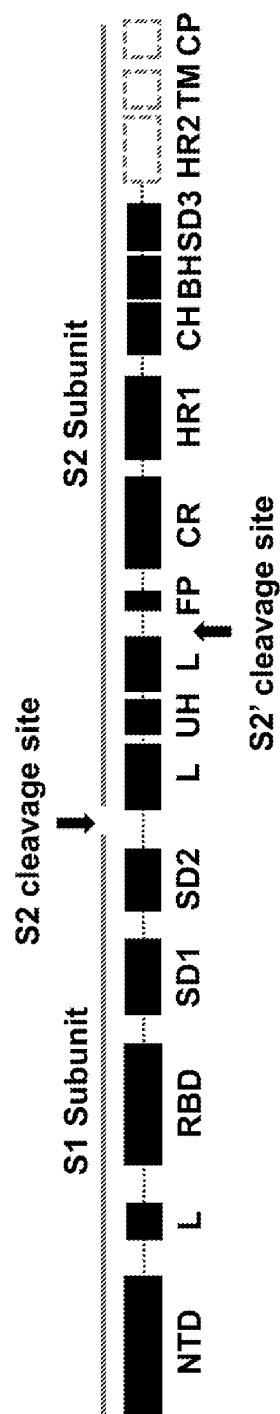


FIG. 1



Coronavirus S1 subunit

NTD, N-terminal domain;

L, linker region;

RBD, receptor-binding domain;

SD1, subdomain 1;

SD2, subdomain 2;

Coronavirus S2 subunit

UH, upstream helix;

CR, connecting region; HR1, heptad repeat 1;

CH, central helix; BH, β -hairpin;

SD3, subdomain 3; HR2, heptad repeat 2;

TM, transmembrane region/domain;

CT, cytoplasmic tail.

FIG. 2

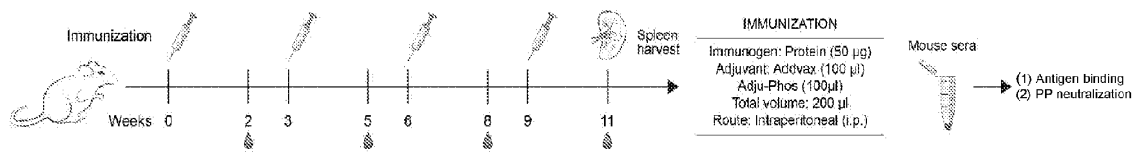


FIG. 3

Mouse serum ELISA ED₅₀ values

Coating antigen	SARS-CoV-2 S2P-5GS-1TD0	SARS-CoV-2 S2GΔHR2-5GS-1TD0	SARS-CoV-2 S2GΔHR2-5GS-E2p-L4P	SARS-CoV-2 S2GΔHR2-10GS-13-01v9-L7P	w2					w5					w8					w11				
					M1	M2	M3	M4	M5	M1	M2	M3	M4	M5	M1	M2	M3	M4	M5	M1	M2	M3	M4	M5
					337	378	438	92	186	8229	14598	15271	11029	15730	31348	19923	48495	20899	27382	87983	74675	105473	61814	98729
SARS-CoV-2 S2P-5GS-1TD0	S2P-5GS-1TD0	160	300	42	264	<20	28889	9634	11211	21972	2225	54738	33977	31597	69701	7331	104858	65140	102307	125912	44213			
	S2GΔHR2-5GS-FR	207	379	907	463	182.2	35236	32621	25025	47534	14631	28314	48030	53004	81962	12542	73512	110204	85167	152548	35108			
	S2GΔHR2-5GS-E2p-L4P	161	145	111	244	64	38631	34068	49277	62820	14788	79610	48384	68459	83674	45019	101870	68785	75147	83008	78758			
	S2GΔHR2-10GS-13-01v9-L7P	2047	1697	2388	2434	2342	53863	58287	13164	67367	77888	136410	136928	130590	190018	126344								
SARS-CoV-2 S2GΔHR2-5GS-foldon	SARS-CoV-2 vaccine antigen	M1	M2	M3	M4	M5	M1	M2	M3	M4	M5	M1	M2	M3	M4	M5	M1	M2	M3	M4	M5			
	S2P-5GS-1TD0	342	584	786	152	186	20525	30418	47919	16989	28307	71336	43544	104033	32473	51430	168104	101372	164947	77599	136078			
	S2GΔHR2-5GS-1TD0	1623	2329	915	1190	<20	38704	63697	51587	77015	8682	168541	133257	137482	306124	53005	848865	287906	427211	524920	103434			
	S2GΔHR2-5GS-FR	1188	2365	4809	2102	1925	100424	99021	105640	217243	94779	112191	207821	177619	227282	43471	240083	710983	381028	592260	116127			
SARS-CoV-2 S2GΔHR2-5GS-E2p-L4P	S2GΔHR2-5GS-E2p-L4P	748	481	288	1132	435	188389	197889	167303	549503	74194	209083	153974	150854	389845	173525	500160	324937	278279	831498	369062			
	S2GΔHR2-10GS-13-01v9-L7P	3695	5177	3135	4338	3353	147140	146498	19018	197789	152853	239618	402217	162383	412328	272905								
SARS-CoV-2 RBD	SARS-CoV-2 vaccine antigen	M1	M2	M3	M4	M5	M1	M2	M3	M4	M5	M1	M2	M3	M4	M5	M1	M2	M3	M4	M5			
	S2P-5GS-1TD0	<20	<20	<20	<20	<20	1801	979.6	2893	260.2	1533	7881	1881	8448	1952	3948	15828	8935	10888	5828	14807			
	S2GΔHR2-5GS-1TD0	26	24	<20	<20	<20	4693	1181	703.1	5881	750.5	13835	3578	3906	28190	4493	32268	8328	9751	40928	6118			
	S2GΔHR2-5GS-FR	<20	<20	22	<20	21	3340	5205	3799	3229	1900	5996	15598	16918	14222	2293	11360	44599	35885	32006	7847			
SARS-CoV-2 RBD	S2GΔHR2-5GS-E2p-L4P	<20	<20	<20	21	<20	5425	8801	6188	22496	3554	10882	19414	10367	38238	10091	17641	32324	17682	84841	23122			
	S2GΔHR2-10GS-13-01v9-L7P	112	384	159	73	151	16285	16054	1920	16797	17388	24415	49820	15028	51700	41325								

FIG. 4

Mouse serum neutralization ID₅₀ values

Pseudovirus	SARS-CoV-2-pp	SARS-CoV-2																			
		W2					W5					W8					W11				
		M1	M2	M3	M4	M5	M1	M2	M3	M4	M5	M1	M2	M3	M4	M5	M1	M2	M3	M4	M5
		S2P-5GS-1TD0	<100	<100	<100	<100	405	444	1032	270	501	776.6	1062	3410	1121	6783	2588	2431	9374	1074	1806
		S2GΔHR2-5GS-1TD0	<100	<100	<100	<100	17433	3960	2747	5170	<100	13124	7579	3443	7902	221	11228	4377	3271	6009	4176
		S2GΔHR2-5GS-FR	<100	<100	<100	<100	4152	8773	5414	10007	3527	3735	5968	8443	7805	3872	3384	4103	5704	8194	2697
		S2GΔHR2-5GS-E2p-L4P	<100	<100	<100	<100	7954	10197	23509	17140	2915	7876	18213	17917	19538	4017	9170	5651	13334	12484	4789
		S2GΔHR2-10GS-I3-01V9-L7P	278	330	247	486	417	8250	11868	8695	15034	8694	14174	14888	22024	21474	9393				
Pseudovirus	SARS-CoV-2-pp	SARS-CoV-2																			
		w2					w5					w8					w11				
		M1	M2	M3	M4	M5	M1	M2	M3	M4	M5	M1	M2	M3	M4	M5	M1	M2	M3	M4	M5
		S2P-5GS-1TD0	<100	<100	<100	<100	1050	787	1524	369	867	3515	3189	2897	1141	1683	11358	7358	10878	10723	7888
		S2GΔHR2-5GS-1TD0	<100	<100	<100	<100	18419	3271	3238	4382	263	12641	4656	6148	9690	1707	27622	13489	18960	31117	4173
		S2GΔHR2-5GS-FR	<100	<100	<100	<100	3055	6659	8044	5184	1072	4156	12881	14238	6453	1827	11054	31423	26556	19137	6777
		S2GΔHR2-5GS-E2p-L4P	<100	<100	<100	<100	5778	11650	7370	18399	977	8613	14120	5999	19054	4733	13128	28298	18219	77734	12356
		S2GΔHR2-10GS-I3-01V9-L7P	<100	<100	<100	<100	5465	5151	1440	8831	4722	14684	22060	12830	23608	13575					

FIG. 5

