

Supporting Information

Supporting Figure legends

Figure S1. Four parameters curve fit model of the quantification of S1-binding antibody levels using the commercially available S1-binding IgA ELISA.

Figure S2. High correlations of purified-IgG and -IgA neutralizing activities with S1-binding antibody levels.

The NT₅₀ values against S1-binding IgG and IgA levels are shown in panels **a** and **c**, respectively, and nIgG-EC₅₀ and nIgA-EC₅₀ values against the S1-binding IgG and IgA are shown in panels **b** and **d**, respectively. Blue symbols denote the samples collected from individuals with moderate symptom, while red symbols those from individuals with severe symptom.

Figure S3. Kinetics and the correlations of nasal SARS-CoV-2-S1-binding-IgA levels and total IgG and IgA amounts in serum.

The % SARS-CoV-2-S1-binding IgA levels in nasal swab samples were determined with the commercially available S1-binding IgA ELISA using a COVID-19-convalescent plasma's S1-binding IgA that was referred as 100%. **(a)** Temporal changes of the nasal S1-binding-IgA levels in over 18 days following the onset of the disease. **(b)** Correlation of % nasal S1-binding-IgA levels with that of sera/plasmas S1-binding IgA. Temporal changes of total human IgG and IgA levels following the diseases **(c** and **d)**. Correlation of total human IgA levels with that of IgG is shown **(e)**. Blue symbols denote the samples collected from individuals with moderate symptom, while red symbols those from individuals with severe symptom.

Figure S4. COVID-19 mRNA-vaccine induces significant neutralizing activity and S1-binding antibody levels in COVID-19-experienced individuals.

The neutralizing activity of sera/plasmas, purified-IgG, and purified-IgA (**a**, **b**, and **d**, respectively) and the amounts of S1-binding IgG and S1-binding IgA (**c** and **e**, respectively) were compared between the pre- and post-vaccination. Green symbols denote the samples collected before COVID-19 mRNA-vaccination, while yellow and light-blue denote after the 1st and 2nd doses, respectively. Each symbol denotes the sample from one and the same individual.

Figure S5. Correlations of sera/plasmas, purified-IgG, and -IgA neutralizing activities with S1-binding antibody levels.

The NT₅₀ values against (**a**) nIgG-EC₅₀ values, (**b**) nIgA-EC₅₀ values, (**d**) S1-binding-IgG level (S1-binding IgG), and (**f**) S1-binding-IgA level are plotted. Note that neutralizing activity of IgG primarily contributes to sera/plasmas SARS-CoV-2-neutralizing activity compared to that of IgA (**a**, **b**, and **c**) in previously-COVID-19-contracted individuals following COVID-19 mRNA vaccination. Green symbols denote the samples collected before COVID-19 mRNA-vaccination, while yellow and light-blue denote after the 1st and 2nd doses, respectively. Each symbol denotes the sample from one and the same individual.

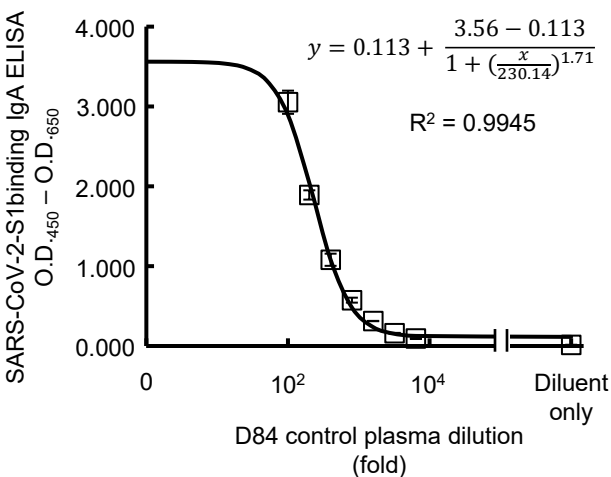
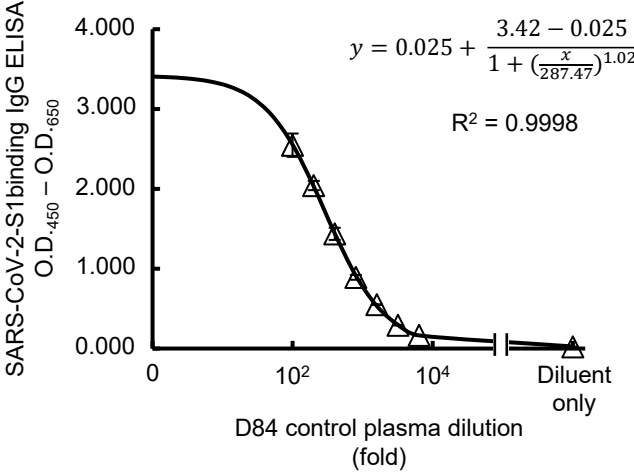
Supporting Table

Table S1. Experimental therapeutic agents used in the COVID-19 group.

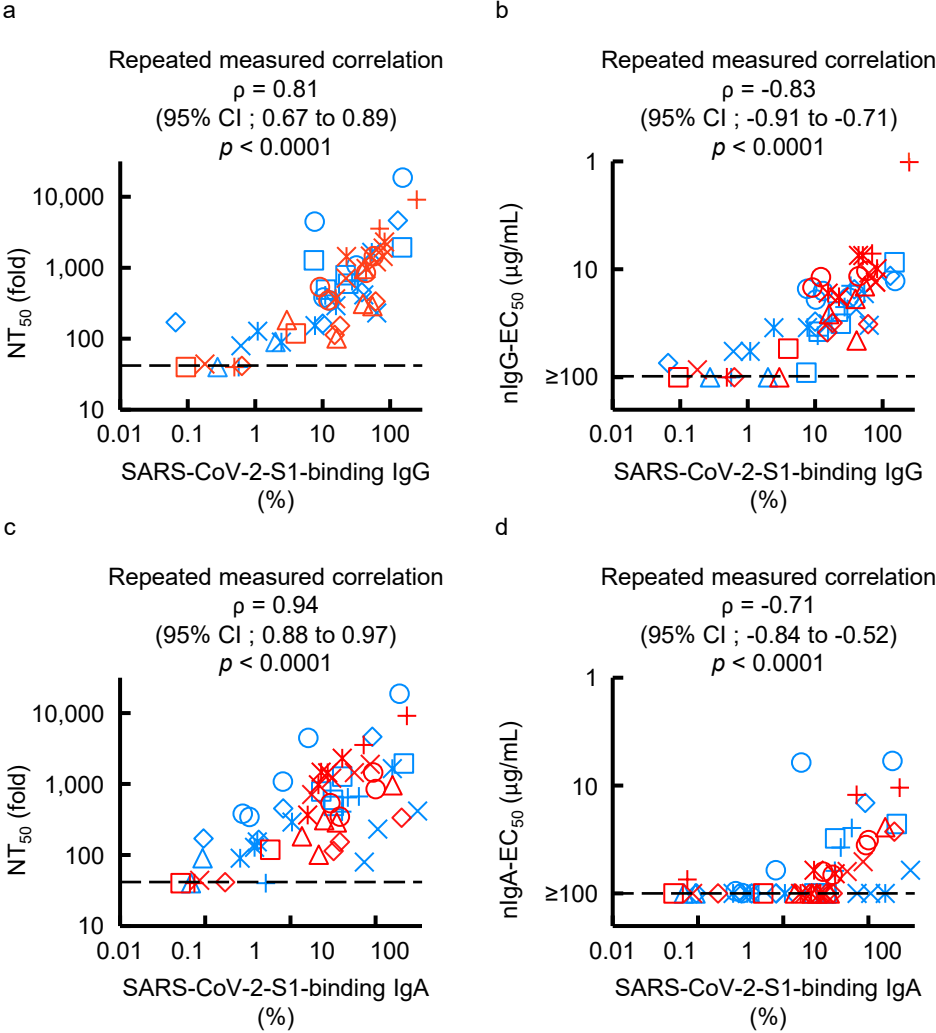
	All patients (n = 14)	Moderate (n = 7)	Severe (n = 7)
Experimental therapeutic agents			
Remdesivir (RDV)	4 (28.6%)	2 (28.6%)	2 (28.6%)
Lopinavir/ritonavir (LPV/r)	2 (14.3%)	1 (14.3%)	1 (14.3%)
Hydroxychloroquine (HCQ)	3 (21.4%)	2 (28.6%)	1 (14.3%)
HCQ + Azithromycin (AZM)	3 (21.4%)	0 (0%)	3 (42.9%)
inhaled Ciclesonide (CIC)	1 (7.1%)	1 (14.3%)	0 (0%)
Favipiravir (FPV)	1 (7.1%)	0 (0%)	1 (14.3%)
None	2 (14.3%)	1 (14.3%)	1 (14.3%)
Corticosteroid use			
Hydrocortisone (HDC)	4 (28.6%)	0 (0%)	4 (57.1%)
Methylprednisolone (mPSL)	1 (7.1%)	0 (0%)	1 (14.3%)
PMX-DHP	3 (21.4%)	0 (0%)	3 (42.9%)

Abbreviation: PMX-DHP; polymyxin B-immobilized fiber column direct hemoperfusion

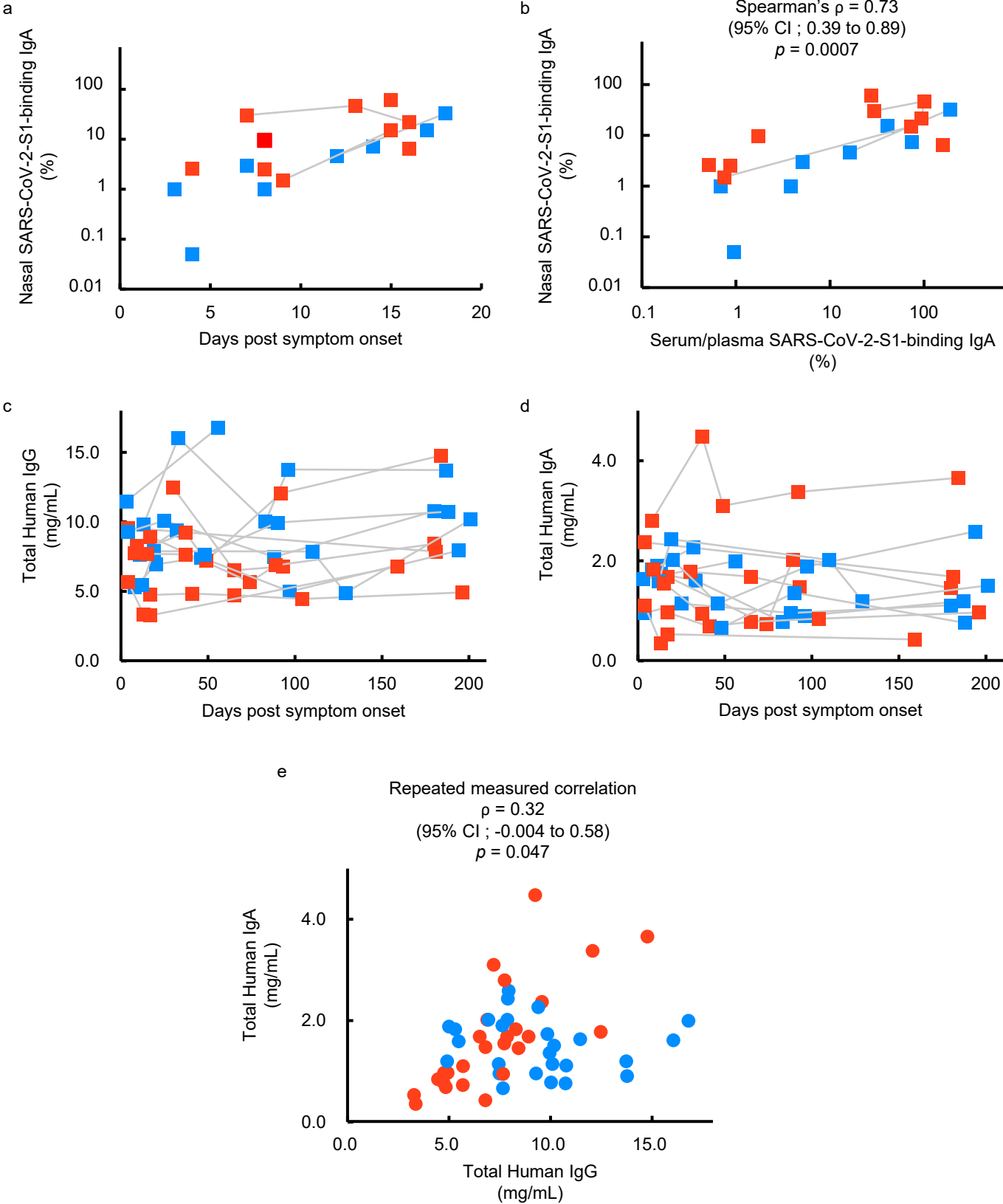
Supporting Figure 1



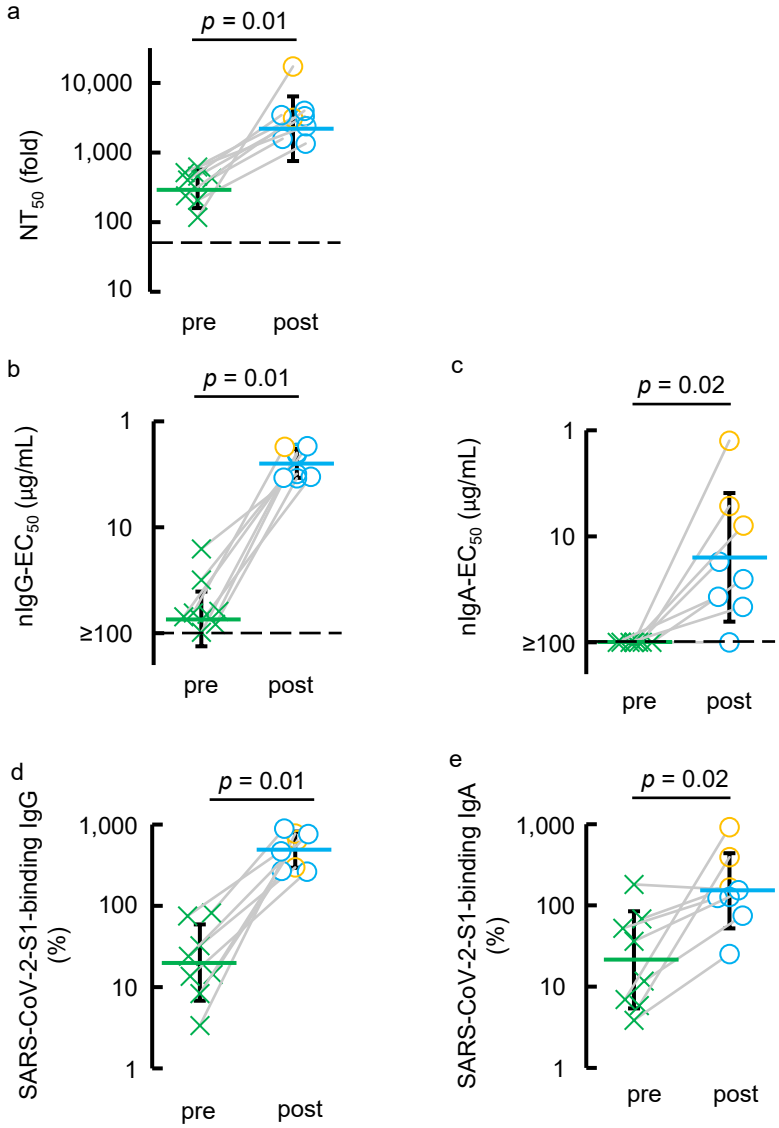
Supporting Figure 2



Supporting Figure 3

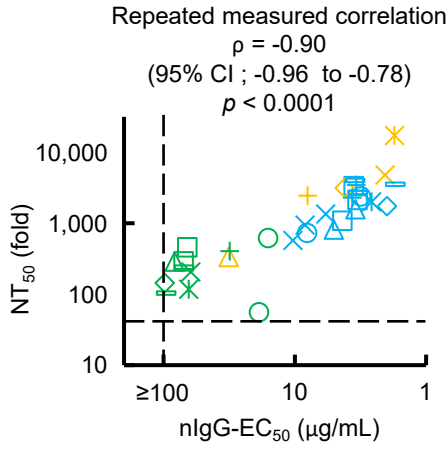


Supporting Figure 4

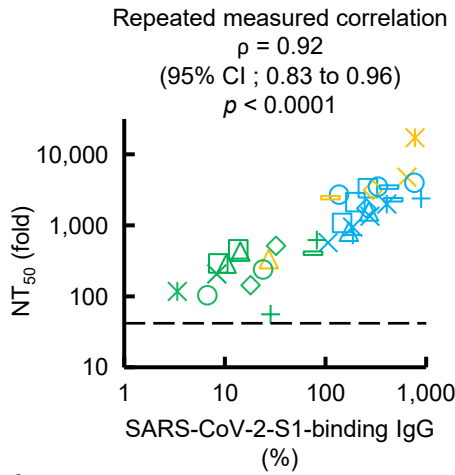


Supporting Figure 5

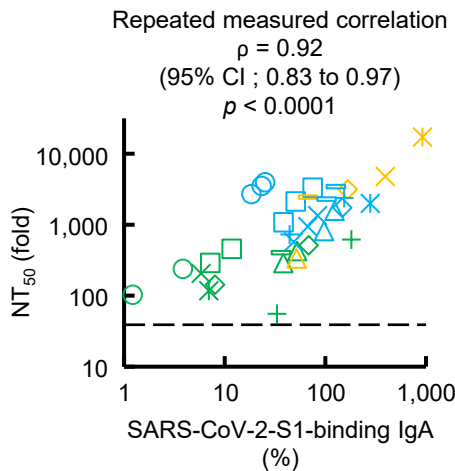
a



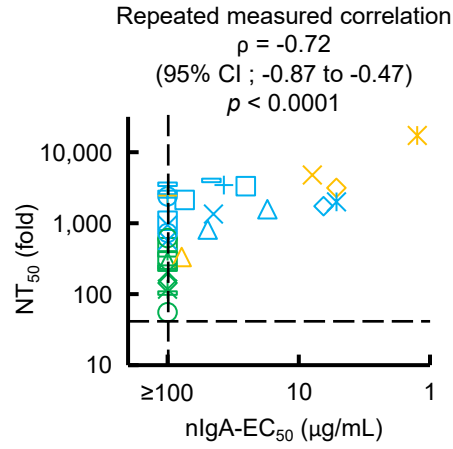
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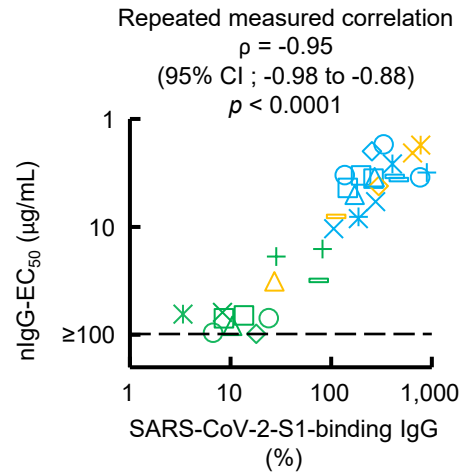
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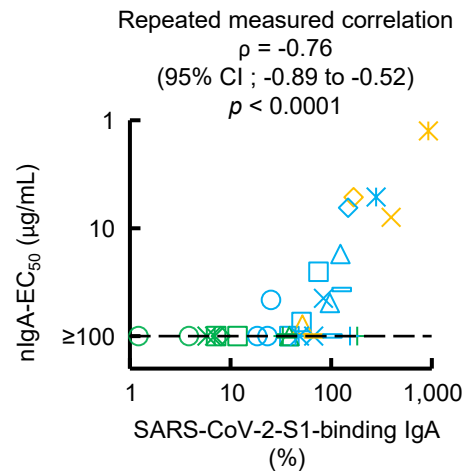
b



e



g



c

