

Supplementary information, Table S3: SARS-CoV-2-S circulating variants

constructed in this study.

SARS-CoV-2-S circulating variants	Mutation sites
B.1.617.1	G142D, E154K, L452R, E484Q, D614G, P618R, Q1071H, and H1101D
B.1.617.2.V2	T19R, G142D, E156G, 157-158 FR deletion (Δ FR157-158), L452R, T478K, D614G, P681R and D950N
B.1.429	S13I, W152C, and L452R
B.1.525	Q52R, A67V, Δ HV69-70, Δ Y145, E484K, D614G, Q677H, and F888L
B.1.526	L5F, T95I, D253G, E484K, D614G, and A701V
B.1.617	E154K, L452R, E484Q, and P681R
B.1.1.7 (Alpha)	Δ 69-70 HV, Δ 144 Y, N501Y, A570D, D614G, P681H, T761I, S982A, and D1118H
B.1.351 (Beta)	L18F, D80A, D215G, Δ LAL242-244, K417N, E484K, N501Y, D614G, and A701V
B.1.1.28 (Gamma)	L18F, T20N, P26S, D138Y, R190S, K417T, E484K, N501Y, D614G, and H655Y.
B.1.617.2 (Delta)	T19R, G142D, L452R, T478K, D614G, P681R and D950N
C.37 (Lambda)	G75V, T76I, Δ R246, Δ S247, Δ Y248, Δ L249, Δ T250, Δ P251, Δ G252, D253N, L452Q, F490S, D614G, and T859N
B.1.621 (Mu)	T95I, Y146insN, R346K, E484K, N501Y, D614G, P681H, and D950N
B.1.1.529 (Omicron BA.1)	A67V, Δ HV69-70, T95I, Δ GVY142-144, Y145D, Δ N211, L212I, ins214EPE, G339D, S371L, S373P, S375F, K417N, N440K, G446S, S477N, T478K, E484A, Q493R, G496S, Q498R, N501Y, Y505H, T547K, D614G, H655Y, N679K, P681H, N764K, D796Y, N856K, Q954H, N969K, and L981F
Omicron BA.2	T19I; Δ L24, Δ P25, Δ P26, A27S, G142D, V213G, G339D, S371F, S373P, S375F, T376A, D405N, R408S, K417N, N440K, S477N, T478K, E484A, Q493R, Q498R, N501Y, Y505H, D614G, H655Y, N679K, P681H, N764K, D796Y, Q954H, N969K
Omicron BA.3	A67V, Δ 69-70, T95I, G142D, Δ V143, Δ Y144, Δ Y145, Δ N211, L212I, G339D, S371F, S373P, S375F, D405N, K417N, N440K, G446S, S477N, T478K, E484A, Q493R, Q498R, N501Y, Y505H, D614G, H655Y, N679K, P681H, N764K, D796Y, Q954H, N969K
Omicron BA.4/5	T19I, L24S, Δ 25-27, Δ 69-70, G142D, V213G, G339D, S371F, S373P, S375F, T376A, D405N, R408S, K417N, N440K, L452R, S477N, T478K, E484A, F486V, Q498R, N501Y, Y505H, D614G, H655Y, N679K, P681H, N764K, D796Y, Q954H, N969K