

Beta	YECDIPIGAGICASYQTQTNSP	RRARSVASQSIIAYTMSLGV	ENSVAYSNNNSIAIPTNFTISVTTEILPVSMTKTSVDCTMYICGDS	TECSNLLLQYGSFCTQLNRALTG	766
Wuhan	YECDIPIGAGICASYQTQTNSP	RRARSVASQSIIAYTMSLGA	ENSVAYSNNNSIAIPTNFTISVTTEILPVSMTKTSVDCTMYICGDS	TECSNLLLQYGSFCTQLNRALTG	769
Alpha	YECDIPIGAGICASYQTQTNSH	RRARSVASQSIIAYTMSLGA	ENSVAYSNNNSIAIPTNFTISVTTEILPVSMTKTSVDCTMYICGDS	TECSNLLLQYGSFCTQLNRALTG	766
Delta	YECDIPIGAGICASYQTQTNSR	RRARSVASQSIIAYTMSLGA	ENSVAYSNNNSIAIPTNFTISVTTEILPVSMTKTSVDCTMYICGDS	TECSNLLLQYGSFCTQLNRALTG	767
Omicron BA.1	YECDIPIGAGICASYQTQTKSH	RRARSVASQSIIAYTMSLGA	ENSVAYSNNNSIAIPTNFTISVTTEILPVSMTKTSVDCTMYICGDS	TECSNLLLQYGSFCTQLNRALTG	763
Omicron JN.1	YECDIPIGAGICASYQTQTKSR	RRARSVASQSIIAYTMSLGA	ENSVAYSNNNSIAIPTNFTISVTTEILPVSMTKTSVDCTMYICGDS	TECSNLLLQYGSFCTQLKRALTG	765
consensus	!!!!!!!!!!!!!!!!!!!!!!*	!!!!!!!!!!!!!!!!!!!!!!*	!!!!!!!!!!!!!!!!!!!!!!*	!!!!!!!!!!!!!!!!!!!!!!*	



Beta	IAVEQDKNTQEVFAQVKQIYKTPPIKDFGGFNFSQILPDPSKPSKRSFIEDLLFNKVT	LADAGFIKQYGDCLGDIAARDLICAKFNGLTVLPPLLTDEMIAQYTSALLA	876
Wuhan	IAVEQDKNTQEVFAQVKQIYKTPPIKDFGGFNFSQILPDPSKPSKRSFIEDLLFNKVT	LADAGFIKQYGDCLGDIAARDLICAKFNGLTVLPPLLTDEMIAQYTSALLA	879
Alpha	IAVEQDKNTQEVFAQVKQIYKTPPIKDFGGFNFSQILPDPSKPSKRSFIEDLLFNKVT	LADAGFIKQYGDCLGDIAARDLICAKFNGLTVLPPLLTDEMIAQYTSALLA	876
Delta	IAVEQDKNTQEVFAQVKQIYKTPPIKDFGGFNFSQILPDPSKPSKRSFIEDLLFNKVT	LADAGFIKQYGDCLGDIAARDLICAKFNGLTVLPPLLTDEMIAQYTSALLA	877
Omicron BA.1	IAVEQDKNTQEVFAQVKQIYKTPPIKDFGGFNFSQILPDPSKPSKRSFIEDLLFNKVT	LADAGFIKQYGDCLGDIAARDLICAKFNGLTVLPPLLTDEMIAQYTSALLA	873
Omicron JN.1	IAVEQDKNTQEVFAQVKQIYKTPPIKDFGGFNFSQILPDPSKPSKRSFIEDLLFNKVT	LADAGFIKQYGDCLGDIAARDLICAKFNGLTVLPPLLTDEMIAQYTSALLA	875
consensus	!!!!!!!!!!!!!!!!!!!!!!*	!!!!!!!!!!!!!!!!!!!!!!*	

Beta	GTITSGWTFGAGAALQIPFAMQMAYRFNGIGVGTQNVLYENQKLIANQFN	SAIGKIQDSLSSSTASALGKLQDVVNQNAQALNTLVKQLSSNFGA	ISSVLNDILSRDKVEA	986
Wuhan	GTITSGWTFGAGAALQIPFAMQMAYRFNGIGVGTQNVLYENQKLIANQFN	SAIGKIQDSLSSSTASALGKLQDVVNQNAQALNTLVKQLSSNFGA	ISSVLNDILSRDKVEA	989
Alpha	GTITSGWTFGAGAALQIPFAMQMAYRFNGIGVGTQNVLYENQKLIANQFN	SAIGKIQDSLSSSTASALGKLQDVVNQNAQALNTLVKQLSSNFGA	ISSVLNDILSRDKVEA	986
Delta	GTITSGWTFGAGAALQIPFAMQMAYRFNGIGVGTQNVLYENQKLIANQFN	SAIGKIQDSLSSSTASALGKLQDVVNQNAQALNTLVKQLSSNFGA	ISSVLNDILSRDKVEA	987
Omicron BA.1	GTITSGWTFGAGAALQIPFAMQMAYRFNGIGVGTQNVLYENQKLIANQFN	SAIGKIQDSLSSSTASALGKLQDVVNQNAQALNTLVKQLSSNFGA	ISSVLNDILSRDKVEA	983
Omicron JN.1	GTITSGWTFGAGAALQIPFAMQMAYRFNGIGVGTQNVLYENQKLIANQFN	SAIGKIQDSLSSSTASALGKLQDVVNQNAQALNTLVKQLSSNFGA	ISSVLNDILSRDKVEA	985
consensus	!!!!!!!!!!!!!!!!!!!!!!*	!!!!!!!!!!!!!!!!!!!!!!*	!!!!!!!!!!!!!!!!!!!!!!*	!!!!!!!!!!!!!!!!!!!!!!*

Beta	EVQIDRLITGRLQSLQTYVTQQLIRAAEIRASANLAATKMSECVLGQSKRVDFCGKGYHLSFPPQSAPHGVVFLHVTYVPAQEKNFTTAP	AICHDGKAHFPREGVFSNG	1096
Wuhan	EVQIDRLITGRLQSLQTYVTQQLIRAAEIRASANLAATKMSECVLGQSKRVDFCGKGYHLSFPPQSAPHGVVFLHVTYVPAQEKNFTTAP	AICHDGKAHFPREGVFSNG	1099
Alpha	EVQIDRLITGRLQSLQTYVTQQLIRAAEIRASANLAATKMSECVLGQSKRVDFCGKGYHLSFPPQSAPHGVVFLHVTYVPAQEKNFTTAP	AICHDGKAHFPREGVFSNG	1096
Delta	EVQIDRLITGRLQSLQTYVTQQLIRAAEIRASANLAATKMSECVLGQSKRVDFCGKGYHLSFPPQSAPHGVVFLHVTYVPAQEKNFTTAP	AICHDGKAHFPREGVFSNG	1097
Omicron BA.1	EVQIDRLITGRLQSLQTYVTQQLIRAAEIRASANLAATKMSECVLGQSKRVDFCGKGYHLSFPPQSAPHGVVFLHVTYVPAQEKNFTTAP	AICHDGKAHFPREGVFSNG	1093
Omicron JN.1	EVQIDRLITGRLQSLQTYVTQQLIRAAEIRASANLAATKMSECVLGQSKRVDFCGKGYHLSFPPQSAPHGVVFLHVTYVPAQEKNFTTAP	AICHDGKAHFPREGVFSNG	1095
consensus	!!!!!!!!!!!!!!!!!!!!!!*	!!!!!!!!!!!!!!!!!!!!!!*	

Beta	THWFVTQRNFYEPQIITTDNTFVSGNCDVVIGIVNNTVYDPLQPELDSFKEELDKYFKNHTSPD	VDLGDISGINASVVNIQKEIDRLNEVAKNLNESLIDLQELGKYEYQ	1206
Wuhan	THWFVTQRNFYEPQIITTDNTFVSGNCDVVIGIVNNTVYDPLQPELDSFKEELDKYFKNHTSPD	VDLGDISGINASVVNIQKEIDRLNEVAKNLNESLIDLQELGKYEYQ	1209
Alpha	THWFVTQRNFYEPQIITTDNTFVSGNCDVVIGIVNNTVYDPLQPELDSFKEELDKYFKNHTSPD	VDLGDISGINASVVNIQKEIDRLNEVAKNLNESLIDLQELGKYEYQ	1206
Delta	THWFVTQRNFYEPQIITTDNTFVSGNCDVVIGIVNNTVYDPLQPELDSFKEELDKYFKNHTSPD	VDLGDISGINASVVNIQKEIDRLNEVAKNLNESLIDLQELGKYEYQ	1207
Omicron BA.1	THWFVTQRNFYEPQIITTDNTFVSGNCDVVIGIVNNTVYDPLQPELDSFKEELDKYFKNHTSPD	VDLGDISGINASVVNIQKEIDRLNEVAKNLNESLIDLQELGKYEYQ	1203
Omicron JN.1	THWFVTQRNFYEPQIITTDNTFVSGNCDVVIGIVNNTVYDPLQPELDSFKEELDKYFKNHTSPD	VDLGDISGINASVVNIQKEIDRLNEVAKNLNESLIDLQELGKYEYQ	1205
consensus	!!!!!!!!!!!!!!!!!!!!!!*	!!!!!!!!!!!!!!!!!!!!!!*	

Beta	IKWPWYIWLGFIAGLIAIVMVTIMLCCMTSCCCLKGCCSCGSCCKFDEDDSEPVLKGVKLHYT	1270
Wuhan	IKWPWYIWLGFIAGLIAIVMVTIMLCCMTSCCCLKGCCSCGSCCKFDEDDSEPVLKGVKLHYT	1273
Alpha	IKWPWYIWLGFIAGLIAIVMVTIMLCCMTSCCCLKGCCSCGSCCKFDEDDSEPVLKGVKLHYT	1270
Delta	IKWPWYIWLGFIAGLIAIVMVTIMLCCMTSCCCLKGCCSCGSCCKFDEDDSEPVLKGVKLHYT	1271
Omicron BA.1	IKWPWYIWLGFIAGLIAIVMVTIMLCCMTSCCCLKGCCSCGSCCKFDEDDSEPVLKGVKLHYT	1267
Omicron JN.1	IKWPWYIWLGFIAGLIAIVMVTIMLCCMTSCCCLKGCCSCGSCCKFDEDDSEPVLKGVKLHYT	1269
consensus	!!!!!!!!!!!!!!!!!!!!!!*	

 non-conserved
 $\geq 50\%$ conserved