

(A)

Species	Position	Residue	PTM
Murine coronavirus	197	S	Phosphorylation
Severe acute respiratory syndrome-related coronavirus	177	S	Phosphorylation
Severe acute respiratory syndrome-related coronavirus	189	S	Phosphorylation
Severe acute respiratory syndrome coronavirus 2	184	S	Phosphorylation

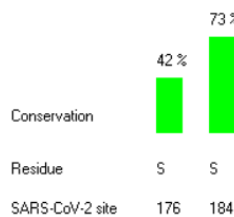
(B)

Species	225	230	235
Bat coronavirus CDPHE15	S P - G S S R A N S R S Q S R		
Bat coronavirus HKU10	S R - P P S R S Q S N S R P Q		
Rhinolophus ferrumequinum alphacoronavirus HuB-2013	V S - R - - - - G N S R S Q		
Human coronavirus 229E	D S R A P S R S Q S R S Q S R		
Lucheng Rn rat coronavirus	A S R P Q S R A Q S Q T R S Q		
Mink coronavirus 1	N S - - - - - R S N S R S R		
Miniopterus bat coronavirus 1	S R - P A S R S D S R S Q S K		
Miniopterus bat coronavirus HKU8	S Q - P N S R S N S R S Q S S		
Myotis ricketti alphacoronavirus Sax-2011	S A - P N S R G N S R S Q S R		
Nyctalus velutinus alphacoronavirus SC-2013	S R - P N S R A S S R A R S Q		
Porcine epidemic diarrhea virus	T P - P A S R A N S R S R S R		
Scotophilus bat coronavirus 512	T P - N N S R A N S R S R S R		
Rhinolophus bat coronavirus HKU2	S R - S A S R S Q S R S R N Q		
Human coronavirus NL63	D R - S N N S S R A S S R S S		
NL63-related bat coronavirus strain BtKYNL63-9b	D R - S N S S S R A S S R A S		
Alphacoronavirus 1	S R - D N S R S R S Q S R S R		
Betacoronavirus 1	G S G R S A - P N S R S - - T		
China Rattus coronavirus HKU24	G S G R S A - P S R S S - - S		
Human coronavirus HKU1	G S G R S A - S N S R P - - G		
Murine coronavirus	G S G R S A - P A S R S - - G		
Bat Hp-betacoronavirus Zhejiang2013	G S R S T S S A S S A S S R		
Hedgehog coronavirus 1	G T G G N S Q S S R A S S A		
Middle East respiratory syndrome-related coronavirus	G T G G N S Q S S R A S S V		
Pipistrellus bat coronavirus HKU5	G T G G N S Q S S R A S S -		
Tylonycteris bat coronavirus HKU4	G T G G N S Q S S R A S S N		
Roussetus bat coronavirus GCCDC1	G T R S R N S S R S S S - -		
Roussetus bat coronavirus HKU9	G R G S R G N S R S S S - -		
Severe acute respiratory syndrome-related coronavirus	G S R G G S Q A S S R S S R		
Severe acute respiratory syndrome coronavirus 2	G S R G G S Q A S S R S S R		
Wigeon coronavirus HKU20	- S R G R S V E R G Q Q - - D		
Bulbul coronavirus HKU11	- S R G R T L Q R G S N - - T		
Common moorhen coronavirus HKU21	- A R G R P Q E R G S G - - P		
Coronavirus HKU15	- S R G R T M E R G N G - - P		
Munia coronavirus HKU13	- S R G R T M D R S N G - - P		
White-eye coronavirus HKU16	- N R G R T M D R G P N - - Q		
Night heron coronavirus HKU19	P Q R G R G M E R G P T - - Q		
Beluga whale coronavirus SW1	R S R S R S R S N S Q A - - D		
Avian coronavirus	L N R G R S G R S T A A - - S		

(C)

Species	225	230	235
Bat coronavirus CDPHE15	S P - G S S R A N S R S Q S R		
Bat coronavirus HKU10	S R - P P S R S Q S N S R P Q		
Rhinolophus ferrumequinum alphacoronavirus HuB-2013	V S - R - - - - G N S R S Q		
Human coronavirus 229E	D S R A P S R S Q S R S Q S R		
Lucheng Rn rat coronavirus	A S R P Q S R A Q S Q T R S Q		
Mink coronavirus 1	N S - - - - - R S N S R S R		
Miniopterus bat coronavirus 1	S R - P A S R S D S R S Q S K		
Miniopterus bat coronavirus HKU8	S Q - P N S R S N S R S Q S S		
Myotis ricketti alphacoronavirus Sax-2011	S A - P N S R G N S R S Q S R		
Nyctalus velutinus alphacoronavirus SC-2013	S R - P N S R A S S R A R S Q		
Porcine epidemic diarrhea virus	T P - P A S R A N S R S R S R		
Scotophilus bat coronavirus 512	T P - N N S R A N S R S R S R		
Rhinolophus bat coronavirus HKU2	S R - S A S R S Q S R S R N Q		
Human coronavirus NL63	D R - S N N S S R A S S R S S		
NL63-related bat coronavirus strain BtKYNL63-9b	D R - S N S S S R A S S R A S		
Alphacoronavirus 1	S R - D N S R S R S Q S R S R		
Betacoronavirus 1	G S G R S A - P N S R S - - T		
China Rattus coronavirus HKU24	G S G R S A - P S R S S - - S		
Human coronavirus HKU1	G S G R S A - S N S R P - - G		
Murine coronavirus	G S G R S A - P A S R S - - G		
Bat Hp-betacoronavirus Zhejiang2013	G S R S T S S A S S A S S R		
Hedgehog coronavirus 1	G T G G N S Q S S R A S S A		
Middle East respiratory syndrome-related coronavirus	G T G G N S Q S S R A S S V		
Pipistrellus bat coronavirus HKU5	G T G G N S Q S S R A S S -		
Tylonycteris bat coronavirus HKU4	G T G G N S Q S S R A S S N		
Roussetus bat coronavirus GCCDC1	G T R S R N S S R S S S - -		
Roussetus bat coronavirus HKU9	G R G S R G N S R S S S - -		
Severe acute respiratory syndrome-related coronavirus	G S R G G S Q A S S R S S R		
Severe acute respiratory syndrome coronavirus 2	G S R G G S Q A S S R S S R		
Wigeon coronavirus HKU20	- S R G R S V E R G Q Q - - D		
Bulbul coronavirus HKU11	- S R G R T L Q R G S N - - T		
Common moorhen coronavirus HKU21	- A R G R P Q E R G S G - - P		
Coronavirus HKU15	- S R G R T M E R G N G - - P		
Munia coronavirus HKU13	- S R G R T M D R S N G - - P		
White-eye coronavirus HKU16	- N R G R T M D R G P N - - Q		
Night heron coronavirus HKU19	P Q R G R G M E R G P T - - Q		
Beluga whale coronavirus SW1	R S R S R S R S N S Q A - - D		
Avian coronavirus	L N R G R S G R S T A A - - S		

(D)



(E)

Residue	S	S	S
Position	176	184	188
Substitutions	9	8	9
Frequencies	R 20 G 17 I 15 N 15 C 2 T 5 P 1 L 1 M 1	P 70 F 57 Y 20 A 19 L 6 T 3 C 3 Q 1	L 1272 P 168 A 9 T 3 G 2 V 2 W 1 Q 1 F 1
Sum of frequencies	77	179	1459
Mutation frequency	0.052775	0.122686	1

**Supplementary Figure S1. PTM Mapping, Propagation, Conservation and Mutation Frequency.** (A) Illustrative dataset of 4 PTM sites. (B) Mapping the PTMs consists of identifying the positions of the PTMs on the alignment, PTM sites are represented in green. (C) Propagating a PTM refers to inferring that the modification exists in all species in which the residue is the same as the amino acid in the PTM site. (D) Degree of conservation of the PTM sites related to SARS-CoV-2 virus located in columns without gaps. (E) Frequencies of the different substitutions reported for the PTM sites, the sum of frequencies was normalized with respect to the higher value, we call this the mutation frequency for a PTM site.