Table S2. The point mutation of primer/probe sets in the sequence of SARS-CoV-2 (89,791 high-quality SARS-CoV-2 sequences)

Institute	Name	Sequence	Position
China CDC	FP-N	**GGGGAACTTCTCCTGCTAGAAT** **AAC**GAACTTCTCCTGCTAGAAT **(47300)** **AACC**AACTTCTCCTGCTAGAAT **(320)** **AACT**AACTTCTCCTGCTAGAAT **(85)** **A**GGGAACTTCTCCTGCTAGAAT **(79)** **T**GGGAACTTCTCCTGCTAGAAT **(28)** GGGGAA**T**TTCTCCTGCTAGAAT **(1803)** GGGGAACTT**T**TCCTGCTAGAAT **(172)** GGGGAACTTCT**T**CTGCTAGAAT **(169)** GGGGAACTTCTC**T**TGCTAGAAT **(208)** GGGGAACTTCTCCTG**T**TAGAAT **(108)** GGGGAACTTCTCCTGC**C**AGAAT **(35)** GGGGAACTTCTCCTGCCA**T**AAT **(91)** GGGGAACTTCTCCTGCCA**A**AAT **(25)**	28881–28902
	RP-N	**CAGACATTTTGCTCTCAAGCTG** CAGCTTGAGAGCAAAATGTCTG CA**T**CTTGAGAGCAAAATGTCTG **(42)** CAG**T**TTGAGAGCAAAATGTCTG **(60)** CAGCTTGAGAGCAAAAT**C**TCTG **(3035)** CAGCTTGAGAGCAAAAT**T**TCTG **(739)** CAGCTTGAGAGCAAAAT**A**TCTG **(245)** CAGCTTGAGAGCAAAATAT**T**TG **(44269)** CAGCTTGAGAGCAAAATATCT**T** **(26)**	28958–28979
	Prb-N	**TTGCTGCTGCTTGACAGATT** TTGCTG**T**TGCTTGACAGATT **(32)** TTGCTGCTGCTTGA**T**AGATT **(202)**	28934–28953
	FP-ORF1ab1	**CCCTGTGGGTTTTACACTTAA** CCC**C**GTGGGTTTTACACTTAA **(40)** CCCTGT**T**GGTTTTACACTTAA **(47)** CCCTGTGGGTTTTA**T**ACTTAA **(43)**	13342–13362
	RP-ORF1ab1	**ACGATTGTGCATCAGCTGA** TCAGCTGATGCACAATCGT TCAGCTGATGCACAATC**T**T **(53)**	13442–13460
	Prb-ORF1ab1	**CCGTCTGCGGTATGTGGAAAGGTTATGG** C**T**GTCTGCGGTATGTGGAAAGGTTATGG **(64)** CCGT**T**TGCGGTATGTGGAAAGGTTATGG **(26)** CCGTCTG**T**GGTATGTGGAAAGGTTATGG **(250)**	13377–13404
	FP-ORF1ab2	**AGAAGATTGGTTAGATGATGATAGT** AGAAGA**C**TGGTTAGATGATGATAGT **(32)**	3193-3217
	RP-	**TTCCATCTCTAATTGAGGTTGAACC**	3286-3310

	ORF1ab2	GGTTCAACCTCAATTAGAGATGGAA GGTTCAACCTCAATTA**A**AGATGGAA **(94)** GGTTCAACCTCAATTAGAGAT**T**GAA **(43)**	
	Prb-ORF1ab2	**TCCTCACTGCCGTCTTGTTGACCA** TGGTCAACAAGACGGCAGTGAGGA T**A**GTCAACAAGACGGCAGTGAGGA **(51)** TG**T**TCAACAAGACGGCAGTGAGGA **(190)** TGGTC**T**ACAAGACGGCAGTGAGGA **(37)** TGGTCAACAA**T**ACGGCAGTGAGGA **(165)** TGGTCAACAAGA**T**GGCAGTGAGGA **(53)**	3229-3252
HKU CDC	FP-N	**TAATCAGACAAGGAACTGATTA** TAA**C**CAGACAAGGAACTGATTA **(41)** TAAT**T**AGACAAGGAACTGATTA **(289)** TAATCAGACAAGGAA**T**TGATTA **(33)** TAATCAGACAAGGAACT**T**ATTA **(66)**	29145–29166
	RP-N	**CGAAGGTGTGACTTCCATG** CATGGAAGTCACACCTTCG CATGGAAGTCA**T**ACCTTCG **(51)** CATGGAAGTCACA**T**CTTCG **(34)** CATGGAAGTCACAC**T**TTCG **(27)** CATGGAAGTCACACC**C**TCG **(39)** CATGGAAGTCACACCTT**T**G **(141)** CATGGAAGTCACACCTTC**T** **(123)** CATGGAAGTCACACCTTC**A** **(66)**	29235–29254
	Prb-N	**GCAAATTGTGCAATTTGCGG** CCGCAAATTGCACAATTTGC CC**T**CAAATTGCACAATTTGC **(384)** CCGCAAATTGCACAATT**C**GC **(241)** CCGCAAATTGCACAATTT**T**C **(32)**	29177–29196
HKU CDC	FP- nsp14	**TGGGGYTTTACRGGTAACCT** TGGGGYTTTA**T**RGGTAACCT **(100)** TGGGGYTTTACRGGTAAC**T**T **(71)**	18778–18797
	RP- nsp14	**AACRCGCTTAACAAAGCACTC** GAGTGCTTTGTTAAGCGTGTT GAGTGCTTTGTTAAG**T**GTGTT **(53)**	18889–18909
	Prb- nsp14	**TAGTTGTGATGCWATCATGACTAG** TAGTTGTGAT**T**CWATCATGACTAG **(41)**	18849–18872
Japan NIDS	FP-N	**AAATTTTGGGGACCAGGAAC** AAATTTTGGGGACCA**A**GAAC **(80)** AAATTTTGGGGACCA**T**GAAC **(27)** AAATTTTGGGGACCAGGAA**T** **(95)**	29125–29144
	RP-N	**TGGCAGCTGTGTAGGTCAAC** GTTAACCTACACAGCTGCCA GTT**A**ACCTACACAGCTGCCA **(548)**	29263–29282

		GTTGACCTA**T**ACAGCTGCCA (377) GTTGACCTACA**T**AGCTGCCA (76) GTTGACCTACACAGCTGC**T**A (78)	
	Prb-N	**ATGTCGCGCATTGGCATGGA** ATGTC**T**CGCATTGGCATGGA (166) ATGTCGC**A**CATTGGCATGGA (68)	29222–29241
USCDC	FP-N1	**GACCCCAAAATCAGCGAAAT** GACCCCAAAATCAGCGAA**G**T (25)	28287–28306
	RP-N1	**TCTGGTTACTGCCAGTTGAATCTG** CATATTCAACTGGCAGTAACCAGA CA**T**ATTCAACTGGCAGTAACCAGA (63) CAGATT**T**AACTGGCAGTAACCAGA (31) CAGATTCAA**T**TGGCAGTAACCAGA (48) CAGATTCAACT**T**GCAGTAACCAGA (46)	28335–28358
	Prb-N1	**ACCCCGCATTACGTTTGGTGGACC** A**A**CCCGCATTACGTTTGGTGGACC (195) A**T**CCCGCATTACGTTTGGTGGACC (111) AC**T**CCGCATTACGTTTGGTGGACC (224) ACC**T**CGCATTACGTTTGGTGGACC (100) ACCC**T**GCATTACGTTTGGTGGACC (172) ACCCC**G**CATTACGTTTGGTGGACC (61) ACCCCGCATTA**T**GTTTGGTGGACC (43) ACCCCGCATTAC**T**TTTGGTGGACC (290) ACCCCGCATTAC**A**TTTGGTGGACC (180) ACCCCGCATTACGTTTGGT**A**GACC (33)	28309–28332
	FP-N2	**TTACAAACATTGGCCGCAAA** TTA**T**AAACATTGGCCGCAAA (183) TTACAAA**T**ATTGGCCGCAAA (154) TTACAAACATTGGCC**T**CAAA (384)	29164–29183
	RP-N2	**GCGCGACATTCCGAAGAA** TTCTTTGGAATGTCGCGC TTCTT**T**GGAATGTCGCGC (384) TTCTTCGGAATGTC**T**CGC (384) TTCTTCGGAATGTCGC**A**C (384)	29213–29230
	Prb-N2	**ACAATTTGCCCCCAGCGCTTCAG** ACAATT**C**GCCCCCAGCGCTTCAG (241) ACAATTT**T**CCCCCAGCGCTTCAG (32) ACAATTTGC**T**CCCAGCGCTTCAG (255) ACAATTTGCCCC**T**AGCGCTTCAG (217) ACAATTTGCCCCCAGCGCTT**T**AG (146)	29188–29210
	FP-N3	**GGGAGCCTTGAATACACCAAAA** GGGAGCCTT**T**AATACACCAAAA (167) GGGAGCCTT**C**AATACACCAAAA (42) GGGAGCCTTGAATA**T**ACCAAAA (98)	28681–28702

		GGGAGCCTTGAATACATCAAAA (75)	
	RP-N3	**TGTAGCACGATTGCAGCATTG** TAATGCTGCAATCGTGCTACA TAATGCTGCAATCGTGCTACA (27) CAACGCTGCAATCGTGCTACA (354) CAATGCTTCAATCGTGCTACA (53) CAATGCTGCAATTGTGCTACA (153) CAATGCTGCAATCGTTCTACA (59)	28732–287 52
	Prb-N3	**AYCACATTGGCACCCGCAATCCTG** AYTACATTGGCACCCGCAATCCTG (263) AYCATATTGGCACCCGCAATCCTG (78) AYCACATTGGCATCCGCAATCCTG (31) AYCACATTGGCACTCGCAATCCTG (30) AYCACATTGGCACCCGTAATCCTG (69) AYCACATTGGCACCCGCAACCCTG (30) AYCACATTGGCACCCGCAATTCTG (122) AYCACATTGGCACCCGCAATCTTG (376) AYCACATTGGCACCCGCAATCCTT (29)	28704–287 27
	FP-N4	**CATGACGTTCGTGTT** CATGATGTTCGTGTT (33) CATGACGTTTGTGTT (61) CATGACGTTCTTGTT (26)	28227- 28241
	RP-N4	**TCTGGTTACTGCCAGTTGAATCTG** CAGATTCAACTGGCAGTAACCAGA CATATTCAACTGGCAGTAACCAGA (63) CAGATTTAACTGGCAGTAACCAGA (31) CAGATTCAATTGGCAGTAACCAGA (48) CAGATTCAACTTGCAGTAACCAGA (46)	28335- 28358
	Prb-N4	**ACCCCGCATTACGTTTGGTGG** AACCCGCATTACGTTTGGTGG (195) ATCCCGCATTACGTTTGGTGG (111) ACTCCGCATTACGTTTGGTGG (224) ACCTCGCATTACGTTTGGTGG (100) ACCCTGCATTACGTTTGGTGG (172) ACCCCTCATTACGTTTGGTGG (61) ACCCCGCATTATGTTTGGTGG (43) ACCCCGCATTACTTTTGGTGG (290) ACCCCGCATTACATTTGGTGG (180) ACCCCGCATTACGTTTGGTAG (33)	28309- 28329
Charité	FP-E	**ACAGGTACGTTAATAGTTAATAGCGT** ATAGGTACGTTAATAGTTAATAGCGT (196)	26269- 26294
	RP-E	**ATATTGCAGCAGTACGCACACA** TGTGTGCGTACTGCTGCAATAT	26360- 26381
	Prb-E	**ACACTAGCCATCCTTACTGCGCTTCG**	26332-

		ATACTAGCCATCCTTACTGCGCTTCG (29)	26357
Institute of Microbiology and Virology	FP-N	**CCTCTTCTCGTTCCTCATCACGTAGTCGCAAC** CCTATTCTCGTTCCTCATCACGTAGTCGCAAC (90) CCTCTTCTCGTTCCTTATCACGTAGTCGCAAC (141) CCTCTTCTCGTTCCTCATCACGTATTCGCAAC (93) CCTCTTCTCGTTCCTCATCACGTAGGCGCAAC (39) CCTCTTCTCGTTCCTCATCACGTAGTCGTAAC (103) CCTCTTCTCGTTCCTCATCACGTAGTCGCAAT (174)	28818-28849
	RP-N	**AGTGACAGTTTGGCCTTGTTGTTGTTGGCCTT** AATGCCAACAACAACAAGGCCAAACTGTCACT (102) AAGGCCAACAACAACAATGCCAAACTGTCACT (143)	28983-29014
	Prb-N	**CCTGCTAGAATGGCTGGCAATGGCGGTGA** TCTGCTAGAATGGCTGGCAATGGCGGTGA (169) CTTGCTAGAATGGCTGGCAATGGCGGTGA (208) CCTGTTAGAATGGCTGGCAATGGCGGTGA (108) CCTGCCAGAATGGCTGGCAATGGCGGTGA (35) CCTGCTATAATGGCTGGCAATGGCGGTGA (91) CCTGCTAAAATGGCTGGCAATGGCGGTGA (25) CCTGCTAGAATTGCTGGCAATGGCGGTGA (117) CCTGCTAGAATGTCTGGCAATGGCGGTGA (72) CCTGCTAGAATGACTGGCAATGGCGGTGA (31) CCTGCTAGAATGGTTGGCAATGGCGGTGA (103) CCTGCTAGAATGGCTTGCAATGGCGGTGA (37) CCTGCTAGAATGGCTGTCAATGGCGGTGA (64) CCTGCTAGAATGGCTGGCAACGGCGGTGA (33) CCTGCTAGAATGGCTGGCAATGGCGTTGA (28)	28892-28920
The First Hospitalof Jilin University	FP-N	**TAATCAGACAAGGAACTGATTA** TAACCAGACAAGGAACTGATTA (41) TAATTAGACAAGGAACTGATTA (289) TAATCAGACAAGGAATTGATTA (33) TAATCAGACAAGGAACTTATTA (66)	29145-29166
	RP-N	**CGAAGGTGTGACTTCCATG** CATGGAAGTCACACCTTCG CATGGAAGTCATACCTTCG (51) CATGGAAGTCACATCTTCG (34) CATGGAAGTCACACTTTCG (27) CATGGAAGTCACACCCTCG (39) CATGGAAGTCACACCTTTG (141) CATGGAAGTCACACCTTCT (123) CATGGAAGTCACACCTTCA (66)	29236-29254
	Prb-N	**GCAAATTGTGCAATTTGCGG** CCGCAAATTGCACAATTTGC CCTCAAATTGCACAATTTGC (384) CCGCAAATTGCACAATTCGC (241)	29196-29177

		CCGCAAATTGCACAATTT**T**C **(32)**	
Institut Pasteur	FP-ORF1ab1	**ATGAGCTTAGTCCTGTTG**	12690-12707
	RP-ORF1ab1	**CTCCCTTTGTTGTGTTGT** ACAACACAACAAAGGGAG A**T**AACACAACAAAGGGAG **(77)** ACAA**T**ACAACAAAGGGAG **(69)** ACAACACAA**T**AAAGGGAG **(348)**	12780-12797
	Prb-ORF1ab1	**AGATGTCTTGTGCTGCCGGTA** AGATGTCTTGTGCTGC**T**GGTA **(132)**	12717-12737
	FP-ORF1ab2	**GGTAACTGGTATGATTTCG** GGT**T**ACTGGTATGATTTCG **(79)** GGTAACTGGTATGATTT**T**G **(36)**	14080-14098
	RP-ORF1ab2	**CTGGTCAAGGTTAATATAGG** CCTATATTAACCTTGACCAG CCTATATTAAC**T**TTGACCAG **(89)** CCTATATTAACCTTGA**T**CAG **(61)** CCTATATTAACCTTGAC**T**AG **(86)**	14167-14186
	Prb-ORF1ab2	**TCATACAAACCACGCCAGG** TCATACAAACCA**G**GCCAGG **(40)** TCATACAAACCA**T**GCCAGG **(29)** TCATACAAACCAC**T**CCAGG **(129)** TCATACAAACCACGC**T**AGG **(1966)**	14105-14123
IPBCAMS	FP-N	**AACACAAGCTTTCGGCAGAC** AA**T**ACAAGCTTTCGGCAGAC **(40)** AACACAAGCTTT**T**GGCAGAC **(492)**	29083-29102
	RP-N	**ACCTGTGTAGGTCAACCACG** CGTGGTTGACCTACACAGGT C**T**TGGTTGACCTACACAGGT **(142)** C**C**TGGTTGACCTACACAGGT **(54)** C**A**TGGTTGACCTACACAGGT **(37)** CGTGGTT**A**ACCTACACAGGT **(548)** CGTGGTTGACCTA**T**ACAGGT **(377)** CGTGGTTGACCTACA**T**AGGT **(76)**	29278-29259
	Prb-N	**CAGCGCTTCAGCGTTCTTCGGAATGTCGC** **T**AGCGCTTCAGCGTTCTTCGGAATGTCGC **(217)** CAGCGCTTCAGCGTTCTT**T**GGAATGTCGC **(146)** CAGCGCTTCAGCGTTCTTCGGAATGTC**T**C **(166)**	29200-29228
Northwell Health Laboratories	FP-S	**TCAACTCAGGACTTGTTCTTAC** TCAA**T**TCAGGACTTGTTCTTAC **(72)** TCAACTCAGGA**T**TTGTTCTTAC **(103)** TCAACTCAGGACTT**T**TTCTTAC **(101)**	21710-21731

		TCAACTCAGGACTTGTTTTTAC (335)	
	RP-S	**TGGTAGGACAGGGTTATCAAAC** GTTTGATAACCCTGTCCTACCA GTTTTATAACCCTGTCCTACCA (95) GTTTGCTAACCCTGTCCTACCA (249) GTTTGGTAACCCTGTCCTACCA (67) GTTTGATAACCCTGTACTACCA (232) GTTTGATAACCCTGTTCTACCA (138) GTTTGATAACCCTGTCTTACCA (76) GTTTGATAACCCTGTCCTACCG (59)	21796-21817
	Prb-S	**TGGTCCCAGAGACATGTATAGCAT** ATGCTATACATGTCTCTGGGACCA ACGCTATACATGTCTCTGGGACCA (35) ATTCTATACATGTCTCTGGGACCA (59) ATGTTATACATGTCTCTGGGACCA (129) ATGCCATACATGTCTCTGGGACCA (79) ATGCTATATATGTCTCTGGGACCA (37) ATGCTATACATATCTCTGGGACCA (361) ATGCTATACATGTTTCTGGGACCA (85) ATGCTATACATGTCTTTGGGACCA (58) ATGCTATACATGTCTCTAGGACCA (93)	21759-21782
Anglia Ruskin Univeisity	FP-nsp10	**GGATCAAGAATCCTTTGGTGG** GGACCAAGAATCCTTTGGTGG (73)	13213-13233
	RP-nsp10	**GTCACAAAATCCTTTAGGATTTGGA** TCCAAATCCTAAAGGATTTTGTGAC CCCAAATCCTAAAGGATTTTGTGAC (54) TTCAAATCCTAAAGGATTTTGTGAC (31) TCCAGATCCTAAAGGATTTTGTGAC (34) TCCAAATCCTAAGGGATTTTGTGAC (84) TCCAAATCCTAAAGGATTTTGTGCC (36) TCCAAATCCTAAAGGATTTTGTGAT (89)	13273-13297
	Prb-nsp10	**CATCGTGTTGTCTGTACTGCCGTTGCC**	13236-13259
	FP-S	**CACCAGGAACAAATACTTC**	23358-23376
	RP-S	**CCAAGTAGGAGTAAGTTGA** TCAACTTACTCCTACTTGG TCAACTTACTTCTACTTGG (38)	23443-23461
	Prb-S	**CTTTATCAGGATGTTAACT**	23339-23357
Shanghai Public Health	FP-ORF1ab	**TGATGATACTCTCTGACGATGCTGT** TGATGATACTTTCTGACGATGCTGT (53) TGATGATACTCTCTGATGATGCTGT (534)	15704-15728

Clinical Center	RP-ORF1ab	**CTCAGTCCAACATTTTGCTTCAGA** TCTGAAGCAAAATGTTGGACTGAG	15823-15846
	Prb-ORF1ab	**ATGCATCTCAAGGTCTAGTG** ATGC**G**TCTCAAGGTCTAGTG **(119)** ATGCATCTCAAGGT**T**TAGTG **(87)** ATGCATCTCAAGGTCTA**T**TG **(3255)**	15749-15768
University of Leipzig	FP-RdRp	**TATGCCATTAGTGCAAAGAATAGAGCTCGCAC** TATGCCATTAGTGCAAAGAA**C**AGAGCTCGCAC **(3229)**	15076-15107
	RP- RdRp	**CAACCACCATAGAATTTGCTTGTTCCAATTAC**	15202-15233
	Prb- RdRp	**TCCTCTAGTGGCGGCTATTGATTTCAATAA** TTATTGAAATCAATAGCCGCCACT**G**GAGGA **(34)** TTATTGAAATCAATAGC**T**GCCACTAGAGGA **(35)**	15163-15192
	FP-E	**GAAGAGACAGGTACGTTAATAGTTAATAGCGTA**	26209-26241
	RP-E	**AAAAAGAAGGTTTTACAAGACTCACGTTAAC** GTTAACGTGAGTCTTGTAAAACCTTCTTTTT GTTAAC**T**TGAGTCTTGTAAAACCTTCTTTTT **(35)**	26383-26413
	Prb-E	**ATCGAAGCGCAGTAAGGATGGCTAG** CTAGCCATCCTTACTGCGCTTCGAT	26335-26359
University of Malaya	FP-N	**TTGTTCGTTCTATGAAGACTTTTTAGAG** TT**T**TTCGTTCTATGAAGACTTTTTAGAG **(173)** TTGTTCGTTCTAT**T**AAGACTTTTTAGAG **(101)** TTGTTCGTTCTATGA**G**GACTTTTTAGAG **(41)** TTGTTCGTTCTATGAAGACT**C**TTTAGAG **(95)**	28196-28223
	RP- N	**TTTGATCGCGCCCCACTGCGTTCTCCATTC** GAATGGAGAACGCAGTGGGGCGCGATCAAA GAAT**A**GAGAACGCAGTGGGGCGCGATCAAA **(64)** GAAT**C**GAGAACGCAGTGGGGCGCGATCAAA **(25)** GAATGGAGAAC**A**CAGTGGGGCGCGATCAAA **(50)** GAATGGAGAACGC**G**GTGGGGCGCGATCAAA **(193)** GAATGGAGAACGCA**T**TGGGGCGCGATCAAA **(47)** GAATGGAGAACGCAG**C**GGGGCGCGATCAAA **(33)** GAATGGAGAACGCAGT**T**GGGCGCGATCAAA **(80)** GAATGGAGAACGCAGTGG**A**GCGCGATCAAA **(27)** GAATGGAGAACGCAGTGGG**T**CGCGATCAAA **(28)** GAATGGAGAACGCAGTGGGG**T**GCGATCAAA **(60)** GAATGGAGAACGCAGTGGGGC**T**CGATCAAA **(221)**	28357-28386

		GAATGGAGAACGCAGTGGGGC**C**CGATCAAA **(158)** GAATGGAGAACGCAGTGGGGC**A**CGATCAAA **(41)** GAATGGAGAACGCAGTGGGGCGCGA**C**CAAA **(31)**	
	Prb- N	**CATGACGTTCGTGTT** CATGA**T**GTTCGTGTT **(31)** CATGACGTT**T**GTGTT **(31)** CATGACGTTC**T**TGTT **(31)**	28227-28241
Department of Pulmonary and Critical Care Medicine	FP-E	**ACTTCTTTTTCTTGCTTTCGTGGT** ACTTCTTTTT**G**TTGCTTTCGTGGT **(125)** ACTTCTTTTT**T**TTGCTTTTGTGGT **(33)** ACTTCTTTTTCTTGCTTT**T**GTGGT **(285)**	26295-26318
	RP-E	**GCAGCAGTACGCACACAATC** GATTGTGTGCGTACTGCTGC	26357-26376
	Prb-E	**CTAGTTACACTAGCCATCCTTACTGC** CTAGTTA**T**ACTAGCCATCCTTACTGC **(29)**	26326-26352
Institute of Medical Microbiology, Virology and Hygiene(UKE)	FP-E	**ACAGGTACGTTAATAGTTAATAGCmGT** A**T**AGGTACGTTAATAGTTAATAGCGT **(196)**	26269-26292
	RP-E	**ATATTGCAGCAGTACGCACAmCA** TGTGTGCGTACTGCTGCAATAT	26362-26381
	Prb-E	**ATCCTTACTGCGCTTCG** ATCCTTACTGCGCTTCG	26341-26357
State Key Laboratory of Emerging Infectious Diseases	FP-RdRp	**CGCATACAGTCTTRCAGGCT**	16220-16239
	RP- RdRp	**GTGTGATGTTGAWATGACATGGTC** GACCATGTCATWTCAACATCACAC GA**T**CATGTCATWTCAACATCACAC **(40)** GACCATGT**T**ATWTCAACATCACAC **(41)** GACCATGTCATWTCAACAT**T**ACAC **(65)**	16330-16353
	Prb- RdRp	**TTAAGATGTGGTGCTTGCATACGTAGAC** TTAAGATGTGGTG**T**TTGCATACGTAGAC **(41)** TTAAGATGTGGTGCTTG**T**ATACGTAGAC **(129)**	16276-16303
	FP-N	**GCGTTCTTCGGAATGTCG** GCGTTCTT**T**GGAATGTCG **(146)** GCGTTCTTCGGAATGTC**T** **(166)**	29210-29227
	RP-N	**TTGGATCTTTGTCATCCAATTTG** CAAATTGGATGACAAAGATCCAA **T**AAATTGGATGACAAAGATCCAA **(69)** CAAATTGGATGA**T**AAAGATCCAA **(159)**	29284-29306

		CAAATTGGATGACAAAGA**C**CCAA **(34)** CAAATTGGATGACAAAGAT**T**CAA **(35)**	
	Prb-N	**AACGTGGTTGACCTACACAGST** AACGTGGTTGACCTACACAGST AAC**T**TGGTTGACCTACACAGST **(142)** AAC**C**TGGTTGACCTACACAGST **(54)** AAC**A**TGGTTGACCTACACAGST **(37)** AACGTGGTT**A**ACCTACACAGST **(548)** AACGTGGTTGACCTA**T**ACAGST **(377)** AACGTGGTTGACCTACA**T**AGST **(76)**	29257-29278
Zheng Zhou Zhong Dao Biotechnology	FP-RdRp	**TGACACAGACTTTGTGAATGAGTTT** T**T**ACACAGACTTTGTGAATGAGTTT **(30)** TGA**T**ACAGACTTTGTGAATGAGTTT **(102)** TGACA**T**AGACTTTGTGAATGAGTTT **(58)**	15651-15675
	RP- RdRp	**CAGCATCGTCAGAGAGTATCATC** GATGATACTCTCTGACGATGCTG GATGATACT**T**TCTGACGATGCTG **(53)** GATGATACTCTCTGA**T**GATGCTG **(534)**	15705-15727
	Prb- RdRp	**ACGCATATTTGCGTAAAC**	15677-15694
Hang zhou Qianji Biotechnology	FP-ORF3a	**TTATACTGAAAAATGGGAATC** TTATACTGAAAAATGGGA**C**TC **(38)** TTATA**T**TGAAAAATGGGAATC **(29)** TTATACTGAAAAATGGGAAT**T** **(26)** TT**G**TACTGAAAAATGGGAATC **(26)**	25956-25976
	RP-ORF3a	**TAACATGTTCAACACCAGTGTC** GACACTGGTGTTGAACATGTTA GACA**T**TGGTGTTGAACATGTTA **(406)** GACACT**T**GTGTTGAACATGTTA **(355)** GACACTGGT**T**TTGAACATGTTA **(330)** GA**T**ACTGGTGTTGAACATGTTA **(298)** GACA**A**TGGTGTTGAACATGTTA **(86)** GACACTG**T**TGTTGAACATGTTA **(77)** **T**ACACTGGTGTTGAACATGTTA **(57)**	26056-26077
	Prb-ORF3a	**TACACAGTTACTTCACTTCAGAC** TACACAGTTA**T**TTCACTTCAGAC **(26)** TACACAGTTACTT**T**ACTTCAGAC **(175)** TACACAGTTACTTCACTTCA**T**AC **(84)** TACACAGTTACTTCACTTCAGA**T** **(173)**	26000-26022
Da An Gene of Sun Yat-sen	FP-nsp3	**TTAAGCGGACACAATCTTGCT** TTAAG**T**GGACACAATCTTGCT **(29)** TTAAGCGGA**T**ACAATCTTGCT **(65)** TTAAGCGGACA**T**AATCTTGCT **(75)**	3578-3596

University		TTAAGCGGACACAACCTTGCT (284)	
	RP-nsp3	**GTTGAATGTCTTCACCTTTGTTAA** TTAACAAAGGTGAAGACATTCAAC TTAATAAAGGTGAAGACATTCAAC (29) TTAACAAATGTGAAGACATTCAAC (587) TTAACAAAGGTGAAGATATTCAAC (69) TTAACAAAGGTGAAGACATTCAAT (123)	3630-3653
	Prb-nsp3	**CACTGTCTTCATGTTGTCGGCCCAAA** TACTGTCTTCATGTTGTCGGCCCAAA (2170) CATTGTCTTCATGTTGTCGGCCCAAA (73) CACTGTCTTCATGTTATCGGCCCAAA (27) CACTGTCTTCATGTTGTAGGCCCAAA (25) CACTGTCTTCATGTTGTTGGCCCAAA (88) CACTGTCTTCATGTTGTCAGCCCAAA (42)	3602-3627
	FP-N	**AAGAAATTCAACTCCAGGCAGC** CAGAAATTCAACTCCAGGCAGC (35) ACGAAATTCAACTCCAGGCAGC (61) AATAAATTCAACTCCAGGCAGC (130) AAGAAATTCAATTCCAGGCAGC (29) AAGAAATTCAACTCCAGGCAGC (231) AAGAAATTCAACTCTAGGCAGC (7100) AAGAAATTCAACTCCATGCAGC (740)	28855-28876
	RP-N	**GCTGGTTCAATCTGTCAAGCAG** CTGCTTGACAGATTGAACCAGC TTGCTTGACAGATTGAACCAGC (32) CTGCTTGATAGATTGAACCAGC (202) CTGCTTGACAGATTGAATCAGC (66) CTGCTTGACAGATTGAACCATC (42)	28940-28961
	Prb-N	**TCACCGCCATTGCCAGCCA** TGGCTGGCAATGGCGGTGA TTGCTGGCAATGGCGGTGA (117) TGACTGGCAATGGCGGTGA (72) TGTCTGGCAATGGCGGTGA (31) TGGTTGGCAATGGCGGTGA (103) TGGCTTGCAATGGCGGTGA (37) TGGCTGTCAATGGCGGTGA (64) TGGCTGGCAACGGCGGTGA (33) TGGCTGGCAATGGCGTTGA (28)	28902-28920
	FP-E	**CTTTCGTGGTATTCTTGCTAGTT** CTTTCGTGGTGTTCTTGCTAGTT (10)	26309-26331
	RP-E	**CACGTTAACAATATTGCAGCA** TGCTGCAATATTGTTAACGTG TGCTGCAATATTGTTAACTTG (26)	26371-26391

	Prb-E	**TAGCCATCCTTACTGCGCTTCGATTG**	26336-26361
Guangdong Pharmaceutical University	FP-ORF1ab	**AGGTTATGGCTGTAGTTGTGATCAACTCCG** AGGTTATGGCTGTAGTTGTGATCAATTCCG (34) AGGTTATGGCTGTAGTTGTGATCAACTTCG (41) AGGTTATGGCTGTAGTTGTGATCAACTCTG (167)	13396-13425
	RP-ORF1ab	**AGTACTAGTGCCTGTGCCGCACGGTGTAAG** CTTACACCGTGCGGCACAGGTACTAGTACT (44) CTTACACCGTGCGGCACAGGCATTAGTACT (433)	13495-13524
	Prb-ORF1ab	**GAACCCATGCTTCAGTCAGCTGATGCACAA**	13427-13460
Sichuan Academy of Medical Sciences – Sichuan Provicial People's Hospital(SAMSPH)	FP-ORF1ab	**ATGTGTGGCGGTTCACTATATG**	15442-15463
	RP-ORF1ab	**CCGTGACAGCTTGACAAATG** CATTTGTCAAGCTGTCACGG CATTTGTCAAGCCGTCACGG (29) CATTTGTCAAGCTGTTACGG (223) CATTTGTCAAGCTGTCACTG (150)	15525-15544
	Prb-ORF1ab	**CAGGTGGAACCTCATCAGGAGATGC** CAGGTGGAACTTCATCAGGAGATGC (403) CAGGTGGAACCTCATCAGGGGATGC (51)	15470-15494
	FP-E	**ACAGGTACGTTAATAGTTAATAGCGT** ATAGGTACGTTAATAGTTAATAGCGT (196)	26269-26294
	RP-E	**ATATTGCAGCAGTACGCACACA**	26360-26381
	Prb-E	**ACACTAGCCATCCTTACTGCGCTTCG** ATACTAGCCATCCTTACTGCGCTTCG (29)	26332-26357
	FP-N	**CTTGAATACACCAAAAGATCACATT** CTTTAATACACCAAAAGATCACATT (167) CTTCAATACACCAAAAGATCACATT (42) CTTGAATATACCAAAAGATCACATT (98) CTTGAATACATCAAAAGATCACATT (75) CTTGAATACACCAAAATATCACATT (57) CTTGAATACACCAAAACATCACATT (42) CTTGAATACACCAAAAAATCACATT (34) CTTGAATACACCAAAAGATTACATT (263) CTTGAATACACCAAAAGATCATATT (78)	28687-28711
	RP-N	**CTCTGCTCCCTTCTGCGTAG** CTACGCAGAAGGGAGCAGAG CTATGCAGAAGGGAGCAGAG (28)	28786-28805

		CTAC**T**CAGAAGGGAGCAGAG **(41)** CTACG**T**AGAAGGGAGCAGAG **(60)** CTACGCAGAAGGGAG**T**AGAG **(125)** CTACGCAGAAGGGAGCAG**G**G **(32)**	
	Prb-N	**ACTTCCTCAAGGAACAACATTGCCA** A**T**TTCCTCAAGGAACAACATTGCCA **(36)** ACTTCC**C**CAAGGAACAACATTGCCA **(196)** ACTTCCT**A**AAGGAACAACATTGCCA **(47)** ACTTCCTCAAGGAACAA**T**ATTGCCA **(37)** ACTTCCTCAAGGAACAACATTG**T**CA **(71)**	28753-28777
Sigma	Prb-S5	**AGACTAATTCTCCTCGGCGGGCACG** **C**GACTAATTCTCCTCGGCGGGCACG **(221)** **G**GACTAATTCTCCTCGGCGGGCACG **(41)** A**T**ACTAATTCTCCTCGGCGGGCACG **(1195)** A**C**ACTAATTCTCCTCGGCGGGCACG **(137)** AGA**T**TAATTCTCCTCGGCGGGCACG **(71)** AGACTAA**A**TCTCCTCGGCGGGCACG **(144)** AGACTAATTCTC**A**TCGGCGGGCACG **(45472)** AGACTAATTCTC**G**TCGGCGGGCACG **(276)** AGACTAATTCTCCTCG**T**CGGGCACG **(111)** AGACTAATTCTCCTCG**C**CGGGCACG **(27)** AGACTAATTCTCCTCGGCG**T**GCACG **(172)** AGACTAATTCTCCTCGGCGGG**T**ACG **(46)**	23592-23616
	FP-S5	**CAGGTATATGCGCTAGTTATCAGAC** C**T**GGTATATGCGCTAGTTATCAGAC **(29)** CAGGTATATG**T**GCTAGTTATCAGAC **(27)** CAGGTATATGCG**T**TAGTTATCAGAC **(36)** CAGGTATATGCGCT**G**GTTATCAGAC **(43)** CAGGTATATGCGCTA**C**TTATCAGAC **(164)** CAGGTATATGCGCTAGTTATC**G**GAC **(42)** CAGGTATATGCGCTAGTTATCA**T**AC **(381)** CAGGTATATGCGCTAGTTATCA**C**AC **(167)** CAGGTATATGCGCTAGTTATCA**A**AC **(25)** CAGGTATATGCGCTAGTTATCAGA**T** **(26)**	23565-23589
	RP-S5	**CATTGCCTACACTATGTCACTTGG** CCAAGTGACATAGTGTAGGCAATG **T**CAAGTGACATAGTGTAGGCAATG **(204)** CATTGC**T**TACACTATGTCACTTGG **(76)** CATTGCCTA**T**ACTATGTCACTTGG **(92)**	23638-23661
	FP-S6	**GCAGGTATATGCGCTAGTTATCAG** **T**CAGGTATATGCGCTAGTTATCAG **(27)** GC**T**GGTATATGCGCTAGTTATCAG **(29)** GCAGGTATATG**T**GCTAGTTATCAG **(27)** GCAGGTATATGCG**T**TAGTTATCAG **(36)**	23564-23587

		GCAGGTATATGCGCTGGTTATCAG (43) GCAGGTATATGCGCTACTTATCAG (164) GCAGGTATATGCGCTAGTTATCGG (42) GCAGGTATATGCGCTAGTTATCAT (381) GCAGGTATATGCGCTAGTTATCAC (157) GCAGGTATATGCGCTAGTTATCAA (25)	
	RP-S6	**ACACTGGTAGAATTTCTGTGGTAAC** GTTACCACAGAAATTCTACCAGTGT	23726-23750
Xi'an Bioreal-coming BioMed Center	FP-E	**GAGACAGGTACGTTAATAGTTAATAGC** GAGATAGGTACGTTAATAGTTAATAGC (196)	26266-26292
	RP-E	**CAATATTGCAGCAGTACGCACACA**	26360-26383
	Prb-E	**AGTTACACTAGCCATCCTTACTGCGCTTCGA** AGTTATACTAGCCATCCTTACTGCGCTTCGA (29)	26328-26358
	FP-N	**TGGCAATGGCGGTGATG** TTGCAATGGCGGTGATG (37) TGTCAATGGCGGTGATG (64) TGGCAACGGCGGTGATG (33) TGGCAATGGCGTTGATG (28)	28906-28922
	RP-N	**AGCTGGTTCAATCTGTCAAGCA** TGCTTGACAGATTGAACCAGCT TGCTTGATAGATTGAACCAGCT (202) TGCTTGACAGATTGAATCAGCT (66) TGCTTGACAGATTGAACCATCT (42) TGCTTGACAGATTGAACCAGTT (60)	28941-28962
	Prb-N	**TGCTCTTGCTTTGCTGC** TGCTATTGCTTTGCTGC (195) TGCTTTTGCTTTGCTGC (41) TGCTCTTGTTTTGCTGC (13871) TGCTCTTGCTTTGCTGT (32)	28924-28940
Thailand NIH	FP-N	**CGTTTGGTGGACCCTCAGAT** TGTTTGGTGGACCCTCAGAT (43) CTTTTGGTGGACCCTCAGAT (290) CATTTGGTGGACCCTCAGAT (180) CGTTTGGTAGACCCTCAGAT (33) CGTTTGGTGGACCCTCATAT (63)	28320-28339
	RP-N	**CCCCACTGCGTTCTCCATT** AATGGAGAACGCAGTGGGG AATAGAGAACGCAGTGGGG (64) AATCGAGAACGCAGTGGGG (25) AATGGAGAACACAGTGGGG (50) AATGGAGAACGCGGTGGGG (193) AATGGAGAACGCAGTGGGG (47) AATGGAGAACGCAGCGGGG (33)	28358-28376

		AATGGAGAACGCAGTTGGG (80) AATGGAGAACGCAGTGGAG (27) AATGGAGAACGCAGTGGGT (28)	
	Prb-N	**ACCCCGCATTACGTTTGGTGG** AACCCGCATTACGTTTGGTGG (195) ATCCCGCATTACGTTTGGTGG (111) ACCCCGCATTACGTTTGGTGG (224) ACCTCGCATTACGTTTGGTGG (100) ACCCTGCATTACGTTTGGTGG (172) ACCCCTCATTACGTTTGGTGG (61) ACCCCGCATTATGTTTGGTGG (43) ACCCCGCATTACTTTTGGTGG (290) ACCCCGCATTACATTTGGTGG (180) ACCCCGCATTACGTTTGGTAG (33)	
Shenzhen United Medical Technology	FP-ORF1ab	**CTGAAGAAGAGCAAGAAGAAGATTG** CTGAAGAAGAGCAAGAAGAAGACTG (32)	3177-3201
	RP-ORF1ab	**TCAACAATTGTTTGAATAGTAGTTG** CAACTACTATTCAAACAATTGTTGA (67) TAACTACTATTCAAACAATTGTTGA (25) CAATTATTATTCAAACAATTGTTGA (44316) CAACTACTACTCAAACAATTGTTGA (31)	3261-3285
	Prb-ORF1ab	**TCACTGCCGTCTTGTTGACCAACA** TGTTGGTCAACAAGACGGCAGTGA TGTTAGTCAACAAGACGGCAGTGA (51) TGTTGTTCAACAAGACGGCAGTGA (190) TGTTGGTCTACAAGACGGCAGTGA (37) TGTTGGTCAACAATACGGCAGTGA (165) TGTTGGTCAACAAGATGGCAGTGA (53)	3226-3249
Chaozhou Kaipu Biochemistry	FP-N	**TCAGCGTTCTTCGGAATGTC** TCAGCGTTCTTTGGAATGTC (146)	29207-29226
	RP-N	**CCAATTTGATGGCACCTGTGTAG** CTACACAGGTGCCATCAAATTGG CTATACAGGTGCCATCAAATTGG (377) CTACATAGGTGCCATCAAATTGG (76) CTACACAGGTGCTATCAAATTGG (78) CTACACAGGTGCCATTAAATTGG (69)	29269-29291
	Prb-N	**CATGGAAGTCACACCTTCGGGAA** CATGGAAGTCATACCTTCGGGAA (51) CATGGAAGTCACATCTTCGGGAA (34) CATGGAAGTCACACTTTCGGGAA (27) CATGGAAGTCACACCCTCGGGAA (39) CATGGAAGTCACACCTTTGGGAA (141) CATGGAAGTCACACCTTCTGGAA (123) CATGGAAGTCACACCTTCAGGAA (66)	29236-29258

The red letters represent the mutated bases. The red number represents the total number of mutation sequences.