

Supplementary Materials

Table S1. Clinical characteristics of asymptomatic to severe COVID-19 patients, according to the detailed severity groups.

	Asymptomatic group <i>n</i> = 6	Anosmia/dysgeusia group <i>n</i> = 9	Mild symptomatic group <i>n</i> = 29	Mild febrile group <i>n</i> = 20	Pneumonia group <i>n</i> = 18*
Age	25.2 ± 5.95	31.0 ± 8.67	29.3 ± 8.78	32.8 ± 9.64	65.7 ± 13.2
Male sex	4 (66.7%)	4 (44.9%)	12 (41.4%)	8 (40.0%)	3 (50%)
Underlying disease	0 (0%)	0 (0%)	0 (0%)	0 (0%)	6 (100%) [†]
Symptom, duration					
Anomia and/or dysgeusia	0 (0%), NA	9 (100%), 14 (5.5– 21.0)	11 (37.9%), 16.0 (9.0–30.0)	5 (25.0%), 21.0 (5.5–25.5)	0 (0%), NA
Rhinorrhea and/or nasal stuffiness	0 (0%), NA	0 (0%), NA	12 (41.4%), 21.0 (14.0– 49.3)	5 (25.0%), 21.0 (2.0–54.0)	0 (0%), NA
Sore throat	0 (0%), NA	0 (0%), NA	13 (44.8%), 7.0 (3.5–13.0)	5 (25.0%), 5.0 (2.5–37.0)	1 (16.7%), 5.0 (NA– NA)
Cough	0 (0%), NA	0 (0%), NA	14 (48.3%), 21.0 (8.8–39.3)	11 (55.0%), 5.0 (3.0–21.0)	4 (66.7%), 10.5 (4.0– 17.8)
Sputum	0 (0%), NA	0 (0%), NA	11 (37.9%), 14.0 (7.0–30.0)	6 (30.0%), 8.0 (6.0–37.3)	1 (16.7%), 14.0 (NA– NA)
Gastrointestinal symptoms	0 (0%), NA	0 (0%), NA	7 (24.1%), 4.0 (2.0–7.0)	3 (15.0%), 7.0 (3.0–NA)	3 (50.0%), 7.0 (5–NA)
Headache	0 (0%), NA	0 (0%), NA	5 (17.2%), 2.0 (0.5–8.5)	5 (25.0%), 3.0 (1.0–5.0)	2 (33.3%), 17 (5–NA)
Fever, chill, and/or myalgia	0 (0%), NA	0 (0%), NA	0 (0%), NA	20 (100%), 3.0 (1.0–5.0)	6 (100%), 15.0 (7.3– 20.8)
Lowest Ct value	34.0 (32.4–36.1)	33.5 (32.2–35.4)	32.2 (30.8– 33.9)	32.1 (30.7– 35.4)	26.4 (19.3– 31.1)
Duration of shedding					
from symptom onset	NA	34.0 (29.5–41.5)	48.0 (32.5– 45.5)	40.0 (34.0– 42.0)	29.0 (23.0– 38.8)
from diagnosis	32.5 (31.5–34.0)	31.0 (24.5–42.0)	33.0 (31.0– 45.5)	31.5 (27.0– 35.5)	23.0 (18.3– 37.8)
Sampling time, days					
from symptom onset	NA	39.0 (34.5–46.5)	43.0 (37.0– 50.0)	43.5 (37.5– 47.0)	24.0 (19.8– 38.3)
from diagnosis	37.0 (36.5–38.3)	35.0 (28.5–46.0)	37.0 (34.5– 49.5)	35.0 (31.0– 39.5)	19.5 (16.8– 35.5)

Data are expressed as the number (%) of patients, mean ± standard deviation, or median (interquartile range). *A total of 18 serum samples were obtained from six pneumonic patients. Two patients with pneumonia underwent endotracheal intubation and symptoms could not be properly assessed. [†]Six (100%) patients had diabetes mellitus, two (33.3%) had hypertension, one (16.7%) had dyslipidemia, one (16.7%) had stable angina, one (16.7%) had gout, and one (16.7%) had thyroid cancer.

Abbreviations: COVID-19, coronavirus disease 2019; NA, not applicable; Ct, cycle threshold of RT-PCR.

Table S2. Neutralizing antibody production and serologic tests for asymptomatic to severe COVID-19 patients, according to the detailed severity groups.

	Asymptomatic group n = 6	Anosmia/dysgeusia group n = 9	Mild symptomatic group n = 29	Mild febrile group n = 20	Pneumonia group n = 18*
Neutralizing antibody					
Positive, titer $\geq 1:10$	5 (83.3%)	7 (77.8%)	26 (89.7%)	20 (100%)	18 (100%)
High MN titer, $\geq 1:80$	1 (16.7%)	2 (22.2%)	11 (37.9%)	7 (35.0%)	18 (100%)
FIA, IgG					
Positive, COI ≥ 1.1	6 (100%)	9 (100%)	28 (96.6%)	20 (100%)	18 (100%)
High COI value, ≥ 15.0	4 (66.7%)	7 (77.8%)	24 (82.8%)	20 (100%)	18 (100%)
ELISA, total					
Positive, OD ≥ 1.0	6 (100%)	9 (100%)	27 (93.1%)	20 (100%)	18 (100%)
High OD ratio, ≥ 3.0	3 (50.0%)	5 (55.6%)	19 (65.5%)	13 (65.5%)	18 (100%)

Data are expressed as the number (%) of sera. *Eighteen sera from six patients. Abbreviations: COVID-19, coronavirus disease 2019; MN, microneutralization; FIA, fluorescence immunoassay; IgG, immunoglobulin G; COI, cut-off index; ELISA, enzyme-linked immunosorbent assay; OD, optical density.

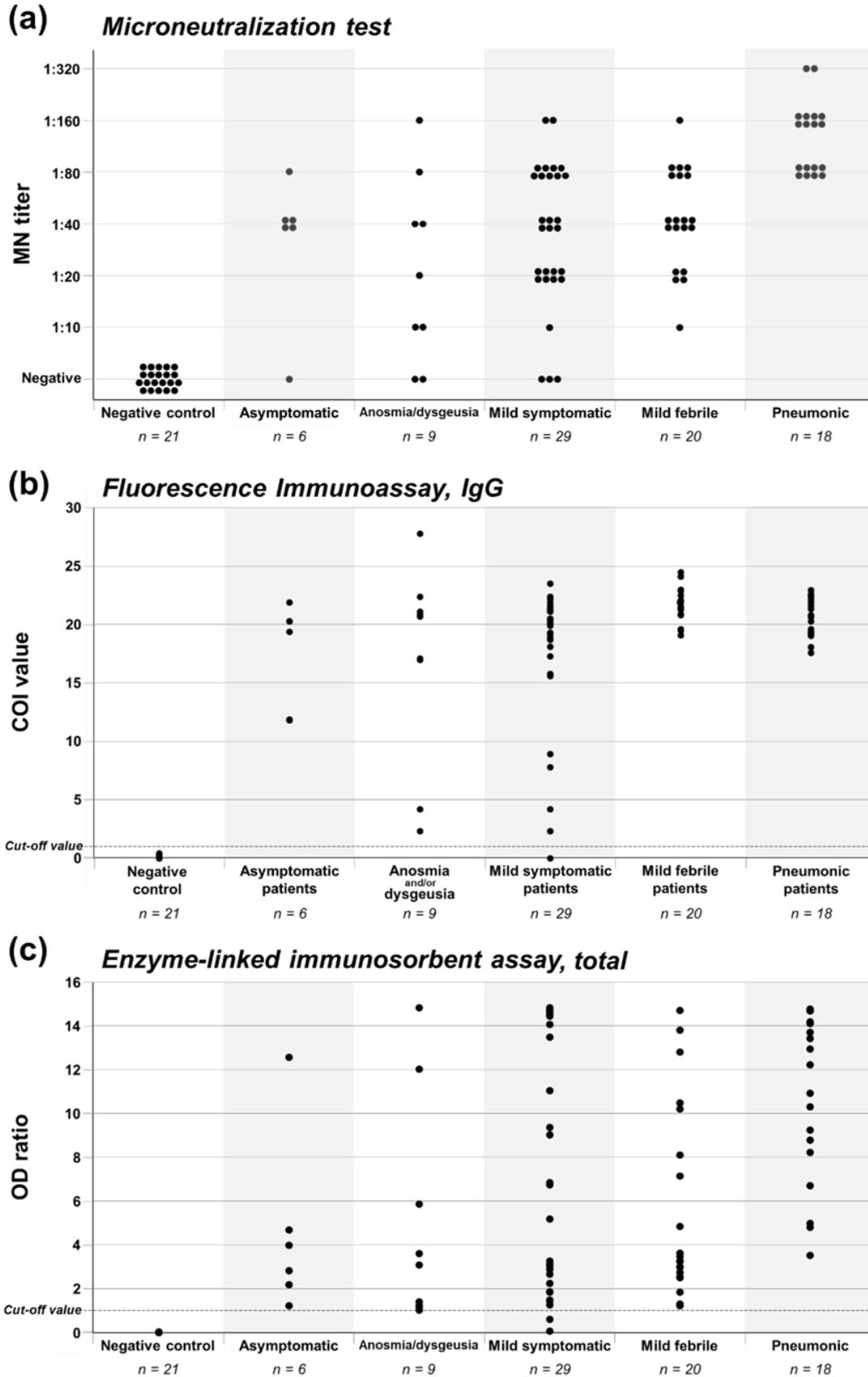


Figure S1. Antibody production of asymptomatic to severe COVID-19 patients, according to the detailed severity groups. Antibody production of asymptomatic and mild COVID-19 patients was evaluated in comparison with pneumonic COVID-19 patients. Tests were conducted by (A) MN test,

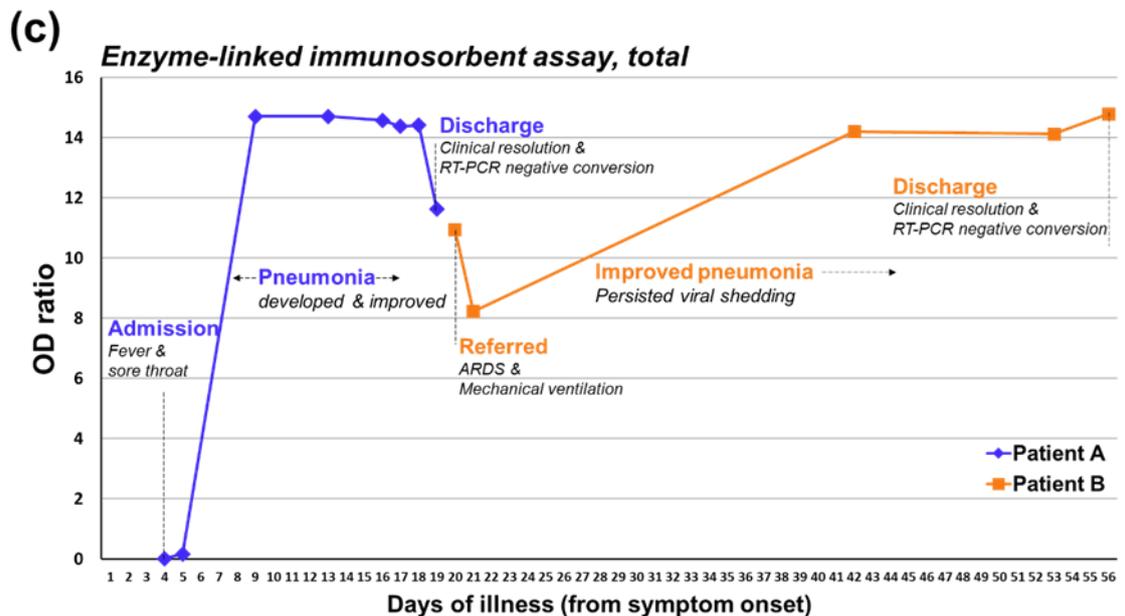
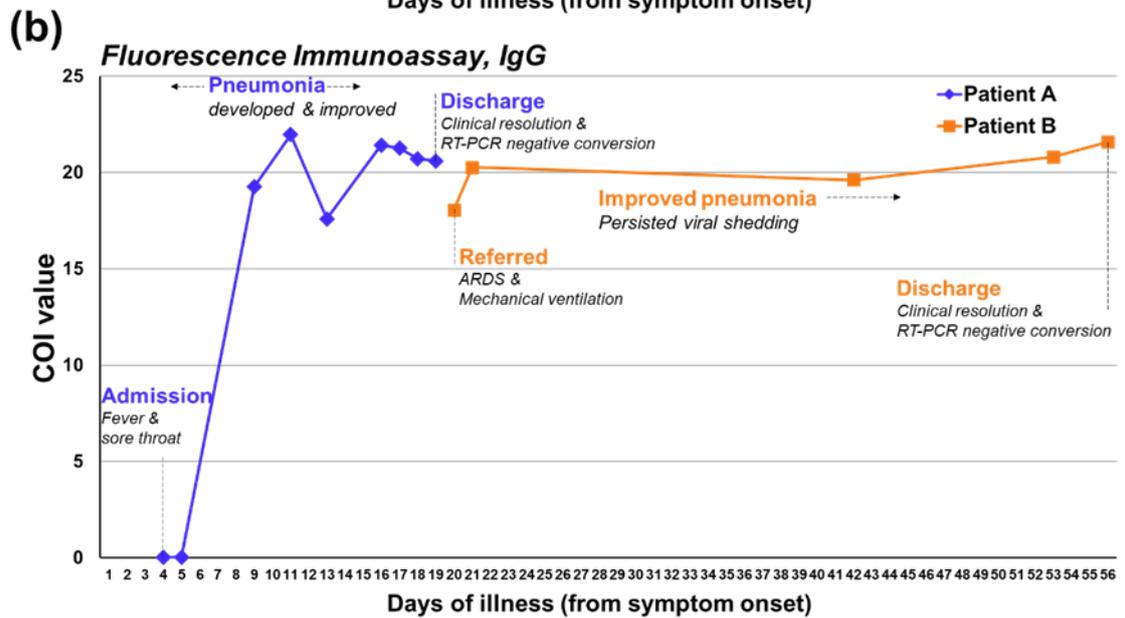
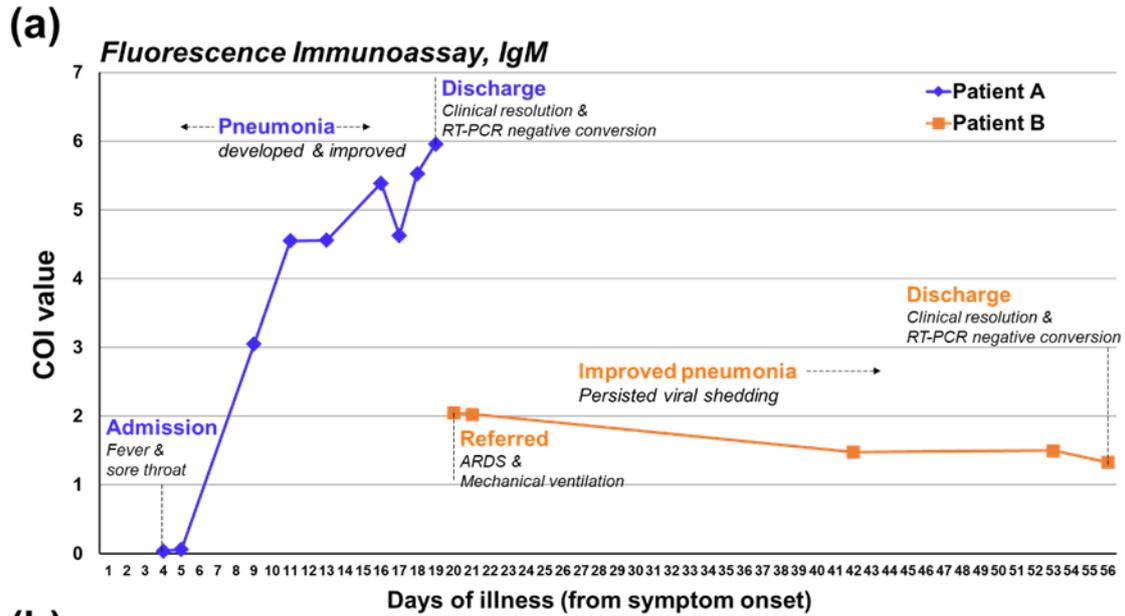


Figure S3. Antibody kinetics of two COVID-19 patients with pneumonia, serially measured by FIA IgM (A), FIA IgG (B), and ELISA total antibody test (C). To present the relationship between IgM, IgG, and total antibodies against SARS-CoV-2, antibody kinetics of two COVID-19 patients with pneumonia are presented. Abbreviations: COVID-19, coronavirus disease 2019; FIA, fluorescence immunoassay; IgM, immunoglobulin M; IgG, immunoglobulin G; ELISA, enzyme-linked immunosorbent assay; COI, cut-off index; COVID-19, coronavirus disease 2019.

Table S3. Demographics and serologic test results of negative control serum specimens.

Number	Sex	Age	Respiratory virus	MN	FIA	ELISA
NC 1	M	10	Coronavirus 229E	Negative	Negative	Negative
NC 2	M	13	Coronavirus 229E	Negative	Negative	Negative
NC 3	M	53	Coronavirus 229E	Negative	Negative	Negative
NC 4	F	62	Coronavirus 229E	Negative	Negative	Negative
NC 5	M	13	Coronavirus NL63	Negative	Negative	Negative
NC 6	M	48	Coronavirus OC43	Negative	Negative	Negative
NC 7	M	11	Influenza A	Negative	Negative	Negative
NC 8	M	17	Influenza A	Negative	Negative	Negative
NC 9	F	53	Influenza A	Negative	Negative	Negative
NC 10	F	65	Influenza A	Negative	Negative	Negative
NC 11	F	7	Metapneumovirus	Negative	Negative	Negative
NC 12	M	66	Metapneumovirus	Negative	Negative	Negative
NC 13	M	16	Parainfluenza virus 2	Negative	Negative	Negative
NC 14	M	7	Respiratory syncytial virus B	Negative	Negative	Negative
NC 15	M	7	Respiratory syncytial virus B	Negative	Negative	Negative
NC 16	M	42	Respiratory syncytial virus B	Negative	Negative	Negative
NC 17	M	73	Respiratory syncytial virus B	Negative	Negative	Negative
NC 18	F	11	Rhinovirus	Negative	Negative	Negative
NC 19	F	12	Rhinovirus	Negative	Negative	Negative
NC 20	F	52	Rhinovirus	Negative	Negative	Negative
NC 21	M	67	Rhinovirus	Negative	Negative	Negative

Abbreviations: MN, microneutralization; FIA, fluorescence immunoassay; ELISA, enzyme-linked immunosorbent assay; IgG, immunoglobulin G; COI, cut-off index.