

Table S1. The numbering and structures of the N-glycans on the microarray.

No.	N-Glycan ID	Structure
1	N000	GlcNAc β 1-2Man α 1-6(GlcNAc β 1-2Man α 1-3)Man β 1-4GlcNAc β 1-4GlcNAc-
2	N001	Gal β 1-4GlcNAc β 1-2Man α 1-6(Gal β 1-4GlcNAc β 1-2Man α 1-3)Man β 1-4GlcNAc β 1-4 GlcNAc-
3	N002	Neu5Ac α 2-3Gal β 1-4GlcNAc β 1-2Man α 1-6(Neu5Ac α 2-3Gal β 1-4GlcNAc β 1-2Man α 1-3)Man β 1-4GlcNAc β 1-4 GlcNAc-
4	N003	Neu5Ac α 2-6Gal β 1-4GlcNAc β 1-2Man α 1-6(Neu5Ac α 2-6Gal β 1-4GlcNAc β 1-2Man α 1-3)Man β 1-4GlcNAc β 1-4 GlcNAc-
5	N004	Gal β 1-4(Fuc α 1-3)GlcNAc β 1-2Man α 1-6(Gal β 1-4(Fuc α 1-3)GlcNAc β 1-2Man α 1-3)Man β 1-4GlcNAc β 1-4 GlcNAc-
6	N005	Neu5Ac α 2-3Gal β 1-4(Fuc α 1-3)GlcNAc β 1-2Man α 1-6(Neu5Ac α 2-3Gal β 1-4(Fuc α 1-3)GlcNAc β 1-2Man α 1-3)Man β 1-4GlcNAc β 1-4 GlcNAc-
7	N010	Man α 1-6(Man α 1-3)Man α 1-6(GlcNAc β 1-2Man α 1-3)Man β 1-4GlcNAc β 1-4GlcNAc-
8	N011	Man α 1-6(Man α 1-3)Man α 1-6(Gal β 1-4GlcNAc β 1-2Man α 1-3)Man β 1-4GlcNAc β 1-4 GlcNAc-
9	N012	Man α 1-6(Man α 1-3)Man α 1-6(Neu5Ac α 2-3Gal β 1-4GlcNAc β 1-2Man α 1-3)Man β 1-4GlcNAc β 1-4 GlcNAc-
10	N013	Man α 1-6(Man α 1-3)Man α 1-6(Neu5Ac α 2-6Gal β 1-4GlcNAc β 1-2Man α 1-3)Man β 1-4GlcNAc β 1-4 GlcNAc-
11	N014	Man α 1-6(Man α 1-3)Man α 1-6(Gal β 1-4(Fuc α 1-3)GlcNAc β 1-2Man α 1-3)Man β 1-4GlcNAc β 1-4 GlcNAc-
12	N015	Man α 1-6(Man α 1-3)Man α 1-6(Neu5Ac α 2-3Gal β 1-4(Fuc α 1-3)GlcNAc β 1-2Man α 1-3)Man β 1-4GlcNAc β 1-4 GlcNAc-
13	N020	GlcNAc β 1-2Man α 1-3Man β 1-4GlcNAc β 1-4GlcNAc-
14	N021	Gal β 1-4GlcNAc β 1-2Man α 1-3Man β 1-4GlcNAc β 1-4GlcNAc-
15	N022	Neu5Ac α 2-3Gal β 1-4GlcNAc β 1-2Man α 1-3Man β 1-4GlcNAc β 1-4GlcNAc-
16	N023	Neu5Ac α 2-6Gal β 1-4GlcNAc β 1-2Man α 1-3Man β 1-4GlcNAc β 1-4GlcNAc-
17	N024	Gal β 1-4(Fuc α 1-3)GlcNAc β 1-2Man α 1-3Man β 1-4GlcNAc β 1-4GlcNAc-
18	N025	Neu5Ac α 2-3Gal β 1-4(Fuc α 1-3)GlcNAc β 1-2Man α 1-3Man β 1-4GlcNAc β 1-4GlcNAc-
19	N030	Man α 1-6(GlcNAc β 1-2Man α 1-3)Man β 1-4GlcNAc β 1-

		4GlcNAc-
20	N031	Man α 1-6(Gal β 1-4GlcNAc β 1-2Man α 1-3)Man β 1-4GlcNAc β 1-4GlcNAc-
21	N032	Man α 1-6(Neu5Ac α 2-3Gal β 1-4GlcNAc β 1-2Man α 1-3)Man β 1-4GlcNAc β 1-4GlcNAc-
22	N033	Man α 1-6(Neu5Ac α 2-6Gal β 1-4GlcNAc β 1-2Man α 1-3)Man β 1-4GlcNAc β 1-4GlcNAc-
23	N034	Man α 1-6(Gal β 1-4(Fuca1-3)GlcNAc β 1-2Man α 1-3)Man β 1-4GlcNAc β 1-4GlcNAc-
24	N035	Man α 1-6(Neu5Ac α 2-3Gal β 1-4(Fuca1-3)GlcNAc β 1-2Man α 1-3)Man β 1-4GlcNAc β 1-4GlcNAc-
25	N040	GlcNAc β 1-2Man α 1-6Man β 1-4GlcNAc β 1-4GlcNAc-
26	N041	Gal β 1-4GlcNAc β 1-2Man α 1-6Man β 1-4GlcNAc β 1-4GlcNAc-
27	N042	Neu5Ac α 2-3Gal β 1-4GlcNAc β 1-2Man α 1-6Man β 1-4GlcNAc β 1-4GlcNAc-
28	N043	Neu5Ac α 2-6Gal β 1-4GlcNAc β 1-2Man α 1-6Man β 1-4GlcNAc β 1-4GlcNAc-
29	N044	Gal β 1-4(Fuca1-3)GlcNAc β 1-2Man α 1-6Man β 1-4GlcNAc β 1-4GlcNAc-
30	N045	Neu5Ac α 2-3Gal β 1-4(Fuca1-3)GlcNAc β 1-2Man α 1-6Man β 1-4GlcNAc β 1-4GlcNAc-
31	N050	GlcNAc β 1-2Man α 1-6(Man α 1-3)Man β 1-4GlcNAc β 1-4GlcNAc-
32	N051	Gal β 1-4GlcNAc β 1-2Man α 1-6(Man α 1-3)Man β 1-4GlcNAc β 1-4GlcNAc-
33	N052	Neu5Ac α 2-3Gal β 1-4GlcNAc β 1-2Man α 1-6(Man α 1-3)Man β 1-4GlcNAc β 1-4GlcNAc-
34	N053	Neu5Ac α 2-6Gal β 1-4GlcNAc β 1-2Man α 1-6(Man α 1-3)Man β 1-4GlcNAc β 1-4GlcNAc-
35	N054	Gal β 1-4(Fuca1-3)GlcNAc β 1-2Man α 1-6(Man α 1-3)Man β 1-4GlcNAc β 1-4GlcNAc-
36	N055	Neu5Ac α 2-3Gal β 1-4(Fuca1-3)GlcNAc β 1-2Man α 1-6(Man α 1-3)Man β 1-4GlcNAc β 1-4GlcNAc-
37	N110	(OAc)4GlcNAc β 1-2Man α 1-6(GlcNAc β 1-2Man α 1-3)Man β 1-4GlcNAc β 1-4GlcNAc-
38	N111	GlcNAc β 1-2Man α 1-6(Gal β 1-4GlcNAc β 1-2Man α 1-3)Man β 1-4GlcNAc β 1-4GlcNAc-
39	N112	GlcNAc β 1-2Man α 1-6(Neu5Ac α 2-3Gal β 1-4GlcNAc β 1-2Man α 1-3)Man β 1-4GlcNAc β 1-4GlcNAc-
40	N113	GlcNAc β 1-2Man α 1-6(Neu5Ac α 2-6Gal β 1-4GlcNAc β 1-2Man α 1-3)Man β 1-4GlcNAc β 1-4GlcNAc-
41	N114	GlcNAc β 1-2Man α 1-6(Gal β 1-4(Fuca1-3)GlcNAc β 1-2Man α 1-3)Man β 1-4GlcNAc β 1-4GlcNAc-

42	N115	GlcNAc β 1-2Man α 1-6(Neu5Ac α 2-3Gal β 1-4(Fuca1-3)GlcNAc β 1-2Man α 1-3)Man β 1-4GlcNAc β 1-4GlcNAc-
43	N122	Gal β 1-4GlcNAc β 1-2Man α 1-6(Neu5Ac α 2-3Gal β 1-4GlcNAc β 1-2Man α 1-3)Man β 1-4GlcNAc β 1-4 GlcNAc-
44	N123	Gal β 1-4GlcNAc β 1-2Man α 1-6(Neu5Ac α 2-6Gal β 1-4GlcNAc β 1-2Man α 1-3)Man β 1-4GlcNAc β 1-4 GlcNAc-
45	N124	Gal β 1-4GlcNAc β 1-2Man α 1-6(Gal β 1-4(Fuca1-3)GlcNAc β 1-2Man α 1-3)Man β 1-4GlcNAc β 1-4 GlcNAc-
46	N125	Gal β 1-4GlcNAc β 1-2Man α 1-6(Neu5Ac α 2-3Gal β 1-4(Fuca1-3)GlcNAc β 1-2Man α 1-3)Man β 1-4GlcNAc β 1-4 GlcNAc-
47	N133	Neu5Ac α 2-3Gal β 1-4GlcNAc β 1-2Man α 1-6(Neu5Ac α 2-6Gal β 1-4GlcNAc β 1-2Man α 1-3)Man β 1-4GlcNAc β 1-4 GlcNAc-
48	N134	Neu5Ac α 2-3Gal β 1-4GlcNAc β 1-2Man α 1-6(Gal β 1-4(Fuca1-3)GlcNAc β 1-2Man α 1-3)Man β 1-4GlcNAc β 1-4 GlcNAc-
49	N135	Neu5Ac α 2-3Gal β 1-4GlcNAc β 1-2Man α 1-6(Neu5Ac α 2-3Gal β 1-4(Fuca1-3)GlcNAc β 1-2Man α 1-3)Man β 1-4 GlcNAc β 1-4 GlcNAc-
50	N144	Neu5Ac α 2-6Gal β 1-4GlcNAc β 1-2Man α 1-6(Gal β 1-4(Fuca1-3)GlcNAc β 1-2Man α 1-3)Man β 1-4GlcNAc β 1-4 GlcNAc-
51	N155	Gal β 1-4(Fuca1-3)GlcNAc β 1-2Man α 1-6(Neu5Ac α 2-3Gal β 1-4(Fuca1-3)GlcNAc β 1-2Man α 1-3)Man β 1-4GlcNAc β 1-4 GlcNAc-
52	N210	GlcNAc β 1-2Man α 1-6((OAc)4GlcNAc β 1-2)Man α 1-3)Man β 1-4GlcNAc β 1-4GlcNAc-
53	N211	Gal β 1-4GlcNAc β 1-2Man α 1-6(GlcNAc β 1-2Man α 1-3)Man β 1-4GlcNAc β 1-4GlcNAc-
54	N212	Neu5Ac α 2-3Gal β 1-4GlcNAc β 1-2Man α 1-6(GlcNAc β 1-2Man α 1-3)Man β 1-4GlcNAc β 1-4GlcNAc-
55	N213	Neu5Ac α 2-6Gal β 1-4GlcNAc β 1-2Man α 1-6(GlcNAc β 1-2Man α 1-3)Man β 1-4GlcNAc β 1-4GlcNAc-
56	N214	Gal β 1-4(Fuca1-3)GlcNAc β 1-2Man α 1-6(GlcNAc β 1-2Man α 1-3)Man β 1-4GlcNAc β 1-4GlcNAc-
57	N215	Neu5Ac α 2-3Gal β 1-4(Fuca1-3)GlcNAc β 1-2Man α 1-6(GlcNAc β 1-2Man α 1-3)Man β 1-4GlcNAc β 1-4GlcNAc-
58	N222	Neu5Ac α 2-3Gal β 1-4GlcNAc β 1-2Man α 1-6(Gal β 1-4GlcNAc β 1-2Man α 1-3)Man β 1-4GlcNAc β 1-4GlcNAc-
59	N223	Neu5Ac α 2-6Gal β 1-4GlcNAc β 1-2Man α 1-6(Gal β 1-4GlcNAc β 1-2Man α 1-3)Man β 1-4GlcNAc β 1-4GlcNAc-
60	N224	Gal β 1-4(Fuca1-3)GlcNAc β 1-2Man α 1-6(Gal β 1-4GlcNAc β 1-2Man α 1-3)Man β 1-4GlcNAc β 1-4GlcNAc-

61	N225	Neu5Ac α 2-3Gal β 1-4(Fuc α 1-3)GlcNAc β 1-2Man α 1-6(Gal β 1-4GlcNAc β 1-2Man α 1-3)Man β 1-4GlcNAc β 1-4GlcNAc-
62	N233	Neu5Ac α 2-6Gal β 1-4GlcNAc β 1-2Man α 1-6(Neu5Ac α 2-3Gal β 1-4GlcNAc β 1-2Man α 1-3)Man β 1-4GlcNAc β 1-4GlcNAc-
63	N234	Gal β 1-4(Fuc α 1-3)GlcNAc β 1-2Man α 1-6(Neu5Ac α 2-3Gal β 1-4GlcNAc β 1-2Man α 1-3)Man β 1-4GlcNAc β 1-4GlcNAc-
64	N244	Gal β 1-4(Fuc α 1-3)GlcNAc β 1-2Man α 1-6(Neu5Ac α 2-6Gal β 1-4GlcNAc β 1-2Man α 1-3)Man β 1-4GlcNAc β 1-4GlcNAc-
65	N255	Neu5Ac α 2-3Gal β 1-4(Fuc α 1-3)GlcNAc β 1-2Man α 1-6(Gal β 1-4(Fuc α 1-3)GlcNAc β 1-2Man α 1-3)Man β 1-4GlcNAc β 1-4GlcNAc-
66	N6000	GlcNAc β 1-2Man α 1-6(GlcNAc β 1-2Man α 1-3)Man β 1-4GlcNAc β 1-4(Fuc α 1-6)GlcNAc-
67	N6030	Man α 1-6(GlcNAc β 1-2Man α 1-3)Man β 1-4GlcNAc β 1-4(Fuc α 1-6)GlcNAc-
68	N6111	GlcNAc β 1-2Man α 1-6(Gal β 1-4GlcNAc β 1-2Man α 1-3)Man β 1-4GlcNAc β 1-4(Fuc α 1-6)GlcNAc-
69	N6112	GlcNAc β 1-2Man α 1-6(Neu5Ac α 2-3Gal β 1-4GlcNAc β 1-2Man α 1-3)Man β 1-4GlcNAc β 1-4(Fuc α 1-6)GlcNAc-
70	N6113	GlcNAc β 1-2Man α 1-6(Neu5Ac α 2-6Gal β 1-4GlcNAc β 1-2Man α 1-3)Man β 1-4GlcNAc β 1-4(Fuc α 1-6)GlcNAc-
71	N6122	Gal β 1-4GlcNAc β 1-2Man α 1-6(Neu5Ac α 2-3Gal β 1-4GlcNAc β 1-2Man α 1-3)Man β 1-4GlcNAc β 1-4(Fuc α 1-6)GlcNAc-
72	N6123	Gal β 1-4GlcNAc β 1-2Man α 1-6(Neu5Ac α 2-6Gal β 1-4GlcNAc β 1-2Man α 1-3)Man β 1-4GlcNAc β 1-4(Fuc α 1-6)GlcNAc-
73	N6144	Neu5Ac α 2-6Gal β 1-4GlcNAc β 1-2Man α 1-6(Gal β 1-4(Fuc α 1-3)GlcNAc β 1-2Man α 1-3)Man β 1-4GlcNAc β 1-4(Fuc α 1-6)GlcNAc-
74	N6211	Gal β 1-4GlcNAc β 1-2Man α 1-6(GlcNAc β 1-2Man α 1-3)Man β 1-4GlcNAc β 1-4(Fuc α 1-6)GlcNAc-
75	N6212	Neu5Ac α 2-3Gal β 1-4GlcNAc β 1-2Man α 1-6(GlcNAc β 1-2Man α 1-3)Man β 1-4GlcNAc β 1-4(Fuc α 1-6)GlcNAc-
76	N6213	Neu5Ac α 2-6Gal β 1-4GlcNAc β 1-2Man α 1-6(GlcNAc β 1-2Man α 1-3)Man β 1-4GlcNAc β 1-4(Fuc α 1-6)GlcNAc-
77	N6222	Neu5Ac α 2-3Gal β 1-4GlcNAc β 1-2Man α 1-6(Gal β 1-4GlcNAc β 1-2Man α 1-3)Man β 1-4GlcNAc β 1-4(Fuc α 1-6)GlcNAc-
78	N6223	Neu5Ac α 2-6Gal β 1-4GlcNAc β 1-2Man α 1-6(Gal β 1-4GlcNAc β 1-2Man α 1-3)Man β 1-4GlcNAc β 1-4(Fuc α 1-6)GlcNAc-
79	N6244	Gal β 1-4(Fuc α 1-3)GlcNAc β 1-2Man α 1-6(Neu5Ac α 2-6Gal β 1-

		4GlcNAc β 1-2Man α 1-3)Man β 1-4GlcNAc β 1-4(Fuca1-6)GlcNAc-
80	N3001	Gal β 1-4GlcNAc β 1-2Man α 1-6(Gal β 1-4GlcNAc β 1-2(Gal β 1-4GlcNAc β 1-4)Man α 1-3)Man β 1-4GlcNAc β 1-4 GlcNAc-
81	N3004	Gal β 1-4(Fuca1-3)GlcNAc β 1-2Man α 1-6(Gal β 1-4(Fuca1-3)GlcNAc β 1-2(Gal β 1-4(Fuca1-3)GlcNAc β 1-4)Man α 1-3)Man β 1-4GlcNAc β 1-4 GlcNAc-
82	Man-1	Man β 1-4GlcNAc β 1-4GlcNAc-
83	Man-2A	Man α 1-6Man β 1-4GlcNAc β 1-4GlcNAc-
84	Man-2B	Man α 1-3Man β 1-4GlcNAc β 1-4GlcNAc-
85	Man-3	Man α 1-6(Man α 1-3)Man β 1-4GlcNAc β 1-4GlcNAc-
86	Man-5	Man α 1-6(Man α 1-3)Man α 1-6(Man α 1-3)Man β 1-4GlcNAc β 1-4GlcNAc-
87	Man-6	Man α 1-6(Man α 1-3)Man α 1-6(Man α 1-2Man α 1-3)Man β 1-4GlcNAc β 1-4GlcNAc-
88	Man-6D2	Man α 1-6(Man α 1-2Man α 1-3)Man α 1-6(Man α 1-3)Man β 1-4GlcNAc β 1-4GlcNAc-
89	Man-7	[Man α 1-2]Man α 1-6(Man α 1-3)Man α 1-6(Man α 1-2Man α 1-3)Man β 1-4GlcNAc β 1-4GlcNAc- (3 isomers)
90	Man-8	[Man α 1-2] [Man α 1-2] Man α 1-6(Man α 1-3)Man α 1-6(Man α 1-2Man α 1-3)Man β 1-4GlcNAc β 1-4GlcNAc- (3 isomers)
91	Man-9	Man α 1-2Man α 1-6(Man α 1-2Man α 1-3)Man α 1-6(Man α 1-2Man α 1-2Man α 1-3)Man β 1-4GlcNAc β 1-4 GlcNAc-
92	N002G	Neu5Gc α 2-3Gal β 1-4GlcNAc β 1-2Man α 1-6(Neu5Gc α 2-3Gal β 1-4GlcNAc β 1-2Man α 1-3)Man β 1-4GlcNAc β 1-4 GlcNAc-
93	N003G	Neu5Gc α 2-6Gal β 1-4GlcNAc β 1-2Man α 1-6(Neu5Gc α 2-6Gal β 1-4GlcNAc β 1-2Man α 1-3)Man β 1-4GlcNAc β 1-4 GlcNAc-
94	N012G	Man α 1-6(Man α 1-3)Man α 1-6(Neu5Gc α 2-3Gal β 1-4GlcNAc β 1-2Man α 1-3)Man β 1-4GlcNAc β 1-4 GlcNAc-
95	N013G	Man α 1-6(Man α 1-3)Man α 1-6(Neu5Gc α 2-6Gal β 1-4GlcNAc β 1-2Man α 1-3)Man β 1-4GlcNAc β 1-4 GlcNAc-
96	N015G	Man α 1-6(Man α 1-3)Man α 1-6(Neu5Gc α 2-3Gal β 1-4(Fuca1-3)GlcNAc β 1-2Man α 1-3)Man β 1-4GlcNAc β 1-4 GlcNAc-
97	N022G	Neu5Gc α 2-3Gal β 1-4GlcNAc β 1-2Man α 1-3Man β 1-4GlcNAc β 1-4GlcNAc-
98	N025G	Neu5Gc α 2-3Gal β 1-4(Fuca1-3)GlcNAc β 1-2Man α 1-3Man β 1-4GlcNAc β 1-4 GlcNAc-
99	N112G	GlcNAc β 1-2Man α 1-6(Neu5Gc α 2-3Gal β 1-4GlcNAc β 1-2Man α 1-3)Man β 1-4GlcNAc β 1-4 GlcNAc-
100	N113G	GlcNAc β 1-2Man α 1-6(Neu5Gc α 2-6Gal β 1-4GlcNAc β 1-2Man α 1-3)Man β 1-4GlcNAc β 1-4 GlcNAc-

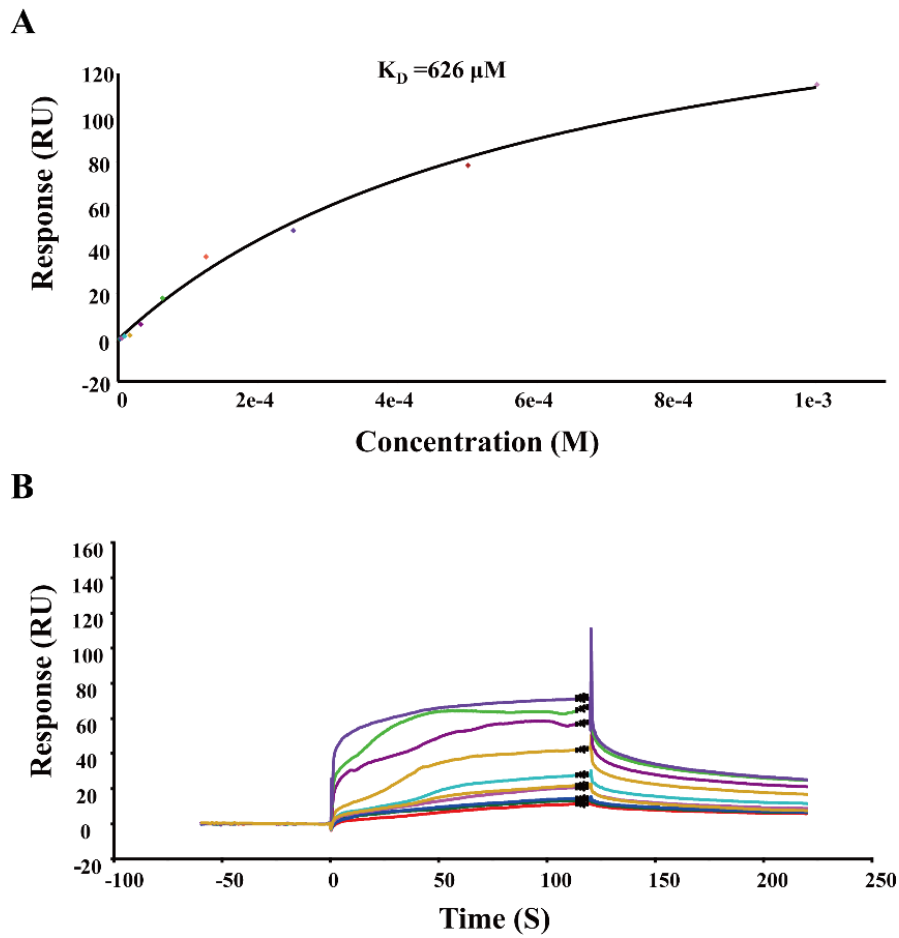


Figure S1. SPR study of the binding of heparin to the SARS-CoV-2-RBD-His.. (A) Saturation curve obtained by using the values of RU bound at equilibrium from injection of increasing concentrations of heparin onto sensorchip-immobilized SARS-CoV-2-RBD-His. (B) Sensorgrams overlay showing the binding of increasing concentrations of heparin (from bottom to top: 0.5, 1, 2, 4, 8, 16, 32 and 64 μM) onto sensorchip-immobilized SARS-CoV-2-RBD-His.

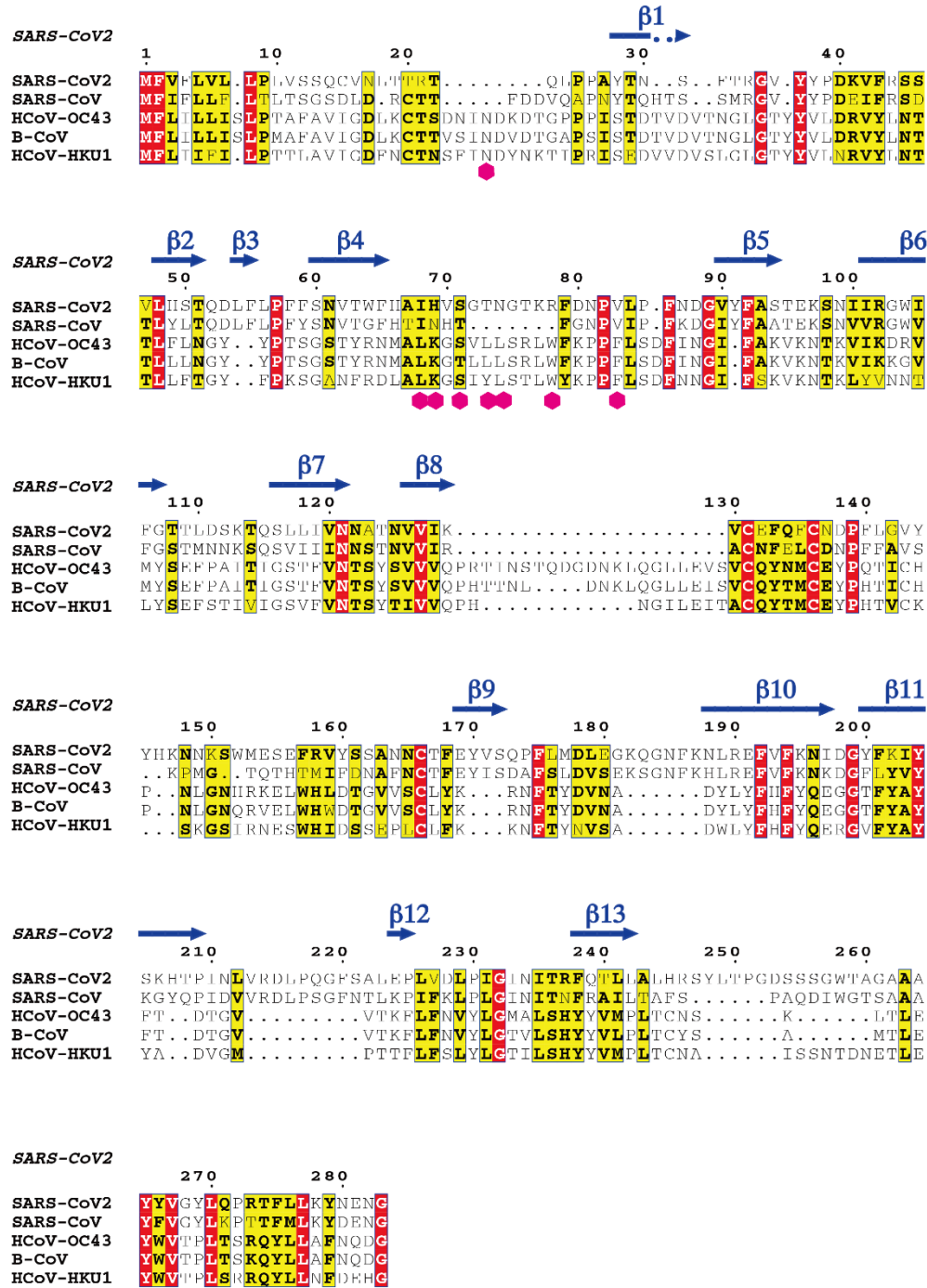


Figure S2. Structure based multiple sequence alignment with the S1-NTDs of coronaviruses that can bind 9-O-Ac-Sia. The UniProt accession number for the SARS-CoV-2 S1-NTD is P0DTC2, SARS-CoV Q202E9, HCoV-OC43 P36334, BCoV P25194, HCoV-HKU1 Q0ZME7. The sequence alignment was performed using the software MUSCLE. The secondary structure elements that are listed on top of the sequences are named according to the crystal structure (PDB: 6M0J). The invariant amino acid residues are highlighted by a red background and the conserved residues by yellow. The residues that are involved in the binding of 9-O-Ac-Sia are indicated by the magenta hexagons.

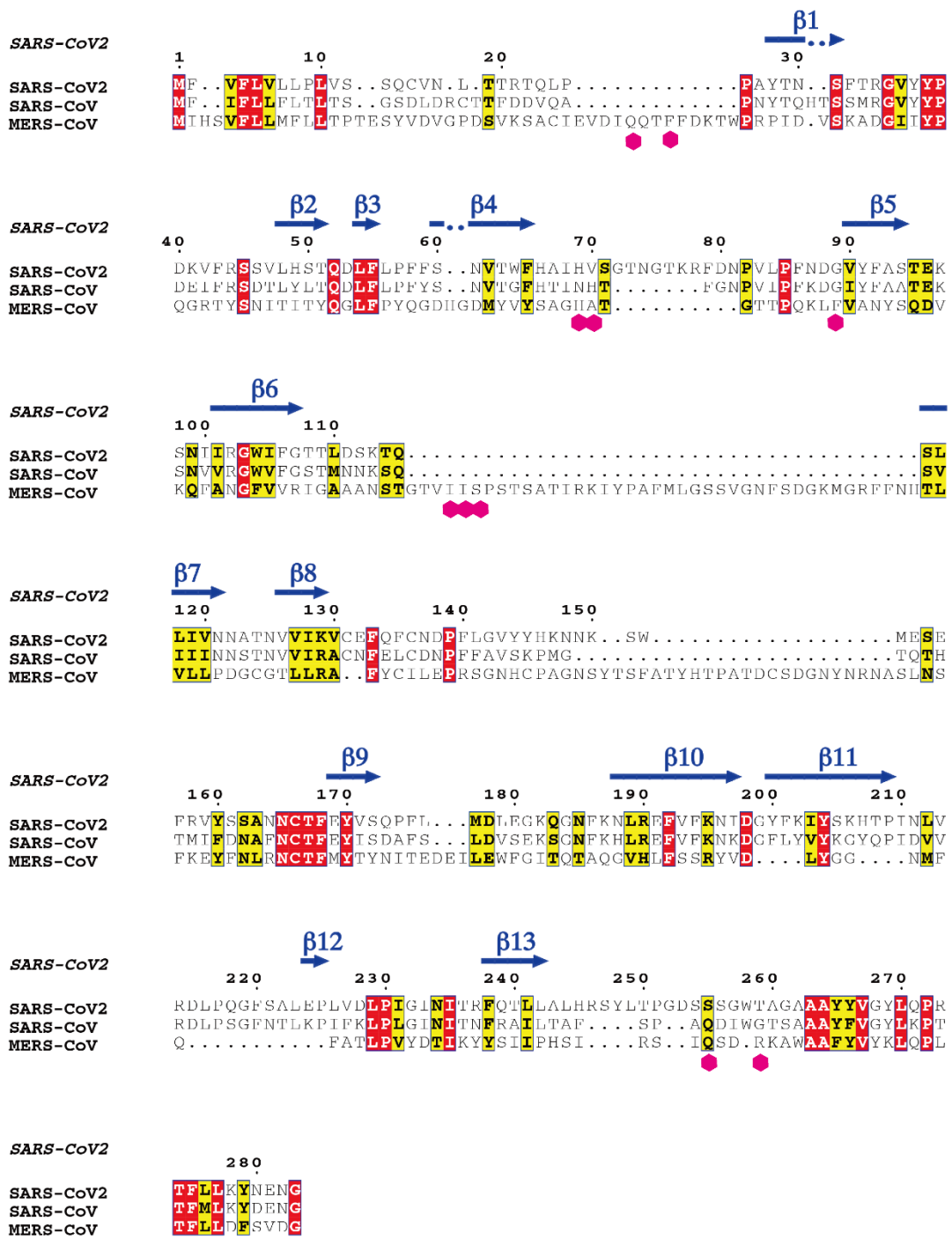


Figure S2. Structure based multiple sequence alignment with the S1-NTD of MERS-CoV. The UniProt accession number for the SARS-CoV-2 S1-NTD is P0DTC2, SARS-CoV Q202E9, MERS-CoV K9N5Q8. The sequence alignment was performed using the software MUSCLE. The secondary structure elements that are listed on top of the sequences are named according to the crystal structure (PDB: 6M0J). The invariant amino acid residues are highlighted by a red background and the conserved residues by yellow. The residues that are involved in the binding of sialic acid are indicated by the magenta hexagons.