Figure S1. Related to figure 1. **(a)** Representative flow cytometry sorting scheme for isolating neuro-immune cells from human postmortem brain tissue from a frontal lobe sample. **(b)** Boxplots of raw gene counts for all genes in the SARS-CoV-2 (NC045512.2) genome from human neuro-immune cell scRNA-seq. Zero counts are detected for all genes. **(c)** Boxplots of raw gene counts for all genes in the EBV1 genome (NC007605.1) from human neuro-immune cell scRNA-seq. Zero counts are detected for all genes.
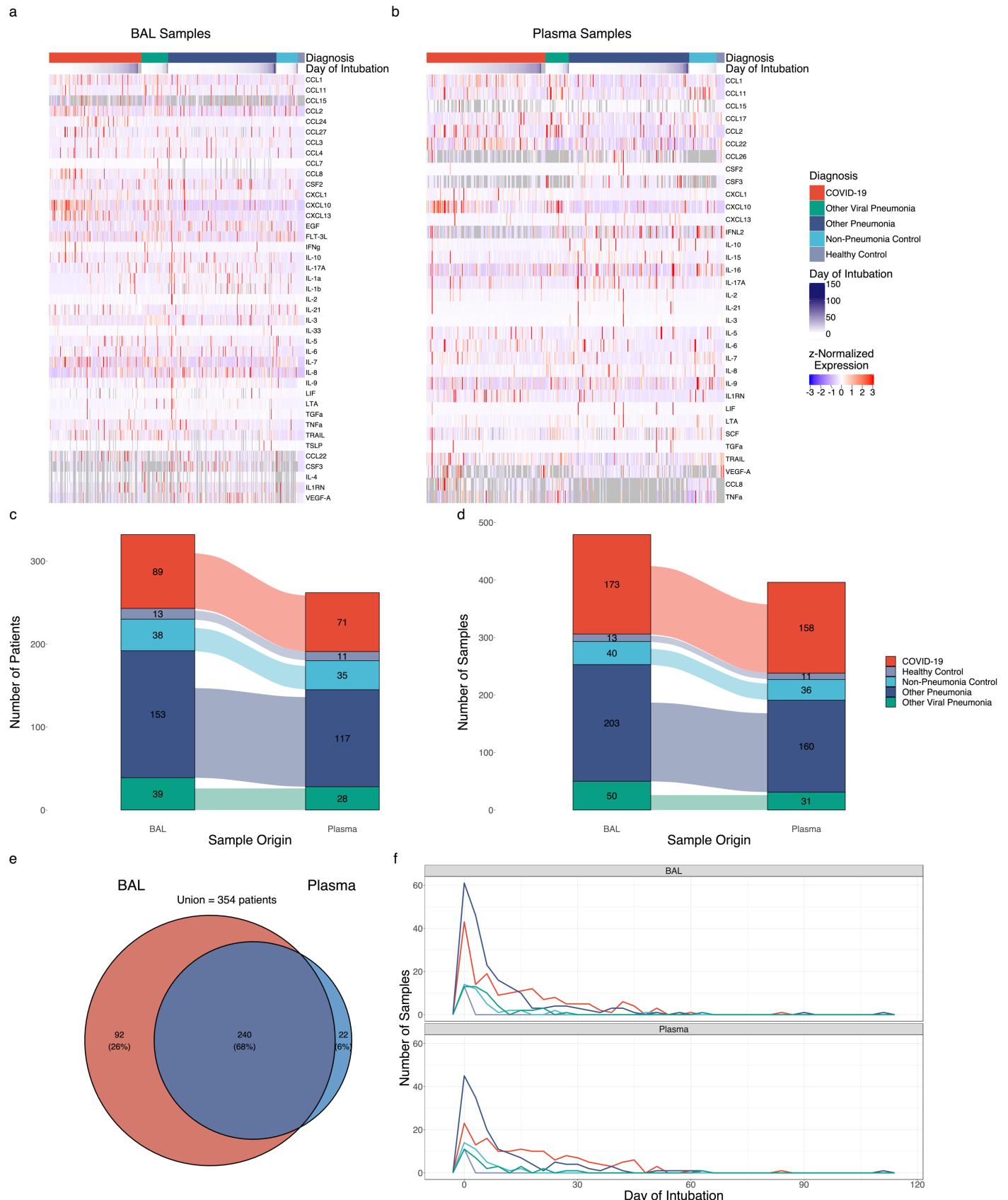
Figure S2. Related to figure 2. **(a)** Heatmap of 41 cytokines showing significant variability by diagnosis (q < 0.05, Kruskal–Wallis) from 479 BAL samples collected throughout the entire ICU stay from 332 patients. **(b)**

Heatmap of 31 cytokines showing significant variability by diagnosis (q < 0.05, Kruskal–Wallis) from 396 plasma samples collected throughout the entire ICU stay from 262 patients. **(c,d)** Alluvial plot of total numbers of patients included in the BAL fluid (c) and plasma (d) datasets. **(e)** Venn diagram of patients with BAL and plasma samples. **(f)** Frequency polygon plot of BAL and plasma sampling distributions throughout patient stay by group.
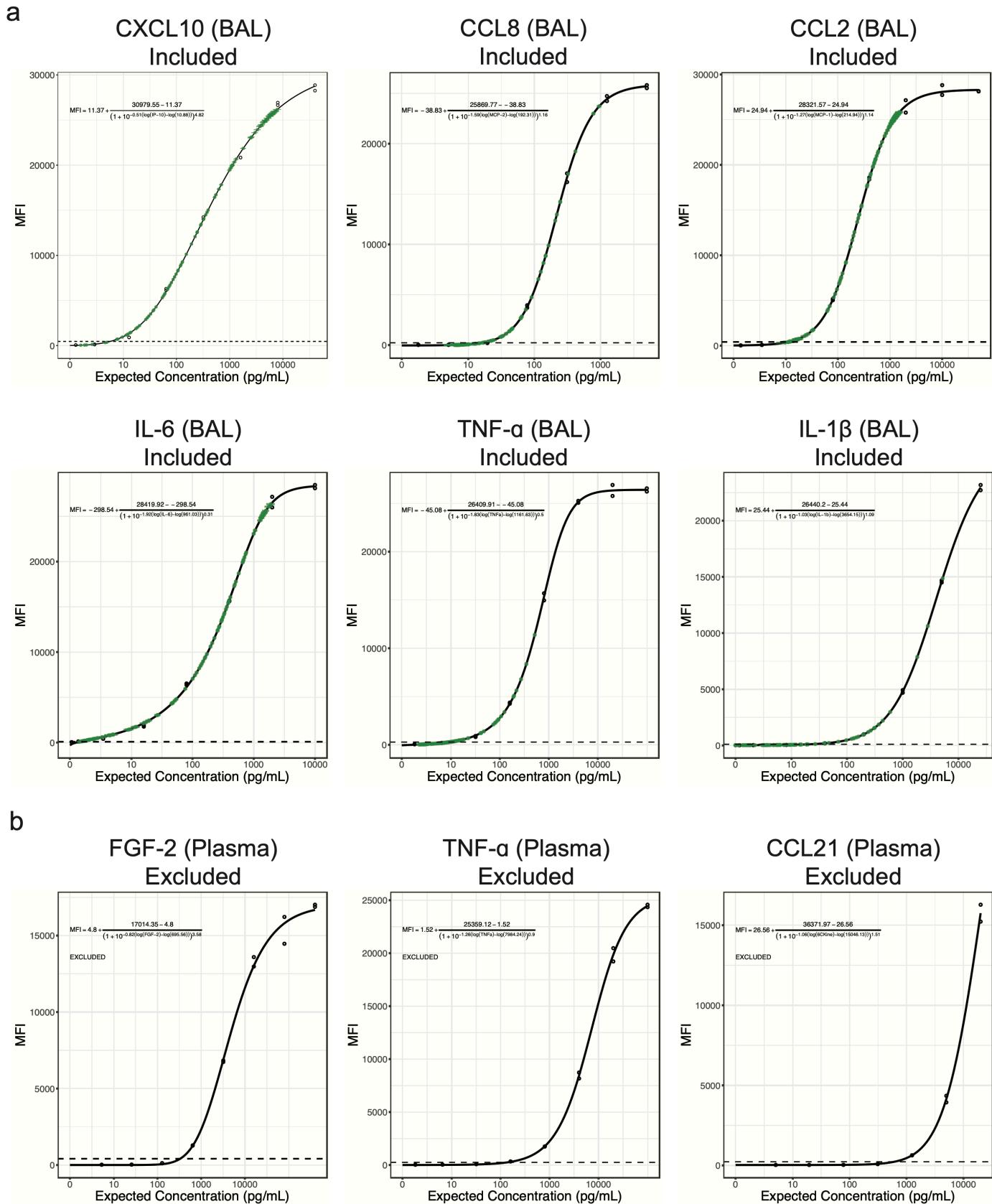
Figure S3. Representative standard curve fitting plots for cytokine data exclusion. (a) Representative standard curves and fitted cytokine expression values for analytes included in this study. From left to right, top to bottom: CXCL10 (IP-10), CCL8 (MCP-2), CCL2 (MCP-1) IL-6, TNF-α, IL-1b. **(b)** Representative standard

curves for analytes excluded for poor sensitivity in this study. From left to right: FGF-2, TNF-α, and CCL21. For all plots, empty points represent standards of known concentration used for curve-fitting. Black curves and associated formulae represent the function fitted to these points. Green points represent experimental values, and green whiskers are the standard error of prediction. Dotted lines are the upper limit of the 95% confidence interval of lower asymptote prediction.

Supplemental Data File 1. Pseudobulk DESeq2 differential expression analysis results from human microglia scRNA-seq in COVID-19 vs. controls.

Supplemental Data File 2. Complete pairwise comparisons between diagnosis groups for all relevant cytokine cohort metadata (see Table 2).

Supplemental Data File 3. Complete comparisons between patients with early BALs and the entire cohort for all relevant cytokine cohort metadata.

Supplemental Data File 4. List of the complete NU SCRIPT investigators.

	COVID-19 (N = 5)	Control (N = 3)	Total (N = 8)
Age (years)			
Minimum	35	44	35
Median (IQR)	61.0 (61.0, 72.0)	51.0 (47.5, 63.5)	61.0 (49.2, 73.0)
Mean (SD)	61.4 ± 16.5	57.0 ± 16.8	59.8 ± 15.5
Maximum	78	76	78
Sex			
Female	0 (0.0%)	1 (33.3%)	1 (12.5%)
Male	5 (100.0%)	2 (66.7%)	7 (87.5%)
Race			
Asian	1 (20.0%)	0 (0.0%)	1 (12.5%)
Black or African-American	1 (20.0%)	1 (33.3%)	2 (25.0%)
Other	0 (0.0%)	1 (33.3%)	1 (12.5%)
White	3 (60.0%)	1 (33.3%)	4 (50.0%)
Ethnicity			
Hispanic or Latino	1 (20.0%)	0 (0.0%)	1 (12.5%)
Not Hispanic or Latino	4 (80.0%)	3 (100.0%)	7 (87.5%)
SOFA			
Minimum	12	10	10
Median (IQR)	15.0 (13.5, 16.5)	14.5 (12.2, 16.8)	15.0 (12.5, 17.5)
Mean (SD)	15.0 ± 2.6	14.5 ± 6.4	14.8 ± 3.5
Maximum	18	19	19
Discharge Status	1 (20.0%)	1 (33.3%)	2 (25.0%)
Deceased	5 (100.0%)	3 (100.0%)	8 (100.0%)
Duration of Intubation (days)			
Minimum	0.8	0.9	0.8
Median (IQR)	7.0 (1.2, 18.0)	1.7 (1.3, 8.8)	4.3 (1.1, 16.5)
Mean (SD)	9.3 ± 9.0	6.2 ± 8.5	8.1 ± 8.3
Maximum	19.4	16	19.4
Length of ICU Stay (days)			
Minimum	0.8	0	0
Median (IQR)	7.9 (1.2, 15.4)	1.7 (0.8, 8.8)	4.8 (1.1, 15.6)
Mean (SD)	8.3 ± 7.4	5.9 ± 8.8	7.4 ± 7.4
Maximum	16	16	16
BMI (kg/m2)			
Minimum	23.8	20.7	20.7
Median (IQR)	26.4 (24.6, 29.4)	21.3 (21.0, 28.1)	24.9 (22.6, 30.8)
Mean (SD)	27.6 ± 4.4	25.7 ± 8.1	26.8 ± 5.7
Maximum	33.647058235294	35	35
Unknown/Missing	1 (20.0%)	0 (0.0%)	1 (12.5%)
Smoking Status			
Current Smoker	1 (20.0%)	0 (0.0%)	1 (12.5%)
Never Smoker	4 (80.0%)	2 (66.7%)	6 (75.0%)
Past Smoker	0 (0.0%)	1 (33.3%)	1 (12.5%)
Postmortem Interval (hours)			
Minimum	15.2	16.7	15.2
Median (IQR)	38.4 (18.9, 45.5)	24.3 (20.5, 36.4)	31.4 (18.3, 46.2)
Mean (SD)	35.1 ± 17.9	29.8 ± 16.6	33.1 ± 16.4
Maximum	57.5	48.5	57.5
Immunosuppressed			
Immunosuppressed	2 (40.0%)	0 (0.0%)	2 (25.0%)
Not Immunosuppressed	3 (60.0%)	3 (100.0%)	6 (75.0%)
Cancer			
Diagnosed	0 (0.0%)	1 (33.3%)	1 (12.5%)
Not Diagnosed	5 (100.0%)	2 (66.7%)	7 (87.5%)
Cardiac Arrest			
Cardiac Arrest with ROSC	2 (40.0%)	2 (66.7%)	4 (50.0%)
No Cardiac Arrest with ROSC	3 (60.0%)	1 (33.3%)	4 (50.0%)
Cognitive Impairment			
Diagnosed	1 (20.0%)	1 (33.3%)	2 (25.0%)
Not Diagnosed	4 (80.0%)	2 (66.7%)	6 (75.0%)
Diabetes			
Diagnosed	1 (20.0%)	0 (0.0%)	1 (12.5%)
Not Diagnosed	4 (80.0%)	3 (100.0%)	7 (87.5%)
Renal Disease			
Diagnosed	3 (60.0%)	1 (33.3%)	4 (50.0%)
Not Diagnosed	2 (40.0%)	2 (66.7%)	4 (50.0%)
Substance Use Disorder			
Not Diagnosed	5 (100.0%)	3 (100.0%)	8 (100.0%)
Venous Thromboembolism			
Diagnosed	0 (0.0%)	1 (33.3%)	1 (12.5%)

Table S1. Demographics of the postmortem brain scRNA-seq cohort. Frontal lobe samples were collected in the course of autopsy at Northwestern Memorial Hospital.

	COVID-19 (N = 5)	Control (N = 3)	Total (N = 8)
Not Diagnosed	5 (100.0%)	2 (66.7%)	7 (87.5%)
Convalescent Plasma			
Received Treatment	1 (20.0%)	0 (0.0%)	1 (12.5%)
Did Not Receive Treatment	4 (80.0%)	3 (100.0%)	7 (87.5%)
Dexamethasone			
Received Treatment	2 (40.0%)	0 (0.0%)	2 (25.0%)
Did Not Receive Treatment	3 (60.0%)	3 (100.0%)	6 (75.0%)
IL-6 Blockers			
Received Treatment	1 (20.0%)	0 (0.0%)	1 (12.5%)
Did Not Receive Treatment	4 (80.0%)	3 (100.0%)	7 (87.5%)
Remdesivir			
Received Treatment	1 (20.0%)	0 (0.0%)	1 (12.5%)
Did Not Receive Treatment	4 (80.0%)	3 (100.0%)	7 (87.5%)
CRP (mg/L)			
Minimum	137.3	Inf	137.3
Median (IQR)	283.6 (210.5, 356.8)	NA (NA, NA)	283.6 (210.5, 356.8)
Mean (SD)	283.6 ± 207.0	NaN ± NA	283.6 ± 207.0
Maximum	430	-Inf	430
Unknown/Missing	3 (60.0%)	3 (100.0%)	6 (75.0%)
D-Dimer (ng/mL)			
Minimum	1135	6226	1135
Median (IQR)	3,078.5 (2,106.8, 4,050.2)	6,226.0 (6,226.0, 6,226.0)	5,022.0 (3,078.5, 5,624.0)
Mean (SD)	3,078.5 ± 2,748.5	6,226.0 ± NA	4,127.7 ± 2,660.7
Maximum	5022	6226	6226
Unknown/Missing	3 (60.0%)	2 (66.7%)	5 (62.5%)

	COVID-19 (N = 93)	Healthy Control (N = 13)	Non-Pneumonia Control (N = 45)	Other Pneumonia (N = 162)	Other Viral Pneumonia (N = 41)	Total (N = 354)
Age (years)						
Minimum	21	21	19	22	34	19
Median (IQR)	59.0 (46.0, 68.2)	25.0 (23.0, 33.0)	62.0 (49.0, 72.0)	66.0 (51.2, 73.0)	59.0 (52.0, 69.0)	62.0 (48.0, 72.0)
Mean (SD)	57.1 ± 14.3	27.8 ± 6.7	59.2 ± 17.6	61.8 ± 16.3	60.3 ± 13.1	58.9 ± 16.6
Maximum	86	40	90	99	88	99
Unknown/Missing	5 (5.4%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	5 (1.4%)
Sex						
Female	31 (33.3%)	7 (53.8%)	20 (44.4%)	63 (38.9%)	18 (43.9%)	139 (39.3%)
Male	60 (64.5%)	6 (46.2%)	25 (55.6%)	99 (61.1%)	23 (56.1%)	213 (60.2%)
Unknown or Not Reported	2 (2.2%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	2 (0.6%)
Race						
White	36 (38.7%)	8 (61.5%)	28 (62.2%)	109 (67.3%)	26 (63.4%)	207 (58.5%)
Black/African American	19 (20.4%)	1 (7.7%)	8 (17.8%)	34 (21.0%)	8 (19.5%)	70 (19.8%)
Unknown or Not Reported	37 (39.8%)	0 (0.0%)	6 (13.3%)	13 (8.0%)	5 (12.2%)	61 (17.2%)
Asian	<=5	<=5	<=5	<=5	<=5	14 (4.0%)
American Indian/Alaska Native	<=5	<=5	<=5	<=5	<=5	<=5
Ethnicity						
Hispanic or Latino	40 (43.0%)	2 (15.4%)	7 (15.6%)	13 (8.0%)	8 (19.5%)	70 (19.8%)
Not Hispanic or Latino	39 (41.9%)	11 (84.6%)	35 (77.8%)	137 (84.6%)	30 (73.2%)	252 (71.2%)
Unknown or Not Reported	14 (15.1%)	0 (0.0%)	3 (6.7%)	12 (7.4%)	3 (7.3%)	32 (9.0%)
SOFA						
Minimum	3	Inf	3	4	2	2
Median (IQR)	9.7 (7.0, 11.2)	NA (NA, NA)	10.8 (8.2, 13.2)	11.0 (9.0, 13.9)	9.5 (8.2, 12.5)	10.1 (8.1, 13.0)
Mean (SD)	9.7 ± 2.8	NaN ± NA	10.8 ± 3.6	11.4 ± 3.6	10.2 ± 3.0	10.7 ± 3.4
Maximum	18.5	-Inf	20.3	21.2	15.3	21.2
Unknown/Missing	2 (2.2%)	13 (100.0%)	5 (11.1%)	15 (9.3%)	7 (17.1%)	42 (11.9%)
APS						
Minimum	39.2	Inf	35.2	23	23.8	23
Median (IQR)	72.3 (61.5, 86.4)	NA (NA, NA)	66.2 (51.0, 78.6)	66.2 (53.6, 80.4)	63.3 (56.4, 77.3)	68.4 (56.0, 81.1)
Mean (SD)	73.6 ± 17.7	NaN ± NA	67.5 ± 19.1	68.2 ± 21.3	66.0 ± 19.0	69.3 ± 20.0
Maximum	108.6	-Inf	109.8	161	105	161
Unknown/Missing	2 (2.2%)	13 (100.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	15 (4.2%)
Discharge Status						
Deceased	26 (28.6%)	0 (NaN%)	15 (33.3%)	59 (36.4%)	14 (34.1%)	114 (33.6%)
Home	36 (39.6%)	0 (NaN%)	20 (44.4%)	36 (22.2%)	10 (24.4%)	102 (30.1%)
Inpatient Facility	17 (18.7%)	0 (NaN%)	7 (15.6%)	48 (29.6%)	14 (34.1%)	86 (25.4%)
LTAC	12 (13.2%)	0 (NaN%)	3 (6.7%)	18 (11.1%)	3 (7.3%)	36 (10.6%)
Other	0 (0.0%)	0 (NaN%)	0 (0.0%)	1 (0.6%)	0 (0.0%)	1 (0.3%)
Unknown/Missing	2 (2.2%)	13 (100.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	15 (4.2%)
Duration of Intubation (days)						
Minimum	0	0	0	0	1	0
Median (IQR)	20.0 (10.0, 32.0)	0.0 (0.0, 0.0)	4.0 (2.0, 9.0)	8.0 (3.0, 17.0)	9.0 (3.0, 14.0)	9.0 (3.0, 19.0)
Mean (SD)	23.9 ± 21.6	0.0 ± 0.0	8.4 ± 11.6	11.7 ± 11.6	10.4 ± 8.9	13.9 ± 15.8
Maximum	153	0	58	68	34	153
Length of ICU Stay (days)						
Minimum	3	0	1	1	2	0
Median (IQR)	22.0 (13.5, 35.0)	0.0 (0.0, 0.0)	7.0 (4.0, 12.0)	10.0 (5.0, 19.0)	11.0 (7.0, 20.0)	12.0 (5.0, 22.0)
Mean (SD)	26.6 ± 21.2	0.0 ± 0.0	11.3 ± 13.9	14.7 ± 14.2	13.4 ± 8.9	16.6 ± 16.8
Maximum	153	0	80	86	34	153
Unknown/Missing	2 (2.2%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	2 (0.6%)
BMI (kg/m2)						
Minimum	19.22	18.4	16.56	12.46	17.34	12.46
Median (IQR)	31.8 (27.9, 38.9)	24.1 (22.3, 26.0)	27.2 (24.5, 33.5)	26.6 (21.9, 31.6)	26.8 (23.2, 31.3)	28.1 (23.9, 33.8)
Mean (SD)	34.1 ± 9.1	24.8 ± 4.2	30.7 ± 9.9	27.5 ± 8.3	29.0 ± 9.3	29.7 ± 9.1
Maximum	81.81	35.1	70.6	70.25	64.18	81.81
Unknown/Missing	3 (3.2%)	0 (0.0%)	1 (2.2%)	1 (0.6%)	0 (0.0%)	5 (1.4%)
Smoking Status						
Current Smoker	0 (0.0%)	0 (0.0%)	6 (13.3%)	21 (13.0%)	5 (12.2%)	32 (9.0%)
Never Smoker	36 (38.7%)	13 (100.0%)	25 (55.6%)	65 (40.1%)	20 (48.8%)	159 (44.9%)
Past Smoker	13 (14.0%)	0 (0.0%)	10 (22.2%)	59 (36.4%)	15 (36.6%)	97 (27.4%)
Unknown or Not Reported	44 (47.3%)	0 (0.0%)	4 (8.9%)	17 (10.5%)	1 (2.4%)	66 (18.6%)
Immunocompromised						
Immunocompromised	9 (9.9%)	0 (0.0%)	10 (22.2%)	49 (30.2%)	18 (43.9%)	86 (24.4%)
Not Immunocompromised	82 (90.1%)	13 (100.0%)	35 (77.8%)	113 (69.8%)	23 (56.1%)	266 (75.6%)
Unknown/Missing	2 (2.2%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	2 (0.6%)
AIDS/HIV						
Diagnosed	1 (1.1%)	0 (0.0%)	0 (0.0%)	2 (1.2%)	3 (7.3%)	6 (1.7%)
Not Diagnosed	90 (98.9%)	13 (100.0%)	45 (100.0%)	160 (98.8%)	38 (92.7%)	346 (98.3%)
Unknown/Missing	2 (2.2%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	2 (0.6%)
Cancer						
Diagnosed	14 (15.4%)	0 (0.0%)	15 (33.3%)	58 (35.8%)	21 (51.2%)	108 (30.7%)

Table S2. Demographics of the SCRIPT cytokines cohort.

	COVID-19 (N = 93)	Healthy Control (N = 13)	Non-Pneumonia Control (N = 45)	Other Pneumonia (N = 162)	Other Viral Pneumonia (N = 41)	Total (N = 354)
Not Diagnosed	77 (84.6%)	13 (100.0%)	30 (66.7%)	104 (64.2%)	20 (48.8%)	244 (69.3%)
Unknown/Missing	2 (2.2%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	2 (0.6%)
Cerebrovascular Disease						
Diagnosed	9 (9.9%)	0 (0.0%)	9 (20.0%)	39 (24.1%)	10 (24.4%)	67 (19.0%)
Not Diagnosed	82 (90.1%)	13 (100.0%)	36 (80.0%)	123 (75.9%)	31 (75.6%)	285 (81.0%)
Unknown/Missing	2 (2.2%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	2 (0.6%)
Chronic Pulmonary Disease						
Diagnosed	21 (23.1%)	0 (0.0%)	16 (35.6%)	68 (42.0%)	17 (41.5%)	122 (34.7%)
Not Diagnosed	70 (76.9%)	13 (100.0%)	29 (64.4%)	94 (58.0%)	24 (58.5%)	230 (65.3%)
Unknown/Missing	2 (2.2%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	2 (0.6%)
Congestive Heart Failure						
Diagnosed	14 (15.4%)	0 (0.0%)	19 (42.2%)	58 (35.8%)	7 (17.1%)	98 (27.8%)
Not Diagnosed	77 (84.6%)	13 (100.0%)	26 (57.8%)	104 (64.2%)	34 (82.9%)	254 (72.2%)
Unknown/Missing	2 (2.2%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	2 (0.6%)
Dementia						
Diagnosed	3 (3.3%)	0 (0.0%)	4 (8.9%)	4 (2.5%)	3 (7.3%)	14 (4.0%)
Not Diagnosed	88 (96.7%)	13 (100.0%)	41 (91.1%)	158 (97.5%)	38 (92.7%)	338 (96.0%)
Unknown/Missing	2 (2.2%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	2 (0.6%)
Diabetes						
Diagnosed	41 (45.1%)	0 (0.0%)	14 (31.1%)	44 (27.2%)	21 (51.2%)	120 (34.1%)
Not Diagnosed	50 (54.9%)	13 (100.0%)	31 (68.9%)	118 (72.8%)	20 (48.8%)	232 (65.9%)
Unknown/Missing	2 (2.2%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	2 (0.6%)
Hemiplegia or Paraplegia						
Diagnosed	2 (2.2%)	0 (0.0%)	5 (11.1%)	17 (10.5%)	3 (7.3%)	27 (7.7%)
Not Diagnosed	89 (97.8%)	13 (100.0%)	40 (88.9%)	145 (89.5%)	38 (92.7%)	325 (92.3%)
Unknown/Missing	2 (2.2%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	2 (0.6%)
Myocardial Infarction						
Diagnosed	2 (2.2%)	0 (0.0%)	8 (17.8%)	15 (9.3%)	2 (4.9%)	27 (7.7%)
Not Diagnosed	89 (97.8%)	13 (100.0%)	37 (82.2%)	147 (90.7%)	39 (95.1%)	325 (92.3%)
Unknown/Missing	2 (2.2%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	2 (0.6%)
Peripheral Vascular Disease						
Diagnosed	12 (13.2%)	0 (0.0%)	10 (22.2%)	44 (27.2%)	8 (19.5%)	74 (21.0%)
Not Diagnosed	79 (86.8%)	13 (100.0%)	35 (77.8%)	118 (72.8%)	33 (80.5%)	278 (79.0%)
Unknown/Missing	2 (2.2%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	2 (0.6%)
Renal Disease						
Diagnosed	13 (14.3%)	0 (0.0%)	20 (44.4%)	50 (30.9%)	12 (29.3%)	95 (27.0%)
Not Diagnosed	78 (85.7%)	13 (100.0%)	25 (55.6%)	112 (69.1%)	29 (70.7%)	257 (73.0%)
Unknown/Missing	2 (2.2%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	2 (0.6%)
Rheumatic Disease						
Diagnosed	4 (4.4%)	0 (0.0%)	5 (11.1%)	15 (9.3%)	4 (9.8%)	28 (8.0%)
Not Diagnosed	87 (95.6%)	13 (100.0%)	40 (88.9%)	147 (90.7%)	37 (90.2%)	324 (92.0%)
Unknown/Missing	2 (2.2%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	2 (0.6%)
Charlson Comorbidity Index						
Minimum	1	Inf	1	1	1	1
Median (IQR)	3 (1.0, 5.0)	NA (NA, NA)	6 (4.0, 9.0)	5 (3.0, 8.0)	5 (3.0, 8.0)	5.0 (2.0, 8.0)
Mean (SD)	3.9 ± 3.7	NaN ± NA	6.3 ± 3.4	5.7 ± 3.5	6.1 ± 4.0	5.4 ± 3.7
Maximum	18	-Inf	14	17	21	21
Unknown/Missing	36 (38.7%)	13 (100.0%)	8 (17.8%)	25 (15.4%)	4 (9.8%)	86 (24.3%)
Steroids						
Treated	54 (58.1%)	0 (0.0%)	33 (73.3%)	116 (71.6%)	34 (82.9%)	237 (66.9%)
Untreated	39 (41.9%)	13 (100.0%)	12 (26.7%)	46 (28.4%)	7 (17.1%)	117 (33.1%)
CRP (mg/L)						
Minimum	0	Inf	0	0	16.8	0
Median (IQR)	17.1 (10.7, 28.8)	NA (NA, NA)	2.8 (1.2, 8.2)	8.6 (2.8, 15.3)	29.5 (23.1, 32.8)	15.3 (6.0, 27.1)
Mean (SD)	22.9 ± 25.7	NaN ± NA	8.8 ± 15.2	10.3 ± 9.4	27.4 ± 9.8	19.4 ± 23.0
Maximum	197.3	-Inf	48.3	32.2	36	197.3
Unknown/Missing	4 (4.3%)	13 (100.0%)	36 (80.0%)	136 (84.0%)	38 (92.7%)	227 (64.1%)
D-Dimer (ng/mL)						
Minimum	0	Inf	187	0	181	0
Median (IQR)	1,069.0 (512.0, 3,573.0)	NA (NA, NA)	3,507.0 (2,734.2, 4,712.2)	2,237.0 (733.0, 6,360.0)	2,398.0 (876.0, 3,315.0)	1,905.0 (610.0, 4,622.0)
Mean (SD)	2,777.3 ± 3,680.2	NaN ± NA	10,501.4 ± 18,742.0	5,482.0 ± 9,262.9	3,229.5 ± 3,327.0	4,328.7 ± 8,142.1
Maximum	18329	-Inf	55024	48657	11692	55024
Unknown/Missing	4 (4.3%)	13 (100.0%)	31 (68.9%)	101 (62.3%)	24 (58.5%)	173 (48.9%)
Ferritin (ng/mL)						
Minimum	66.5	Inf	21.6	33.3	184.9	21.6
Median (IQR)	798.5 (380.6, 1,394.2)	NA (NA, NA)	250.5 (92.4, 290.1)	376.7 (135.9, 1,257.8)	938.1 (599.2, 1,166.8)	677.9 (257.4, 1,361.5)
Mean (SD)	1,671.3 ± 3,383.9	NaN ± NA	298.8 ± 321.8	1,367.2 ± 4,169.4	1,095.3 ± 904.7	1,498.1 ± 3,456.3
Maximum	25815	-Inf	839.5	23599.7	2781.7	25815
Unknown/Missing	21 (22.6%)	13 (100.0%)	40 (88.9%)	131 (80.9%)	35 (85.4%)	240 (67.8%)
WBC Count, BAL (cells/µL)						
Minimum	31	Inf	0	3	0	0

	COVID-19 (N = 93)	Healthy Control (N = 13)	Non-Pneumonia Control (N = 45)	Other Pneumonia (N = 162)	Other Viral Pneumonia (N = 41)	Total (N = 354)
Median (IQR)	207.5 (127.2, 434.0)	NA (NA, NA)	146.5 (33.2, 251.0)	423.5 (193.8, 1,612.2)	781.5 (177.0, 2,147.0)	273.5 (143.8, 863.2)
Mean (SD)	848.3 ± 3,873.2	NaN ± NA	495.5 ± 1,403.1	2,434.8 ± 5,691.9	2,038.4 ± 4,215.8	1,661.5 ± 4,674.0
Maximum	34300	-Inf	7800	43375	24500	43375
Unknown/Missing	11 (11.8%)	13 (100.0%)	3 (6.7%)	30 (18.5%)	5 (12.2%)	62 (17.5%)
Neutrophils, BAL (%)						
Minimum	2	Inf	0	0	0	0
Median (IQR)	41.5 (22.5, 69.0)	NA (NA, NA)	26.0 (6.0, 56.8)	82.0 (63.8, 91.2)	84.0 (57.5, 90.0)	69.0 (32.0, 87.0)
Mean (SD)	45.4 ± 27.2	NaN ± NA	34.4 ± 30.3	72.9 ± 25.0	66.8 ± 32.8	59.7 ± 31.2
Maximum	95	-Inf	97	100	96	100
Unknown/Missing	11 (11.8%)	13 (100.0%)	3 (6.7%)	14 (8.6%)	3 (7.3%)	44 (12.4%)
Lymphocytes, BAL (%)						
Minimum	1	Inf	1	1	1	1
Median (IQR)	14.0 (6.5, 29.5)	NA (NA, NA)	5.0 (3.0, 8.8)	3.0 (1.0, 6.0)	2.0 (1.0, 5.2)	5.0 (2.0, 12.0)
Mean (SD)	20.5 ± 18.7	NaN ± NA	8.8 ± 15.1	5.7 ± 8.2	5.8 ± 10.5	10.7 ± 14.9
Maximum	85	-Inf	88	51	55	88
Unknown/Missing	14 (15.1%)	13 (100.0%)	11 (24.4%)	48 (29.6%)	9 (22.0%)	95 (26.8%)
WBC Count, Blood (10e3 cells/µL)						
Minimum	3.4	Inf	4.8	0.1	5.2	0.1
Median (IQR)	10.2 (7.2, 14.2)	NA (NA, NA)	9.2 (6.9, 11.5)	11.9 (9.1, 15.8)	8.7 (7.7, 10.2)	10.4 (7.6, 14.5)
Mean (SD)	12.5 ± 10.8	NaN ± NA	9.9 ± 4.8	13.9 ± 8.7	9.2 ± 3.8	12.6 ± 9.9
Maximum	98.6	-Inf	20.4	43.6	14.4	98.6
Unknown/Missing	9 (9.7%)	13 (100.0%)	36 (80.0%)	128 (79.0%)	37 (90.2%)	218 (61.6%)
Absolute Neutrophils, Blood (10e3 cells/µL)						
Minimum	2.3	Inf	0.6	0.1	0	0
Median (IQR)	8.1 (5.4, 10.7)	NA (NA, NA)	11.2 (5.7, 17.9)	10.0 (5.8, 15.6)	7.4 (4.9, 13.0)	9.0 (5.4, 14.1)
Mean (SD)	8.9 ± 4.6	NaN ± NA	12.3 ± 8.5	11.7 ± 8.5	9.3 ± 7.3	10.7 ± 7.5
Maximum	25.4	-Inf	32.3	48.3	27.1	48.3
Unknown/Missing	9 (9.7%)	13 (100.0%)	11 (24.4%)	25 (15.4%)	8 (19.5%)	66 (18.6%)
Absolute Lymphocytes, Blood (10e3 cells/µL)						
Minimum	0	Inf	0	0	0	0
Median (IQR)	1.0 (0.6, 1.4)	NA (NA, NA)	0.6 (0.4, 1.4)	0.9 (0.5, 1.8)	0.8 (0.3, 1.6)	0.9 (0.5, 1.6)
Mean (SD)	2.3 ± 10.1	NaN ± NA	1.4 ± 2.1	1.6 ± 2.3	1.1 ± 0.9	1.7 ± 5.7
Maximum	93.7	-Inf	11.2	18.2	3.8	93.7
Unknown/Missing	9 (9.7%)	13 (100.0%)	11 (24.4%)	24 (14.8%)	8 (19.5%)	65 (18.4%)

Laser	Filter	Dye	Antigen	Clone	Dilution	Catalog Number	RR ID
305	750/50	BUV737	CD56	NCAM16.2	1:10	BD 612766	AB_2813880
405	450/50	eFluor450	HLA-DR	L243	1:20	Thermo-Fisher 48-9952-42	AB_1603291
552	575/25	PE	CD14	MΦP9	1:10	BD 562691	AB_2737725
552	575/25	PE	CD3	SK7	1:20	Thermo-Fisher 12-0036-42	AB_10805512
552	575/25	PE	CD19	J3-119	1:10	Beckman Coulter IM1285U	AB_10640419
488	530/30	SYTOX Green			1:500-1:1000	Thermo-Fisher S7020	
640	670/39	APC	CD15	W6D3	1:10	BioLegend 323008	AB_756014
640	780/60	APC-Cy7	CD45	HI30	1:10	CST 77322	AB_2799894

Table S3. List of reagents used for FACS sorting of human neuroimmune cells.