

SUPPLEMENTRAY TABLES

SUPPLEMENTARY TABLE 1. List of predicted linear antibody epitopes with mutations highlighted in red colour in NSP1 protein collectively from 12,225 isolates of SARS-CoV-2 from humans across many countries. List of countries where the epitope amino acids have mutations are given in right column. Mutated amino acids are numbered with each country code. Abbreviations for countries are: ARG: ARGENTINA, AUS: AUSTRALIA, AUT: AUSTRIA, BGD: BANGLADESH, BEL: BELGIUM, BRA: BRAZIL, CAN: CANADA, CHL: CHILE, CHN: CHINA, HKG: HONG KONG, COL: COLOMBIA, COD: CONGO, CRI: COSTA RICA, HRV: CROATIA, CZE: CZECH REPUBLIC, DNK: DENMARK, EST: ESTONIA, ETH: ETHIOPIA, FIN: FINLAND, FRA: FRANCE, GEO: GEORGIA, DEU: GERMANY, GRC: GREECE, HUN: HUNGARY, ISL: ICELAND, IND: INDIA, IDN: INDONESIA, IRN: IRAN, IRQ: IRAQ, IRL: IRELAND, ISR: ISRAEL, ITA: ITALY, JAM: JAMAICA, JPN: JAPAN, JOR: JORDAN, KAZ: KAZAKHSTAN, KEN: KENYA, KOR: KOREA (SOUTH), KWT: KUWAIT, KGZ: KYRGYZSTAN, LVA: LATVIA, LBN: LEBANON, LBR: LIBERIA, LTU: LITHUANIA, LUX: LUXEMBOURG, MYS: MALAYSIA, MUS: MAURITIUS, MEX: MEXICO, NLD: NETHERLANDS, NZL: NEW ZEALAND, NOR: NORWAY, PAK: PAKISTAN, PHL: PHILIPPINES, POL: POLAND, PRT: PORTUGAL, QAT: QATAR, ROU: ROMANIA, RUS: RUSSIAN FEDERATION, SAU: SAUDI ARABIA, SEN: SENEGAL, SRB: SERBIA, SGP: SINGAPORE, SVK: SLOVAKIA, SVN: SLOVENIA, ZAF: SOUTH AFRICA, ESP: SPAIN, LKA: SRI LANKA, SDN: SUDAN, SWE: SWEDEN, CHE: SWITZERLAND, TWN: TAIWAN, THA: THAILAND, TUR: TURKEY, UGA: UGANDA, ARE: UNITED ARAB EMIRATES, GBR: UNITED KINGDOM, USA: UNITED STATES OF AMERICA, VNM: VIETNAM, BEL: BELGIUM, NA: NOT ASSIGNED

Predicted Antibody Epitopes with Mutations in NSP1	Country with Mutations in Antibody Epitopes Residues
1 MESLVPGFNE 10	(1:USA), (3:CHL, USA, GBR, SCOTLAND), (4:NLD), (7:CHN, AUT, GBR, ENGLAND, SCOTLAND)
110 HVGEIPVAY 118	(117: USA, GBR, SCOTLAND), (118: BEL, LUX, FRA)
156 DFQENWNTKHSSGVTR ELMRELNGG 180	(162: GBR, ENGLAND), 172 (TUR)
56 VEKGVLPQLEQP 67	(56: GBR, ENGLAND, WALES), (60: USA, GBR, SCOTLAND)
76 ARTAP HGH 83	(81: USA, IND), (82: TWN), (83: USA, GBR, SCO)
21 LQVRDVLVRGFGDSVEE 37	(21, 23: USA), (24: USA, DEN, FRA, GBR, ENGLAND, JPN, PRT), (32: NA), (37 AUS)
90 AELEGIQYGRSG 101	(92: USA), (99: FRA), (100: BEL)

SUPPLEMENTARY TABLE 2. List of predicted linear antibody epitopes with mutations highlighted in red colour in NSP2 protein collectively from 12,225 isolates of SARS-CoV-2 from humans across many countries. List of countries where the epitope amino acids have mutations are given in right column. Abbreviation for each country is given in supplementary table 1.

Predicted Antibody Epitopes with Mutations in NSP2	Country with Mutations in Antibody Epitopes Residues
183 TRYVDNNFCGPDGYPLECIKDLLARAGKASCT LSEQLDFIDTKRGVYCCREHEHEIAWYTERSE KSYELQTPFEIKLAKKFDTFNG 268	(184:COL,CHN) ,(190:USA,AUS,CAN,GBR;ENGLAND,(193:GBR;SCOTLAND,GBR;ENGLAND),(194:ISL,CHN;SHANGRAO),(197:SWE,GBR;ENGLAND,CAN),(204:USA,BEL,GBR;WALES,IND;GUJARAT),(205:NLD),(206:TUR),(207:DNK,GBR;SCOTLAND,USA,TUR,ARE,IND;LADAKH,KAZ,AUS,CHN;BEIJING,CHE,BEL,UGA,LBN,CAN;ONTARIO,ISR,IND,NOR,SVK,KWT),(212:USA,NLD,JOR,CHL;SANTIAGO),(217:GEO,FRA),(223:USA),(224:MEX,USA,GBR;ENGLAND),(231:AUS),(232:CHE,USA,BEL),(241:USA),(245:AUS),(260:AUS),(268:GBR;ENGLAND),(265:USA,SWE,CHN;BEIJING,ESP,GBR;ENGLAND,GBR;SCOTLAND,DNK,FRA,BEL,CHE,AUS,JAM,POL,NOR,COL,ISR,GBR;WALES,AUT,GBR;NORTHERNIRELAND,DEU,TWN,ARE,RUS,HUN,CZE,LUX,FIN,CAN)
306 VASPNECNQMCCLSTLMKCDHCGETSWQTGD FVKATCEFCGTENLTKEGATTCGYLPQNAVVKI YCPACHNSEVGPPEHSLAEYHNESGLKTLRKG GRTIAFG 407	(306:USA),(309:FRA,GBR;ENGLAND,RUS,USA,DNK,IND;GUJARAT),(316:USA),(318:USA,ISL,GBR;ENGLAND,CON),(322:DNK,GBR;ENGLAND),(325:USA),(327:GBR;ENGLAND),(333:USA,DNK,JOR,DNK),(334:CHN;SHANGRAO),(339:IND;GUJARAT,IND;TELANGANA,SGP,GBR;WALES),(346:DNK,SWE,LVA,ISL),(348:MEX,AUS),(350:GBR;ENGLAND,USA,TWN,TUR),(352:ISL,USA,CHL;SANTIAGO),(354:USA,GBR;SCOTLAND,GBR;WALES),(355:USA),(356:ISL),(357:USA),(361:DNK,GBR;WALES,GBR;ENGLAND),(362:GBR;ENGLAND),(365:TUR),(368:AUS,GBR;ENGLAND,GBR;WALES),(371:GBR;SCOTLAND,GBR;ENGLAND),(372:USA,THA,NLD),(376:AUS,DNK),(374:USA,ISL,GEOR),(378:AUS,CHN;BEIJING,UGA,IND;MAHARASHTRA,BLR,LBN,TWN,THA,IRN,TUR,ARE,KAZ,IND;LADAKH,SWE,DNK,DEU,CHN;SHANGHAI,IND,HKG,CAN,NZL,CHN;SHANDONG),(379:RUS,USA),(380:CZE,HKG),(383:GBR;ENGLAND),(384:NOR,GBR;SCOTLAND),(385:USA,GBR;ENGLAND),(388:CHE,GBR;SCOTLAND,USA,GBR;ENGLAND,FRA,AUS),(389:USA,CHN;SICHUAN,CHN;YUNAN,CHN;GANGZHOU,CHN;GUANGDONG),(391:TUR,GBR;ENGLAND,BEL),(392:USA,ISL,BEL,GBR;ENGLAND,GBR;SCOTLAND,ISR,DEU,SWE,AUT,SGP,GRC,DEU,CAN,HUN,TWN,NLD,BEL,CHN;SENEGAL,IND;DELHI,PRT,LVA,BRA,POL),(397:GBR;SCOTLAND),(398:GBR;SCOTLAND,GBR;ENGLAND,USA,AUT,ISL,NLD,IND;TELANGANA),(402:USA,TUR,GBR;ENGLAND,USA),(403:UGA,USA,ARG,PRT,TUR),(404:TUR)
716 LYRKCVKSREETGLLLMPLKAPKEIIFLEGETL 747	(727:DNK,USA,AUS),(728:KAZ,GBR;ENGLAND,AUT,USA,BEL),(735:BEL,FR A,USA,GBR;ENGLAND),(736:GBR;ENGLAND),(737:TUR,CHL;SANTIAGO),(739:JAM,USA,GBR;ENGLAND,GBR;SCOTLAND,FRA,GBR;NORTHERNIRELAND,GRC;ATHENS,GBR;WALES,DEU,SGP,AUS,BRA),(746:TWN,GBR;ENGLAND)
760 TGD LQPLEQPTSEAVEAPL 778	(760:NLD),(762:USA,TUR),(765:GBR;ENGLAND,USA,GBR;SCOTLAND,JAM,CHL;SANTIAGO,FRA,GBR;NORTHERNIRELAND,GRC;ATHENS,AUS,TWN,ISL,PRT,CAN),(767:USA),(769:CHN;SHANGHAI),(774:TUR),(776:TUR,USA)
273 FVFPLNSIIKTIQ 285	(278:USA),(279:GBR;SCOTLAND,USA,ISR,KOR,TUR),(281:TUR),(284:AUS),(285:TUR)
414 VGCHNK CAY 422	(417:USA,GBR;ENGLAND,GBR;SCOTLAND)
791 LEIKDTEKYCALA 803	(796:USA,THA),(798:SWE,GBR;ENGLAND,ROU)
698 AKLKALNLGETF 709	(708:BRA,GBR;ENGLAND,USA,SWE)
686 LALCAD 691	(686:NLD),(690:USA,CHN;WEIFANG)
806 MMVTNNTFTLKG 818	(814:GBR;ENGLAND,GBR;SCOTLAND,AUS),(817:TUR),(818:SWE)
440 GEGSEG 445	(441:GBR;SCOTLAND),(444:USA,HKG),(445:USA,ESP;VALENCIA)
657 CEIVGGQIVTCAKEIKESVQT 677	(658:BEL,KWT),(660:USA),(662:TUR,USA,IND;GUJARAT(AHMEDABAD),(671:IND;KERALA),(672:USA),(675:USA)

SUPPLEMENTARY TABLE 3. List of predicted linear antibody epitopes with mutations highlighted in red colour in NSP3 protein collectively from 12,225 isolates of SARS-CoV-2 from humans across many countries. List of countries where the epitope amino acids have mutations are given in right column. Abbreviation for each country is given in supplementary table 1.

Predicted Antibody Epitopes with Mutations in NSP3	Country with Mutations in Antibody Epitopes Residues
1224 QRKQDDKIKACVEEVTTLLEETKFLTENLLLY ID 1258	(1228:USA),(1230:DEU,CZE,USA,AUS),(1236:GBR;ENGLAND),(1238:BEL),(1241:FRA),(1242:TWN),(1246:DNK,BEL,POL,CHE,HRV,GBR;ENGLAND,GBR;WALES,CHL;SANTIAGO,AUT,GBR;NORTHERNIRELAND,DNK,ZAF,VNM,HUN,CRI,ARG,SWE,RUS,AUS,USA,COD,ISL),(1248:USA),(1249:GBR;SCOTLAND,BEL)
2465 ISDEVARDLSLQFKRPINPTDQSSYIVDSVTVKNGSIHLYFDKAGQKTYERHLSHFVNLDNLRANNTKGSPLINIVVFDGKSKCEESSAKSASVYYSQLMC 2566	(2467:ITA),(2482:ITA),(2484:USA),(2488:USA,COL,BEL),(2497:USA,GBR;ENGLAND),(2500:GBR;ENGLAND,USA,ISR),(2502:USA,LUX),(2503:BEL),(2511:RUS,GBR;SCOTLAND,GBR;ENGLAND,NLD),(2517:USA,GBR;SCOTLAND),(2522:BEL),(2527:USA,FRA),(2529:BEL,GBR;ENGLAND),(2534:CHN;WUHAN),(2535:GBR;WALES,GBR;SCOTLAND),(2538:GBR;ENGLAND,NLD),(2554:GBR;SCOTLAND),(2558:CHN;SHANGRAO)
1880 VTYKLDGVVCTEIDPKLDNYYKKDNSYFTEQPIDLVPNPYPNASFDNF 1928	(1890:USA),(1891:CAN),(1892:USA),(1895:SWE,DNK,BEL),(1910:RUS),(1911:GBR;SCOTLAND,RUS),(1921:GBR;ENGLAND,USA,VNM,GBR;WALES,JOR,DNK,CZE),(1924:USA)
1969 AIDYKHYTPSFKKGAKLLHKPIVWHVNNATNKATYKPNWCIRCLWSTKPVETSNSFDVLKSEDAQGMDNLACEDLKPVSEEVVENPTIQKDVLECNVKTTE 2070	(1978:USA,DNK,LBN,IND;TELANGANA),(1996:NA),(1997:USA,GBR;WALES,NLD,KOR),(2001:ISL,CHN;SHANGRAO,USA),(2007:USA,AUS),(2015:CHN;SHENZHEN,SGP,USA,IND;TELANGANA,IND;GUJARAT,SGP,IND;ASSAM,AUS,MYS),(2016:IND;GUJARAT,USA,THA;BANGKOK,IND;TELANGANA,JAM,GBR;ENGLAND,TWN,IND,IND;TAMILNADU,FRA,SGP,GRC;ATHENS,IND;HYDERABAD,IND;DELHI,IND;WESTBENGAL,BRN,PHL,CHN;FUJIAN,CAN,BRA,SVN,BEL,AUS,MYS,SAU),(2018:CHL;SANTIAGO,ISL,USA,CHN;SICHUAN),(2020:USA),(2022:USA,DNK),(2024:GBR;ENGLAND,LVA),(2024:GBR;ENGLAND,LVA),(2026:DNK,USA),(2027:USA),(2063:USA),(2062:ITA,USA,ESP;VALENCIA,ARG,ESP;CASTILLALAMANCHA),(2060:CHE,USA),(2055:NLD),(2053:USA),(2052:USA),(2046:ESP;VALENCIA,IND;GUJARAT,GBR;ENGLAND,TUR,USA,DNK),(2033:USA,GBR;ENGLAND,CHN;SHANGHAI),(2030:USA,GBR;ENGLAND,ESP;BARCELONA),(2029:IND;GUJARAT,CHE,GBR;ENGLAND,GBR;WALES)
1309 TTEMLAKALRKVPTDNYITTYPGQGLNGYTVEEAKTVLKKCKSAFYILPSIISNEKQEILGTVSWNLREMLAHAETRKL 1389	(1312:GBR;ENGLAND,PRT,BGD,RUS,ARE,LKA),(1324:USA,LUX,SAU),(1339:ISL,GBR;ENGLAND),(1341:CHE,CHN),(USA),(1348:CHN),(1351:AUS),(1352:USA,LUX,BEL,CHE),1369:ISL),(1379:AUS),
920 MYCSFYPPDEDEEEGDCEEEEFEPSTQYIEYGTEDDYQGKPLEFGATSAA 968	(920:JPN),(921:CHN;SAHNGHAI),(928:NLD),(937:LUX,FRA),(939:USA),(941:CHN,KOR,CHN;ANHUI),(944:USA,AUS,GBR;ENGLAND,GBR;WALES,CHL;SANTIAGO),(945:USA,AUS,SAU),(951:TUR,CHE,GBR;ENGLAND),(952:KOR),(953:TWN,NLD),(956:JPN),(959:PRT,RUS,USA),(960:USA,NLD),(961:TUR)
1041 KNADIVEEAKVKPTVVVNAANVYLKHGGGVAGALNKATNNAMQVESDDYIATNGPLKVGSGCVLSGHNLAKHCLHVVGNV 1130	(1043:RUS,DNK,GBR;ENGLAND,CHL;SANTIAGO),(1047:ESP;VALENCIA,USA),(1049:USA,GBR;SCOTLAND),(1050:USA(DELETION),(1051:USA),(1052:GBR;ENGLAND,FRA,AUS),(1054:GBR;SCOTLAND,GBR;WALES,SGP),(1055:FRA,USA,GBR;ENGLAND),(1061:NLD),(1062:USA),(1085:USA,DEU,CHN;GUANGDONG),(1092:GBR;ENGLAND),(1093:GBR;SCOTLAND),(1094:USA),(1095:ISL),(1098:USA,IRL),(1100:AUS,ESP),(1108:POL,USA,GBR;ENGLAND),(1110:USA,GBR;ENGLAND),(1124:USA)
2696 ARHINAQVAKSHNIALIWNVVKDFMSLSEQLRKQIRSAAKNNL 2743	(2702:PRT,BGD,DNK,LUX,FRA,TUR,CHN;SENEGAL,AUS,SVK),(2708:THA,CHN;WUHAN),(2710:BEL),(2719:GBR;ENGLAND,DEU),(2739:USA,POL,GBR;ENGLAND,IND;GUJARAT(UNA))
2604 VPMEKLTLLVATAEAELAKNVSLDNVLS 2635	(2605:USA,GBR;ENGLAND,GBR;SCOTLAND,AUS),(2609:GBR;ENGLAND,USA,CHL;ANTOFAGASTA,SGP,AUS,CHN;SHENZHEN),(2613:GBR;ENGLAND,USA,AUS),(2618:USA),(2631:FRA)
1260 GNLHPDSATLVSDIDITFLKKDAPYIVGDVVQEGVLTAVV 1303	(1261:PRT),(1262:BEL),(1263:NA),(1277:BEL,GBR;NORTHERN IRELAND),(1283:USA,DNK,FRA),(1286:ISL),(1288:JPN),(1292:ISL),(1295:USA,GBR;ENGLAND),(1298:USA,HKG,COD,JPN)
864 LGTEVNEFACVVADAVIKTLQPVSELLT 917	(869:NLD),(876:DEU,GBR;ENGLAND,DNK,BEL,USA,NOR,ISR,GBR;WALES,NLD,SWE,GBR;NORTHERNIRELAND,GRC;ATHENS,HUN,ISL,TWN,LUX,LVA,PRT,AUS,POL,BRA,CAN;ONTARIO),(885:ISL,GBR;ENGLAND,GBR;SCOTLAND),(886:CHN;NANCHANG),(889:ISL),(890:USA,RUS),(891:AUS,GBR;SCOTLAND,GBR;ENGLAND),(892:USA,LUX,GBR;ENGLAND,GBR;SCOTLAND,MEX,RUS,ISL),(894:ISR,DNK,AUS,SWE,USA),(896:USA),(897:USA),(898:USA),(902:USA,KOR),(903:ISL),(906:LUX,GBR;SCOTLAND),(911:TUR,ESP;VALENCIA),(917:AUS)

2568 PILLLDQALVSDVGDSEVAVKMFDA YV 2595	(2593:GBR;ENGLAND,IND),(2589:GBR;ENGLAND,USA,PRT),(2587:POL,GBR;ENGLAND,TWN,SWE),(2586:CHN;BEIJING,BEL),(2584:GBR;ENGLAND,USA),(2580:FRA,JPN),(2579:CHN;WUHAN)
2673 YMLTYNKVENMTPRDLGACI 2692	(2691:IND),(2688:AUS;SYDNEY),(2684:USA,NLD).33
1458 NLEEAAARYMRSCLKVPATVSVSSPDAVTAY NGYLTSSSKTPEEHFI 1502	(1460:CHN;SHENZHEN),(1462:NLD),(1464:CHL;SANTIAGO,CHN;SHANGHAI,DEU,UGA,CHN;SHENZHEN),(1468:GBR;ENGLAND,DNK,TWN,AUS),(1473:SGP,USA,AUS),(1480:BEL),(1481:BEL),(1488:BEL,CHN;SHENZHEN),(1492:CHN;SHENZHEN),(1497:GBR;ENGLAND,CAN,USA,GBR;SCOTLAND),(1500:GBR;NORTHERN IRELAND,NLD)
2075 IILKPANNSLK 2085	(2079:HKG,USA,CHN;GUANGDONG,CHN;WEIFANG,IND;KERALA),(2080:USA,AUS),(2083:CHN;SHANGHAI)
2649 KDVVECLKLSHQSDIEVT 2666	(2653:CHE,USA),(2661:USA,LVA)
1933 DNIKFADDLNQLTGYKPP 1950	
2143 KPFLNKVVSTTT 2154	
2095 LMAAYVDNSSLT 2106	(2096:NA),(2097:CZE),(2103:GBR;ENGLAND,GBR;SCOTLAND,IND,ITA,SGP,AUS,GMB,CHL;SANTIAGO,GEO)
2178 QLCTFTRSTNSRIKASMPRTIAKNTVKS 2205	(2183:USA,GBR;SCOTLAND),(2185:CHN;GUANGZHOU),(2186:USA),(2187:AUT,DNK,NOR,NLD,GBR;SCOTLAND),(2190:CHN;SHENZHEN),(2193:AUT,AUS,USA,CZE,MEX),(2194:CHN;SHENZHEN),(2196:AUS),(2197:NA),(2198:NA),(2199:GBR;ENGLAND,TWN,CHE,IRL)
843 FELDERI 849	(847:LUX),(848:USA,SWE)
1145 LAPLLSAGIFGADP 1158	(1145:USA),(1154:NOR),(1155:FRA,USA),(1156:AUS),(1158:GBR;ENGLAND,IND;GUJARAT(AHMEDABAD),GBR;SCOTLAND,USA,GBR;WALES)
1176 AVFDKNLYDK 1185	(1176:GBR;WALES,JPN,GBR;SCOTLAND),(1179:CHN;SHENZHEN)
1441 LNETLVMT 1448	(1444:USA,TWN,CHN;SHANGHAI)
1537 YTSNPTTFH 1545	(1538:USA,GBR;SCOTLAND),(1539:NA),(1541:UGA,DEU),(1542:CHN;GUANGDONG)
1008 VQPQLEMELTP 1018	(1008:CAN),(1014:AUS),(1016:USA)
2311 ISSFKWD 2317	(2312:CAN)
1517 SGQSTQLGIEFLKRGDKS 1534	(1521:GBR;ENGLAND,GBR;SCOTLAND)
1585 DMSMT 1589	
1788 TCGKQ 1792	
1752 CKTC 1755	
2436 VYANGGKGF 2444	

SUPPLEMENTARY TABLE 4. List of predicted linear antibody epitopes with mutations highlighted in red colour in NS41 protein collectively from 12,225 isolates of SARS-CoV-2 from humans across many countries. List of countries where the epitope amino acids have mutations are given in right column. Abbreviation for each country is given in supplementary table 1.

Predicted Antibody Epitopes with Mutations in NSP4	Country with Mutations in Antibody Epitopes Residues
3251 QPPQTSITSAVLQ 3263	(3258:AUS)
3202 TQYNRYLALYNKYKYFSGAMDTSYREA ACCH 3233	(3209:CHN;SHANGHAI,FRA,GBR;ENGLAND,USA),(3220:USA,GBR;ENGLAND,COD),(3229:USA)
3030 MFTPLIQPIGALDISASIVA 3049	(3031:IND),(3035:RUS,CHN;SHANGHAI),(3036:USA),(3040:RUS),(3041:BEL),(3042:RUS),(3047:RUS),(3048:RUS)
2764 KIVNNWLKQLIKVTLVFLVAAIFYLITPVH VMSKHTDFSSEIIG 2808	(2766:NLD),(2779:USA),(2791:GBR;ENGLAND),(2794:USA),(2796:UGA,USA,TUR,ARE,KAZ,GBR;ENGLAND,GBR;SCOTLAND,CHN;BEIJING,AUS,DNK,NOR,IND,KWT,CAN;ONTARIO,LBN,IND;LADAKH,FRA),(2797:USA,GBR;ENGLAND,LBN,COD),(2799:USA,AUS,GBR;ENGLAND),(2801:GBR;ENGLAND),(2802:BEL),(2804:USA,AUS),(2806:USA,GBR;ENGLAND,CHE),(2808:NA)
3084 LFLMSFTVLCLTPVYSFLPGVYSVIYLYLT FYLTNDVSVFLAHIQWMMVFTPLVPFWITI AYIICISTK 3151	(3085:DNK,GBR;ENGLAND,USA),(3090:USA,GBR;ENGLAND,CHN;WUHAN),(3099:USA,GBR;ENGLAND,BEL,CHN;GUANGDONG(SHENZHEN),(3103:USA),(3123:GBR;ENGLAND,GBR;SCOTLAND,USA),(3140:USA),(3143:GBR;ENGLAND,CAN,AUT,ISR),(3147:USA),(3148:USA,AUS)
2900 SKLIEYDFATSA 2912	(2900:TUR,GBR;ENGLAND,USA),(2906:GBR;ENGLAND),(2908:TH)
2886 PRVSFAVGN 2894	(2887:CHN;NANCHANG),(2891:GBR;SCOTLAND,USA)
2856 AVITREVG FV2865	
2958 DGSIIQFPNTYLEG SVRV 2975	
3162 KRRVVF 3167	(3162:GBR;ENGLAND,AUS)
3000 TSGRWV 3005	(3000:USA),(3001:RUS,CAN)
3176 EEAALCT 3182	
2837 WFSQRGGSYTN 2847	(2838:GBR;ENGLAND),(2842:AUS)
2813 DGGVT 2817	

SUPPLEMENTARY TABLE 5. List of predicted linear antibody epitopes with mutations highlighted in red colour in NSP5 protein collectively from 12,225 isolates of SARS-CoV-2 from humans across many countries. List of countries where the epitope amino acids have mutations are given in right column. Abbreviation for each country is given in supplementary table 1.

Predicted Antibody Epitopes with Mutations in NSP5	Country with Mutations in Antibody Epitopes Residues
3563 CSGVTFQ 3569	(3564:GBR;WALES)
3306 ICTSEDM LNP NYEDLLIRKSNHNFLVQA GNVQLRVIGHSMQ 3346	(3308:USA),(3311:GBR;ENGLAND),(3312:GBR;SCOTLAND),(3233:GBR;ENGLAND,GBR;SCOTLAND,VNM),(3324:GBR;ENGLAND,USA),(3332:USA),(3334:USA,CHE,TWN,CHL;CHILLAN,CHL;SANTIAGO,CHL;CONCEPCION,SRB,DNK,SRB,BRA,AUS,DEU),(3338:USA,GBR;ENGLAND,IND;GUJARAT)
3352 LKVDTANPKTPKY 3364	(3352:USA,BEL,BRA,GBR;ENGLAND,ISL,GEO),(3353:BGD,DNK,USA,ESP;VALENCIA,GBR;ENGLAND,GBR;SCOTLAND,AUS,ISL,GBR;WALES,FRA,CHN;SHANGHAI),(3357:USA,GBR;SCOTLAND),(3359:USA,GBR;SCOTLAND),(3362:AUS)
3474 AVINGDRWFLNRFTTTLNDFNLVAMKY NYEPLTQDHVDILGPLSAQTGI AVLDMC ASLKELLQNGMNGRTILGSAL 3549	(3483:USA,GBR;SCOTLAND),(3488:FRA),(3495:FRA),(3497:USA,AUS,GBR;ENGLAND),(3499:USA),(3511:GBR;SCOTLAND),(3514:USA),(3518:USA,ENGLAND),(3522:USA,NLD),(3524:GBR;ENGLAND),(3527:USA),(3529:AUS,USA,GBR;ENGLAND,GBR;SCOTLAND),(3537:FRA,FIN,USA,GBR;SCOTLAND),(3542:USA,AUS,FRA)
3416 DYDC 3419	
3284 TCGTT 3289	
3446 GPFVDRQTAQAAGTD 3460	(3447:CHN;BEIJING,MAL,CHE,GBR;ENGLAND,LVA),(3453:ISL),(3454:SWE,USA,CHN;WUHAN),(3456:USA,AUS),(3459:ISL)
3430 LPTG 3434	
3293 LWLDDV 3298	

SUPPLEMENTARY TABLE 6. List of predicted linear antibody epitopes with mutations highlighted in red colour in NSP6 protein collectively from 12,225 isolates of SARS-CoV-2 from humans across many countries. List of countries where the epitope amino acids have mutations are given in right column. Abbreviation for each country is given in supplementary table 1.

Predicted Antibody Epitopes with Mutations in NSP6	Country with Mutations in Antibody Epitopes Residues
3596 QSTQWSLFFFLYENAF 3612	(3602:AUS),(3604:GBR;SCOTLAND),(3606:USA,IND;GUJARAT,CHE,ITA,CHN,USA,UGA,BEL,CAN;ONTARIO,JAM,GBR;ENGLAND,GBR;SCOTLAND,THA,CAN,IND;MAHARASHTRA,JOR,POL,LBN,ISR,TWN,IND;TELANGANA,IND,DNK,CHL;SANTIAGOGBR;WALES,AUT,FRA,GBR;NORTHERNIRELAND,SGP,IRN,TUR,COD,DEU,RUS,CHN;GUANGDONG,CZE,QAT,BRA,KOR,HKG,SVN,NLD,CHN;HANNING,CHN;XINYU,CHN;FUYANG,NOR,ESP;MADRID,ISR,MYS,JPN,CHN;SHANDONG,CHN;CHONGQING,GEO,GRC;ATHENS,ESP;VALENCIA,IND;WEST BENGAL,BRN,ARE,VNM,IDN,PHL,ARG,LUX),(3609:DEU,GBR;ENGLAND)
3847 VGGKPCIKVATVQ 3859	(3854:ITA),(3856:AUS,GBR;ENGLAND,GBR;WALES,ITA)
3570 SAVKRTIKGTHHW 3582	(3577:USA,CHL;COYHAQUE),(3579:GBR;SCOTLAND,GBR;NORTHERN IRELAND,GBR;ENGLAND),(3580:USA,SWE,GBR;SCOTLAND)
3806 LTLGVYDYLSTQEFYRMSQGLLPPK NSIDAFKLN 3842	(3815:CHN;WUHAN),(3826:USA,IND;TELANGANA),(3828:GBR;ENGLAND),(3829:TWN,USA,GBR;ENGLAND,CHN;SHANGRAO),(3833:CHN;WUHAN),(3839:USA)
3650 FNMVYMPASWVMRIMTWLDMVDTSL SGFKLKDC 3682	(3652:GBR;ENGLAND),(3656:TUR),(3657:TUR,ITA),(3660:ESP;MADRID),(3669:USA,TWN,JPN,GBR;ENGLAND),(3670:NA),(3671:NA),(3675:USA),(3682:JPN)
3719 YKVYYGNALDQAISM 3733	(3722:GBR;ENGLAND,GBR;SCOTLAND,CHN;SHANGHAI,CHN;WEIFANG),(3725:NLD,EST,ITA),(3729:RUS),(3733:AUT,LUX,TWN)
3695 MTARTVYDDGARRVWTL 3711	(3697:BEL,GBR;ENGLAND,THA;BANGKOK),(3704:AUS,USA)
3770 FITGNTLQ 3777	(3770:CHN;JIANGXI(JIAN) (3776:USA),(3777:USA,GBR;SCOTLAND,NLD,IDN)
3628 FVKHKH 3633	
3741 TSNYSGVVT 3749	
3762 CVEYCPI 3768	(3763:ISL),(3764:JPN,GBR;SCOTLAND)

SUPPLEMENTARY TABLE 7. List of predicted linear antibody epitopes with mutations highlighted in red colour in NSP7 protein collectively from 12,225 isolates of SARS-CoV-2 from humans across many countries. List of countries where the epitope amino acids have mutations are given in right column. Abbreviation for each country is given in supplementary table 1.

Predicted Antibody Epitopes with Mutations in NSP7	Country with Mutations in Antibody Epitopes Residues
3900 LAKDT T E 3906	(3905:USA,ISL)
3919 LSMQGA V D I N K 3929	(3921:GBR;ENGLAND),(3925:USA,GBR;ENGLAND),(3926:AUS,CHN),(3927:USA),(3929:USA,AUS)
3938 RA T LQ 3942	(3939:USA)
3877 QQLRVES S S K 3886	(3884:USA,GBR;ENGLAND,COL,ISR,ARG,AUS,CAN,CHN)
3860 SKMSD V KC 3867	(3865:LUX)

SUPPLEMENTARY TABLE 8. List of predicted linear antibody epitopes with mutations highlighted in red colour in NSP8 protein collectively from 12,225 isolates of SARS-CoV-2 from humans across many countries. List of countries where the epitope amino acids have mutations are given in right column.. Abbreviation for each country is given in supplementary table 1.

Predicted Antibody Epitopes with Mutations NSP8	Country with Mutations in Antibody Epitopes Residues
3955 AAFATAQEAYEQAVANGDSEVVLKKL KKSLNVAKSE 3990	(3956:USA,GBR;ENGLAND),(3958:GBR;ENGLAND,ISL,CAN),(3959:FRA,CHN;WU HAN),(3963:USA),(3965:CHN),(3969:USA),(3975:GBR;WALES),(3979:CHN),(3981: CHN),(3983:SWE,GBR;SCOTLAND,GBR;ENGLAND,GRC;ATHENS,ARG,CHN;GUA NGDONG,USA)
4024 KVTSAMQTMFLTMLRKLND 4043	(4029:NA),(4030:CHN),(4031:CHE,AUS,ESP;VALENCIA),(4034:RUS),(4037:NLD),(4 038:CHN),(4039:RUS),(4041:RUS),(4042:GBR;ENGLAND)
4099 QQVVDADSKIVQLSEISMDNSPNLAW 4124	(4100:CAN,GBR;ENGLAND,RUS),(4103:CHN),(4105:CHN),(4106:CHN),(4111:CHN; SHENZHEN),(4112:CHN),(4119:GBR;ENGLAND,FRA,NLD)
4133 ANSAVKLQ 4140	
4062 IPLTTAA 4068	(4063:BEL),(4065:USA.GBR;ENGLAND,RUS),(4067),(4068:CHN,BEL)

SUPPLEMENTARY TABLE 9. List of predicted linear antibody epitopes with mutations highlighted in red colour in NSP9 protein collectively from 12,225 isolates of SARS-CoV-2 from humans across many countries. List of countries where the epitope amino acids have mutations are given in right column. Abbreviation for each country is given in supplementary table 1.

Predicted Antibody Epitopes with Mutations in NSP9	Country with Mutations in Antibody Epitopes Residues
4141 NNELSPVA 4148	(4141:RUS)
4214 RFVTDTPKGPKV 4225	(4217:GBR;ENGLAND,USA),(4220:GBR;ENGLAND,USA,GBR;WALES,GBR;SCOTLAND,ESP;MADRID,NLD,LVA),(4224:RUS)
4158 TTQTACTDD 4166	(4159:GBR;ENGLAND,GBR;WALES,TUR,CHN;GUANGDONG,AUS),(4161:USA,GBR;SCOTLAND,GBR;ENGLAND),(4164:USA,BEL,DEU,HKG)
4250 VRLQ 4253	
4174 TTKGG 4178	(4176:USA,CRI,CHN),(4178:GBR;ENGLAND,DEU,RUS,CHN;GUANGDONG,CRI)
4197 PKSDGTGTIYTELEPP 4212	(4197:USA,AUS,GBR;SCOTLAND,GBR;IRELAND),(4201:FRA),(4211:CHN;SHANGHAI,USA,GBR;WALES,CHN;SICHUAN,CHN;SHANGRAO)
4231 IKGLNNL 4212	
4188 LQDLK 4192	(4188:USA,LUX,ITA,RUS),(4189:NA),(4191:GBR;ENGLAND,CHE,RUS)

SUPPLEMENTARY TABLE 10. List of predicted linear antibody epitopes with mutations highlighted in red colour in NSP10 protein collectively from 12,225 isolates of SARS-CoV-2 from humans across many countries. List of countries where the epitope amino acids have mutations are given in right column.. Abbreviation for each country is given in supplementary table 1.

Predicted Antibody Epitopes with Mutations in NSP10	Country with Mutations in Antibody Epitopes Residues
4381 C S CDQLRE P MLQ 4392	(4382:GBR;ENGLAND,BEL),(4383:BEL),(4384:BEL),(4389:GBR;ENGLAND,NLD,AUT,USA,LVA)
4254 AGNATEV P ANST 4265	(4261:AUS,GBR;SCOTLAND)
4296 KMLCTH T G T G 4305	(4302:USA),(4304:CHN,SWE,CHE)
4268 SFCFAVD 4275	
4332 CHIDH P NPKGFC 4343	(4337:USA)
4285 A SGG 4288	(4285:USA,DEU,SAU,NLD,AUS)
4309 TVTPE A N M D 4317	(4314:SGP),(4316:USA,GBR;ENGLAND),(4317:GBR;ENGLAND,GBR;SCOTLAND,GBR;NORTHERN IRELAND,GBR;WALES,ISL)
4370 C T VCG 4374	(4371:ISL,TUR)

SUPPLEMENTARY TABLE 11. List of predicted linear antibody epitopes with mutations highlighted in red colour in NSP11 protein collectively from 12,225 isolates of SARS-CoV-2 from humans across many countries. List of countries where the epitope amino acids have mutations are given in right column. Abbreviation for each country is given in supplementary table 1.

Predicted antibody epitopes with mutations in NSP11	Country with Mutations in Antibody Epitopes Residues
3 DAQ S F 7	(6:NA)

SUPPLEMENTARY TABLE 12. List of predicted linear antibody epitopes with mutations highlighted in red colour in RdRp protein collectively from 12,225 isolates of SARS-CoV-2 from humans across many countries. List of countries where the epitope amino acids have mutations are given in right column.. Abbreviation for each country is given in supplementary table 1.

Predicted Antibody Epitopes with Mutations in RdRp	Country with Mutations in Antibody Epitopes Residues
4720-PLVRKIFVDGVPFVSTG-4737	
4399- FLNRVCGVSAARLTPCGTGTSTDV VYRAFDIYNDKVAGFAKFLKTNCC RFQEKDEDDNLIDSYFVVKRHTFS NYQHEETIYNLLKDCPAVAKHDFD KFRIDGDMVPHISRQRLTKY-4514	(4408:USA,SGP),(4410:TUR),(4417:USA),(4418:GBR;ENLAND,USA,GBR;SCOTLAND,GBR;NORTHERNIRELAND,DNK,FRA,LUX,TWN,SWE,BEL),(4423:SGP,CAN),(4431:CHN;SHANGRAO),(4435:CHE,GBR;ENLAND,ARE,SWE,AUS),(4436:USA,AUS,SWE,GBR;ENGLAND,CHN;JIANGSU),(4451:FRA,ISR,ESP,IND;GUJARAT),(4455:GBR;ENGLAND,TWN,AUS,NZL),(4459:GBR;ENGLAND),(4470:USA),(4472:SGP),(4477:GBR;ENGLAND,GBR;SCOTLAND,SGP),(4480:GBR;ENGLAND),(4483:USA,PRT,GBR;ENGLAND),(4486:AUS),(4502:USA),(4495:DNK,GBR;WALES,USA),(4489:IND;MAHARASHTRA,CHN;BEIJING,IND;GUJARAT,TWN,IND;TELANGANA,THA,GBR;ENGLAND,COL,IND,FRA,SGP,IND;HYDERABAD,IND;WESTBENGAL,BRN,PHL,CHN;FUJIAN,CAN,MYS,AUS,SAU,GMB,CAN;ONTARIO)
5210- MLVKQGDDYVYLPYPDPSRILGAG CFVDDIVKTDGTLMIERFVSLAIDAY PLTKHPNQEYADVHFLYLQYIRKL HDELTDGHMLDMYSVMLTNDNTSR YWEPEFYEAMYTPHTVLQ-5324	(5212:AUS),(5215:USA,JPN),(5217:IRE),(5222:USA,BEL),(5232:TUR),(5236:NA),(5261:USA,FRA),(5264:ISL),(5262:GBR;ENGLAND,DNK,CHN;ANHUI),(5266:USA,IND),(5267:USA),(5268:FRA,AUS),(5269:USA),(5273:NA),(5270:GBR;SCOTLAND,GRC;ATHENS),(5272:IND;GUJARAT),(5271:USA,BEL,GBR;SCOTLAND,NLD),(5274:JPN),(5320:GBR;SCOTLAND,AUS),(5314:GBR;ENGLAND,AUS),(5311:CHN,GBR;ENGLAND),(5310:BEL),(5286:NA)(5308:TWN,CHN;GUANGDONG),(5294:GBR;ENGLAND),(5285:GBR;ENGLAND,DNK),(5284:CHN;HANGZHOU),(5283:USA,CHE,GBR;ENGLAND),(5282,5281,5280,5279,5278,5277,5276,5275:NA)
4747- HNQDVNLHSSRSLSFKELLVYAADP AMHASGNLLLDKRT-4785	(4759:ESP;MADRID),(4762:USA),(4764:USA),(4772:POL,USA,GBR;ENGLAND,FRA,GBR;WALES,BEL),(4774:DNK,TWN,GBR;ENGLAND,CHN;HUBEI(TIANMEN)),(4777:RUSS),4781(NA)
4790- VAALTNNVAFQTVKPGNFNKDFYD FAVSKGFFKEGSSVELKHFFAQD GN-4839	(4792:USA),(4794:SGP,USA,FRA),(4797:USA,THA,AUT,SWE,NLD,KWT),(4798:USA,IND;KERALA,GBR;ENGLAND),(4804:TWN)(4806:TWN),(4816:TUR),(4818:USA),(4826:TUR,GBR;WALES,SWE),(4828:USA),(4833:TUR),(4835:NLD,CHN;WEIFANG),(4836:USA),(4837:TUR,GBR;ENGLAND,COD)
4648- HVDTDLTKPYIKWDLKLYDFTEE- 4670	(4654:AUS),(4655:USA),(4659:GBR;WALES),(4669:BEL),(4668:GBR;ENGLAND,GRC;ATHENS)
4896- FPFNKVGKARLYYDSMSYEDQDA LFA YTKRNV-4927	(4906:ISL,USA),(4918:GBR;WALES,GBR;SCOTLAND,SAU),(4921:AUT,BEL)
4609-YDFGDFIQTTPGSGVP-4624	(4614:USA),(4619:GBR;ENGLAND,TWN,BEL,GBR;WALES),(4620:AUS,TUR,SAU),(4621:USA)
4586-DAMRNAGIVG-4595	
5195-TDLTKG-5200	(5196:ISL),(5199:FRA),(5198:GBR;ENGLAND,DEU,DNK,TWN,ISL,USA,GBR;WALES)
5035-TTCCSLSH-5042	(5035:USA,GBR;SCOTLAND,GBR;ENGLAND),(5036:USA,AUS,IND;GUJARAT),(5039:BEL,CAN,NOR,DNK,FRA,AUT,GBR;SCOTLAND,GBR;WALES,GBR;ENGLAND,CRI,DEU,ISL)
4999-SDVENP-5004	
4539-VTYNCCDDDYFNKGD-4553	(4546:USA)
4878-GCINANQV-4885	(4881:ISL),(4883:USA)
5104-GNKIADKYVRN-5114	(5104:USA,NOR)

SUPPLEMENTARY TABLE 13. List of predicted linear antibody epitopes with mutations highlighted in red colour in Helicase protein collectively from 12,225 isolates of SARS-CoV-2 from humans across many countries. List of countries where the epitope amino acids have mutations are given in right column. Abbreviation for each country is given in supplementary table 1.

Predicted Antibody Epitopes with Mutations in Helicase	Country with Mutations in Antibody Epitopes Residues
5508- GYR V TKNSKVQIG-5520	(5511:AUS)
5349- LCCKCCYDHV I STSHKLVLSV N PYVC N APGCDV TDVT Q LYLGMSYY C SHK P ISFPLCANGQVF GLYKNT C V G SDNVT- 5428	(5360:FRA),(5367:USA,GBR;ENGLAND)(5371:USA,AUS,GBR;WALES,Z AF,GBR;ENGLAND)(5373:USA,NLD),(5375:USA),(5377:GBR;WALES,US A,ESP;BARCELONA,BEL)(5378:USA,GBR;WALES),(5386:CAN)(5398:US A,GBR;ENGLAND,NLD),(5401:USA),(5402:USA,GBR;ENGLAND,CAN,CH N;HANGZHOU,FRA)(5404:CHE,GBR;SCOTLAND,CHN;SHANGHAI,CHN; WEIFANG)(5424:CHN;USA)
5567- QEHY V RI T GLY P TLNIS D EFSSNVANY Q K V GM Q K- 5600	(5571:CHE,IND;GUJARAT,USAGBR;ENGLAND),(5574:USA)(5578:NLD),(5579:USA),(5580:BEL,CHN;BEIJING),(5584:SWE,CHE,LUX,USA,ESP;VA LENCIA,GBR;ENGLAND),(5595:USA,BEL),(5598:AUS),(5599:USA)
5897- LC I MSDRDL Y DKL Q FTSLEIPRRNV A TL Q - 5925	(5900:CHE,USA,RUS,GBR;ENGLAND,GBR;WALES),(5905:NLD),(5910:A US,USA),(5912:GBR;ENGLAND,GBR;NORTHERNIRELAND,GBR;WALE S,GBR;SCOTLAND) 5922: USA,NLD,FRA
5811- AINRPQIG V REFLTR N PAWR K A- 5833	(5820:SGP),(5828: GBR;NORTHERN IRELAND, BEL,GBR;ENGLAND,USA,ESP;VALENCIA),(5829:USA) (5833:GBR;ENGLAND)
5474- GI A TV R EVLSDREL H LSWE V G K PR P - 5498	(5477:USA,SGP,GBR;ENGLAND,GBR;SCOTLAND),(5479:AUS,ESP;MA DRID),(5488:USA,ARG,AUS,DNK,GBR;ENGLAND),(5493:FRA,GBR;SCO TLAND,USA,GBR;ENGLAND)(5494:ESP;MADRID),(5496:USA,GBR;SCO TLAND,LUX,RUS,LVA)
5645- A LK Y L P IDKCS-5655	(5646: CHN,GBR;SCOTLAND),(5651:BEL)
5618- G L A LYPSARI- 5628	(5620:CHN,AUS,USA,GBR;ENGLAND,IND;MADHYAPRADESH,KOR),(56 21:USA,NLD,GBR;ENGLAND,DNK,GBR;SCOTLAND,ESP;VALENCIA,GB R;WALES,ESP;MADRID,BEL)
5667- FD K FK V NS T LEQY- 5679	(5669:NOR,EST,TWN),(5672:USA,GBR;SCOTLAND)(5674:USA,ESP;CA STILLAY,LEON),(5675:USA,CHL;SANTIAGO)
5781- YDN K L K A H K D SAQCF K MFYKGVITH D V S - 5809	(5784:USA),(5788:NLD),(5790:AUS,GBR;ENGLAND,USA)(5792:USA,SG P,CHL;SANTIAGO,ESP;VALENCIA,ESP;MADRID,MEX,PRT),(5799:BLR), (5808:USA,THA),(5798:GBR;WALES,GBR;SCOTLAND,IND;DELHI,NOR, USA,EST)
5526- KGD Y G DA V V R GT T TYKLN V GD Y F V - 5550	(5530:IND;GUJARAT(AHMEDABAD),GBR;ENGLAND,ARG,ISL,NLD,IND; GUJARAT(GANDHINAGAR)),(5534:ISL)(5532:USA,GBR;ENGLAND,GBR ;SCOTLAND),(5538:IND;KERALA)(5548:GBR;ENGLAND),(5549:CHN;NA NCHANG),(5550:USA,CHE)
5845- V A S K IL G L P - 5853	(5848:USA,GBR;WALES,DNK,GBR;NORTHERN IRELAND),(5853:FRA)
5331- LCNSQ T SLR- 5339	
5325- AV G A-5328	
5690- T T A D- 5693	(5692:FRA)

SUPPLEMENTARY TABLE 14. List of predicted linear antibody epitopes with mutations highlighted in red colour in 3'-5'-exonuclease protein collectively from 12,225 isolates of SARS-CoV-2 from humans across many countries. List of countries where the epitope amino acids have mutations are given in right column.. Abbreviation for each country is given in supplementary table 1

Predicted Antibody Epitopes with Mutations in 3' TO 5' EXONUCLEASE	Country with Mutations in Antibody Epitopes Residues
5934- KDCSKVITGLHPTQAPTHLSVDTKFKTEGLCV DIPGIPKDMTYRR-5978	(5941: USA,AUS,GBR;ENGLAND,NLD,BLR),(5951:,USA,SGP,BRN,GBR;ENGLAND,DZA),(5953:USA),(5962:USA,LUX),(5968:FRA,KOR,ITA),(5971:IND;TELANGANA,USA),(5974:SWE,IND;GUJARAT(SURAT),ESP;MADRID),USA,GBR;ENGLAND,GBR;SCOTLAND
6368- PFFYYSDSPCESHGKQVVSIDIDYVPLKSATCI TRCNLGGAVCRHHANEYRL-6418	(6368:USA,GBR;ENGLAND,AUT,NLD,LVA),(6376:ISL)(6378:GBR;ENGLAND)(6380:USA,ESP;VALENCIA,GBR;ENGLAND,AUS,NLD,FRA)(6386:USA,GBR;ENGLAND,GBR;SCOTLAND),(6397:USA),(6407:GBR;ENGLAND,TUR,QAT,GBR;SCOTLAND,CAN),(6410:USA),(6418:USA,BEL,CHN;SHANGHAI,GBR;ENGLAND,PAK(DELETION))
5926-AENVTG-5931	(5926:SGP)
6436-YKQFDTYNLWNTFTRLQ-6452	(6440:RUS),(6449: USA,GBR;ENGLAND,SWE,CHN;GUANGZHOU)
6260- PKAIKCVPQADVEWKFYDAQPCSDKAYKIEE LFYSYATHSDKFTDGVC-6307	(6270:UGA,USA,ARE),(6279:USA,GBR;WALES)(6280:GBR;ENGLAND,USA,BEL),(6285:USA,AUS,GBR;SCOTLAND)(6288:RUS,LVA),(6291:USA),(6296: SWE,GBR;WALES),(6301:USA)(6304:USA,AUS)
6142-FSTASDTY-6149	(6142:BGD,IND;U.P;NOIDA,IND;DELHI,IND;TAMILNADU,IND;LADAKH),(6145: BGD,GBR;ENGLAND)(6149: AUS,GBR;SCOTLAND)
6127-GPERTCCLCDR-6137	(6128:SWE,USA,NLD,FIN),(6133:NLD)(6129:BGD,GBR;ENGLAND,GBR;WALES,GBR;SCOTLAND,NLD),(6130:BGD,USA,GBR;ENGLAND),(6131: BGD,FRA,JPN,DNK)
6050- VDPNNTDFSRVSAKPPPGDQFKHLIPLMYK GLPWNV-6086	(6056:AUS),(6057:SAU,USA),(6058:PRT),(6065:USA,AUS),(6073:USA),(6075:CAN,FRA,COD,GBR;ENGLAND,CHE)(6082:IND;GUJARAT;VADODRA,USA,GBR;ENGLAND,GBR;SCOTLAND,DNK),(6083: JPN,BGD,IND;TELANGANA)
6246-LLADKFPVLH-6255	(6247:ZAF),(6252: USA,AUS,COL,GBR;ENGLAND),(6255:USA)
6020-HATREAVG-6027	(6022:USA),(6023:TWN)
5987-MNYQVNGYP-5995	(5990:USA)
6314-VDRYPAN-6320	(6319:USA)
6357-DKSAFVNLKQ-6366	(6360:BEL),(6363: GBR;ENGLAND)
6153-HHSIGFD-6159	(6158: AUS,USA,BGD,GBR;SCOTLAND,TWN,NZL)

SUPPLEMENTARY TABLE 15. List of predicted linear antibody epitopes with mutations highlighted in red colour in Endo-RNAase protein collectively from 12,225 isolates of SARS-CoV-2 from humans across many countries. List of countries where the epitope amino acids have mutations are given in right column.. Abbreviation for each country is given in supplementary table 1

Predicted Antibody Epitopes with Mutations in <u>Endo-RNASE</u>	Country with Mutations in Antibody Epitopes Residues
6467-FDGQQGEVVPVSIINNTVYTKVDGVDVELFENK-6498	(6471:GBR;ENGLAND,ITA,GBR;SCOTLAND,NLD,CAN)(6474:AUS,USA,GBR;SCOTLAND,IND,GBR;ENGLAND,NZL,FRA)(6481:CHN;GUANGDONG),(6485:USA,AUT,DNK,SRB,HUN,RUS,ISL)(6491:GBR;ENGLAND,SWE,IND)
6759-KSQDLSVVS K V-6769	(6764: USA,GBR;SCOTLAND),(6769: GBR;ENGLAND)
6633-KV D GVVQQL-6641	(6635:USA)
6597-EGSVKGLQPS-6606	(6599: USA,GBR;ENGLAND,DNK)
6731-FITDAQTGSSKCV-6743	(6740: USA,GBR;SCOTLAND,FRA,LKA)
6579-V D GQVDLFRNARN-6591	(6579:USA,GBR;WALES,NLD,AUS),(6581:GBR;ENGLAND,NLD,CHL,USA)(6587: GBR;ENGLAND,FRA)
6663-IDFLELAMDEFIERYKLEGYAFEH-6686	(6663:NLD),(6664:IND;U.P.;NOIDA,BLR),(6669:GBR;ENGLAND,GBR;SCOTLAND,SGP,AUS,USA,ISL,GBR;WALES,PRT),(6671:FRA,BEL,DNK,GBR;ENGLAND,NLD),(6673:USA),(6675:ISL),(6678:USA(DELTION)),(6679:USA(DELETION)),(6684:USA,CHN;GUANGDONG(SHENZHEN))(6686:USA,AUS,NLD)
6689-YGDFS S SQLG-6698	(6691:CHN;SHANGHAI),(6693: USA(NEW YORK)),(6698:USA)
6554-CSMTDIAK K PTETICAPLT-6572	(6559:GBR;ENGLAND),(6561:GBR;ENGLAND,CHN;HANGZHOU),(6566:ISL)(6564:GBR;SCOTLAND,GBR;ENGLAND),(6565:CHN;SHENZHEN,GBR;SCOTLAND)
6621-GEAV-6624	(6622:USA,GRC),(6623:USA,BEL,CAN),(6624:THA,USA,GBR;SCOTLAND,GBR;ENGLAND,NLD,FRA)

SUPPLEMENTARY TABLE 16. List of predicted linear antibody epitopes with mutations highlighted in red colour in 2'-O-Ribose Methyltransferase protein collectively from 12,225 isolates of SARS-CoV-2 from humans across many countries. List of countries where the epitope amino acids have mutations are given in right column. Abbreviation for each country is given in supplementary table 1.

Predicted Antibody Epitopes with Mutations in 2'-O-RIBOSE METHYLTRANSFERASE	Country with Mutations in Antibody Epitopes Residues
7031- NTNPIQLSSYSLFDMSKFPLKLRGTAVMSLKEGQINDMILS LLSKGRLLIIRENNRVVVISSDVLVNN-7096	(7032:ISL),(7039:USA),(7041:GBR;ENGLAND),(704 GBR;SCOTLAND),(7056:GBR;ENGLAND),(7063:TU USA),(7065:USA),(7068:GBR;ENGLAND,HKG),(707 USA:NY),(7085:GBR;ENGLAND),(7086:USA,ESP),(087:TWN,SGP),(7091:USA),(7092:GBR;WALES,USA (7096:ESP;MADRID)
6931- DPKTKNVTKENDSK-6944	(6932:USA,GBR;ENGLAND,CHL,VNM,AUS),(6938:USA ,GBR;ENGALND)
6809- MPNLYKMQRMLLEKCDLQNYGDSATLPKGIM-6839	(6810:GBR;ENGLAND,CHN;WUHAN,CHN;SAHNGHAI), (6815:GBR;ENGLAND,AUT,SWE,RUS,JPN),(6826:NLD ,(6830:USA),(6831:GBR;ENGLAND,USA,ISR,AUS,RUS ,(6832:NLD,GBR;ENGLAND,USA,DNK,ISL),(6833:USA ,AUS,GBR;ENGLAND,RUS,ESP,JPN),(6837:AUS,GBR; SCOTLAND)
6799- SSQAWQP-6805	(6800:USA)
7010- LGKPREQIDGYV-7021	(7011:USA),(7013:GBR;ENGLAND,USA),(7014:,GBR;E NGLAND,USA,GBR;SCOTLAND,ISR,QAT),(7018:CHN; WUHAN)
6871- GSDKGVA-6877	(6875: CAN,FRA,AUS,DEU,IRN) (6876:IND(deletion),DNK) (6877:USA,GBR;WALES)
6898- LNDFVSDADSTLIGDCATVHTANK-6921	(6906: USA,DEU,CHN),(6911: BEL,LUX)
6888- PTGT-6891	(6891: GBR;ENGLAND,GBR;SCOTLAND,KOR)

SUPPLEMENTARY TABLE 17. List of predicted linear antibody epitopes with mutations highlighted in red colour in spike protein collectively from 12,225 isolates of SARS-CoV-2 from humans across many countries. List of countries where the epitope amino acids have mutations are given in right column. Abbreviation for each country is given in supplementary table 1.

Predicted Antibody Epitope with Mutations in SPIKE PROTEIN	Country with Mutations in Antibody Epitopes Residues
1067- YVPAQEKNFTT AP AICH DGKA HFPREGVFVSN GTHWVFVTRQNFYEP Q IIT TDNTFVSG NC DV VIG IVN - 1134	(1067:TWN),(1074:NA),(1078:USA,LUX,BEL,GBR;ENGLAND),(1079:AUS,JPN,GBR;SCOTLAND),(1084:CHN;XINYU,CHN;NANCHANG,GBR;SCOTLAND),(1086:JPN),(1087:BEL,GBR;SCOTLAND),(1112:ISL),(1117:GBR;ENGLAND),(1112:CON,UGA,GRC;ATHENS),(1124:IND;WEST BENGAL:KOLKATA),AUS,USA),(1129:CHN;SHENZHEN),(1132:FRA),(1133:GBR;WALES,USA,GBR;ENGLAND)
432-CV IA WNS NN LDSKV GG NYNYLYR LF RKS NLKPFER DI STE IYQ AGSTPCNG VEGF NCY F PLQS YGFQPTNGV GY Q PYR VVLSFELL HAP ATVCG PK KSTNLVKN-536	(432:NA),(435:ISR,FRA),(438:IND),(439:GBR;SCOTLAND),(446:AUS,GBR;ENGLAND),(456:NA),(458:HKG),(467:AUS),(468:AUS,TUR;(472:CAN),(575:USA),(483:USA,GBR;ENGLAND,ESP;VALENCIA),(491:AUS),(503:USA),(508:FRA),(509:HKG),(510:KHG),(519:USA),(520:USA,AUS),(522:AUS,NLD,IND),(528:USA),(529:USA,TWN)
239- QTLLALHRSY LTPGD SSG WTAGAA-264	(239:USA,GBR;SCOTLAND,DNK,NLD,FIN),(240:USA,FRA,BEL,CHN;WEIFANG),(243:USA,BEL,IND;DELHI),(245:GBR;ENGLAND,USA,ESP;BARCELONA,GBE;SCOTLAND),(247:USA,AUS,CHN;HANGZHOU),(249:HKG),(250:NA),(255:CAN,GBR;ENGLAND,AUS),(258:USA,GBR;SCOTLAND,GBR;ENGLAND,USA,AUS)
1-MFV FLVLLPLVSSQ CVNL TRTQ LP P -26	(5:USA,IND;GUJARAT,LVA,GBR;ENGLAND,GBR;SCOTLAND,GBR;WALES,BEL,DNK,FRA,ISL,TWN,PRT,CAN,JPN),(8:HKG),(9:GBR;ENGLAND,USA),(18:GBR;ENGLAND,USA,CAN,ISL),(21:GBR;WALES,GBR;ENGLAND,DNK,AUS),(22:IRN,CAN,NLD,USA),(23:USA),(26:GBR;ENGLAND,GBR;SCOTLAND)
326- IVRFPNITNLC PFGEV FNATRF ASVYAW N RKRIS NC VADY-365	(338:GBR;SCOTLAND),(341:GBR;WALES),(348:USA),(354:CHN;SHENZHEN,CHN;BEIJING,NLD),(359:USA,GBR;ENGLAND),(364:CHN;SHENZHEN)
108- TTL D SKTQ S LL I VNNATNV VI KVCE FQ FCND P FL G VY Y H K NN K SW ME S EF R VYSSANN CT FEY V SQ P FL MD LE GK QGN F KN-188	(111:USA),(119:ISR,JPN),(120:FRA,GBR;SCOTLAND),(128:AUS),(138:USA,AUS,RUS,HKG),(140:AUS),(144:NA),(145:USA,ISL,AUS),(146:COL,USA,GBR;ENGLAND,GBR;WALES),(148:USA,ESP;ENGLAND),(149:ESP;MADRID),(151:GBR;ENGLAND,FRA),(152:USA,FRA),(153:USA,GBR;SCOTLAND,LBN,BEL,CHN;WEIFANG,FRA),(156:CHN;SENEGAL),(157:USA,AUS,CAN),(176:FRA,ARG,GBR;ENGLAND),(177:AUS,IND;GUJARAT),(181:DNK,USA,JPN,GBR;ENGLAND),(182:BEL)
701-A EN S V A Y S NN S IA I P T N F-718	(703:GBR;ENGLAND,CHN;SHANGHAI),(704:AUS,USA),(706:USA,BEL,GBR;SCOTLAND,TWN,POL,IND;GUJARAT),(714:GBR;WALES),(716:GBR;WALES,GBR;ENGLAND)
64-W F H AI H V S G T NG T K R F D N P V L-84	(64:GBR;WALES),(69:USA,CHN),(70:USA),(71:USA),(74:BRA,CHN),(76:TUR,AUS,GBR;ENGLAND,IND),77:IND;TELANGANA,IND;DELHI,BEL,USA),(78:AUS,IND;GUJARAT),(80:GBR;ENGLAND),(83:USA)
391- CFTNVYADSFVIR G DE V R Q I AP G Q T G K I ADYNYKL PDDFT-430	(405:USA),(408:ING;KERALA),(409:CHN;GUANGDONG),(414:GBR;ENGLAND,USA),(417:GBR;ENGLAND)
553-L T ES N KK FL P F Q Q FG-566	(561:AUS)
1233- ML C CM T SC C S CL K G CC SC G S CK F DE DD S E P V L K G V K L H Y T -1273	(1236:AUT,GBR;ENGLAND,USA,TWN),(1247:GBR;ENGLAND,USA,TW),(1248:USA,GBR;SCOTLAND),(1252:GBR;ENGLAND,USA,CHN),(1254:AUS),(1260:AUS,POL,FRA),(1262:CHN;SHENZHEN),(1263:GBR;ENGLAND,USA,FRA,ISR,CHL,GBR;NORTHERN,IRELAND,GRC;ATHENS,IND;DELHI,GBR;WALES,GBR;SCOTLAND,AUS,ISL),(1264:GBR;ENGLAND),(1265:ESP;MADRID),(1269:USA),

879- AGTITSGWTFGAGAAALQIPFAMQMAYRFNGIGVT QNVLYENQKLIAN-925	(1271:USA),(1272:USA),(1273:USA,RUS)(879:GBR;SCOTLAND), (884:DEU,TWN),(892:GBR;ENGLAND,AUS,GRC;ATHENS,IND;G UJARAT), (893: GBR;WALES), (902:NA), (924:FRA)
575-AVRDPQTLIELD-586	(583:USA,AUS,GBR;NORTHERNIRELAND,SWE,GBR;ENGLAND ,IND;GUJARAT)
95-TEKSNIIRGWI-105	(95:ESP,AUT,GBR;NORTHERNIRELAND,HUN,GBR;SCOTLAND ,NLD),(99:NA),(102:GBR;ENGLAND,ESP;VALENCIA,GBR;WALE S,BEL), (104:USA).
783-AQVKQIYKTPPIKDFGGFN-801	(791: AUS,TWN,GBR;NORTHERN IRELAND,CHL;SANTIAGO
371-SASFST-376	
1159-HTSPDVLGDISGINASVVNIQKE-1182	(1161:NA),(1163:AUS,DEU,USA),(1165:GBR;WALES,GBR;ENGL AND)(1168: DEU,USA,CHN;BEIJING), (1169:NLD),(1170:ISL),(1176:DNK,CHN;FUJIAN,BRA,USA)
210-INLVRD-215	(213:FRA), (214:USA,GBR;ENGLAND), (215: ISR,USA,SAU,DNK,CHN;HANGZHOU,FRA,CHN;SICHUAN)
1033-VLGQSKR-1039	(1037:NA)
807-PDPSK-811	(808:USA,AUS), (809:USA,AUS)

SUPPLEMENTARY TABLE 18. List of predicted linear antibody epitopes with mutations highlighted in red colour in ORF3a protein collectively from 12,225 isolates of SARS-CoV-2 from humans across many countries. List of countries where the epitope amino acids have mutations are given in right column. Abbreviation for each country is given in supplementary table 1

Predicted Antibody Epitopes with Mutations in ORF3a	Country with Mutations in Antibody Epitopes Residues
13 VTLKQGEIKDATPSDFVRATATIPIQASL 41	(13:USA,AUS,GBR;ENGLAND,GBR;SCOTLAND,COL,GBR;WALES,CHL,HUN,POL,IND,ISL),(14:BEL,CAN,GBR;SCOTLAND,USA,GBR;ENGLAND,LUX,COD),(15:USA,BEL),(16:LUX,ROU,GBR;SCOTLAND,FIN),(21:GBR;ENGLAND,GBR;WALES,ARG),(23:GBR;ENGLAND,CHN;BEIJING,UGA,RUS,ITA),(26:ROU,TUR,AUS,USA,CAN),(27:GBR;ENGLAND,USA,GBR;SCOTLAND),(30:USA,GBR;WALES),(31:HUN,GBR;SCOTLAND,USA,AUS),(32:USA),(34:GBR;WALES),(38:GBR;WALES),(40:USA,BGD,GBR;WALES,GBR;SCOTLAND,NLD)
1 MDLFMRIF 8	(5:USA,GBR;ENGLAND),(8:AUT,DNK,NLD)
217 TQLSTDTGVEH 227	(217:BEL),(218:USA),(224:GBR;ENGLAND,USA,ISR,GBR;SCOTLAND,JPN)
103 APFLYLALVY 113	(104:GBR;ENGLAND(LONDON),USA,BEL),(106:USA,GBR;ENGLAND),(108:GBR;ENGLAND,GBR;SCOTLAND,FRA,GBR;WALES),(110:USA,IND(DELETION),LUX,ARG),(111:USA,CHN;NANCHANG)
250 DGSSGVVNPVMEPIYDEPTTTSVPL 275	(250:CHN;SHENZHEN),(251:USA),(253:GBR;SCOTLAND,PRT),(254:GBR;WALES,USA,ESP;MADRID),(259:CHN;BEIJING,KOR),(260:GRC;ATHENS,USA),(262:GBR;ENGLAND,USA,AUS,SAU),(263:LKA),(267:USA,GBR;ENGLAND),(268:GBR;ENGLAND),(269:HKG,CHN;WEIFANG)
56 FQASKIIT 64	(56:USA),(57:AUS,IND;GUJARAT(JAMNAGAR),IND;GUJARAT(VADODRA),BEL,USA,SWE,IND;GUJARAT(AHMEDABAD),JAM,LBN,POL,NOR,BGD,CAN,GBR;ENGLAND(LONDON),GBR;SCOTLAND,VNM,SVN,TWN,COL,ISR,GEO,ROU,IND;GUJARAT(GANDHINAGAR),GBR;WALES,IND;GUJARAT(MANSA),IND;GUJARAT(HIMATNAGAR),IND;GUJARAT(MODASA),ESP;VALENCIA,CHL,FRA,AUT,SAU,DNK,LVA,DEU,USA:PITTSBURG,IND:DELHI,BRA,LUX,CHE,THA:BANGKOK,CZE,RUS,SEN,NOR,CAN;VANCOUVER,CAN;ONTARIO),(59:GBR;NORTHERN IRELAND,USA),(60:USA,AUS),(61:USA,GBR;WALES,GBR;ENGLAND,NLD)
234 NKIVDEPEEHVQ 245	(239:AUT,GBR;WALES,ESP;MADRID,USA,CHN;SHENZHEN)
80 VCNLLLLFVT 89	(80:GBR;ENGLAND,CHN;GUANGDONG,TWN),(83:COL,IND),(87:CHN;BEIJING,VNM),(88:USA),(89:USA,GBR;SCOTLAND,GBR;ENGLAND,SGP,DNK,JPN)
179 ISEHDYQIGGYTEKWESGV 197	(185:USA,CAN,GBR;SCOTLAND,GBR;ENGLAND,GBR;WALES,CHN;SHANGHAI),(189:ISL,GBR;ENGLAND),(191:TWN,GBR;ENGLAND),(193:CZE),(196:AUS,COL,CHL;SANTIAGO,DNK,ESP;BARCELONA,POL,GBR;ENGLAND,GBR;SCOTLAND,GRC;ATHENS,ESP;VALENCIA,USA,KAZ,IND;DELHI,BRA,MEX,NLD,LUX,ESP;PAIS VASCO,GBR;WALES,ESP;LARIOJA,CHN;SENEGAL,ESP;CASTILLAY LEONE,GEO,FRA),(197:USA)
133 CRSKNPLLYDANY 145	(134:BRA,CHL;SANTIAGO,USA,GBR;ENGLAND,IND;MADHYA PRADESH),(140:CHN;GUANGDONG,JPN,TWN),(144:USA,GBR;ENGLAND)
148 CWHTNCYD 155	(151:GBR;ENGLAND,GBR;SCOTLAND,GBR;NORTHERN IRELAND,USA),(153:USA;WASHINGTON),(155:ISR,SWE,GRC;ATHENS,USA,IND;GUJARAT(AHMEDABAD)

SUPPLEMENTARY TABLE 19. List of predicted linear antibody epitopes with mutations highlighted in red colour in E-protein protein collectively from 12,225 isolates of SARS-CoV-2 from humans across many countries. List of countries where the epitope amino acids have mutations are given in right column. Abbreviation for each country is given in supplementary table 1

Predicted Antibody Epitopes with Mutations in E protein	Country with Mutations in Antibody Epitopes Residues
22AFV F LLVTLA L IT35	NA
58V V SRV K NLN S SR V PDL73	NA
4149AYCCNIV N V	NA
413F V SEETGLI	NA

SUPPLEMENTARY TABLE 20. List of predicted linear antibody epitopes with mutations highlighted in red colour in M-glycoprotein protein collectively from 12,225 isolates of SARS-CoV-2 from humans across many countries. List of countries where the epitope amino acids have mutations are given in right column. Abbreviation for each country is given in supplementary table 1

Predicted Antibody Epitopes with Mutations in M glycoprotein	Country with Mutations in Antibody Epitopes Residues
28 FLTWICLLQFAYANRNRF ^L Y 47	(33:ISL),(40:GBR;ENGLAND,GBR;SCOTLAND,CHN;JIAN,KOR,CAN),(46:NLD,GBR;WALES,IRL)
198 RYRIGNYKLNTDHSSSDNIAL ^L 220	(200:BEL),(209:DNK,USA,GBR;SCOTLAND,MYS,SGP),(210:CHN;GUANGDONG,DEU),(214:DNK,AUS,GBR;SCOTLAND)
69 AVYRINWIT ^G 78	(69:FRA,USA,GBR;ENGLAND),(70:USA,DNK),(78:GBR;ENGLAND,NLD;HOLLAND,CHN;SHENZHEN)
178 YYKLGASQRVAGDSGFA 194	(190:USA),(194:TUR)
157 GRCDIKDLPKEI 168	(158:USA,GBR;ENGLAND),(162:GBR;WALES,GBR;ENGLAND,ITA,BEL),(164:GBR;SCOTLAND,DNK)
1 MADSNGTITVEELKKLLEQWNL 22	(2:CHN;BEIJING,BGD,GBR;ENGLAND,LUX,RUS,LKA,PRT,BEL,ARE,COD),(3:GBR;ENGLAND,BEL,USA,CAN,NOR,ISR,COD,DNK,AUT,FRA,ISL,IND,GBR;SCOTLAND,LVA,RUS,LUX,SWE,CHE,CHN;BEIJING,KAZ,THA,ARE,LTU,ITA,SVK,PRT,AUS,FIN),(4:ARG,ITA,GBR;ENGLAND,CHN;SHANGHAI),(8:TWN,USA,GBR;SCOTLAND),(10:TUR)
99 SFRLFARTRSMWSPET ^N 117	(104:GBR;ENGLAND),(117:NLD)
145 LRGH 148	

SUPPLEMENTARY TABLE 21. List of predicted linear antibody epitopes with mutations highlighted in red colour in ORF6 protein collectively from 12,225 isolates of SARS-CoV-2 from humans across many countries. List of countries where the epitope amino acids have mutations are given in right column. Abbreviation for each country is given in supplementary table 1

Predicted Antibody Epitopes with Mutations in ORF6	Country with Mutations in Antibody Epitopes Residues
42 KSLTENKYSQLDEEQP 57	(42:GBR;ENGLAND,USA),(46:USA),(47:USA),(48:USA),(53:GBR;ENGLAND,AUS),(54:USA),(55:USA,GBR;WALES,FRA,GBR;NORTGERNIRELAND),(56:USA),(57:RUS,USA,GBR;SCOTLAND,SAU)
19 MRTFKVSIWNLDYI 32	(20:GBR;ENGLAND,COL,CHN;SENEGAL,HUN),(21:ESP;VALENCIA,GR C;ATHENS),(27:BGD,GBR;ENGLAND,SGP,GBR;SCOTLAND,AUS),(32:FRA,GBR;SCOTLAND)
1 MFHL 4	3:FRA,USA,IND;DELHI

SUPPLEMENTARY TABLE 22. List of predicted linear antibody epitopes with mutations highlighted in red colour in ORF7a protein collectively from 12,225 isolates of SARS-CoV-2 from humans across many countries. List of countries where the epitope amino acids have mutations are given in right column. Abbreviation for each country is given in supplementary table 1

Predicted Antibody Epitope with Mutations in ORF7A	Country with Mutations in Antibody Epitopes Residues
112-LCFTLKRKTE-121	(116:GBR;ENGLAND,ESP;MADRID),(120:PRT,GBR;ENGLAND,DEU,ITA,SGP)
80-RSVSPKLFIRQEVQELYSP-99	(80:CHN;GUANGDONG),(81:AUS,USA,GBR;SCOTLAND,NZL) , (91:CHN;SHANGHAI), (93:AUS,GBR;WALES), (97:NA), 98:USA), (98:USA)
42-GNSPFHPLADNKF-54	(44:GBR;SCOTLAND), (47:LUX,ISL), (50:GRB,ENGLAND), (54:CHN;SHANGHAI,BGD,USA)
1-MKIIL-5	(2:USA)
67-CPDGVK-72	(67:FRA,USA), (68:GRB, ENGLAND), (71:DNK,AUS)
23-CVRGTTVLLKEPCSSG-38	(28:USA,GBR;SCOTLAND,GBR;WALES,ISL), (29:USA,CAN,GBR;ENGLAND) (33:NA), (35:BGD), (37:GBR;ENGLAND,BEL,JPN,SAU), (38:GBR;ENGLAND,CHL;SANTIAGO,PRT,MEX,NLD)

SUPPLEMENTARY TABLE 23. List of predicted linear antibody epitopes with mutations highlighted in red colour in ORF8 protein collectively from 12,225 isolates of SARS-CoV-2 from humans across many countries. List of countries where the epitope amino acids have mutations are given in right column. Abbreviation for each country is given in supplementary table 1

Predicted Antibody Epitope with Mutations in ORF8	Country with Mutations in Antibody Epitopes Residues
103-SFYEDFLEYH-112	(103:NA), (106:ESP;MADRID), (111:BEL), (112:USA)
33-VDDPCPIHFYSKW-45	(35:AUS), (36:SAU,USA,GBR;ENGLAND,AUS,IND), (38:GBR;ENGLAND),(45:BEL,USA,GBR;ENGLAND)
14-AAFHQEC-20	(15:USA), 17:PRT)
71-IQYIDIGNYTV-81	(72:USA,TUR,FRA), (73:AUT,NLD,LVA), (74:NA), (75:CHN;SENEGAL), (76:NA), (77:CHL;SANTIAGO)
88-INCQEPKL-95	(88:USA),(89:NA),(91:GBR;ENGLAND), (92:SWE,UGA),(93:DNK),(94:NA),(95:USA)
23-QSCTQHQP-30	(25:CHN), (27:NA)
62-VDEAGSKS-69	(64:USA), (65:GBR;ENGLAND,BGD,CHL;SANTIAGO,GBR;NORTHERN IRELAND,SWE,ESP;MADRID,NLD,GBR;SCOTLAND,GRC,USA,AUS,FRA),(66:USA), (67:USA,GBR;ENGLAND,AUS,CHN;JINGZHOU), (69:USA)

SUPPLEMENTARY TABLE 24. List of predicted linear antibody epitopes with mutations highlighted in red colour in N-protein protein collectively from 12,225 isolates of SARS-CoV-2 from humans across many countries. List of countries where the epitope amino acids have mutations are given in right column. Abbreviation for each country is given in supplementary table 1

Predicted Antibody Epitope with Mutations in N-protein	Country with Mutations in Antibody Epitopes Residues
113-LGTG PE AGLPYGANKDGIWV ATE GAL NTP KD-144	(117:ISL),(119:AUT,NLD,DEU,ISL,LAT,GBR;ENGLAND,GBR;WALES,USA),(122:CHL;SANTIA GO,ESP;VALENCIA,ESP;MADRID,MEX,PRT,USA), (128:GBR;SCOTLAND,THA,USA,NLD,CHN;GUANGDONG ,GBR ;ENGLAND,DNK),(134:USA),(135:RUS,USA,GBR;ENGLAND,BEL, IND;BIHAR), (139:AUS,BEL,GBR;ENGLAND), (140:USA,RUS), (142:USA,SGP,GBR;ENGLAND), (143:NA), (144:CHL;PEURTO,TWN)
159-LQLP QG TTL PK GFYAEG-175	(161:GBR;ENGLAND,GBR;SCOTLAND), (163:USA,AUS), (168:GBR;ENGLAND,SGP,ISL,TWN,GBR;WALES), (171:NA)
56-L TQH G K EDL KF PR GG VP INT N SSP DD Q IGY-86	(60:AUS), (62:AUS,USA), (68:USA), (81:GBR;ENGLAND,USA)
231- ESK MS G K G Q Q Q G Q T V T K S-250	(231:NA), (232:USA,GBR;ENGLAND), (234:GBR;ENGLAND, GRC;ATHENS,NLD,JOR,SAU), (235:USA), (238:CHE,USA,NLD,COL COL;ANTIOQUIA), (243:AUS,NLD,ISR,GBR;SCOTLAND), (245:USA), (246:ITA,USP,USA), (247:USA,ISR,GBR;ENGLAND,FRA), (249:USA, CHN;WUHAN)
89- R ATRRIR G GD G K M KDLS P RW-108	(89:USA), (85:AUS), (97:RUS,GBR;WALES), (101:GBR;ENGLAND), (103:GBR;ENGLAND,GBR;SCOTLAND,UGAGBR;WALES,AUS,ISL, CHL;TALCA)
411- M SS A D S T Q A-419	(413:AUT,USA), (414:GBR;ENGLAND,FRA,ISL,RUS,GBR;WALES), (415:USA,RUS,LUX,FRA), (416:RUS,USA), (417:RUS,GBR;ENGLAND), (418:CHN;GUANGZHOU,HUN,ISL,CHN;GUANGDONG,RUS), (419: RUS,GBR;ENGLAND,ISR)
19- G PS D STGS N Q NG ERS G AR S KQRR P Q-43	(20:USA,DNK,GBR;ENGLAND), (21:NA), (22:GBR;ENGLAND,TWN, AUS,GBR;WALES,NZL), (23:USA,CHN;SHANGHAI), (27:GBR; ENGLAND), (30:CAN,GBR;SCOTLAND,USA,GBR;ENGLAND), (32:CHE,CAN,SWE,USA,GBR;SCOTLAND), (33:ISR,DEU,RUS, GBR;WALES,IND;GUJARAT;AHMEDABAD), (34:CAN,GBR; ENGLAND,CHE,GBR;SCOTLAND), (35:NLD,GBR;ENGLAND,USA), (36:GBR;ENGLAND)
361- K T F PP T EP K D K K K A D E T Q A L P Q R Q K K-388	(363:ISL,GBR;ENGLAND,GBR;SCOTLAND), (364:RUS,ARE, IND;TELANGANACHN,JPN,AUS), (365:USA,GBR;ENGLAND,HKG), (370:GBR;ENGLAND,RUS,USA,NLD), (371:RUS), (372:NA), (373:BGD,GBR;ENGLAND,USA,NLD,SGP,RUS), (377:BGD,USA, GBR;ENGLAND,NZL,DEU), (378:GBR;ENGLAND, GBR;SCOTLAND,FIN,FRA), (381:USA,RUS,ARE,GBR;WALES), (383:USA,CHN;SENEGAL,AUS), (384:RUS,BEL), (387:RUS), (388:NA)
340- D D K D P N-345	(340:USA,ESP;VALENCIA,GBR;SCOTLAND,BEL),(344:RUS,ARE,IND;TELANGANACHN,JP N,AUS)
293- R Q G T D Y K H-300	(300:GBR;ENGLAND,GBR;SCOTLAND,RUS)
184- S R S S R S R N S S R N S T P G S S R G T S P A-208	(185:USA,CHN;GUANGDONG), (185:CAN,DEU,CHN;SHANGHAI,IRN), (188:CHE,GBR;SCOTLAND,GBR;ENGLAND,USA,DNK,ISL,LUX, TWN,TUR,ARE,AUS,CAN,NLD;HOLLAND),(190:GBR;SCOTLAND,USA,AUS,GBR;ENGLAND ,NLD,JOR,RUS,GRC;ATHENS,GBR;WALES,VNM,AUT),(191:CHN;SICHUAN,USA,GBR;SCO TLAND,BEL,CHN;SHANGHAI,NLD,ARG,IND;TELANGANA,IND;GUJARAT;AHMEDABAD), (192:USA), (193:USA,GBR;ENGLAND,GBR;WALES,AUT,SGP,SWE, GBR;SCOTLAND,CHN;SHANGHAI,CHL;TEMUCO), (194:CHE,USA, IND;GUJARAT,CAN,BGD,THA,GBR;ENGLANDGBR;SCOTLAND,COL, GBR;WALES), (195:THA,GBR;WALES,GBR;ENGLAND,LUX,KAZ, BEL,TWN,FRA),(197:AUS,COL,CHL;SANTIAGO,USA,DNK;BARCELONA,GBR;ENGLAND,GB R;SCOTLAND,POL,GRC;ATHENS,ESP;VALENCIA,KAZ,IND;DELHI,ARG,ESP;MADRID,BRA, MEX,NLD, LUX,ESP;PAIS VASCO,ESP;PAIS VASCO,ESP;CASTILLAY LEONCHL;SANTIAGO,GEO,NLD,FRA), (198:GBR;ENGLAND,USA,AUS) (199:GBR;ENGLAND,USA,AUT,ARE,GBR;WALES,SGP), (200:USA), (202:GBR;ENGLAND,ISR,AUT,CHN;SICHUAN,UGA,USA,SWE,JOR, IND;MAHARASHTRA,BGD,GBR;ENGLAND,SWE,AUT,SAU,TUR, RUS,CHN;FUJIAN,AUS,CHN;SENEGAL,CHN;SHANGHAI,NLD,SGP) (203:USA,POL,CHE,AUS,BEL,UGA,IND;GUJARAT,SWE,RUS,LVA,THAEST,LTU,LBN,GBR;E NGLAND,CAN,NOR,GBR;NORTHERNIRELAND,GBR;SCOTLAND,COL,ISR,GBR;WALES,ES P,IND;TAMILNADU, CHL;SANTIAGO,DNK,AUT,JPN,CZE,SRB,FRA,SGP,HUN,VNM,GRC, TUR,JOR,BRA,FRA,DEU,NLD,ITA,KWT,PRT,IND), (204:LVA USA,CHE,AUS,BEL,UGA,POL,IND;GUJARAT,SWE,BGD,BRA,LVA,LTU,LBN,EST,THA,RUS, GBR;ENGLAND,CAN,NOR,GBR;SCOTLAND,GBR;NORTHERN IRELAND,COLGBR;WALES,ESP,CHL;SANTIAGO, DNK,AUT,FRA,GRC;ATHENS,TUR,SRB,HUN,VNM,SGP,,ITA, ARE,JOR,LUX,BRA,CZE,ISL,PRT), (205:CHE,GBR;ENGLAND,AUS,SWE,GRC,SGP,USA,GB R;WALES,CHN;BEIJING,RUS,JOR,ISLGBR;SCOTLAND), (207:GBR;WALES), (208:GBR;ENGL AND,SWE,ZAF,USA,TWN,AUS)
265-TKAY-268	

SUPPLEMENTARY TABLE 25. List of predicted linear antibody epitopes with mutations highlighted in red colour in ORF10 protein collectively from 12,225 isolates of SARS-CoV-2 from humans across many countries. List of countries where the epitope amino acids have mutations are given in right column. Abbreviation for each country is given in supplementary table 1.

Predicted Antibody Epitope with Mutations in ORF10	Country with Mutations in Antibody Epitopes Residues
21-MNSRNYI-27	(21:RUS),(23:GBR;ENGLAND,USA,GBR;WALES,GBR;SCOTLAND,RUS), (24:USA,ISR,AUS,RUS,GBR;ENGLAND,TWN,NLD), (25:RUS), (27:RUS)
31-DVVNFNLT-38	31:ESP;VALENCIA,DEU,RUS),32:RUS), 33:DNK,RUS), 35:RUS), 36:NA) 37:USA,AUS,RUS,THA), 38:GBR;ENGLAND,AUS,CHN;SHANGHAI,RUS)
8-AFPFT-12	8:USA,RUS), 9:RUS), 10:GBR;ENGLAND,GBR;SCOTLAND,ESP;VALENCIA, USA,RUS,FIN), 11:RUS), 12:JPN,GBR;WALES).