Supporting Information

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

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

The NT$_{50}$ values against S1-binding IgG and IgA levels are shown in panels A and C, respectively, and nIgG-EC$_{50}$ and nIgA-EC$_{50}$ values against the S1-binding IgG and IgA are shown in panels B and D, respectively.

S3 Fig. 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).

S4 Fig. 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.
S5 Fig. Correlations of sera/plasmas, purified-IgG, and -IgA neutralizing activities with S1-binding antibody levels.

The NT\textsubscript{50} values against (A) nIgG-EC\textsubscript{50} values, (B) nIgA-EC\textsubscript{50} 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.
S1 Table. Experimental therapeutic agents used in the COVID-19 group.

| Experimental therapeutic agents                        | All patients (n = 14) | Moderate (n = 7) | Severe (n = 7) |
|--------------------------------------------------------|-----------------------|-----------------|---------------|
| 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