

Table S1: IgG epitopes mapped for Sars-CoV-2 Spike protein using a pool of sera from patients with COVID-19 disease and cross-reactivity against DENV serotypes 1-4 (Taxid: 12637).

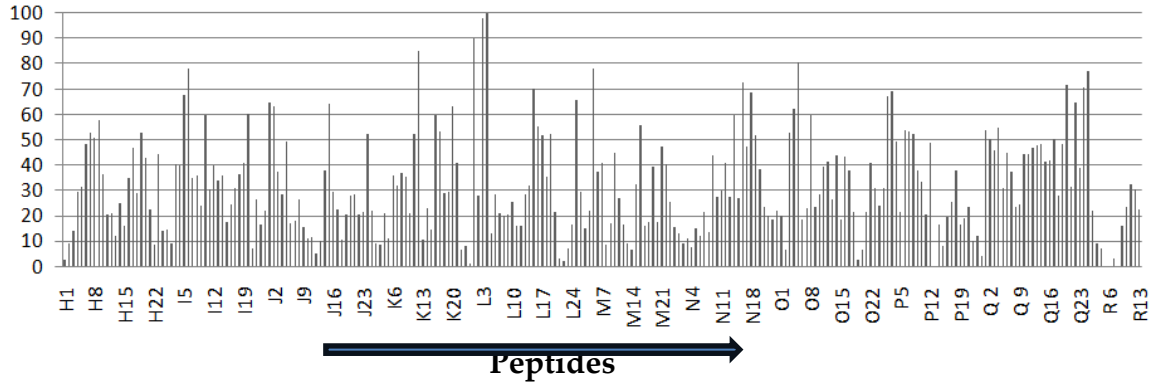
Peptides	Cross-reactivity*	Specificity
FNDGVYFASTEKSN	DENV2	Sars-CoV-2, BatCoV-RaTG13
DSKTQSLIVNNATN	DENV3	Sars-CoV-2, BatCoV-RaTG13
LGVYYHKNNK	No	Sars-CoV-2, BatCoV-RaTG13
LMDLEGKQGNFKNLR	DENV3	Sars-CoV-2, BatCoV-RaTG13
NLVRDLPQGF	No	Sars-CoV-2, BatCoV-RaTG13
RSVLTPGDSSS	Gram-positive bacteria and rodent	Sars-CoV-2, BatCoV-RaTG13
GAAAYYVGYL	No	Sars-CoV-2, BatCoV-RaTG13, SARS-CoV-1, MERS-CoV
GIYQTSNFRV	DENV2	Sars-CoV-2, BatCoV-RaTG13, SARS-CoV-1
KRISNCVADYSVLYN	No	Sars-CoV-2, BatCoV-RaTG13, SARS-CoV-1
YADSFVIRGD	No	Sars-CoV-2, BatCoV-RaTG13, SARS-CoV-1
GKIADYNYKL	DENV1	Sars-CoV-2, BatCoV-RaTG13, SARS-CoV-1
LDSKVGGNYN	No	SARS-CoV-2
LKPFERDIST	No	Sars-CoV-2, BatCoV-RaTG13, SARS-CoV-1
PLQSYGFQPTGVGY	No	Sars-CoV-2, BatCoV-RaTG13, SARS-CoV-1
NKKFLPFQQF	DENV2	Sars-CoV-2, BatCoV-RaTG13, SARS-CoV-1
DTTDAVRDPQ	No	Sars-CoV-2, BatCoV-RaTG13, SARS-CoV-1
NQVAVLYQDV	No	Sars-CoV-2, BatCoV-RaTG13, SARS-CoV-1
ADQLTPTWRV	No	Sars-CoV-2, BatCoV-RaTG13, SARS-CoV-1
IGAHEVNNSY	DENV2	Sars-CoV-2, BatCoV-RaTG13, SARS-CoV-1
TQTNSPRRAR	DENV 1 and 3	Sars-CoV-2, BatCoV-RaTG13, SARS-CoV-1
SIHAYTMSL	No	Sars-CoV-2, BatCoV-RaTG13, SARS-CoV-1
AYSNNIAIP	No	Sars-CoV-2, BatCoV-RaTG13, SARS-CoV-1
AVEGD	No	Sars-CoV-2, BatCoV-RaTG13
KQIYK	Several organisms and DENV2	Sars-CoV-2, BatCoV-RaTG13
DFGGF	Several organisms and DENV1	Sars-CoV-2, BatCoV-RaTG13, SARS-CoV-1, MERS-CoV
LPDPSKPSKRSFIED	DENV1 and 2	Sars-CoV-2, BatCoV-RaTG13, SARS-CoV-1, MERS-CoV
LPPLLTDEMI	DENV3	Sars-CoV-2, BatCoV-RaTG13, SARS-CoV-1, MERS-CoV, HCoV_OC43, HCoV_HKU1

ALLAGTITSGWTFGA	DENV1	Sars-CoV-2, BatCoV-RaTG13, SARS-CoV-1
QMAYRFNGIG	No	Sars-CoV-2, BatCoV-RaTG13, SARS-CoV-1, MERS-CoV
KLIANGFNSA	Fungi	Sars-CoV-2, BatCoV-RaTG13, SARS-CoV-1, MERS-CoV, HCoV_OC43, HCoV_HKU1, HCoV-NL63, HCoV-229E
VVNQNAQALN	DENV1	Sars-CoV-2, BatCoV-RaTG13, SARS-CoV-1, MERS-CoV, HCoV_OC43, HCoV_HKU1, HCoV-NL63, HCoV-229E
GAISSVLNDI	DENV1 and 3	Sars-CoV-2, BatCoV-RaTG13, SARS-CoV-1, MERS-CoV, HCoV_OC43, HCoV_HKU1
LITGRLQSLQ	No	Sars-CoV-2, BatCoV-RaTG13, SARS-CoV-1, HCoV-NL63, HCoV-229E
AEIRA	No	Sars-CoV-2, BatCoV-RaTG13, SARS-CoV-1
GYHLSFPQS	No	Sars-CoV-2, BatCoV-RaTG13, SARS-CoV-1
REGVFVSNGTHW	DENV3	Sars-CoV-2, BatCoV-RaTG13, SARS-CoV-1
EPQII	Several organisms	Sars-CoV-2, BatCoV-RaTG13, SARS-CoV-1
TVYDPLQPEL	No	Sars-CoV-2, BatCoV-RaTG13, SARS-CoV-1
KEIDRLNEVAK	Fungi, DENV1 and 3	Sars-CoV-2, BatCoV-RaTG13, SARS-CoV-1
SLIDLQELGK	No	Sars-CoV-2, BatCoV-RaTG13, SARS-CoV-1
FDEDDSEPMI	No	Sars-CoV-2, BatCoV-RaTG13, SARS-CoV-1

*Crossreactivity was performed using Basic Local Alignment Search Tool (BLAST) and were considered if sequences matches at least four amino acids

Figure S1:

A



B

H1	MFVFLVLLPLVSSQC	I8	EFRVYSSANNCTFEY	J1	FTVEKGIYQTSNFRV	9	
H2	VLLPLVSSQCVNLTT	I9	SSANNCTFEYVSQPF	J1		K2	FRKSNLKPFFERDIST
H3	VSSQCVNLTTTRTQLP	I1	CTFEYVSQPF LM DLE	J1	GIYQTSNFRVQPTES	K2	
H4	VNLTTTRTQLPPAYTN	I1	VSQPF LM DLE EG KQGN	J1	SNFRVQPTESIVRFP	1	LKPFFERDISTEIQQA
H5	RTQLPPAYTN SF TRG	I1		J1	QPTESIVRFPNITNL	2	RDISTEIQAGSTPC
H6	PAYTN SF TRGVYYPD	I1	LM DLE EG KQGN FN KNL	J1	IVRFPNITNLCPFGE	3	EIQAGSTPCNGVEG
H7	SF TRGVYYPDKVFRS	I1	GK QGN FN KNLREFVFK	J1	NITNLCPFGEVFNAT	4	GSTPCNGVEGFNCYF
H8	VY YPDKVFRSSVLHS	I1	FN KNLREFVFKNIDGY	J2	CPFGEVFNATRFASV	L1	NGVEGFNCYF PL QSY
H9	KV FRSSVLHSTQDLF	I1	EFVFKNIDGYFKIYS	J2	VFNATRFASVYAWNR	L2	FNCYF PL QSYGFQPT
H1	SV LHSTQDLFLPFFS	I1	NIDGYFKIYSKHTPI	J2	RFASVYAWNRKRISN	L3	PL QSYGFQPTNGVG
H1	TQDLFLPFFSNVTWF	I1	FKIYSKHTPI NL VRD	J2	YAWNRKRISNCVADY	L4	GF QPTNGVGYPYRV
H1	LPFFSNVTWFHAIHV	I1	KHTPI NL VRDL PQ GF	J2	KRISNCVADYSVLYN	L5	NGVGYPYRVVVL
H1	NVTWFHAIHVSGTNG	I1	NL VRDL PQ GFSALEP	K1	CVADYSVLYNSASF	L6	QPYRVVLSFELLHA
H1	HAIHVSGTNGTKRFD	I2	LP QGFSALEPLVDLP	K2	SVLYNSASFSTFKCY	L7	VVLSFELLHAPATVC
H1	SGTNGTKRFDNPVLP	I2	SALEPLVDLPIGINI	K3	SASFSTFKCYGVSPT	L8	ELLHAPATVCGPKKS
H1	TKRFDNPVLP FND GV	I2	LVLDLPIGINITRFQT	K4	TFKCYGVSPTKLNDL	L9	PATVCGPKKSTNLVK
H1	NPVLP FND GVYFAST	I2	IGINITRFQTLALH	K5	GVSPTKLNDLCFTNV	L1	GPKKSTNLVKNKCVN
H1	FND GVYFASTEKSNI	I2	TRFQTLALHRSYLT	K6	KLNDLCFTNV YAD SF	L1	TNLVKNKCVNFNFNG
H1	YF ASTEKSNIIRGWI	J1	LLALHRSYLT PGD SS	K7	CFTNV YAD SFVIRGD	L1	NKCVNFNFNGLTGTG
H2	EK SNIIRGWIFGTTL	J2	RS YLT PGD SSSGWTA	K8	YAD SFVIRGDEVRQI	L1	FNFGTLGTGVLTES
H2	IRGWIFGTTLDSKTQ	J3	PGDSSSGWTAGAAAY	K9	VIR GDEVRQIAPGQT	L1	LTGTGVLTES NKK FL
H2	FGTTLDSKTQSLIV	J4	SGWTAGAAAYYVGYL	K1	EVQRQIAPGQTGKIAD	L1	VLTES NKK FL PF QQF
H2	DS KTQSLIVNNTATN	J5	GAA AYYVGYLQPRTF	K1	APGQT GKI ADYNYKL	L1	NKK FL PF QQFGRDIA
H2	SLIVNNTATNVVIKV	J6	YVGYLQPRTFLLKYN	K1	GKI ADYNYKL PDD FT	L1	PF QQFGRDIAD TTD A
I1	NNATNVVIKVCEFQF	J7	QPRTFLLKYNENGTI	K1	YNYKL PDD FTGCVIA	L1	GRDIAD TTD AVRDPQ
I2	VVIKVCEFQFCNDPF	J8	LLKYNENGTITDAVD	K1	PDD FTGCVIAWNSNN	L1	DTT DAVRDPQTLEIL
I3	CEFQFCNDPF LG VYY	J9	ENGTITDAVDCALDP	K1	GCVIAWNSNNLDSKV	L2	VRDPQTLEILDITPC
I4	CNDPF LG VYYHKNK	J1	TDAVDCALDPLSETK	K1	WNSNN LDS KVGGNYN	L2	TLEILDITPCSFGGV
I5	LG VYYHKNKSWMES	J1	CALDPLSETKCTLKS	K1	LDS KVGGNYN YL YRL	L2	DITPCSFGGVSVITP
I6	HK NNKSWMESEFRVY	J1	LSETKCTLKSFTVEK	K1	GGNYN YL YRLFRKSN	L2	SFGGVSVITPGTNTS
I7	SW MESEFRVYSSANN	J1	CTLKSFTVEKGIYQT	K1	YLYRLFRKSNLKPFE	L2	SVITPGTNTSNQVAV

M1 GTNTSNQVAVLYQDV
M2 NQVAVLYQDVNCTEV
M3 LYQDVNCTEVPVAIH
M4 NCTEVPVAIHADQLT
M5 PVAIHADQLTPTWRV
M6 ADQLTPTWRVYSTGS
M7 PTWRVYSTGSNVFQT
M8 YSTGSNVFQTRAGCL
M9 NVFQTRAGCLIGAETH
M1 RAGCLIGAETHVNNYSY
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2
M1 ECDIPIGAGICASYQ
3
M1 IGAGICASYQTQNTS
4
M1 CASYQTQNTSPRRAR
5
M1 TQNTSPRRARSVASQ
6
M1 PRRARSVASQSIIAY
7
M1 SVASQSIIAYTMSLG
8
M1 SIIAYTMSLGAENSV
9
M2 TMSLGAENSVAYSNN
0
M2 AENSVAYSNNISAIIP
1
M2 AYSNNISAIIPTNFTI
2
M2 SIAIPTNFTISVTTE
3
M2 TNFTISVTTEILPVS
4
N1 SVTTEILPVSMTKTS
N2 ILPVSMTKTSVDCTM
N3 MTKTSVDCTMYICGD
N4 VDCTMYICGDSTECs
N5 YICGDSTECsNLLQ
N6 STECSNLLQYGSFC
N7 NLLQYGSFCTQLNR
N8 YGSFCTQLNRALTGI
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N1
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7 NFSQILPDPSKPSKR

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N1
9 KPSKRSFIEDLLFNK
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1 LLFNKVTLADAGFIK
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O5 LPLLTDEMIAQYTS
O6 TDEMIAQYTSALLAG
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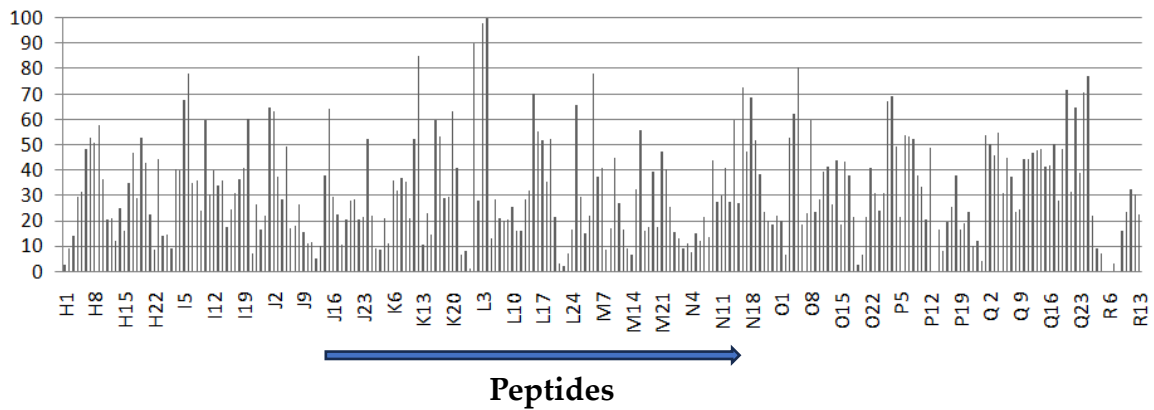
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R
5 IAGLIAIVMVTIMLC
R
6 AIVMVTIMLCCMTSC
R
7 TIMLCCMTSCCCLK
R
8 CMTSCCCLKGCCSC
R
9 CCLKGCCSCGSCCK
R1
0 GCCSCGSCCKFDEDD
R1
1 GSCCKFDEDDSEPV
R1
2
R1
3

SARS-CoV-2	---	MFVFLVLLPLV---	SSQCVNLT---	TRTQLPPAYTNSFTR---	GVY-----	YP-DKVFR	44						
SARS	---	MFIFLLLTLT---	SGSDLDRC	TFDDVQAPNYTQHTSSMR---	GVY-----	YP-DEIFR	48						
MERS-CoV	MIHSVFLIMLLTPTESYVDVGPDSVKASACIEVDIQQTFDDKTWPR---	PIDVSKADGI---				YPQGRYS	65						
HCoV OC43	---	MFILILLISLPT-AFAVIG---	DLKCTSDNIND---	KDTGPPPISTDTVDVTNGLGTY---		YVLDRVYL	58						
HCoV NL63	---	MKLFILILVPLASCFTTCNSNA-NLSMLQLGVPD	NSSTIVTGLLPHWFCANQSTSVYSANGFFYIDVGNHRS	AFALHTGYDANQYYI	YV	VTNEIGL	97						
HCoV HKU1	---	MFIIIFILPTT-LAVIG---	DFNCTNSFIND---	YNKTIPIRISEDVVDVSLGLGTY---		YVNLRVYL	57						
HCoV 229E	---	MFVLLVA-----				YAL-----	10						
BatCoV-RaTG13	---	MFVFLVLLPLV---	SSQCVNLT---	TRTQLPPAYTNSSTR---	GVY-----	YP-DKVFR	44						
SARS-CoV-2	SSV-----		LHSTQDLFLPF-----	FSNVTWFHAIHVS	SGTNGTKR-----		78						
SARS	SDT-----		LYLTQDLFLPF-----	YSNVTGFHTINH	T-----		75						
MERS-CoV	NIT-----		ITYQG LFPYQG-DHGD	MYVYSAGHATGTPQKL-----			10						
HCoV OC43	NTT-----		LFNG YPPTSGSTYR	NMALKGSVLLSRLWFKPP-----			94						
HCoV NL63	NASVTLKICKFSRNTTFDFLSNASSS	FD	CIVNL	LFTEQLGAPLGITISGETVRLHLNVN	TRTFYVPAAYKLTKLSVKCYFNYSCVFSV	VNATVTVNV	197						
HCoV HKU1	NTT-----		LFTG YFPKSGAN	FRDLALKGSKYLSTLWYKPP-----			93						
HCoV 229E			LHIAG-----	CQTTNGLNTSYS-----			27						
BatCoV-RaTG13	SSV-----		LHLTQDLFLPF-----	FSNVTWFHAIHVS	GTNGIKR-----		78						
SARS-CoV-2	---	FDNP---	VLPNDGVYFASTEKSN	NIIRG-----	WIFGTTLDSKT-----	QSLIVNN	ATNVV 127						
SARS	---	FGNP---	VIPKDGIIYFAATEKSN	VVRG-----	WVFGSTMNKS-----	QSVIIINN	STNVV 124						
MERS-CoV	---	LVANYSQDVQKANGF-VVRIGAAANS	GTGTVIISP	TSATIRKIYPAFMLGSSVGNFSDGKMGRF	NHTLVLLP-----	DGCGT	178						
HCoV OC43	---	FLSD---	FINGI-FAKVNKT	VKIDRVMYSE-----	FFAITIGSTFVN	TS	YSVVVQPTINSTQDGDNLQGLLE 160						
HCoV NL63	---	NGRVVNYTVCD	---	CNGYTDNI-FSVQDGRIPNGFP-----	FNNWFL--LTNGS-----	TLV-----	DGVS	250					
HCoV HKU1	---	FLSD---	---	FNGI-FSKVNKT	ILYVNNTLYSE-----	FSTIVIGS	VEFN	TS-----	YTVVQPH-----	NGILE	147		
HCoV 229E	---	VCNG---	CVGSEN	VAVESGGY	IPSDFA-----	FNNWFL--LTNTS-----	SVV-----	DGVR	72				
BatCoV-RaTG13	---	FDNP---	VLPNDGVYFASTEKSN	NIIRG-----	WIFGTTLDSKT-----	QSLIVNN	ATNVV 127						
SARS-CoV-2	IKVCE	QFCNDPFL	VYYHKNKNSWMESE	FRVYSSANNCTFEYVSQ	PFLMLEGKQGN	KNLRE-----	FVFNKIDGYFKIY	YSK-----	HTPI	210			
SARS	IRACN	FELCDNPF	---	SKPMGTQTHM--IFDNA	FNCTFEYISDAFSLD	VSERSENKRE-----	FVFNKIDGFLVY	YKG-----	YQPI	203			
MERS-CoV	LLRAF	YCILE-PRSEN-	---	CPAGNSYTSFATYHT	PATDC-----	SDGNYNRNASLSE	KEYFN-----	LRNCTFM	YTYNITEDEILEW	FGITQTAQGVHL 265			
HCoV OC43	SVSCQ	YNMCEYPQT	---	---	ENPNLGNHRKEL	WHLDTGVVSC-----	LYKRNFTYDV	NADLYEHFYQE-----	GGTFYAYFT-----	228			
HCoV NL63	LYQPL	RLTCLNFPV	---	EL-KSTGTFVY--FNATGSD	VNVC-----	NGYQHSVVDV	VMRNLNFSANS	LDNLKSGVIV	EKTLQYDVLFYCS-----	NSSSG 334			
HCoV HKU1	ITACQ	LTMCYPH	---	TC--KSKGSIRNES	SWHIDSSPELC-----	LFKKNFTY	NVSADWLYEHFYQE-----	RGVFY	AYYA-----	214			
HCoV 229E	SFQPLL	NCLWSVSE	---	EL--RFTTGFVY--FN-GTGR	GDCC-----	KGFS	SDVLS	DVIRNLNFE-----	ENLRRGTILFK	TSYGVVVFYCT-----	NNTLV 15		
BatCoV-RaTG13	IKVCE	QFCNDPFL	VYYHKNKNSWMESE	FRVYSSANNCTFEYVSQ	PFLMLEGKQGN	KNLRE-----	FVFNKIDGYFKIY	YSK-----	HTPI	210			
SARS-CoV-2	NLVRDL	PQG--FSALE	PLVDLP	IGINITRFQT--LLALHRS	YLT	PGDSSSGWTA	GAAGAAVY--GY	QPRTE	LLKYNENG	TTDAVDCALDPLSE	TKTCLKS 305		
SARS	DVVRDL	PSG--FNTL	KPIFKLP	IGINITNFA-----	ILTA	FSPAQDI--WGT	SAAAYF-VGY	KPTTE	MLKYDENG	TTDAVDCSQNPLAE	LKCSVKS 292		
MERS-CoV	FS	SRVLDY--GGN	MFQFATLP	VDYTIKYYSI--IPHS	SIRSIQSDR-KA--W--	---	AAAFV-VYK	QPLTE	LD	FSVDGVI	IRRAIDCGFN	DLSSQLHCSYES 353	
HCoV OC43	---	DTGV	VTK--F--	LFNVY	GMALSHYYV--MPLT	CNSKLT-----	LEYW-VTP	TSRQY	LLAFNQDGI	IFNAEDCMS	DFMSEIKCKTQS 304		
HCoV NL63	VLDT	TI	FP	GPSSQPYCYCFNSTINTH	TVSTFVGLIPPTVREIVARTGQ--FYINGE	KYVDELGF	EA	VN	NTTASA--TD	FWTVA	FATFVDVLVNVSA 429		
HCoV HKU1	---	DVG	MPTT--F--	LFSLY	LTILSHYYV--MPLT	CKA	ISSNTDNE-----	TEYW-VTP	SRQY	LLN	FEDEHGVITNA	VDCCSSSELSI	QCKTQS 296
HCoV 229E	SGDA	H	IFPGTVLGNFYCFVNTTIGNET	TS	SAFVGALPKTVREFVIS	RTGH--FYINGY	RTLEN	EA	VN	NTTAAET--TD	FCTVALAS	YADVLVNVSQ 246	
BatCoV-RaTG13	NLVRDL	PPG--FSALE	PLVDLP	IGINITRFQT--LLALHRS	YLT	PGDSSSGWTA	GAAGAAVY-VGY	QPRTE	LLKYNENG	TTDAVDCALDPLSE	TKTCLKS 305		
SARS-CoV-2	FTVEKGI	YQTSNFRVQPTESIV-RFPN	TNLCP	FGFEVFNATFRASVYAWNRRKISNCVADYSVL	YNSTSFSTFKCYGVSPTK	LN	DL	CFTN	VYADSFVIRG 404				
SARS	FEIDKGI	YQTSNFRVQPTESIV-RFPN	TNLCP										

HCoV 229E	-----AMPIVAN-----WAYSYYT-----IGSLYVSWSDG-----	422
BatCoV-RaTG13	-----NGQTGLNC-----YY-----PLYRYGYFPT-----DGVGHQPYRVVLSFE-----	516
SARS-CoV-2	-----LLHA-----PATVCGPKK-----STNLV-----KNKCVNFNFNGLTGTGVLTESNKKFL-PFQQFGRDIADTTDAVRDPQTLEILDTPCSFGGVSVI	598
SARS	-----LLNA-----PATVCGPKL-----STDLI-----KNQCVNFNFNGLTGTGVLTPSSKRQ-PFQQFGRDVSDFDTSVRDPKTSLEILDSPCSFGGVSVI	584
MERS-CoV	-----VQYGTDTNSVCPKLEFANDTKIASQGNVEVSLYGVSGRVFQNCNTAVGV-RQRFVYDAYQNLVGYYS-DDGNYYCLRACVSPVPSVI	662
HCoV OC43	GDRCNIFANFILDHVNLSGLTCSDDLQKANTDII--LGVVNYDLYGILGQGFVEVYATYNSWQNLLYDSNGNLYGFRDYIINRTFMRSCYSGRVSA	682
HCoV NL63	-----NSI--TGVPYPVSGIREFSNLV--LNNCTKYNIDYVGTGIIRSSQSLAGGITYV--SNSGNLLGFKNVSTGNIFIIVTPCNQPDQVAV	686
HCoV HKU1	NNRCNIFSNFIFNGNSGTCSNDLLYSNTEVS--TGVVNYDLYGILGQGFKEVSAAYYNNWQNLLYDSNGNIIGFKDFLTNKTYYTLPCYSGRVSA	680
HCoV 229E	-----DGI--TGVPQPVGVGSSFMNV--LDKCTKYNIDYVSGVGIRVSDTLNGITYT--STSGNLLGFKDVTKGTIYSITPCNPPDQLVV	505
BatCoV-RaTG13	-----LLNA-----PATVCGPKK-----STNLV-----KNKCVNFNFNGLTGTGVLTESNKKFL-PFQQFGRDIADTTDAVRDPQTLEILDTPCSFGGVSVI	598
SARS-CoV-2	TPGTNTSNQVAVLYQDVNCTEVPVAIHA-----DQLTPTWRVYSTGSNVFQTRAGCLIGAEHVNS--YECDIPIGAGICASYQT-QTNSPRRARSVAS	689
SARS	TPGTNASSEVAVLYQDVNCTDVSTAIHA-----DQLTPAWRIYSTGNVNFQTAGCLIGAEHVDTS--YECDIPIGAGICASYHTVSLLR-----TSQ	671
MERS-CoV	Y--DKEIKTHATLFGSVACEHISSTMSQYSRSTRMVKRRDSTY-----GPLQTPVGCVLGLVNSSLF-VEDCKPLPGQSLCALPDPSTLTPSVRSVPG	755
HCoV OC43	F--HANSEPALFLFNKICNYVFN-----NSLTRQLQPI-----NYFD SYLGCVVAYNSTAISVQTCDLTVGSGQCVDS--KNRRSCACITTG	764
HCoV NL63	Y-----QQSIIAMTAVNESRYGLQ-----NLLQLPNFY-----VSGGNCTTAVMTYSNF-----GICADGSL-IPVRPN-----	749
HCoV HKU1	F--YQNSSSPALLYRNKCSYVL-----NNISFISQPF-----YF SYLGCVLNAVNLTSYSVSSCDLRMGSGFCIDYALPSSRRKRRGIHSPY	762
HCoV 229E	Y---QQAVVCAMLSENFSTSYGFS-----NVVELPKFFY-----ASNGTYNCTDAVLTYSF-----GVCADGSI-IAVQFN-----	568
BatCoV-RaTG13	TPGTNASNQVAVLYQDVNCTEVPVAIHA-----DQLTPTWRVYSTGSNVFQTRAGCLIGAEHVNS--YECDIPIGAGICASYQTQTNRS-----SVAS	685
SARS-CoV-2	QSIIAYTMSLGAENSVAYSNNS---IAIPTNFTISVTTEILFVMTKTSVDCMTYICGDSTECSNLLQYGSFCTQLNRAITGIAVEQDKNTQEVFAQVK	786
SARS	KSIVAYTMSLGADSSIAYSNNT---IAIPTNFSISITTEVMPVSMAKTSVDCNMYICGDSTECANLLQYGSFCTQLNRAISGIAAEQDRNTEVFAQVK	768
MERS-CoV	EMRLAS-IAFNHPIQVDQLNSSYFKLSIPTNFSFGVTQEYIQTIIQKVTVDCKQYVNGFKQCEQLLREYGGQFCSKINQALHGANLRQDSDVRNLFASV	854
HCoV OC43	RFTNFPEFTVNSVNSDLEPVGGLEYEQIPSEFTIGNMVEFIQTSSPKVTIDCAAFVCGDYAAKSQLVEYGSFCDNINAILTEVNELLDDTQLQVANSLM	864
HCoV NL63	-----SSDNGISAIITAN-----LSIPSNWTTTSVQVEYLIQISTPIVVDCAITYVNGNPRCKNLKQYTSACKTIEDAIRLSAHLETNDVSSMLTFDS	837
HCoV HKU1	RFVTFEPFNVSFVNSDSEVETVGGLEFIQIPTNFTIAGHEFIQTSSPKVTIDCSAFVCSNYAACHDLSYEGTFCNDINSIINEVDLLDITQLQVANALM	862
HCoV 229E	-----VSYDSVSAIVTAN-----LSIPSNWTTTSVQVEYLIQISTPIVVDCAITYVNGNPRCKNLKQYTSACKTIEDAIRLSAHLETNDVSSMLTFD	862
BatCoV-RaTG13	QSIIAYTMSLGAENSVAYSNNS---IAIPTNFTISVTTEILFVMTKTSVDCMTYICGDSTECSNLLQYGSFCTQLNRAITGIAVEQDKNTQEVFAQVK	782
SARS-CoV-2	QIYKTPPIKDFG----G-FNFSQILPD-PSK---PSKRSFIEDLLFNKVTTLADAGFIKQ-YGDCI--GDIAARDLCAQKFNGLTVLPLLTDEMIAY	873
SARS	QMKTPPLKYFG----G-FNFSQILPD-PLK---PTKRSFIEDLLFNKVTTLADAGFMKQ-YGDCI--GDINARDLCAQKFNGLTVLPLLTDDMIAY	855
MERS-CoV	SSQSSPIIPGFG-----GDFNLTLLEPVSIISGTS-RSARSAIEDLLFDKVTIADPGYMQG-YDDCMQGPASARDLCAQYVAGYKVLPLMDVNMEAA	947
HCoV OC43	NGVTLSTKLKDGVNFDVNDINFSVPLGCLGSECSKASSRAIEDLLFDKVKLSDVGFVEA-YNNCT--GGAEIRDLICVQSYKGIKVLPLLENQISGY	961
HCoV NL63	NAFSLANVTSG-----D-YNLSSVLPQRNIRSRRIAGRSALIEDLLFSKVTSGLCTVDVDYKSC--KGLSADLACAQYNGIMVLPGVADAERMAM	929
HCoV HKU1	QGVTLSSNLNTNLHSDVDNIDFKSLGCLGSGCQ-SSRSLELLELFFNKVKLSDVGFVEA-YNNCT--GGSEIRDLICVQSFNGIKVLPLPILSETQISGY	958
HCoV 229E	KAFTLANVSSFG-----D-YNLSSVIPSPLTSGSRVAGRSALIEDILFSKLVTSGGLCTVDADYKSC--KGLSADLACAQYNGIMVLPGVADAERMAM	748
BatCoV-RaTG13	QIYKTPPIKDFG----G-FNFSQILPD-PSK---PSKRSFIEDLLFNKVTTLADAGFIKQ-YGDCI--GDIAARDLCAQKFNGLTVLPLLTDEMIAY	869
SARS-CoV-2	TSALLAGTITSGWTFAGAAQIPFAMQMAYFNGIGVTONVLYENQKLIANQFNSAIGKIQDSLSSSTA-----SALGKLQDVVNQNAQAL	959
SARS	TAAVLSGTATAGWTFAGAAQIPFAMQMAYFNGIGVTONVLYENQKLIANQFNSAIGKIQDSLSSSTA-----TALGKLQDVVNQNAQAL	941
MERS-CoV	TSSILGSIAGWTFAGLSFPAIPFAQSIIFYRLNGVIGITQVLSENQKLIANKFNKALGAMQTGFTTTN-----EAFHKVQDAVNNAQAL	1033
HCoV OC43	TLAATSASLFPWTA-----AGVPEFLNVQYRINGLGVTMDVLQSQKLIANAFNNAIYATQEGFDATN-----SALVKIQAUVNANAQAL	1043
HCoV NL63	TGSLIGGMVLGGLTSA-----AAIPFSLALQARLNYVALQTDVLIQENQKILASFNKAINNVASFSSVNDAITQTAEAIHTVTIILNKIQDVVNQQAQ	1025
HCoV HKU1	TTAATVAAFPFPWTA-----AGVPEFLNVQYRINGLGVTMDVLQSQKLIANAFNNAIYATQEGFDATN-----SALAKIQSVVNANAQAL	1040
HCoV 229E	TGSLIGGIALGGLTSA-----VSIPFSLAIQARLNYVALQTDVLIQENQKILASFNKAMTNIVDAFTGVNDAITQTSQALQTVATAILNKIQDVVNQQAQ	844
BatCoV-RaTG13	TSALLAGTITSGWTFAGAAQIPFAMQMAYFNGIGVTONVLYENQKLIANQFNSAIGKIQDSLSSSTA-----SALGKLQDVVNQNAQAL	955
SARS-CoV-2	NTLVKQISSNFGAISSVLNDILSRDLKVEAEVQIDRLITGRLQSLQTYVVTQQLIRAAEIRASANLAATMSECVLGQSKRVDFCQGYHMSFPQAPFH	1059
SARS	NTLVKQISSNFGAISSVLNDILSRDLKVEAEVQIDRLITGRLQSLQTYVVTQQLIRAAEIRASANLAATMSECVLGQSKRVDFCQGYHMSFPQAPFH	1041
MERS-CoV	SKLASEISNTGFAISAGIDIIQRLDVLQDAQVLDRLINGRLTLNFAVQQLVRSESAALSAQLAKDVNECVKAQSKRGFCQCTHIVSVVNAFNG	1133
HCoV OC43	NNILQQLSNRFGAISASLQELSRDLDALEAEQIDRLINGRLTALNAYVSQQLSDSTLVKFSAAQAMEVNECVKSSSRINFCGNCNTHISIVNAPYG	1143
HCoV NL63	NHILSQIRNFGAISNSIQAYDRDLDSIQADQVDRITGRLAALNAFVSQQLNKYTEVRGSRRLAQKINECVKSSQNRINFCGNCNTHISIVNAPYG	1125
HCoV HKU1	NNILQQLFNKFGAISLQELSRDLDALEAEQVQVDRITGRLAALNAFVSQQLSDITLIKAGSRAIEVNECVKSSQNRINFCGNCNTHISIVNAPYG	1140
HCoV 229E	NHILSQIRNFGAISNSIQAYDRDLDSIQADQVDRITGRLAALNAFVSQQLSDITLIKAGSRAIEVNECVKSSQNRINFCGNCNTHISIVNAPYG	944
BatCoV-RaTG13	NTLVKQISSNFGAISSVLNDILSRDLKVEAEVQIDRLITGRLQSLQTYVVTQQLIRAAEIRASANLAATMSECVLGQSKRVDFCQGYHMSFPQAPFH	1055
SARS-CoV-2	VVFLHVTVYVPAQEKNETTAPAIACHD---KAHFPREGVFF--SNGTH-----WFVITQRNFEPQIITDNTFVSGNCDVIGIVNNTVYDPLQPEL--DS	1147
SARS	VVFLHVTVYVPAQEKNETTAPAIACHG---KAYFPREGVFF--FNCTS-----WFVITQRNFEPQIITDNTFVSGNCDVIGIVNNTVYDPLQPEL--DS	1129
MERS-CoV	LYFMHVGYYPNHNIEVVSAYGLCDAANPTNCIAPVNGYFI--KTNNTRIVDEWSYTGSSFYAPEPITSLNKTIVAP-QVYTYQNISTNLPPPLGNSTGID	1230
HCoV OC43	LYFIHFSYVPTKYTVARVSPGLCAGD--RGAPKSGYFF--NVNNT-----WMYTGSGSYYPEPITENNVVMSTCAVNYTKAPYVMLNTSIPNL--PD	1232
HCoV NL63	LLFLHTVLLPTDYKKNVKAWSGICVDGI--YGVVLQPNLVLYSNGV-----FRVTSRVMEQRLPEVLSDFVQIYNCNVTFVNISRVLEHTVTPDY--VD	1216
HCoV HKU1	LLFIHFSYKPTSFKTVLVSPGLCLSGD--RGAPKQGYFI--KQNS-----WMFYGSSSYYPEPISDKNVFMNSCSVFTKAPFYIYNNSIPNL--SD	1229
HCoV 229E	LVFLHTVLLPTDYKKNVKAWSGICVDGT--NGVVLQPNLVLYSNGV-----YRITSRIMEPRIPMTADFQIENCNVFTNISRSELQTVPEY--ID	1035
BatCoV-RaTG13	VVFLHVTVYVPAQEKNETTAPAIACHD---KAHFPREGVFF--SNGTH-----WFVITQRNFEPQIITDNTFVSGNCDVIGIVNNTVYDPLQPEL--DS	1143
SARS-CoV-2	FKEELDRY-FKNHTSPDVLDGDISGINASVNNIQKEID-----RLNEVAKNLNESLIDLQELGKYEQYIKWPWYIWLGFIAGLIAIVMTI	1232
SARS	FKEELDRY-FKNHTSPDVLDGDISGINASVNNIQKEID-----RLNEVAKNLNESLIDLQELGKYEQYIKWPWYIWLGFIAGLIAIVMTI	1214
MERS-CoV	FQDELDEF-FKNVTSIPNFGSLTQINTLLDLTYEML-----SLQGVVKALNESYIDLKELGNYYTNKWPWYIWLGFIAGLIALALCVF	1315
HCoV OC43	FKEELDQW-FKNQTSVAPDL-SLDYINVTFLDLQVEMN-----RLQEAIKVLNQSYINLKDICTGYEYVVKWPWYIWLGFIAGLIALVLLF	1316
HCoV NL63	VNKTQLQEAQNLPKYVKPNF-DLTPFNLTLYNLSELKQLEAKTASLFQTTVELQGLIDQINSTYVDLKLNRNFENYIKWPWVWLIISVVFVLLSLV	1315
HCoV HKU1	FEAEFSLW-FKNHTSIAPNLTFSHINATFLD-----	1260
HCoV 229E	VNKTQLQELSYKLPNYTPDL-VVEQYNQITLNLTSISTLENKSAELNYTVQKLQTLIDNINSTLVDLKWLNRVETIYKWPWVWLIISVVFVLLSMLL	1134
BatCoV-RaTG13	FKEELDRY-FKNHTSPDVLDGDISGINASVNNIQKEID-----RLNEVAKNLNESLIDLQELGKYEQYIKWPWYIWLGFIAGLIAIVMTI	1228
SARS-CoV-2	MLCCMTSCCCLKGCSCGSCCKFEDDDSEPVLGKVKLHYT	1273
SARS	LLCCMTSCCCLKGCSCGSCCKFEDDDSEPVLGKVKLHYT	1255
MERS-CoV	FILCCTGCGTNCMGLKCNRC--DRYEEYD-LEPHKVHVH	1353
HCoV OC43	FICCCTGCGT--SCFKKCGGCC--DDYTGQYQELVIKTSDD	1353
HCoV NL63	FCCLSTGCCGCCNCLTSSMRGCCDCGSKLPPYEFKVVHQ	1356
HCoV HKU1	-----	1260
HCoV 229E	LCCSTGCCGFFSCFASIRGC--CESTKLPHYDVEKIHIQ	1173
BatCoV-RaTG13	MLCCMTSCCCLKGCSCGSCCKFEDDDSEPVLGKVKLHYT	1269

Figure S3: Multiple sequence alignment of Sars-CoV-2 Spike protein [P0DTC2] and endemic coronaviruses. Identified cross-reactive sites (yellow), correspondent identical residues (red) in coronaviruses (Sars-CoV-1 [P59594], MERS-CoV [K9N5Q8], HCoV-OC43 [P36334], HCoV-NL63 [Q6Q152], HCoV-HKU1 [Q14EB0], HCoV-229E [P15423], BatCoV-RaTG13 [A0A6B9WHD3]), similar amino acids (gray) were highlighted. Analysis was performed using MEGA11 software and alignment using the MUSCLE algorithm.

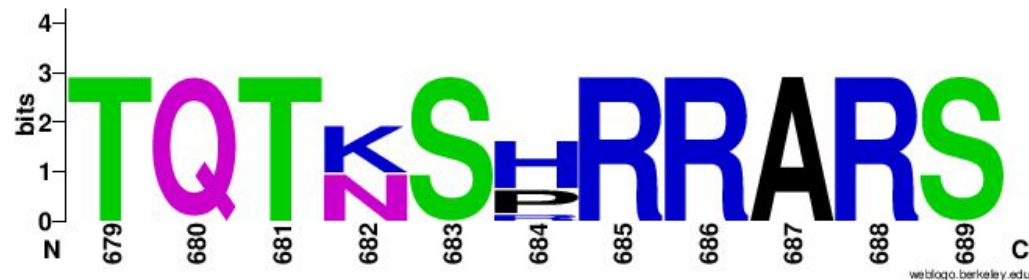
A



B

H1	MFVFLVLLPLVSSQC	I3	CEFQFCNDPFLGVYY	J5	GAAAYVGYLQPRTF	K7	CFTNVYADSFVIRGD
H2	VLLPLVSSQCVNLTT	I4	CNDPFLGVYYHKNNK	J6	YVGYLQPRTFLLKYN	K8	YADSFVIRGDEVQRI
H3	VSSQCVNLTTTRTQLP	I5	LGVIYHKNNKSWMES	J7	QPRTFLLKYNENGTI	K9	VIRGDEVQRIAPGQT
H4	VNLTTTRTQLPPAYTN	I6	HKNNKSWMESEFRVY	J8	LLKYNENGTITDAVD	K10	EVRQIAPGQTGKIAD
H5	RTQLPPAYTNSFTRG	I7	SWMESEFRVYSSANN	J9	ENGTITDAVDCALDP	K11	APGQTGKIADYNYKL
H6	PAYTNSFTRGVVYYPD	I8	EFRVYSSANNCTFEY	J10	TDAVDCALDPLSETK	K12	GKIADYNYKLPPDFT
H7	SFTRGVVYYPDKVFRS	I9	SSANNCTFEYVSQPF	J11	CALDPLSETKCTLKS	K13	YNYKLPPDFTGCVIA
H8	VYYPDKVFRSSVLHS	I10	CTFEYVSQPF LMDLE	J12	LSETKCTLKSFTVEK	K14	PPDFTGCVIAWNSNN
H9	KVFRSSVLHSTQDLF	I11	VSQPF LMDLEGKQGN	J13	CTLKSFTVEKGIYQT	K15	GCVIAWNSNNLDSKV
H10	SVLHSTQDLFLPFFS	I12	LMDLEGKQGNFKNLR	J14	FTVEKGIYQTSNFRV	K16	WNSNNLDSKVGGNYN
H11	TQDLFLPFFSNVTWF	I13	GKQGNFKNLRFEVFK	J15	GIYQTSNFRVQPTES	K17	LDSKVGGNYNYLYRL
H12	LPFFSNVTWTFHAIHV	I14	FKNLRFEVFKNIDGY	J16	SNFRVQPTESIVRFP	K18	GGNYNYLYRLFRKSN
H13	NVTWTFHAIHVSGTNG	I15	EFVFKNIDGYFKIYS	J17	QPTESIVRFPNITNL	K19	YLYRLFRKSNLKPFE
H14	HAIHVSGTNGTKRFD	I16	NIDGYFKIYSKHTPI	J18	IVRFPNITNLCPFGE	K20	FRKSNLKPFFERDIST
H15	SGTNGTKRFDNPVLP	I17	FKIYSKHTPINLVRD	J19	NITNLCPFGEVFAT	K21	LKPFFERDISTEIYQA
H16	TKRFDNPVLPFNDGV	I18	KHTPINLVRDLPOGF	J20	CPFGEVFATRFASV	K22	RDISTEIYQAGSTPC
H17	NPVLPFNDGVYFAST	I19	NLVRDLPOGFSALEP	J21	VFATRFASVYAWNR	K23	EIYQAGSTPCNGVEG
H18	FNDGVYFASTEKSNI	I20	LPQGFSALEPLVDLP	J22	RFASVYAWNRKRISN	K24	GSTPCNGVEGFNCYF
H19	YFASTEKSNIIRGWI	I21	SALEPLVDLPIGINI	J23	YAWNRKRISNCVADY	L1	NGVEGFNCYFPLQSY
H20	EKSNIIRGWIFGTTL	I22	LVDLPIGINITRFQT	J24	KRISNCVADYSVLYN	L2	FNCYFPLQSYGFQPT
H21	IRGWIFGTTLDSKTQ	I23	IGINITRFQTLALH	K1	CVADYSVLYNSASF	L3	PLQSYGFQPTNGVGY
H22	FGTTLDSKTQSLIV	I24	TRFQTLALHRSYLT	K2	SVLYNSASFSTFKCY	L4	GFQPTNGVGYQPYRV
H23	DSKTQSLIVNNATN	J1	LLALHRSYLTTPGDSS	K3	SASFSTFKCYGVSPT	L5	NGVGYQPYRVVLSF
H24	SLIVNNATNVVIKV	J2	RSYLTTPGDSSSGWTA	K4	TFKCYGVSPTKLNDL	L6	QPYRVVLSFELLHA
I1	NNATNVVIKVCEFAQ	J3	PGDSSSGWTAGAAAY	K5	GVSPTKLNDLCFTNV	L7	VVLSFELLHAPATVC
I2	VVIKVCEFAQCNDPF	J4	SGWTAGAAAYVGYL	K6	KLNDLCFTNVYADSF	L8	ELLHAPATVCGPKKS

L9	PATVCGPKKSTNLVK	M23	SIAIPTNFTISVTTE	O13	Q MAYR FNGIGVTQNV	Q 3	REGV FV SN GH W FVT
L10	GPKKSTNLVKNCVN	M24	TNFTISVTTEILPVS	O14	FNGIG VTQNVLYENQ	Q 4	V SN GH W FVT Q RNFY
L11	TNLVKNCVNFNFNG	N1	SVTTEILPVSMTKTS	O15	VTQNVLYENQ KLIAN	Q 5	HWFVT Q RNFY E PQII
L12	NKCVNFNFNGLTGTG	N2	ILPVSMTKTSVDCTM	O16	LYENQ KLIANQFNSA	Q 6	Q RNFY E PQII TTDNT
L13	FNFNGLTGTGVLTES	N3	MTKTSVDCTMYICGD	O17	KLIANQFNSA IGKIQ	Q 7	E PQII TTDNT FVSGN
L14	LTGTGVLTES NKKFL	N4	VDCTMYICGDSTEC	O18	QFNSAIGKIQDSLSS	Q 8	TTDNT FVSGN CDVVI
L15	VLTES NKKFLPFQQF	N5	YICGDSTECNLLQ	O19	IGKIQDSLSS TASAL	Q 9	FVSGN CDV VIGIVNN
L16	NKKFLPFQQF GRDIA	N6	STECNLLQYGSFC	O20	DSLSS TASALGKLQD	Q10	CDV VIGIVNN TVYDP
L17	PFQQF GRDIAD TTDA	N7	NLLQYGSFCTQLNR	O21	TASALGKLQDVVNQN	Q11	GIV VNN TVYDPLQPEL
L18	GRDIAD TTDA VRDPQ	N8	YGSFCTQLNRALTGI	O22	GKLQD VVNQNAQALN	Q12	TVYDPLQPEL DSFKE
L19	TTDA VRDPQ TLEIL	N9	TQLNRALTGI AVEQD	O23	VVNQNAQALN TLVKQ	Q13	LQPEL DSFKE LDKY
L20	VRDPQ TLEIL DITPC	N10	ALTGI AVEQD KNTQE	O24	AQALNTLVKQLSSNF	Q14	DSFKE LDKY FKNHT
L21	TLEIL DITPCSFGGV	N11	AVEQD KNTQE VFAQV	P1	TLVKQLSSNF GAISS	Q15	ELDKY FK NHT SPD VD
L22	DITPCSFGGVSVITP	N12	KNTQE VFAQV KQIYK	P2	LSSNF GAISSVLNDI	Q16	FKNHT SPD VD LGD IS
L23	SFGGVSVITPGTNTS	N13	VFAQV KQIYK TPPIK	P3	GAISSVLNDI LSRLD	Q17	SPD VDLGD IS GINAS
L24	SVITPGTNTSNQVAV	N14	KQIYK TPPIK DFGGF	P4	VLNDI LSRLDKVEAE	Q18	LGD IS GINAS VVNIQ
M1	GTNTSNQVAVLYQDV	N15	TPPIK DFGGF NFSQI	P5	LSRLDKVEAEVQIDR	Q19	GINAS VVNIQ KEIDR
M2	NQVAVLYQDV NCTEV	N16	DFGGF NFSQI LPDPS	P6	KVEAEVQIDR LITGR	Q20	VVNIQ KEIDR LNEVA
M3	LYQDVNCTEVPVAIH	N17	NFSQI LPDPSKPSKR	P7	VQIDR LITGR LQSLQ	Q21	KEIDR LNEVA KNLNE
M4	NCTEVPVAIH ADQLT	N18	LPDPSKPSKR SFIED	P8	LITGR LQSLQTYVTQ	Q22	LNEVA KNLNE SLIDL
M5	PVAIH ADQLTPTWRV	N19	KPSKR SFIEDLLFNK	P9	LQSLQ TYVTQQLIRA	Q23	KNLNE SLIDLQELGK
M6	ADQLTPTWRV YSTGS	N20	SFIED LLFNKVTLAD	P10	TYVTQQLIRA AEIRA	Q24	SLIDLQELGK YEQYI
M7	PTWRV YSTGSNVFQT	N21	LLFNKVTLADAGFIK	P11	QLIRA AEIRA SANLA	R 1	QELGK YEQYIKWPWY
M8	YSTGSNVFQTRAGCL	N22	VTLADAGFIKQYGDC	P12	AEIRA SANLAATKMS	R 2	YEQYIKWPWYIWLGF
M9	NVFQTRAGCLIGAHEH	N23	AGFIKQYGDCLGDIA	P13	SANLAATKMSECVLG	R 3	KWPWYIWLGF IAGLI
M10	RAGCL IGA EHVNNSY	N24	QYGDCLGDIAARDLI	P14	ATKMSECVLGQSKRV	R 4	IWLGF IAGLIAIVM V
M11	IGA EHVNNSYECDIP	O1	LGDIAARDLICAQKF	P15	ECVLGQSKRVDFCGK	R 5	IAG LIAIVM VTIMLC
M12	VNNSYECDIPIGAGI	O2	ARDLICAQKFENGLTV	P16	QSKRVDFCGGYHLM	R 6	AIVMVTIMLC CM TSC
M13	ECDIPIGAGICASYQ	O3	CAQKFENGLTV LPPLL	P17	DFCGK GYHLM SFPQS	R 7	TIMLC CM TSCC CL K
M14	IGAGICASYQTQ TNS	O4	NGLTV LPPLL TDEMI	P18	GYHLM SFPQSAPHGV	R 8	CM TSCC CL KGCC SC
M15	CASYQ TQ TNS PRRAR	O5	LPPLL TDEMIAQYTS	P19	SFPQSAPHGVVFLHV	R 9	C CL KGCC SC GC CK
M16	TQ TNS PRRAR SVASQ	O6	TDEMIAQYTSALLAG	P20	APHGVVFLHVTYVPA	R10	GCC SC GC CK FDEDD
M17	PRRAR SVASQ SIIAY	O7	AQYTSALLAGTITSG	P21	VFLHVTYVPAQEKNF	R11	G SC CK FDEDD SEPVL
M18	SVASQ SIIAY TMSLG	O8	ALLAGTITSG WTFGA	P22	TYVPAQEKNFTTAPA	R12	
M19	SIIAY TMSLG AE NSV	O9	TITSGWTFGAG AALQ	P23	QEKNFTTAPA ICH DG	R13	
M20	TMSLG AE NSVAYSNN	O10	WTFGAG AALQ IPFAM	P24	TTAPA ICH DGKAHFP		
M21	AE NSV AYS NN SIAIP	O11	G AALQ IPFAM Q MAYR	Q 1	ICH DG KAHFP REGV F		
M22	AYS NN SIAIP TNFTI	O12	IPFAM Q MAYR FNGIG	Q 2	KAHFP REGV F VSNGT		



SARS-CoV-2 ---MFVFLVLLPLV-----SSQCVNLT---TRTQLPPAYTNSFTR---GVY-----YP-DKVF 44
SARS ---MFVFLVLLPLV-----SSQCVNLT---TRTQLPPAYTNSFTR---GVY-----YP-DEIF 48
MERS-CoV MIHSVFLIMFLLTPTESYVDVGPDSVKSACIEVDIQTFDFDKTWPR---PIDVSKADGII---YPQGRY 65
HCoV OC43 ---MFVFLVLLPLV-----SSQCVNLT---TRTQLPPAYTNSFTR---GVY-----YP-DEIF 58
HCoV NL63 ---MKLFLILLVPLASCFPTCSNA-NLSMLQLGVEDNSSTIVTGLLTHFWFCANQSTSVYSANGFFYIDVGNHRSALHTGYDANQYYI-VTNEIGL 97
HCoV HKU1 ---MFVFLVLLPLV-----SSQCVNLT---TRTQLPPAYTNSFTR---GVY-----YP-DEIF 57
HCoV 229E ---MFVFLVLLPLV-----SSQCVNLT---TRTQLPPAYTNSFTR---GVY-----YP-DEIF 10
BatCoV-RaTG13 ---MFVFLVLLPLV-----SSQCVNLT---TRTQLPPAYTNSFTR---GVY-----YP-DKVF 44

SARS-CoV-2 SSV-----LHSTQDLFLPF-----FSNVTWFHAIHVSNGTNGTKR-----78
SARS SDT-----LYLTQDLFLPF-----YSNVTGFHTINHT-----75
MERS-CoV NIT-----ITYQG LFPYQG-DHGDYVYSAGHATGTPQKL-----100
HCoV OC43 NNT-----LFLNG YYPTSGSTYRNMAKGSVLLSRLWFKPP-----94
HCoV NL63 NASVTLKICKFSRNTTFDFLSNASSSFDICVNLFLTEQLGAPLGITISGETVRLHLVNVTRTFYVPAAYKLTKLSVKCYFNYSCVFSVUNATVTNVNTH 197
HCoV HKU1 NNT-----LFTG YFPKSGANFRDLALGSKYLSTLWYKPP-----93
HCoV 229E -----LHIAG-----CQTNGNLNTSYS-----27
BatCoV-RaTG13 SSV-----LHSTQDLFLPF-----FSNVTWFHAIHVSNGTNGTKR-----78

SARS-CoV-2 -----FDNP---VLPFNDGVYFASTEKSNIIRG-----WIFGTTLDSKT-----QSLILVNN-----ATNVV 127
SARS -----FGNP---VIPKDGIIYFAATEKSNNVVRG-----WVFGSTMNNKS-----QSVIIINN-----STNV 124
MERS-CoV -----FVANYSDQVKQFANGF-VVRIGAAANSTGTVIISPSTSATIRKIYPAMFLGSSVGNFSDGKMGFRFNHFLVLLP-----DGCYT 178
HCoV OC43 -----FLSD-----FINGI-FAKVNTKVIKDRVMYSE-----FPATIGSTFVNTS-----YSVVQVQPTINSTQDGNKLQGLLE 160
HCoV NL63 NGRVVNYTVCD-----CNGYTDNI-FSVQQDGRIPNGFP-----FNNWFL-----LTNGS-----TLV-----DGVSR 250
HCoV HKU1 -----FLSD-----FNGGI-FSKVNTKVIYNTLYSE-----FSTIVGVSFVNTS-----YTIIVVQPH-----NGILE 147
HCoV 229E -----VCNG---CVGYSENV-FAVESGGYIPSDFA-----FNNWFL-----LTNTS-----SVV-----DGVVR 72
BatCoV-RaTG13 -----FDNP---VLPFNDGVYFASTEKSNIIRG-----WIFGTTLDSKT-----QSLILVNN-----ATNVV 127

SARS-CoV-2 IKVCFEQFCNDPFL VYYHKNNKSWMESEFRVYSSANNCTFEYVSQPFLLM LEGKQGN KNLRE-----FVFNKIDGYFKIYSK-----HTPI 210
SARS IRACNFELCNDPFFV-SKPMGTQTHM--IFDNAENCTFEYISDAFLDSEKSNKHLRE-----FVFNKIDGYFKIYSK-----YQPI 203
MERS-CoV LLRAFYCILE-FN-CPAGNSYTSFATYHTPATDC-----SDGNYNRNASINFEYFN-----LRNCTFMYTYNITEDLEWFGITQTAQGVHL 265
HCoV OC43 VSVQCYNMCEYPQTIC-HPNLGNHRKELWHLDTGVVSC--LYKRNFYTDVNADYLYFFHYQE-----GGTFYAYFT-----228
HCoV NL63 LYQPLRLTCLWEPVCL-KSSTGFVY--FNATGSDVNC-----NGYQHNVSVDVMRYNLNFSANSNLNLKSGVIVFKTLQYDVLVFCYCS-----NSSSG 334
HCoV HKU1 ITACQYTMCEYPHTVC--KSKGSIRNESWHIDSEPLC--LFKKNFYTNVSDADWLYFFHYQE-----RGVYAYYA-----214
HCoV 229E SFQPLLNLNCLWSVSL-REFTTGFVY--FN-GTGRGDC-----KGFSSDVLSDVIRYNLNFEE--ENLRRTILFKTSYGVVVFYCT-----NNTLV 151
BatCoV-RaTG13 IKVCFEQFCNDPFL VYYHKNNKSWMESEFRVYSSANNCTFEYVSQPFLLM LEGKQGN KNLRE-----FVFNKIDGYFKIYSK-----HTPI 210

SARS-CoV-2 NLVRDLPGQ--FSALEPLVDLPGINITRFQT--LLALHRSYLTGPDSSSGWTAAGAAAT-VGYQPRTFLKYNENGITITDAVDCALDPLSETKCTLKS 305
SARS DVVRDLPSG--FNTLKPIFKLPGINITNFRA-----ILTAFAPAQDI--WGTSAAAT-VGYKPTTFM KYDENGITITDAVDCSQNPLAELKCSVKS 292
MERS-CoV FSSRYVDLY--GGNMFQFATLPVYDTIKYYSI--IPHSIRSIQSDR-KA--W--AAAT-VGYKPTTFM KYDENGITITDAVDCSQNPLAELKCSVKS 353
HCoV OC43 --DTGVVTK--F--LFNVYLGALSHYV--MPLTCSNKLTL--LEAT-VTPDTSRQYLAFNQDGIIFNAEDCMSDFMSIKCKTQS 304
HCoV NL63 VLDTTIPFGPSSQPYCYFINSTINTTHVSTFVGILPPTVREIVVARTGQ--FYINGFKVDELEAVNENVTASA--TDFWTVAFAFVQVVLNVSA 429
HCoV HKU1 --DVGMPTT--F--LFSLYLGTILSHYV--MPLTCKAISNTDNE--TLEAT-VTPDTSRQYLAFNQDGIIFNAEDCMSDFMSIKCKTQS 296
HCoV 229E SGDAHIFPGTVLGNFYCFVNTTIGNETTSKFAVGLPKTREFVISRTGH--FYINGFKVDELEAVNENVTASA--TDFWTVAFAFVQVVLNVSA 246
BatCoV-RaTG13 NLVRDLPPG--FSALEPLVDLPGINITRFQT--LLALHRSYLTGPDSSSGWTAAGAAAT-VGYQPRTFLKYNENGITITDAVDCALDPLSETKCTLKS 305

SARS-CoV-2 FTVEKGIYQTSNFRVQPTESIV-RFPNITNLCPGGEVFNATRFASVYAWNRRKISNCVADYSVLVNSASFSTFKCYGVSPTKLNLDLCFTNVYADSFVIRG 404
SARS FEIDKGIYQTSNFRVPSGDVV-RFPNITNLCPGGEVFNATRFASVYAWNRRKISNCVADYSVLVNSASFSTFKCYGVSATKLNLDLCFTNVYADSFVIRG 391
MERS-CoV FDVESGVYVSSSFEAKPSGSVVEQAEGV--CDFSELLSGTP-PQVYNFKRLVFTNCNLYNLTKLLSFSVNDFTCSQISPAAIASNCYSLLIDYFSYPL 450
HCoV OC43 IAPPTGYYLNGYTVQPIADVRRKPNLPN-CNIEAELNDKSPPLNWERFTSCNCFNMSSLSFIQADSFTCNNIDAIYGMCFSSITDKFAIPN 403
HCoV NL63 TNQNLGLYCDSPFEKLQCEHLQ--FGQDGFYSANFLDNDVLPETVYALPIYQHTDINFATASF--GGSCYVCKPHQV--NISNG--511
HCoV HKU1 FAPNTGVYDLSGFTVKPVATVYRRIPNLPD-CDIDNWLNVSVSPPLNWERIFSCNCFNLSTLLRLVHVDSEFCNNLDKSKIFGSCFNSITDKFAIPN 395
HCoV 229E TSIANIYCNVSVINRLRQDQLS--FDVPDGFYSTSPIQSVLPVSVISLVPYHKHTFIVLYVDFKP-QSGGKCFNCYCPAGV--NITLANF--N 333
BatCoV-RaTG13 FTVEKGIYQTSNFRVQPTESIV-RFPNITNLCPGGEVFNATRFASVYAWNRRKISNCVADYSVLVNSASFSTFKCYGVSPTKLNLDLCFTNVYADSFVIRG 404

SARS-CoV-2 DEVRQIAPGQTKIADYNYKLPPDFTGCVIAWNSNLDKSVKGNV-----YLYRLFR-----KSNLKPFERDISTEIQAGST--PC-----480
SARS DDVRQIAPGQTKIADYNYKLPPDFTGCVIAWNSNLDKSVKGNV-----YLYRLFR-----KSNLKPFERDISTEIQAGST--PC-----467
MERS-CoV SMKSDLSVSSAIPISQFNKYQSFNPTCLILATVPHNLTITKPLK-----YSY-----LNKSRFLSDDRTEVPQLV-----518
HCoV OC43 GRKVDILQGLNLYLQSFNIRIDTATSCQLYNNLPAANVSVSFRNPSTWNKRFGFIEDSVFKPRPAGVLTNDHVYVAQHCFKAPNFCPC--KLGSCV 500
HCoV NL63 --NTSVCVRTSHFSIRVILNRVKSQSGPDSSWHIYLKSGTC--P--FSESK-----LNNFQK-FKTCISTVEVPVPGSC-----577
HCoV HKU1 RRRDDILQGLSSFLQSSNYKIDISSSSQLYSLPLVNVNTINNFPSSWNRRYGFSGFN-----VSSYDVVYSDHCFVSNSDFCPCADPSVNVSCV 486
HCoV 229E ETGKPICVDTSHFTTKIVAVYANVG--RWSASINTGNC--P--FSESK-----LNNFQK-FKTCISTVEVPVPGSC-----396
BatCoV-RaTG13 DEVRQIAPGQTKIADYNYKLPPDFTGCVIAWNSNLDKSVKGNV-----YLYRLFR-----KSNLKPFERDISTEIQAGST--PC-----480

SARS-CoV-2 -----NGVEGFNC-----YF-----PLQSYGFQPT-----NGVGYQPYRVVLSFE-----516
SARS -----TPPALNC-----YW-----PLNDYGFYTT-----TGIGYQPYRVVLSFE-----502
MERS-CoV -----NANQYSPC-----VSIVPSTWEDGYYRQLSPLEGGGWLVASG-----STVAMTEQLQMGFGIT-----574
HCoV OC43 GSGPGKNNIGITCPAGTNYLTCD-----NLCTPDPIFTTGTGYKCPQTKSLVGIGEHCSGLAVKSDYCGG--NSCTCRPQAFGLWSADSCLQ 584
HCoV NL63 -----NFPLEAT-----WHYTSYTI-----VGALYVTWSEG-----603
HCoV HKU1 KSKPLS-----AICPAGTKYRCHDLDTTLYVNNWCRCSCLDPDSTYSPTCQKKVVVGIGEHCPGLGINEEKGCTQLNHSSCSCPDPAFLGWSFSDSCIS 582
HCoV 229E -----AMPIVAN-----WAYSYYT-----IGSLYVSWSDG-----422
BatCoV-RaTG13 -----NGQTGLNC-----YY-----PLYRYGFYPT-----DGVGHQPYRVVLSFE-----516

SARS-CoV-2 -----LLHA--PATVCGPKK--STNLV--KNKCVNENFNGLTGTGVLTESNKKFL-PFQQFGRDIADTTDAVRDPQTLEILDITPCSFGGSVI 598
SARS -----LLNA--PATVCGPKL--STDLI--KNQCVNENFNGLTGTGVLTPSSRRQ-PFQQFGRDVSDFDTSVRDPKTEYILDITPCSFGGSVI 584
MERS-CoV -----VQYGDNTSVCPKLEFANDTKIASQNGCNVEYSNGLGSRGVFNQNTAVGV-RQGRFYVDAYQNLVGYYS--DDGNYICRACVSPVSV 662
HCoV OC43 GDKCNIFANFILHDVNSGLTCTDLQKANTDII--LGVCVNDLYLGILGQGFVEVYATYNSWNNLLYDSNGNLYGFRDYIINRTFMIRSCYSGRVSA 682
HCoV NL63 -----NSI-TGVPYPVSGIREFSNLV--LNNCTKYNIYDYVGTGIRSSNOSLAGGITVY--SNSGNLLGFKNVSTGNIFIPTCNQPPQVAV 686
HCoV HKU1 NNRNCFNSNFINGNSGTTCSDNLLYSNTEVS--TGVCVNDLYLGITGQGFKEVSAAYYNNLLYDSNGNIIFGKDFLTNKTYITLPCYSGRVSA 680
HCoV 229E -----DGI-TGVPQPVGVSSFMNV--LDKCTKYNIYDVSGVGVIRVSDTFNGITYT--STSGNLLGFKVDVTKGTIYSTPCNPPDQLVV 505
BatCoV-RaTG13 -----LLNA--PATVCGPKK--STNLV--KNKCVNENFNGLTGTGVLTESNKKFL-PFQQFGRDIADTTDAVRDPQTLEILDITPCSFGGSVI 598

SARS-CoV-2 TPGTNTSNQVAVLYQDVNCTEVPVAIHA-----DQLTPTWRVYSTGNSVFTQTRAGLIGAEHVNS--YECDIPIGAGICASYQT-QTNSPRRARSVAS 689
SARS TPGTNASSEVAVLYQDVNCTEVPVAIHA-----DQLTPTWRVYSTGNSVFTQTRAGLIGAEHVNS--YECDIPIGAGICASYHTVSLLR-----STQ 671
MERS-CoV Y--DKETKTHATLFGSVACEHISSTMSQYSRSTRMLKRDSTY-----GPLQTPVGCVLGVNSSLF-VEDCKPLPGQSLCALPDTPSLTPSVPV 755
HCoV OC43 Y--HANSEPALLFNRKICNYFN-----NSLTRQLPTI-----NYFSLYGCVVNAYNSTAISVQTCDLTVGSGVCDYS--KNRRSNGAITTGY 764
HCoV NL63 Y--QQSIIAMTAVNESRYGLQ-----NLQLFNFXY-----VSNNGNCTTAVMTYSNF-----GICADGSL-IPVRPN-----749
HCoV HKU1 F--YQNSSPALLRNKLKCSYVL-----NNISFISQPF-----YFSLYGCVLNAYNSTAISVQTCDLTVGSGVCDYS--KNRRSNGAITTGY 762
HCoV 229E Y--QQAVVAMLENSTYSYGS-----NVVELPKFFY-----ASNGTYNCTDAVLTYSF-----GVCADGSI-IAVQPN-----568
BatCoV-RaTG13 TPGTNASQVAVLYQDVNCTEVPVAIHA-----DQLTPTWRVYSTGNSVFTQTRAGLIGAEHVNS--YECDIPIGAGICASYQTQTNPRRARSVAS 685

SARS-CoV-2 QSIIAYTMSLGAENSVAYSNNNS---IAIPTNFTISVTEILPVMTKTSVDCOTMYICGDSTECNSNLLQYGSFCTQLNRAITGIAVEQDKNTQEVFAQVK 786

SARS KSIIVAYMTSLGADSSIIAYSNNT---IAIPTNFSISITTEVMPVSMKTSVDCNMICYGDSCEANLLQYGSFCTQLNRALSGIAAEQDRNTRREVFAQVK 768

MERS-CoV EMRLAS-IAFNHPHQVDQLNSSYFKLSIPTNFSFGVTQEYIQTIIQKVTVDCQYVVCNGFQKCEQLREYQGQFCSKINQAIHGANLRQDSDVRNLFASVK 854

HCoV OC43 RFTNFPEPTVNSVNSDLEPVGGLEYEQIPSEFTIGNMVEFIQTSSPKVTIDCAAFVCGDYAAKSKQLVEYGSFCDNINAILTEVNELLDDTQLQVANSLM 864

HCoV NL63 -----SSDNGISAIITAN-----LSIPSNWTTTSVQVEYLQITSTPIVVDCAATVYCNNGNPRCKNLKQYTSACKTIEDAIRLSAHLETNDVSSMLTFDS 837

HCoV HKU1 RFVTFEPFNVSVFVNSVETVGGLEFIQIPTEFTIAGHEEFIQTSSPKVTIDCAAFVCSNYAACHDLLSEYGTCDNINSII NEVNDLLDITQLQVANALM 862

HCoV 229E -----VSYSVSAIVTAN-----LSIPSNWTTTSVQVEYLQITSTPIVVDCAATVYCNNGNVRVELLKQYTSACKTIEDAIRNSARLESADVSEMLTFD 656

BatCoV-RaTG13 QSIITAYMTSLGAENSVAYSNNNS---IAIPTNFTISVTEILPVMTKTSVDCIMYICGDSCECNLLQYGSFCTQLNRALTGIAVEQDKNTQEVFAQVK 782

SARS-CoV-2 QIYKTPPIKDFG----G-FNFSQILPD-PSK---PSKRSFIEDLLFNKVTTLADAGFIKQ-YGDCI--GDIAARDLICAQKFNGLTVLPPLLTDEMIAY 873

SARS QMYKTPPLKYFG----G-FNFSQILPD-PLK---PTKRSFIEDLLFNKVTTLADAGFMKQ-YGDCI--GDINARDLICAQKFNGLTVLPPLLTDDMIAY 855

MERS-CoV SSQSSPIIPGFG-----GDFNLTLLEPVSIISTGS-RSARSAIEDLLFDKVTIADPGYMQG-YDDCMQGPASARDLICAQYVAGYKVLPPIMDVNMEAY 947

HCoV OC43 NGVTLSKLKDGVNFNVDINFSFVLGCLGSECSKASSRAIEDLLFDKVKLSDVGFVEA-YNNCT--GGAEIRDLICVQSYKGIKVLPPILSENQISGY 961

HCoV NL63 NAFSLANVTSFG-----D-YNLSSVLPQRNIRSSRIAGRSALDILLFSKVVTSGLTVDVDYKSCOT--KGLSADLACAQYNGIMVLPGVADAERMAMY 929

HCoV HKU1 QGVTLSSNLNLTNLHSDVDNIDFKSLGCLGSCGQ-SSRSLLDILLFNKVKLSDVGFVEA-YNNCT--GGSEIRDLICVQSFNGIKVLPPILSETQISGY 958

HCoV 229E KAFTLANVSSFG-----D-YNLSSVIPSLPTSGSRVAGRSALDILLFSKVVTSGLTVDADYKSCOT--KGLSADLACAQYNGIMVLPGVADAERMAMY 748

BatCoV-RaTG13 QIYKTPPIKDFG----G-FNFSQILPD-PSK---PSKRSFIEDLLFNKVTTLADAGFIKQ-YGDCI--GDIAARDLICAQKFNGLTVLPPLLTDEMIAY 869

SARS-CoV-2 TSALLAGTITSGWTFAGAAALQIPFAMQMAYFNGIGVTONVLYENQKLIANQFNSAIGKIQDSLSTTA-----SALGKLQDVVNQNAQAL 959

SARS TAALVSGTATAGWTFAGAAALQIPFAMQMAYFNGIGVTONVLYENQKLIANQFNSAIGKIQDSLSTTA-----TALGKLQDVVNQNAQAL 941

MERS-CoV TSSLGSIAGVGWTFAGLSFAAIPFAQSIIFYRLNGVGITQOVLSENQKLIANKFNQALGAMQTGFTTTN-----EAFHKVQDAVNNAQAL 1033

HCoV OC43 TLAATSASLFPWTA---AGVPFYLNVQYRINGLGVTMDVLSQNKLIANAFNNALYAIQEGFDATN-----SALVKIQAVVNANAQAL 1043

HCoV NL63 TGSLLIGMVLGLTSA---AAIPFSLALQARLNYVALQTDVILQENQKILASFNKAINNIVASFSSVNDAITQTAEAIHTVTIALNKIQDVVNQQAQAL 1025

HCoV HKU1 TTAATVAAMFPWSA---AGVPFSLNVQYRINGLGVTMDVILNKNQKLIANAFNKALLSIQNGFTATN-----SALAKIQSVVNANAQAL 1040

HCoV 229E TGSLLIGMVLGLTSA---VSIPFSLAIQARLNYVALQTDVILQENQKILASFNKAMTNIVDAFTGVNDAITQTSQALQTVATALNKIQDVVNQQAQAL 844

BatCoV-RaTG13 TSALLAGTITSGWTFAGAAALQIPFAMQMAYFNGIGVTONVLYENQKLIANQFNSAIGKIQDSLSTTA-----SALGKLQDVVNQNAQAL 955

SARS-CoV-2 NTLVKQLSSNFGAISSVLNDILSRLDKVEAEVQIDRLITGRQLSLQTYVVTQQLIRAAEIRASANLAATMSECVLGQSKRVDFCGKYHLMSPQSAAPHG 1059

SARS NTLVKQLSSNFGAISSVLNDILSRLDKVEAEVQIDRLITGRQLSLQTYVVTQQLIRAAEIRASANLAATMSECVLGQSKRVDFCGKYHLMSPQSAAPHG 1041

MERS-CoV SKLASEISNTFGAISASIGDI IQRLDVLQDQIDRLINGRLTTLNAPVAQQVRSESAALSAQLAKDVNECVKASQSKRGFCGQTHIVSVVNAFNG 1133

HCoV OC43 NNILQQLSNRFGAISASIQEILSRDLDAEAQIDRLINGRLTALNAYVSQQLSDSTLVKFSAAQAMEVNECVKSQSSRINFECGNENHILSLVONAPYG 1143

HCoV NL63 NHITSQIRHNQAISNSIQAIYDRLDSIQADQVDRILITGRILALNAYVSQVLNKYTEVRGSRRLAQQINECVKSQSNRYGFCGNGTHIFSVNSAFDQ 1125

HCoV HKU1 NSILQQLFNKFGAISSIQEILSRDLNLEAQVQIDRLINGRLTALNAYVSQQLSDITLIKAGASRAIEVNECVKSQSPRINFECGNENHILSLVONAPYG 1140

HCoV 229E NHITSQIRHNQAISNSIQAIYDRLDTIQADQVDRILITGRILALNAYVSQVLNKYTEVRASRQLAQQVNECVKSQSKRYGFCGNGTHIFSVNAFEG 944

BatCoV-RaTG13 NTLVKQLSSNFGAISSVLNDILSRLDKVEAEVQIDRLITGRQLSLQTYVVTQQLIRAAEIRASANLAATMSECVLGQSKRVDFCGKYHLMSPQSAAPHG 1055

SARS-CoV-2 VVFLHVTYVPAQEKNETTAPAICHG---KAHFPREGVFV--SNGTH-----WVFTQRNFYEPQIITDNTFVSGNCDVIGIVNNTVYDPLQPEL--DS 1147

SARS VVFLHVTYVPSQERNETTAPAICHEG---KAYFPREGVFV--FNGTS-----WFTQRNFYEPQIITDNTFVSGNCDVIGIVNNTVYDPLQPEL--DS 1129

MERS-CoV LYFMHVGYPSNHIEVVSAYLGLDAANPTNCIAPVNGYFI--KTNNTRIVDEWSYTGSSFYAEPITSLNTKYVAP-QVTYQNISTNLPPPLLGSTGID 1230

HCoV OC43 LYFIHFSYVPTKYVTARVSPGLCIAGD--RGIAPKSGYFV--NVNNT-----WMTGSGYYPPEPITENVVMSTCAVNYTKAPYVMLNTSIPNL--PD 1232

HCoV NL63 LLFLHTVLLPTDYKKNVKAWSGICVDGI--YGVVLRQPNLVLYSDNGV-----FRVTSRVMEQPRLPVLSDFVQIYCNVTFVNI SRVELHTVIPDY--VD 1216

HCoV HKU1 LLFIHFSYKPTSFKTVLVSPLGLSGD--RGIAPKQGYFI--KQND-----WMFTGSSYYPPEISDKNVFMNSCSVNFTKAPFIYLNNSIPNL--SD 1229

HCoV 229E LVFLHTVLLPTQYKDVSAWSGLCVDGT--NGVVLRLQPNLALYKEGNY-----YRITSRIMEEPRIPTMADFVQIENCNVTFVNI SRSELQITVPEY--ID 1035

BatCoV-RaTG13 VVFLHVTYVPAQEKNETTAPAICHG---KAHFPREGVFV--SNGTH-----WVFTQRNFYEPQIITDNTFVSGNCDVIGIVNNTVYDPLQPEL--DS 1143

SARS-CoV-2 FKEELDKY-FKNHTSPDVLDGDISGINASVNNIQKEID-----RLNEVAKNLNESLIDLQELGKYEQYIKWPWYIWLGFIAGLIAIVMTI 1232

SARS FKEELDKY-FKNHTSPDVLDGDISGINASVNNIQKEID-----RLNEVAKNLNESLIDLQELGKYEQYIKWPWYIWLGFIAGLIAIVMTI 1214

MERS-CoV FQDELDEF-FKNVTSIPNFGSLTQINTTLDLTYEML-----SLQOVVKALNESYIDLKELGNITYYNKWPWYIWLGFIAGLVALALCVF 1315

HCoV OC43 FKEELDQW-FKNQTSVAPDL-SLDYINVTFLDLQVEMN-----RLQEAIKVLNQSYINLKDITGYEYVVKWPWYVWLLICLAGVAMLVLLF 1316

HCoV NL63 VNKTQLQEAQNLPKYVKPNF-DLTPFNLTLYNLSSSELKQLEAKTASLFQTTVELQGLIDQINSTYVDLKLNLRFENYIKWPWWVLLIISVVFVLLSLV 1315

HCoV HKU1 FEAEFSLW-FKNHTSIAPNLTFSHINATFLD-----1260

HCoV 229E VNKTQLQELSYKLPNYTVPDL-VVEQYNQITLNLTSISTLENKSAELNYTVQRLQTLIDNINSTLVDLKWLNRVETIYKWPWWVWLCISVVLIFVVSMLL 1134

BatCoV-RaTG13 FKEELDKY-FKNHTSPDVLDGDISGINASVNNIQKEID-----RLNEVAKNLNESLIDLQELGKYEQYIKWPWYIWLGFIAGLIAIVMTI 1228

SARS-CoV-2 MLCCMTSCCCLKGCCSCGSCCKFEDEDDSEPVLGKVKLHYT 1273

SARS LLCCMTSCCCLKGACSCGSCCKFEDEDDSEPVLGKVKLHYT 1255

MERS-CoV FILCCTGCGTNCMGLKCNRC--DRYEEYD-LEPHKVHVH 1353

HCoV OC43 FICCTGCGT--SCFKKCGGCC--DDYTGQYQELVIKTSDD 1353

HCoV NL63 FCCLSTGCCGCCNCLTSSMRGCCDCGSKLPYYEFKVVHQ 1356

HCoV HKU1 -----1260

HCoV 229E LCCCTGCCGFFSCFASSIRGC--CESTKLPPYDVEKIHQ 1173

BatCoV-RaTG13 MLCCMTSCCCLKGCCSCGSCCKFEDEDDSEPVLGKVKLHYT 1269