

Table S1. The positive rate of the desired mutants by PCR confirmation

	1 st infection	2 nd infection
Δ S1-2	1/11	15/24
Δ S2-2	7/49	11/20
Δ S2-3	17/20	13/20
Δ S2-6	8/10	20/20

Note: the frequency was shown by plaques with mutant amplicon/total selected plaques; Primer pairs S1-2 gF and S1-2+48 inverse F, S2-2_g+1061F and S2-2_g+1208R, S2-3_g+1159F and S2-3_g+1087R, and S2-6+1068gF and S2-6+1050gR were used for PCR confirmation of target genes S1-2, S2-2, S2-3 and S2-6 respectively.

Table S2. Preincubation (adsorption) assay of Φ K64-1

	Original (before adsorption) titer	Preincubated with K1	Reduced titer
titer on K1	1.67×10^8	2.11×10^6	1.64×10^8
titer on K11	1.89×10^8	2×10^6	1.87×10^8
titer on K21	1.89×10^8	1.67×10^6	1.87×10^8
titer on K25	1.55×10^8	1.78×10^6	1.54×10^8
titer on K30	1.78×10^8	2.22×10^6	1.75×10^8
titer on K35	2×10^8	1.89×10^6	1.98×10^8
titer on K64	1.55×10^8	1.55×10^6	1.54×10^8
titer on K69	1.78×10^8	1.89×10^6	1.76×10^8
titer on KN4	1.44×10^8	1.89×10^6	1.42×10^8
titer on KN5	1.89×10^8	1.44×10^6	1.87×10^8
	Original (before adsorption) titer	Preincubated with K11	Reduced titer
titer on K1	1.67×10^8	2.22×10^6	1.64×10^8
titer on K11	1.89×10^8	1.67×10^6	1.87×10^8
titer on K21	1.89×10^8	1.67×10^6	1.87×10^8
titer on K25	1.55×10^8	1.55×10^6	1.54×10^8
titer on K30	1.78×10^8	1.78×10^6	1.76×10^8
titer on K35	2×10^8	1.89×10^6	1.98×10^8
titer on K64	1.55×10^8	1.33×10^6	1.54×10^8
titer on K69	1.78×10^8	2×10^6	1.76×10^8
titer on KN4	1.44×10^8	1.67×10^6	1.43×10^8
titer on KN5	1.89×10^8	1.44×10^6	1.87×10^8
	Original (before adsorption) titer	Preincubated with K21	Reduced titer
titer on K1	1.67×10^8	1.44×10^6	1.65×10^8
titer on K11	1.89×10^8	1.78×10^6	1.87×10^8
titer on K21	1.89×10^8	1.67×10^6	1.87×10^8
titer on K25	1.55×10^8	1.89×10^6	1.54×10^8
titer on K30	1.78×10^8	1.67×10^6	1.76×10^8
titer on K35	2×10^8	1.55×10^6	1.98×10^8
titer on K64	1.55×10^8	1.78×10^6	1.54×10^8
titer on K69	1.78×10^8	1.67×10^6	1.76×10^8
titer on KN4	1.44×10^8	1.67×10^6	1.43×10^8
titer on KN5	1.89×10^8	1.78×10^6	1.87×10^8

	Original (before adsorption) titer	Preincubated with K25	Reduced titer
titer on K1	1.67×10^8	2×10^6	1.65×10^8
titer on K11	1.89×10^8	1.89×10^6	1.87×10^8
titer on K21	1.89×10^8	1.44×10^6	1.87×10^8
titer on K25	1.55×10^8	1.44×10^6	1.54×10^8
titer on K30	1.78×10^8	1.55×10^6	1.76×10^8
titer on K35	2×10^8	1.55×10^6	1.98×10^8
titer on K64	1.55×10^8	1.67×10^6	1.54×10^8
titer on K69	1.78×10^8	1.55×10^6	1.76×10^8
titer on KN4	1.44×10^8	1.44×10^6	1.43×10^8
titer on KN5	1.89×10^8	1.78×10^6	1.87×10^8
	Original (before adsorption) titer	Preincubated with K30	Reduced titer
titer on K1	1.67×10^8	1.78×10^6	1.65×10^8
titer on K11	1.89×10^8	1.67×10^6	1.87×10^8
titer on K21	1.89×10^8	1.44×10^6	1.87×10^8
titer on K25	1.55×10^8	1.89×10^6	1.54×10^8
titer on K30	1.78×10^8	1.55×10^6	1.76×10^8
titer on K35	2×10^8	1.55×10^6	1.98×10^8
titer on K64	1.55×10^8	1.67×10^6	1.54×10^8
titer on K69	1.78×10^8	1.55×10^6	1.76×10^8
titer on KN4	1.44×10^8	1.67×10^6	1.43×10^8
titer on KN5	1.89×10^8	1.55×10^6	1.87×10^8
	Original (before adsorption) titer	Preincubated with K35	Reduced titer
titer on K1	1.67×10^8	1.89×10^6	1.65×10^8
titer on K11	1.89×10^8	2×10^6	1.87×10^8
titer on K21	1.89×10^8	1.44×10^6	1.87×10^8
titer on K25	1.55×10^8	1.44×10^6	1.54×10^8
titer on K30	1.78×10^8	1.67×10^6	1.76×10^8
titer on K35	2×10^8	1.78×10^6	1.98×10^8
titer on K64	1.55×10^8	1.44×10^6	1.54×10^8
titer on K69	1.78×10^8	1.67×10^6	1.76×10^8
titer on KN4	1.44×10^8	1.44×10^6	1.43×10^8
titer on KN5	1.89×10^8	1.55×10^6	1.87×10^8

	Original (before adsorption) titer	Preincubated with K64	Reduced titer
titer on K1	1.67×10^8	1.55×10^6	1.65×10^8
titer on K11	1.89×10^8	1.67×10^6	1.87×10^8
titer on K21	1.89×10^8	1.44×10^6	1.87×10^8
titer on K25	1.55×10^8	1.78×10^6	1.54×10^8
titer on K30	1.78×10^8	1.22×10^6	1.76×10^8
titer on K35	2×10^8	1.89×10^6	1.98×10^8
titer on K64	1.55×10^8	1.44×10^6	1.54×10^8
titer on K69	1.78×10^8	2×10^6	1.76×10^8
titer on KN4	1.44×10^8	1.44×10^6	1.43×10^8
titer on KN5	1.89×10^8	1.78×10^6	1.87×10^8
	Original (before adsorption) titer	Preincubated with K69	Reduced titer
titer on K1	1.67×10^8	1.67×10^6	1.65×10^8
titer on K11	1.89×10^8	1.33×10^6	1.87×10^8
titer on K21	1.89×10^8	1.89×10^6	1.87×10^8
titer on K25	1.55×10^8	1.55×10^6	1.54×10^8
titer on K30	1.78×10^8	1.55×10^6	1.76×10^8
titer on K35	2×10^8	1.78×10^6	1.98×10^8
titer on K64	1.55×10^8	1.78×10^6	1.54×10^8
titer on K69	1.78×10^8	1.78×10^6	1.76×10^8
titer on KN4	1.44×10^8	1.89×10^6	1.42×10^8
titer on KN5	1.89×10^8	1.44×10^6	1.87×10^8
	Original (before adsorption) titer	Preincubated with KN4	Reduced titer
titer on K1	1.67×10^8	1.78×10^6	1.65×10^8
titer on K11	1.89×10^8	1.55×10^6	1.87×10^8
titer on K21	1.89×10^8	1.89×10^6	1.87×10^8
titer on K25	1.55×10^8	1.55×10^6	1.54×10^8
titer on K30	1.78×10^8	1.33×10^6	1.76×10^8
titer on K35	2×10^8	1.67×10^6	1.98×10^8
titer on K64	1.55×10^8	1.55×10^6	1.54×10^8
titer on K69	1.78×10^8	1.78×10^6	1.76×10^8
titer on KN4	1.44×10^8	1.55×10^6	1.43×10^8
titer on KN5	1.89×10^8	1.55×10^6	1.87×10^8

	Original (before adsorption) titer	Preincubated with KN5	Reduced titer
titer on K1	1.67×10^8	1.55×10^6	1.65×10^8
titer on K11	1.89×10^8	1.55×10^6	1.87×10^8
titer on K21	1.89×10^8	1.67×10^6	1.87×10^8
titer on K25	1.55×10^8	1.55×10^6	1.54×10^8
titer on K30	1.78×10^8	1.55×10^6	1.76×10^8
titer on K35	2×10^8	1.55×10^6	1.98×10^8
titer on K64	1.55×10^8	1.67×10^6	1.54×10^8
titer on K69	1.78×10^8	1.44×10^6	1.76×10^8
titer on KN4	1.44×10^8	1.78×10^6	1.43×10^8
titer on KN5	1.89×10^8	1.44×10^6	1.87×10^8

Note: three independent experiments were performed and the average is shown. The strains used in this experiment are NTUH-K2044(K1), reference stain K11, 6668E(K21), VGHN4(K25), reference stain K30, reference stain K35, reference stain K64, reference stain K69, 4565 (KN4) and Ca0431 (KN5).