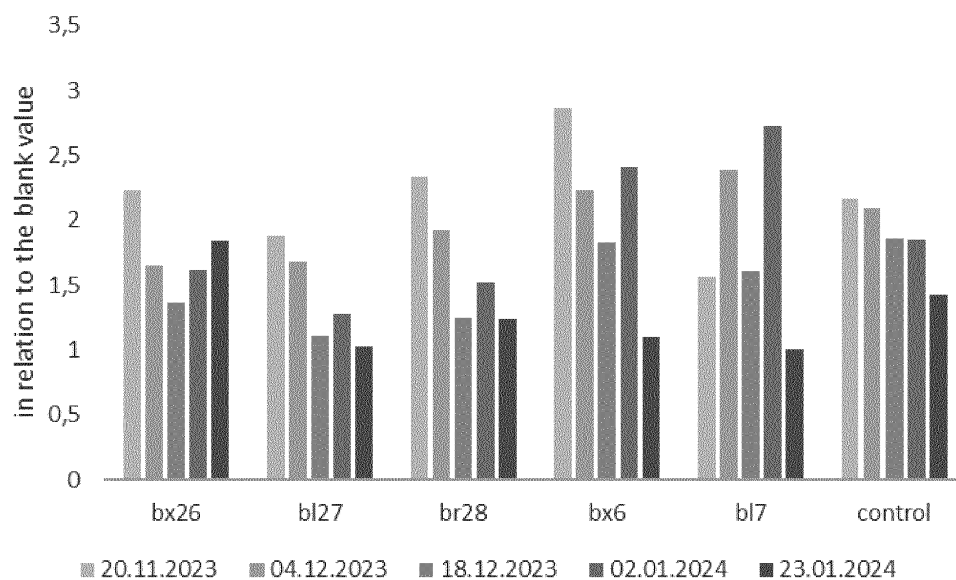


Fig. 31D

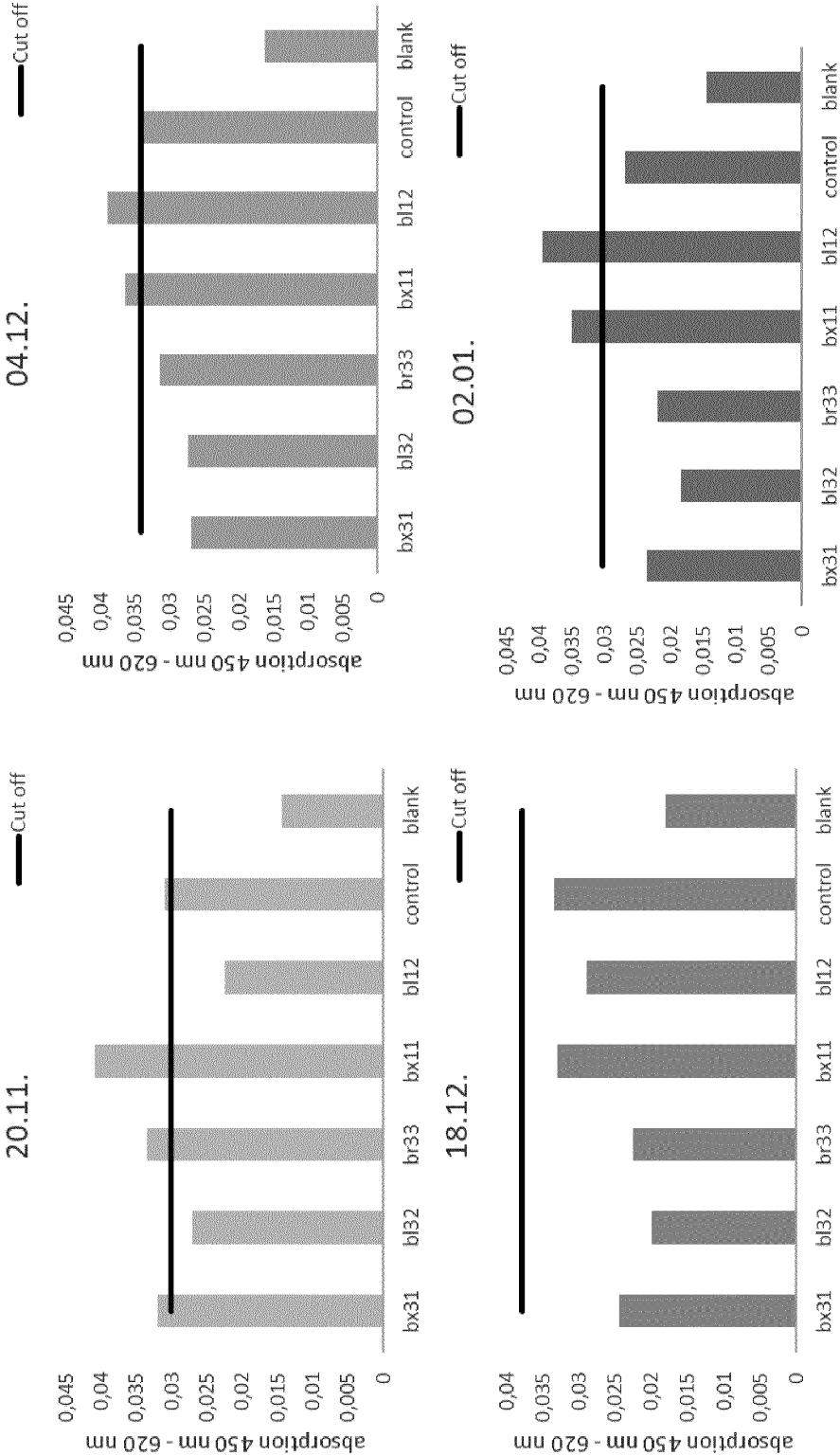
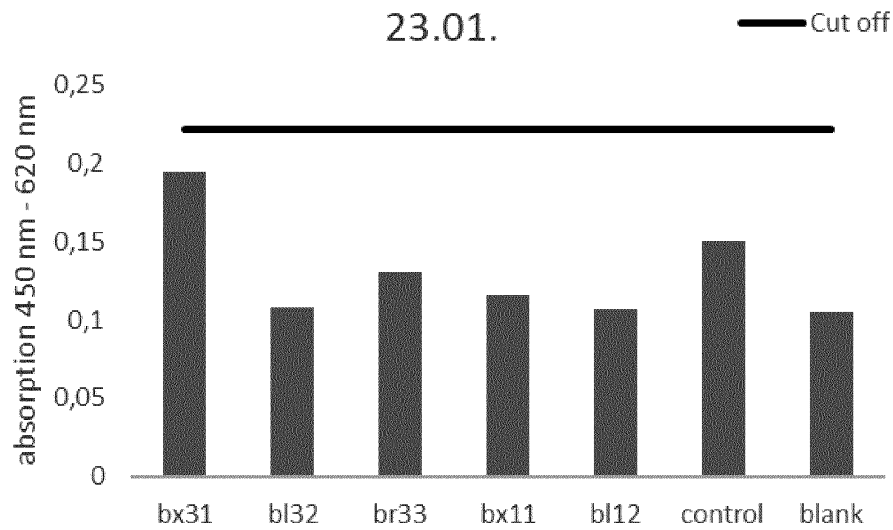


Fig. 31D (continued-1)



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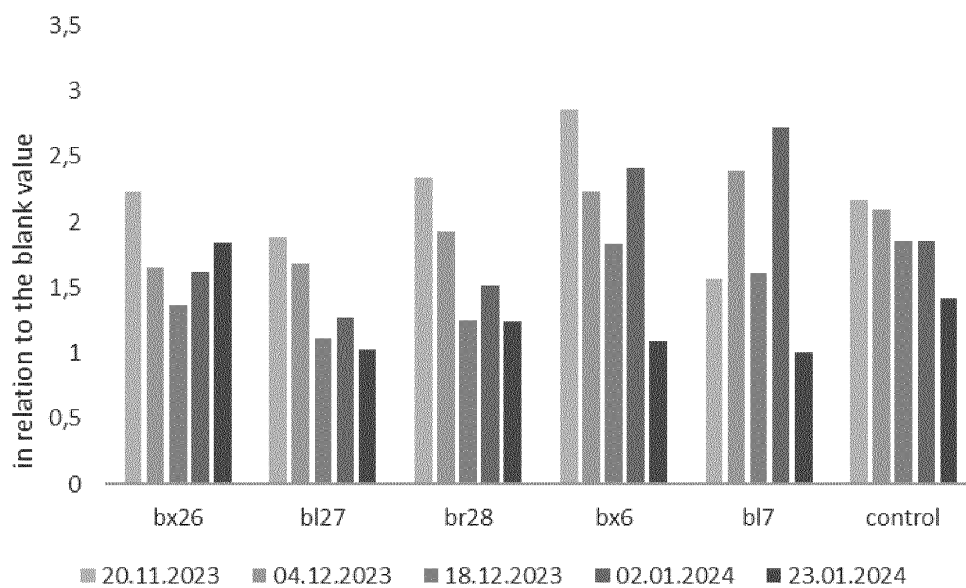
Fig. 31E

Fig. 31F

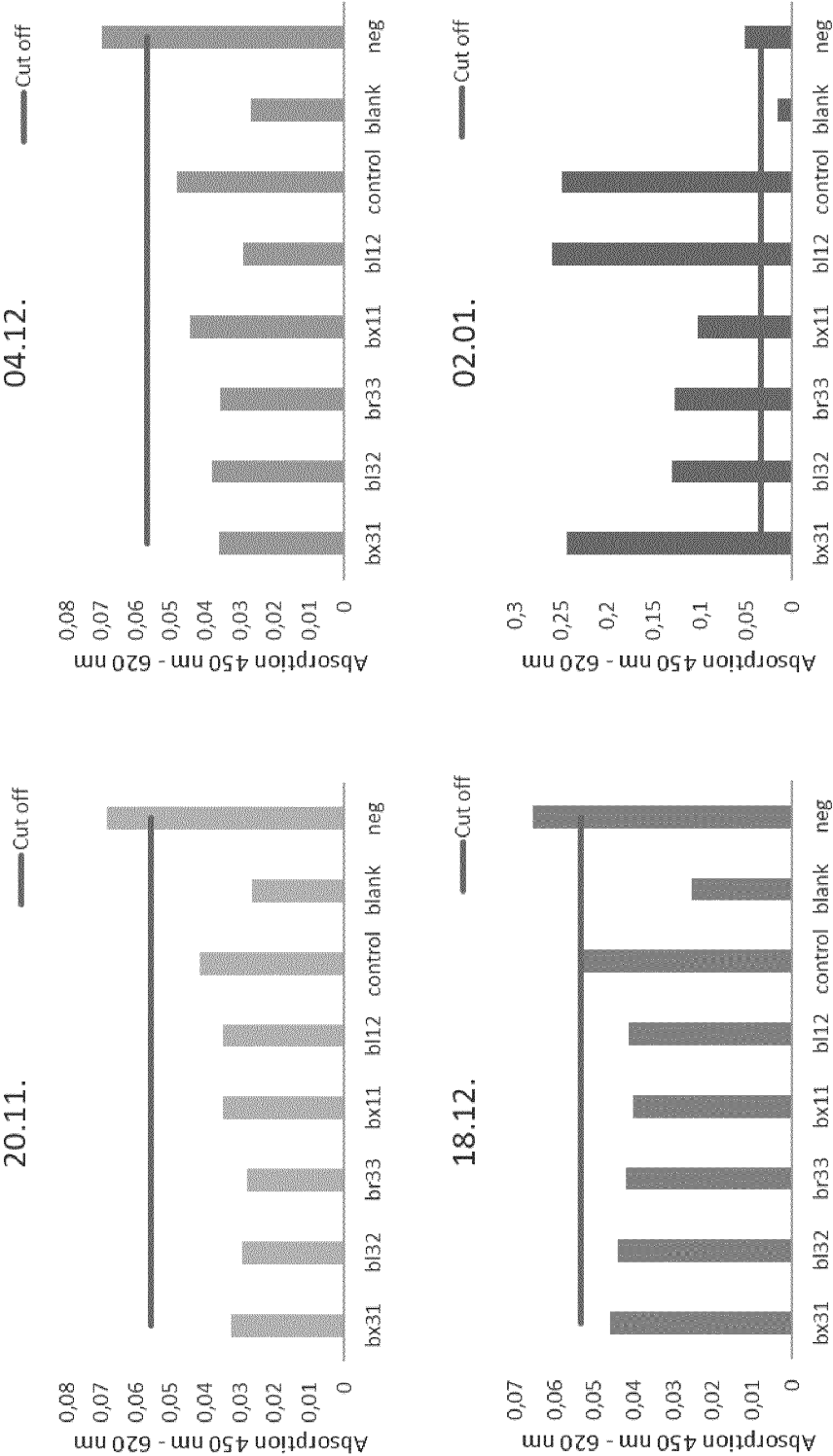


Fig. 31F (continued-1)

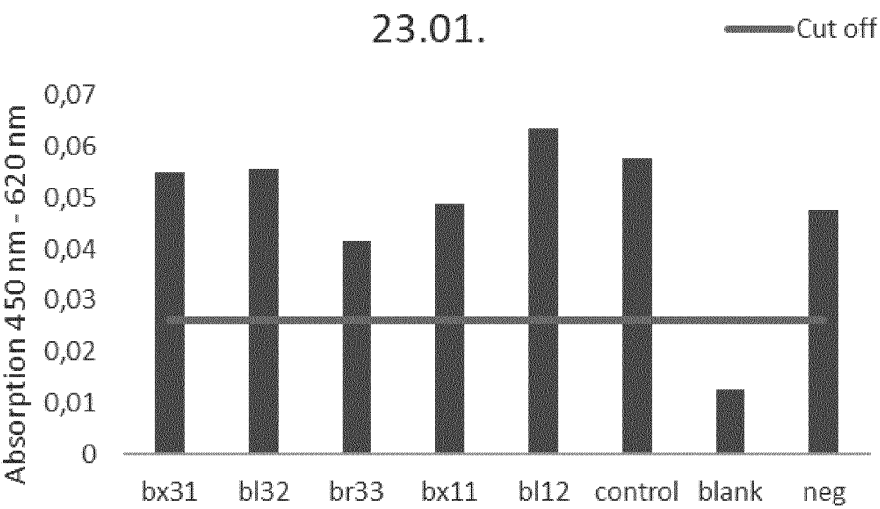


Fig. 31G

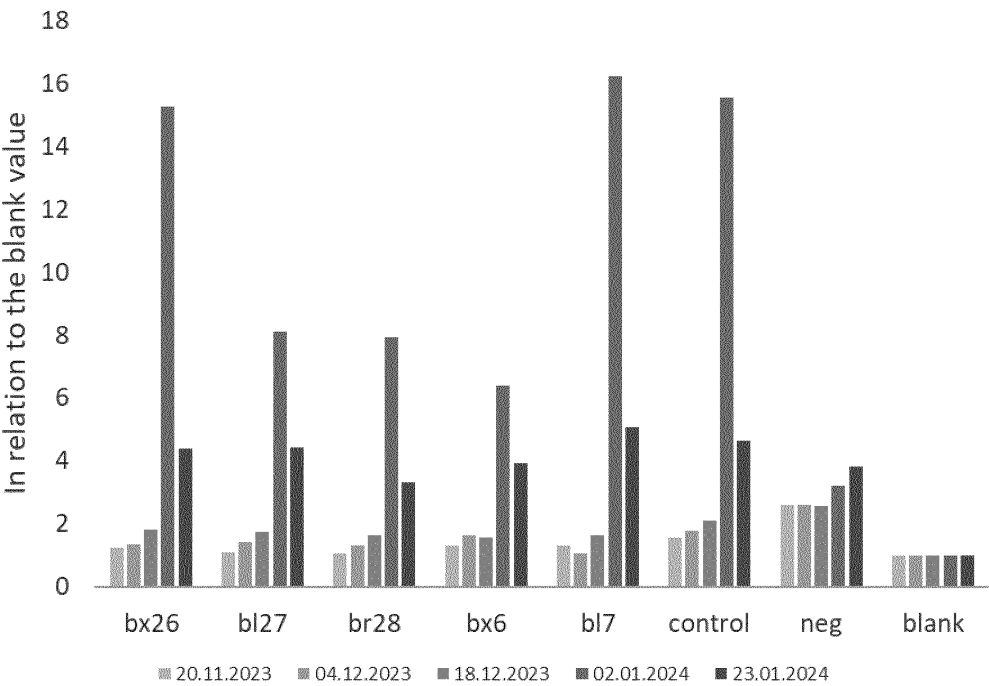
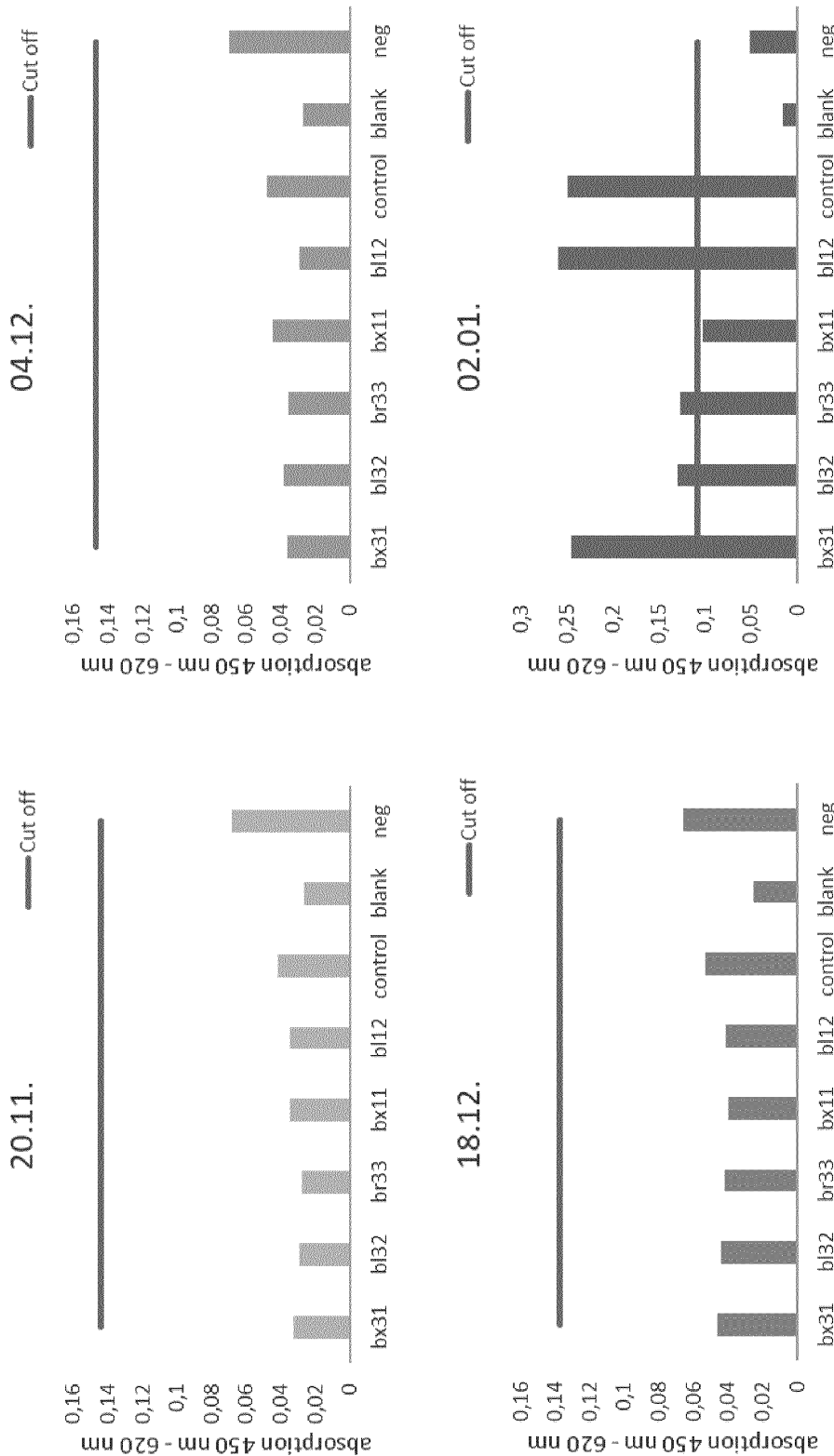
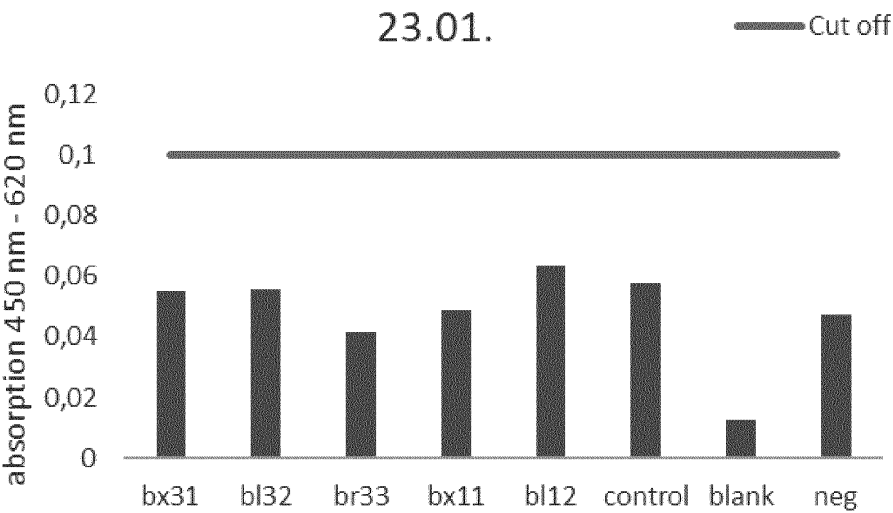


Fig. 31H



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Fig. 31H (continued-1)



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Fig. 31I

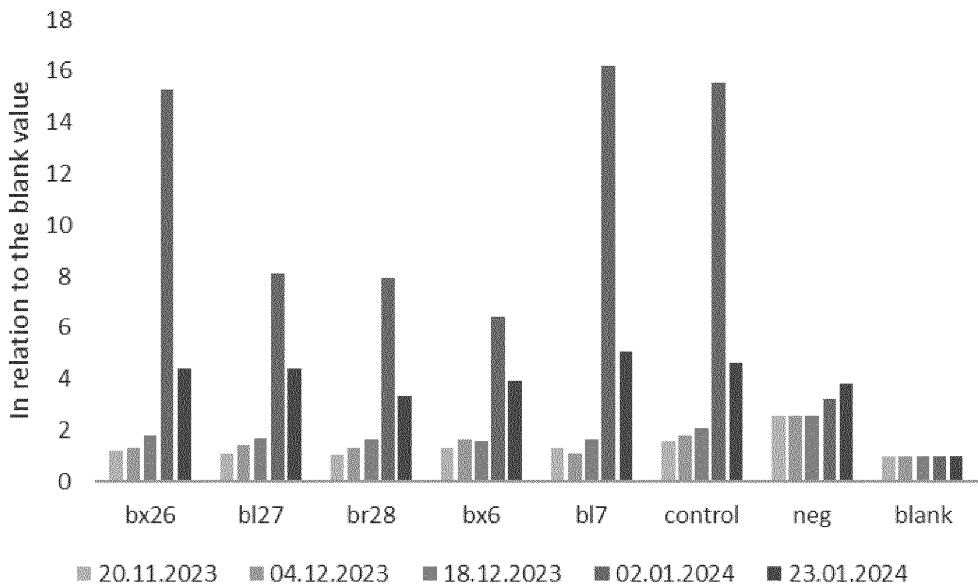


Fig. 31J

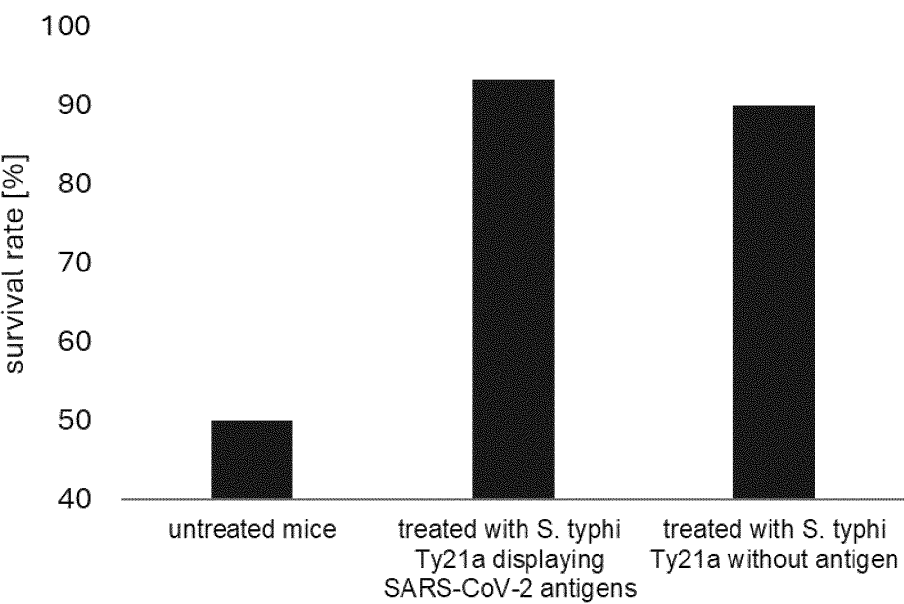


Fig. 32

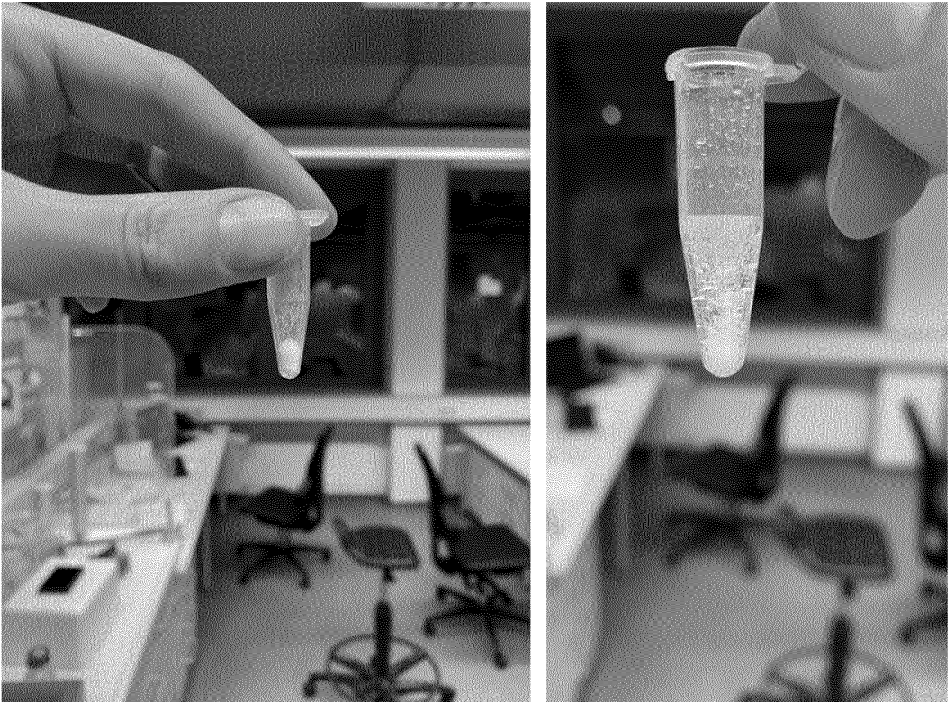


Fig. 33

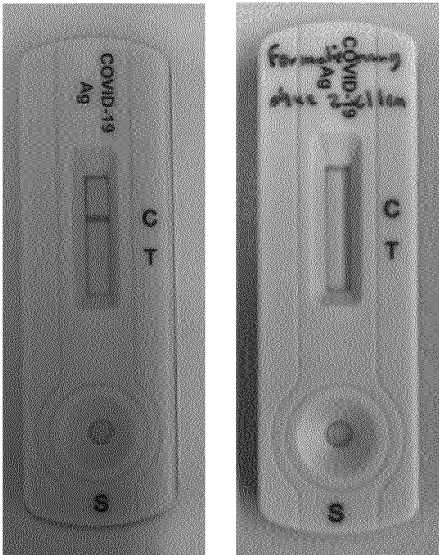


Fig. 34A

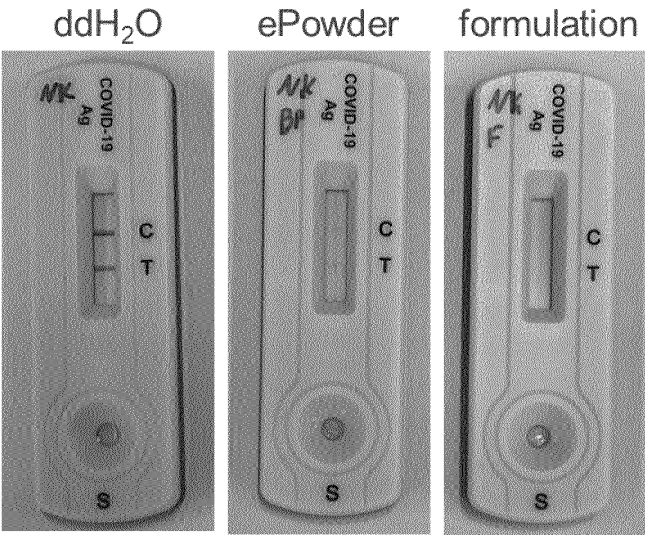


Fig. 34B

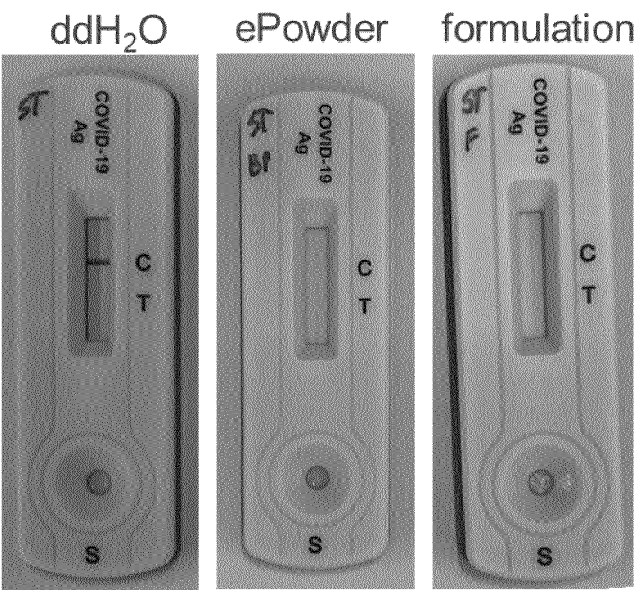


Fig. 34C

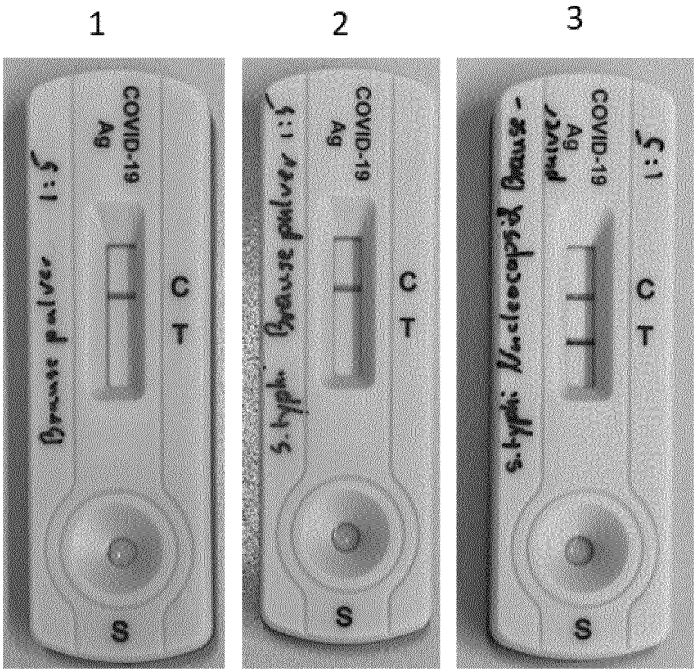


Fig. 34D

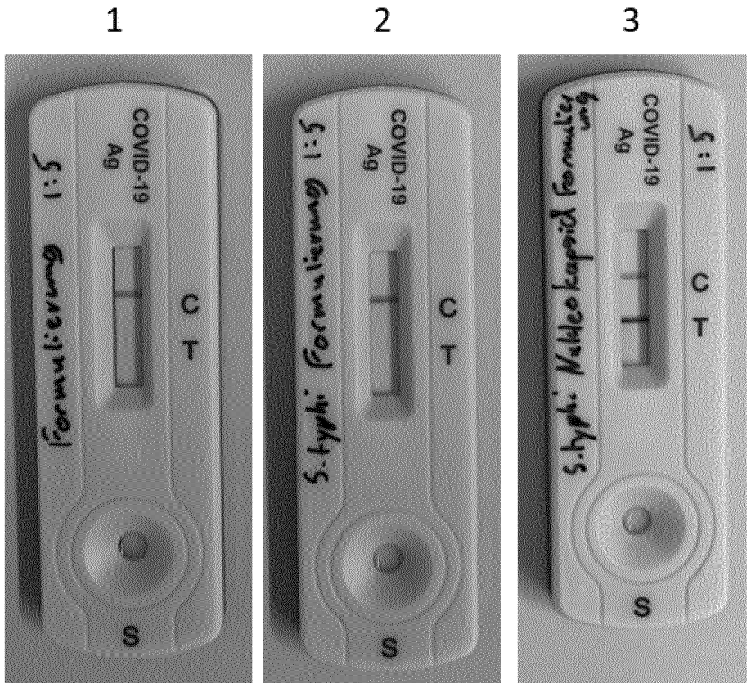


Fig. 35A

SVLQSGALPSVGVDKIDLSYETTESGDTAVSEDSYDKYASQNTNKEY
VCDFTDQLKPTESGPKVKKCEVKVNEPLIKVKIICPLKGSVEKLYDNIEYVP
KKSPYVVLTKKETKLKEKLLSKLIYGLLISPTVNEKENNFKEGVIEFTLPPVV
HKATVFYFICDNSKTEDDNKKGNRGIVEVYVEPYGNKING

Fig. 35B

GDRAAGQPAGDRAAGQPAGDRAAGQPAGDRAAGQPAGDRAAGQPA
GDRADGQPAGDRADGQPAGDRADGQPAGDRADGQPAGNGAGGQAA
ANGAGNQPGANGAGGQAAANGAGNQPGANGAGGQAAANGAGDQPG
ANGAGDQPGANGADDQPGANGAGDQPGEDGAGNQPGANGAGDQPG
GGNGAGGQAAAGGNAGGGQGNNEGANAPNEKSVKEYLDKVRATVGT
EWTPCSVTCGVGVRVRRRVNAANKKPEDLTLDLETDVCTMDK

Fig. 35C

MALWRPSDNTVYLPSPVARVVNTDDYVTRTSIFYHAGSSRLLTVGNPY
FRVPAGGGNKQDIPKVSAYQYRVFRVQLPDPNKFGLPDNSIYNPETQRL
VWACAGVEIGRGQPLGVGLSGHPFYNKLDDTESSHAATSNVSEDVRD
NVSVDYKQTQLCILGCAPAIGEHWAKGTACKSRPLSQGDCPPLELKNTV
LEDGDMVDGTGYGAMDFSTLQDTKCEVPLDICQSICKYPDYLMASADPY
GDSMFFCLRREQLFARHFWNRAGTMGDTVPSLYIKGTGMRASPGSC
VYSPSPSGSIVTSDSQLFNKPYWLHKAQGHNNGICWHNQLFVTVVDTT
RSTNLTICASTQSPVPGQYDATKFKQYSRHVEEYDLQFIFQLCTITLTADV
MSYIHSMNSSILEDWNFGVPPPPTTSLVDTYRFVQSVAITCQKDAAPAE
NKDPYDKLKFWNVDLKEKFSLDLDQYPLGRKFLVQAGLRRKPTIGPRKR
SAPSATTSSKPAKRVVRVRARK

Fig. 35D

YPHCKPGFLYAIKNDIEIGLLGAIGLTTQWYEYSDEMRLQDSTVEVWCK
DGEVRYLTRCEREARYLAALHTRALPTSVMFEKIFDGKEQEDIVEMDDN
FEFGLCPCDARPLIRGKFNTTLLNGPAFQMVCPIGWTGTVSCTLANKDT
LATTVVRTYKRNSPFPHRQDCVTQKTIGEDLYNCALGGNWTCVPGDQL
RYVAGPVESCKWCGHKFFKSEGLPHFPIGKCRLKNETGYRQVDETSN
RNGVAIVQSGLVKCRIGDTVQVIAMDDKLGPMPCKPHEIIPSEGPVEKT
ACTFNYTRTLKNKYFEPRDNYFQQYMLKGEYQYWFLEITDHHRDYFA
EFL

Fig. 36

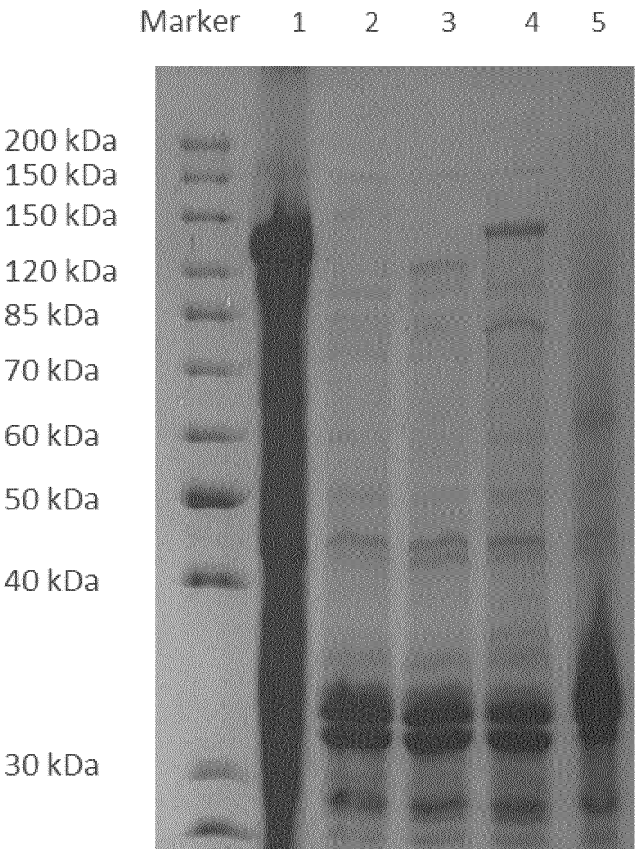


Fig. 37A

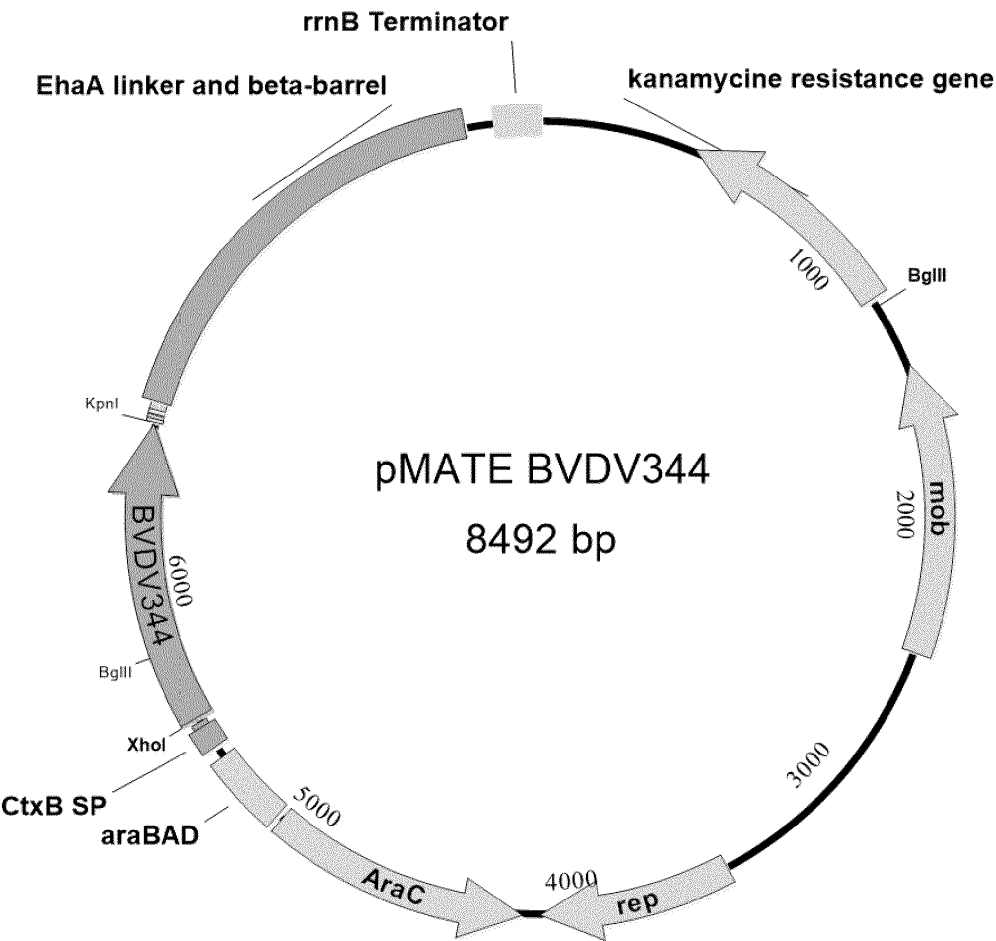


Fig. 37B

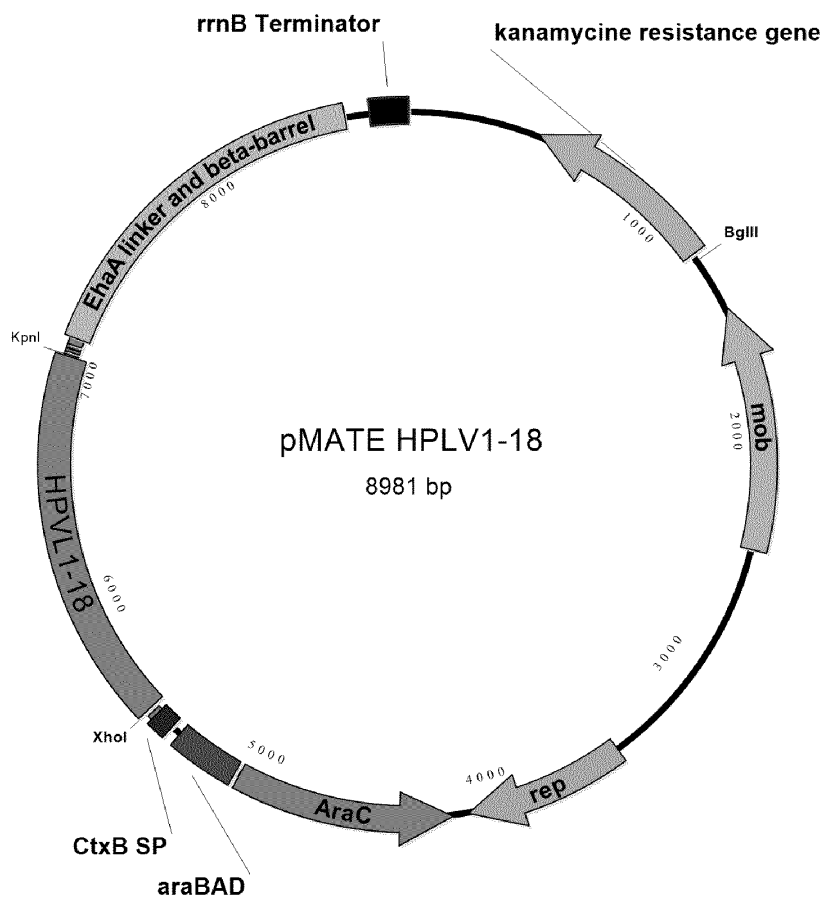


Fig. 37C

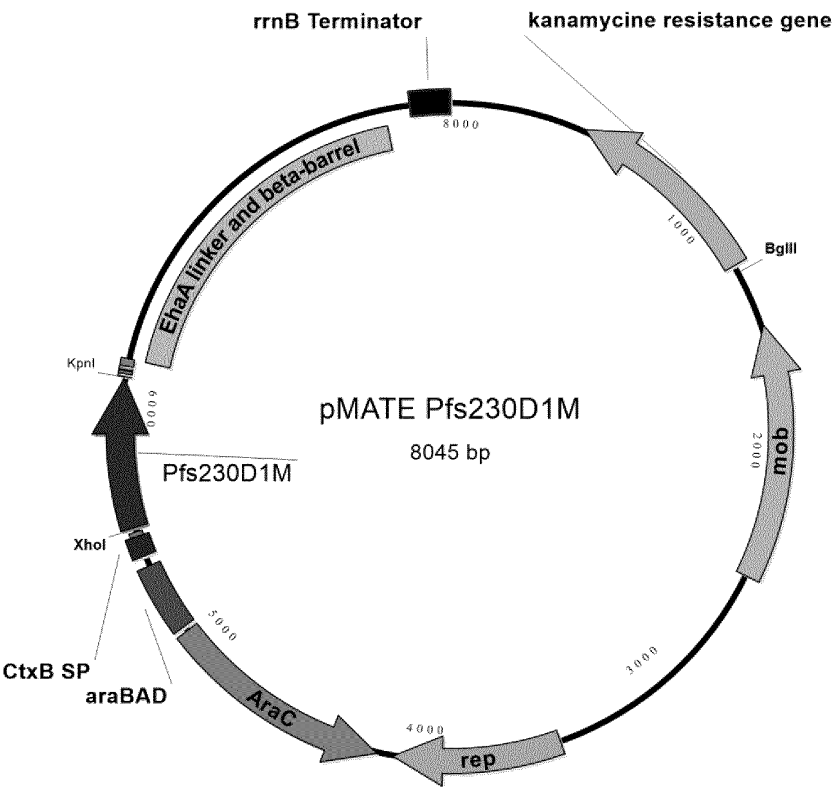


Fig. 37D

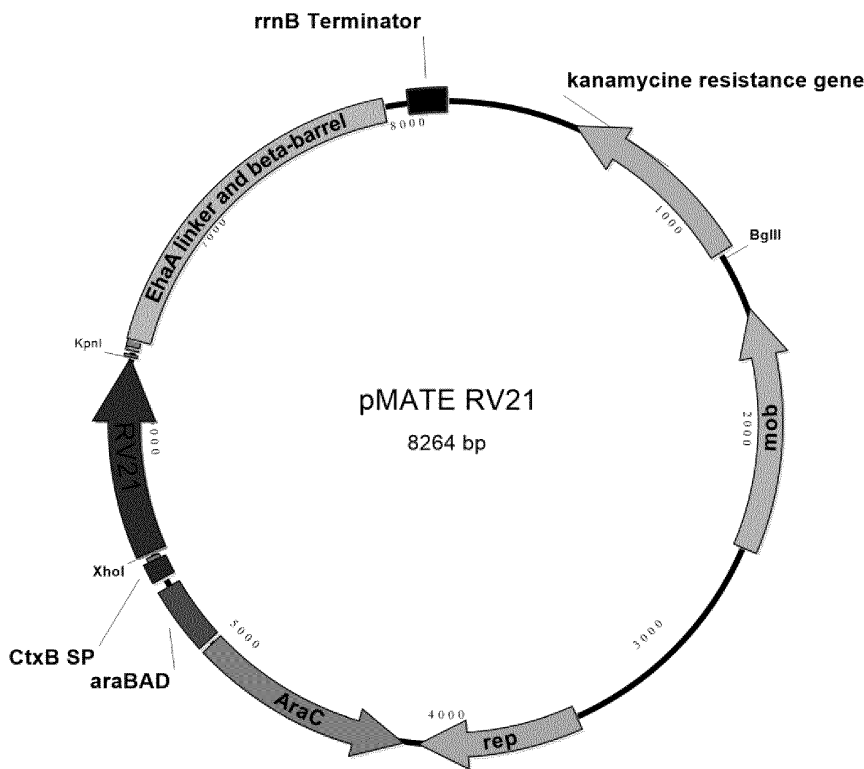


Fig. 38

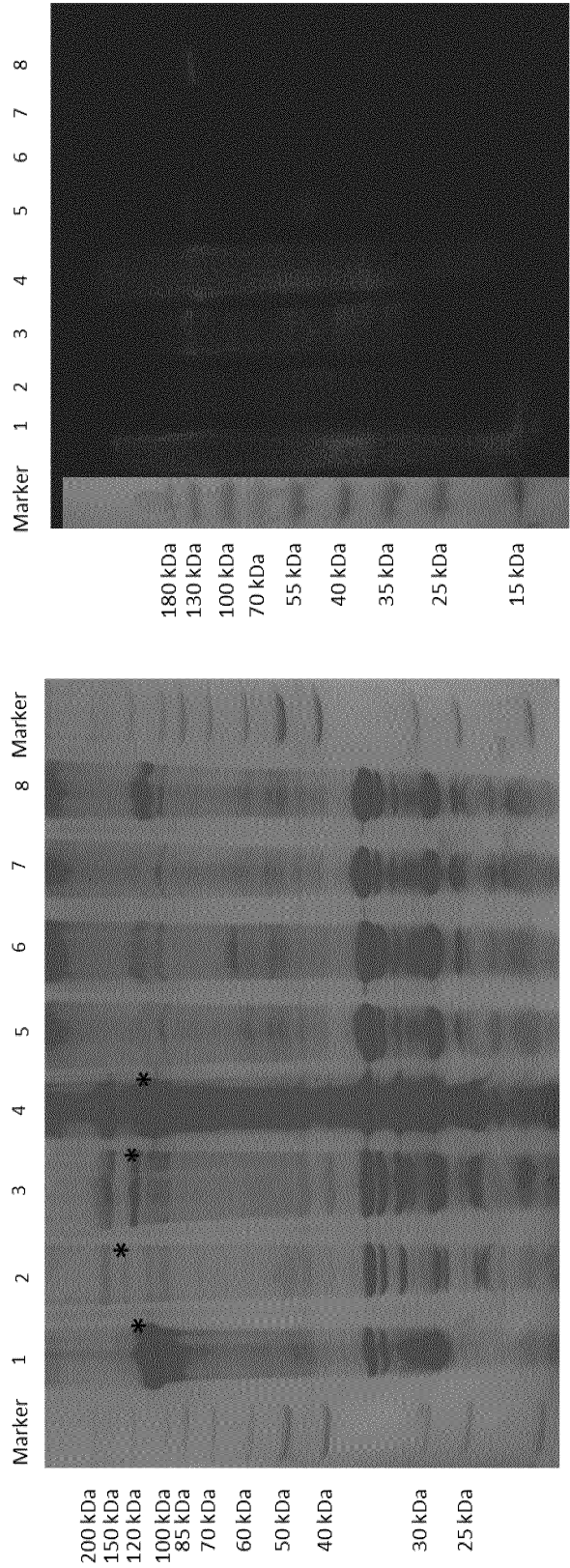


Fig. 39

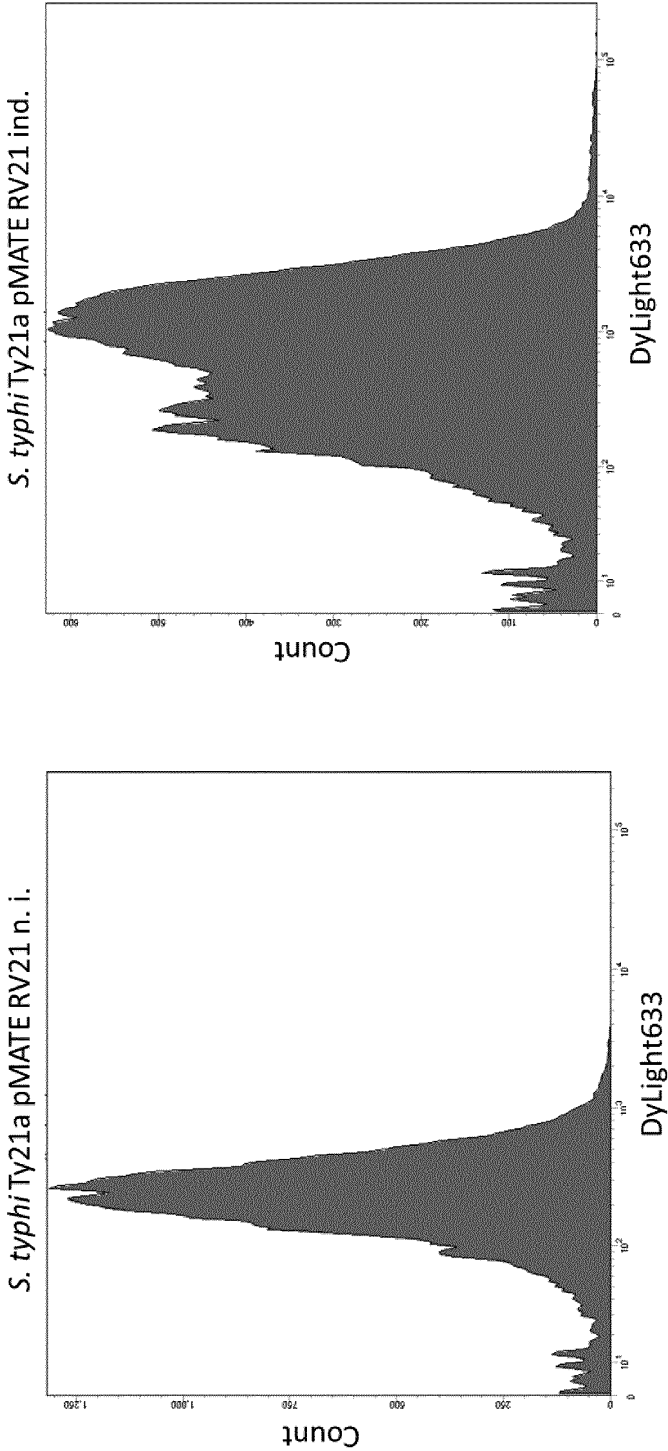


Fig. 40

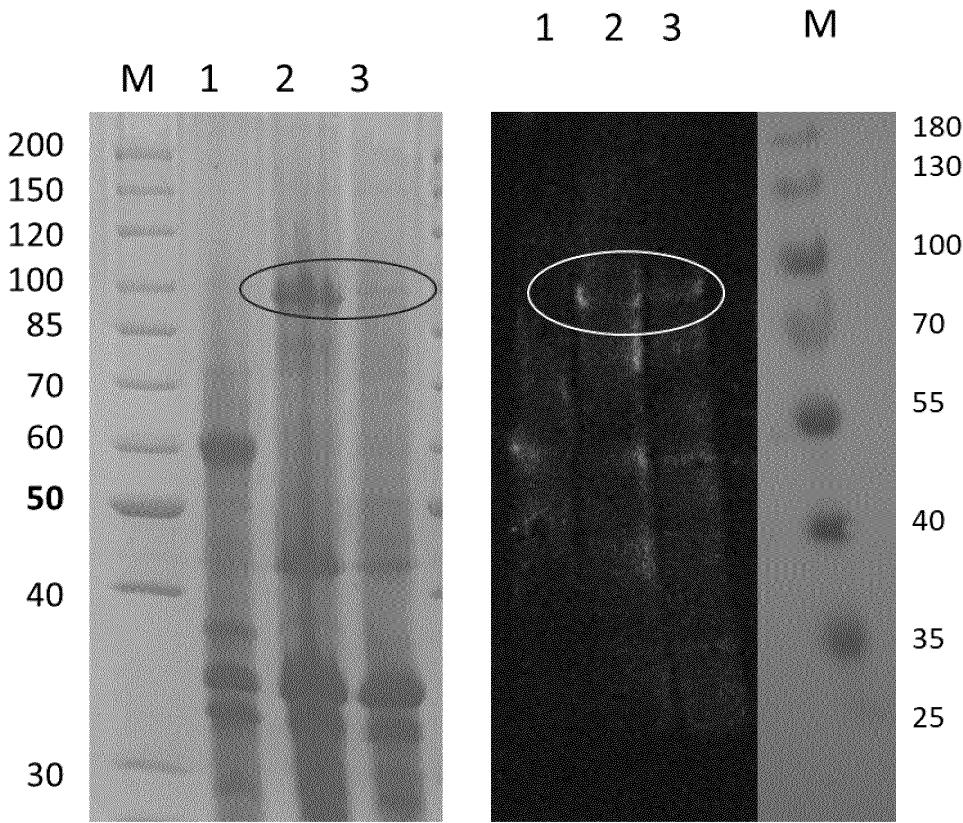


Fig. 41

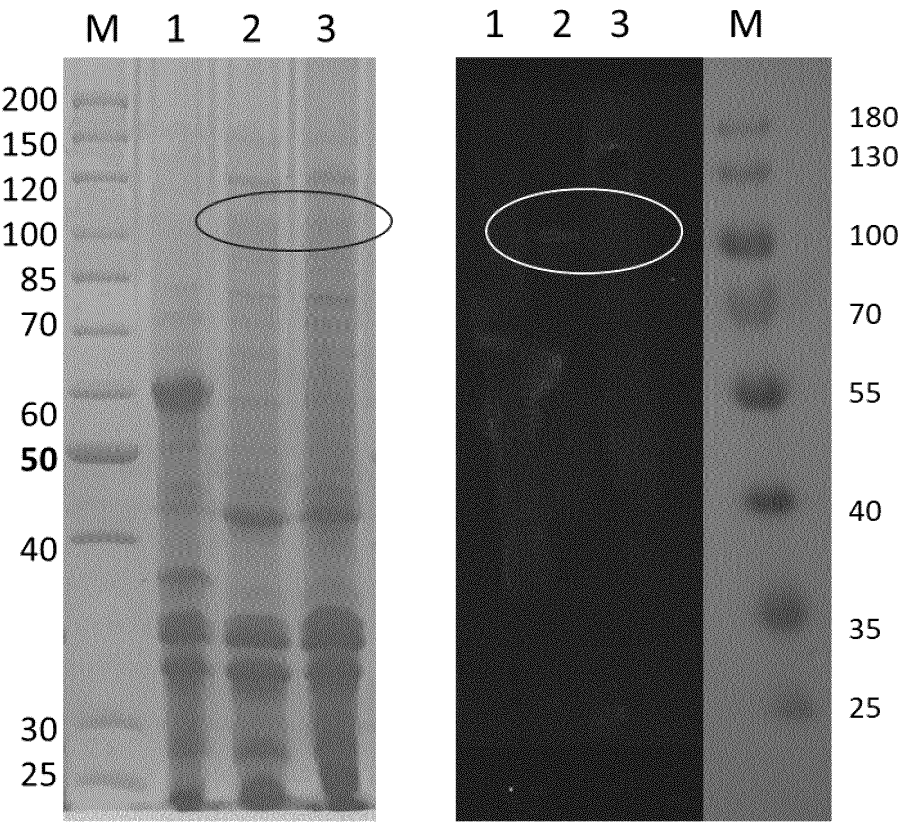


Fig. 42

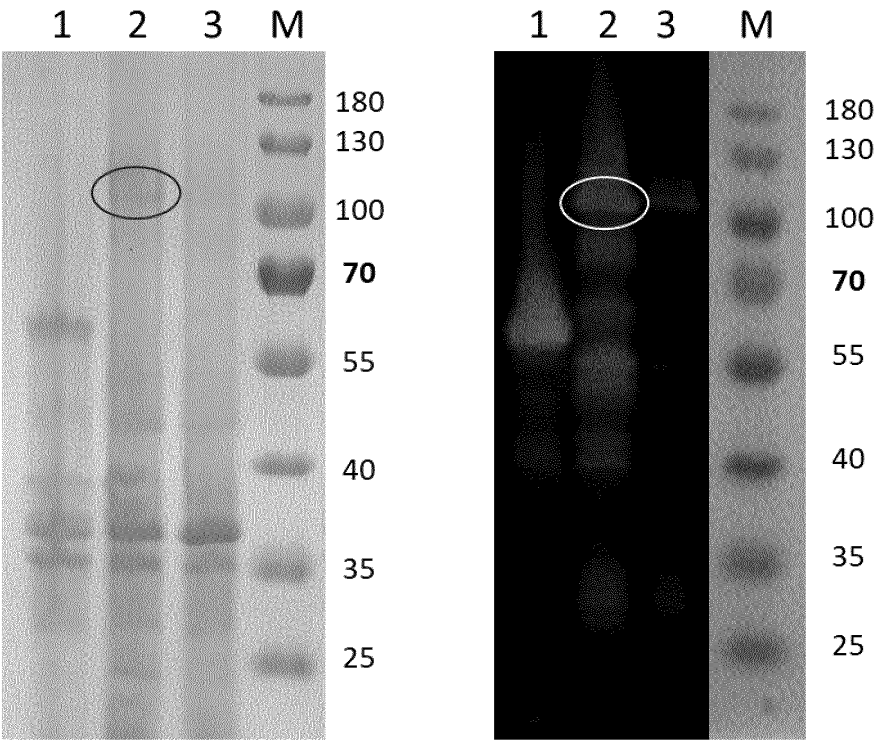


Fig. 43

