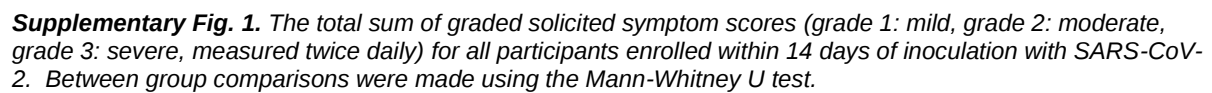


Supplementary figure 1 and supplementary tables 1 and 2



Supplementary Table 1. Immune markers screened using single immune marker logistic regression models adjusted for dose of SARS-CoV-2 received showing their Crude OR and crude p values alongside ORs and p values after adjusting for dose. Profile likelihood 95% CIs are shown in brackets. Dose was $\log_{10}$ transformed and Immune markers were $\log_{10}$ transformed and then standardised to a mean of 0 and standard deviation (SD) of 1. The p value corrected for multiple comparisons (q value) is shown. Correction for multiple comparisons was by the Benjamini- Hochberg procedure across all 35 markers considered.

Marker	Crude OR (95% CI)	Crude p value	Adj OR (95% CI)	Adj p value	q value
Nasal_IgG_CoV_2_RBD_BL	0.84 (0.46–1.50)	0.557	0.24 (0.08–0.60)	0.002	0.035
Nasal_IgG_CoV_2_S_BL	0.81 (0.44–1.45)	0.478	0.26 (0.09–0.63)	0.002	0.035
Serum_IgA_CoV_2_S_BL	0.86 (0.47–1.53)	0.594	0.32 (0.12–0.75)	0.007	0.047
Serum_IgA_CoV_2_RBD_BL	0.83 (0.45–1.47)	0.514	0.35 (0.13–0.78)	0.009	0.047
Nasal_IgG_CoV_2_NTD_BL	0.87 (0.48–1.55)	0.635	0.34 (0.13–0.78)	0.009	0.047
Nasal_IgA_CoV_2_N_BL	0.51 (0.25–0.95)	0.032	0.40 (0.18–0.81)	0.010	0.047
Serum_IgA_CoV_2_N_BL	0.52 (0.25–0.97)	0.041	0.39 (0.16–0.83)	0.012	0.047
Serum_IgG_CoV_2_S_BL	0.95 (0.53–1.71)	0.861	0.34 (0.11–0.80)	0.013	0.047
Serum_IgA_CoV_2_NTD_BL	0.80 (0.44–1.42)	0.448	0.36 (0.12–0.82)	0.013	0.047
Serum_IgG_CoV_2_RBD_BL	0.99 (0.55–1.80)	0.975	0.33 (0.10–0.81)	0.013	0.047
ACE_2_inhibition_Wuhan_BL	0.94 (0.52–1.68)	0.830	0.41 (0.15–0.91)	0.027	0.082
Nasal_IgA_CoV_2_RBD_BL	0.84 (0.46–1.50)	0.555	0.42 (0.17–0.92)	0.028	0.082
ELISpot_S1_BL	0.92 (0.51–1.64)	0.770	0.46 (0.21–0.96)	0.040	0.107
Serum_IgG_CoV_2_NTD_BL	1.07 (0.60–1.95)	0.824	0.42 (0.16–0.98)	0.045	0.107
Nasal_IgA_CoV_2_S_BL	0.95 (0.52–1.69)	0.854	0.45 (0.18–0.99)	0.048	0.107
Serum_IgM_CoV_2_NTD_BL	1.40 (0.79–2.60)	0.255	2.07 (1.00–4.96)	0.049	0.107
ELISpot_ORF7_BL	0.65 (0.34–1.18)	0.161	0.49 (0.20–1.01)	0.052	0.107
Serum_IgM_CoV_2_N_BL	1.53 (0.85–2.94)	0.157	1.96 (0.97–4.62)	0.060	0.117
Nasal_IgG_CoV_2_N_BL	0.95 (0.53–1.71)	0.875	0.48 (0.19–1.04)	0.065	0.120
ELISpot_CD8_BL	0.50 (0.24–0.94)	0.030	0.55 (0.24–1.10)	0.094	0.158
Nasal_IgA_CoV_2_NTD_BL	0.83 (0.45–1.47)	0.514	0.55 (0.25–1.10)	0.095	0.158
MNA_Victoria_BL	1.15 (0.65–2.14)	0.626	0.53 (0.21–1.17)	0.117	0.187
ELISpot_M_BL	0.83 (0.45–1.48)	0.523	0.58 (0.26–1.17)	0.130	0.197
Serum_IgM_CoV_2_S_BL	0.73 (0.39–1.31)	0.296	1.84 (0.77–4.85)	0.170	0.248
Serum_IgM_CoV_2_RBD_BL	0.61 (0.30–1.11)	0.105	2.09 (0.71–7.04)	0.186	0.260
ELISpot_CD4_BL	1.13 (0.63–2.05)	0.687	0.74 (0.34–1.50)	0.408	0.549
Nasal_IgM_CoV_2_N_BL	1.02 (0.57–1.84)	0.938	0.79 (0.39–1.53)	0.485	0.629
Nasal_IgM_CoV_2_NTD_BL	0.79 (0.43–1.41)	0.429	0.81 (0.41–1.53)	0.509	0.636
Serum_IgG_CoV_2_N_BL	1.25 (0.70–2.30)	0.448	0.83 (0.41–1.66)	0.596	0.720
ELISpot_ORF8_BL	1.40 (0.78–2.63)	0.261	1.16 (0.59–2.23)	0.646	0.754
Nasal_IgM_CoV_2_RBD_BL	0.72 (0.38–1.28)	0.264	0.92 (0.46–1.84)	0.819	0.905
ELISpot_S2_BL	1.27 (0.71–2.39)	0.414	0.93 (0.45–1.87)	0.828	0.905
ELISpot_N_BL	1.04 (0.58–1.87)	0.899	0.94 (0.48–1.78)	0.854	0.906
Nasal_IgM_CoV_2_S_BL	0.81 (0.44–1.44)	0.467	0.98 (0.50–1.89)	0.950	0.978
ELISpot_ORF3_BL	1.12 (0.63–2.03)	0.708	0.99 (0.51–1.93)	0.988	0.988

Supplementary Table 2. Raw baseline immune marker values shown as median [IQR] for all participants enrolled and by dose group. Units are shown in brackets. Units are reported in AU/ml (arbitrary units/ml), SFC/10⁶ PBMC (Spot Forming Cells per million peripheral blood mononuclear cells, IC50 (half maximal inhibitory concentration).

Immune marker (units)	All participants (N=48)	Dose 1 (n= 8)	Dose 2 (n = 10)	Dose 3 (n= 6)	Dose 4 (n= 7)	Dose 5 (n=17)
ACE_2_inhibition_Wuhan_BL (AU/ml)	14.8 [6.73, 24.3]	1.17 [1.08, 1.28]	18 [7.89, 28.8]	18 [15.6, 33.1]	24.1 [11.2, 44.8]	15.6 [10.1, 18.2]
ELISpot_CD4_BL (SFC/10 ⁶ PBMC)	195 [123, 323]	87.3 [54.7, 189]	157 [131, 202]	242 [112, 321]	391 [289, 486]	208 [169, 321]
ELISpot_CD8_BL (SFC/10 ⁶ PBMC)	45.3 [17.5, 101]	103 [35.5, 134]	33.3 [22.7, 63]	56 [38.3, 101]	78 [60, 117]	25.3 [10, 72]
ELISpot_M_BL (SFC/10 ⁶ PBMC)	60.3 [33.3, 79]	35.3 [10, 63.3]	64.7 [37, 88.7]	45.3 [20.7, 73]	72 [50.7, 109]	60.7 [45.3, 70.7]
ELISpot_N_BL (SFC/10 ⁶ PBMC)	103 [62, 175]	129 [57.7, 177]	85.3 [53.7, 110]	60 [44.3, 84.7]	252 [136, 320]	105 [88, 139]
ELISpot_ORF10_BL (SFC/10 ⁶ PBMC)	10 [10, 20.3]	10 [10, 10]	10 [10, 22.5]	10 [10, 10]	21.3 [15, 53.3]	10 [10, 21.3]
ELISpot_ORF3_BL (SFC/10 ⁶ PBMC)	80.7 [46.3, 149]	76.7 [29.7, 105]	98.7 [52.3, 169]	76 [39.7, 95.3]	161 [63.3, 223]	74.7 [45.3, 147]
ELISpot_ORF6_BL (SFC/10 ⁶ PBMC)	10 [10, 12.8]	10 [10, 10]	10 [10, 10]	10 [10, 10]	10 [10, 19.7]	10 [10, 24]
ELISpot_ORF7_BL (SFC/10 ⁶ PBMC)	19.3 [10, 49.3]	10 [10, 26]	25.7 [10, 78.7]	14.3 [10, 20.7]	22.7 [14.3, 41.3]	24 [10, 50.7]
ELISpot_ORF8_BL (SFC/10 ⁶ PBMC)	28.7 [10, 46]	10 [10, 14.8]	20 [10, 35.3]	54 [20.2, 58.3]	38.7 [33.3, 77.3]	29.3 [20, 45.3]
ELISpot_S1_BL (SFC/10 ⁶ PBMC)	152 [100, 320]	52 [18.7, 104]	159 [120, 208]	189 [110, 217]	593 [220, 707]	153 [109, 323]
ELISpot_S2_BL (SFC/10 ⁶ PBMC)	265 [140, 395]	132 [36.3, 201]	219 [146, 283]	340 [161, 439]	359 [288, 456]	309 [156, 420]
MNA_Victoria_BL (IC50)	1220 [596, 2240]	64 [29, 97.7]	2110 [903, 3250]	1360 [997, 1510]	1900 [1150, 2280]	1280 [800, 2520]

Supplementary Table 2. Continued

Immune marker (units)	All participants (N=48)	Dose 1 (n= 8)	Dose 2 (n = 10)	Dose 3 (n= 6)	Dose 4 (n= 7)	Dose 5 (n=17)
Nasal_IgA_CoV_2_NTD_BL (AU/ml)	103 [46.9, 218]	48.4 [18.5, 194]	69.1 [47.5, 86.6]	146 [103, 187]	254 [190, 345]	108 [41.9, 206]
Nasal_IgA_CoV_2_N_BL (AU/ml)	116 [52.9, 232]	154 [25.1, 185]	88.2 [39.6, 223]	163 [70, 311]	324 [205, 366]	69.8 [54.7, 127]
Nasal_IgA_CoV_2_RBD_BL (AU/ml)	351 [135, 978]	234 [32.3, 350]	155 [112, 497]	295 [225, 885]	699 [663, 1380]	521 [234, 1030]
Nasal_IgA_CoV_2_S_BL (AU/ml)	404 [194, 926]	203 [50.3, 277]	193 [134, 242]	442 [269, 803]	700 [612, 1460]	579 [302, 1070]
Nasal_IgG_CoV_2_NTD_BL (AU/ml)	26.6 [3.16, 64.5]	0.592 [0.144, 1.03]	37.5 [13.6, 62.6]	43.7 [16.2, 58.5]	69.7 [51.8, 92]	16.8 [5.08, 63.3]
Nasal_IgG_CoV_2_N_BL (AU/ml)	77.9 [19.8, 271]	17.4 [8.92, 80.3]	44 [17.3, 69.1]	61.3 [22.9, 105]	301 [91.5, 431]	168 [57, 339]
Nasal_IgG_CoV_2_RBD_BL (AU/ml)	1210 [213, 2460]	21.3 [6.06, 40]	1270 [447, 2150]	1540 [601, 2600]	3040 [2100, 4010]	1300 [370, 2070]
Nasal_IgG_CoV_2_S_BL (AU/ml)	2140 [302, 3900]	43.4 [23.8, 73.1]	2200 [805, 3830]	2860 [1030, 4240]	5010 [3230, 5680]	2350 [412, 3380]
Nasal_IgM_CoV_2_NTD_BL (AU/ml)	0.701 [0.287, 1.14]	0.423 [0.272, 0.775]	0.671 [0.558, 1]	1.12 [0.686, 1.24]	1.22 [1, 2.24]	0.342 [0.172, 0.879]
Nasal_IgM_CoV_2_N_BL (AU/ml)	14.3 [8.21, 25.4]	7.95 [4.47, 14.7]	10.7 [5.69, 13.9]	18.1 [8.77, 28.9]	35 [30.4, 51.9]	14.7 [8.55, 19.6]
Nasal_IgM_CoV_2_RBD_BL (AU/ml)	17.8 [6.91, 27.5]	22 [7.68, 29.1]	18.1 [9.55, 23.9]	19.8 [16.5, 38.3]	24.9 [18.1, 28.3]	7.83 [4.26, 17.6]
Nasal_IgM_CoV_2_S_BL (AU/ml)	14.2 [5.64, 27.6]	17.3 [8.46, 28.9]	12.9 [4.17, 20]	22 [12.8, 28.7]	17.8 [15.2, 67.4]	6.72 [3.06, 16.8]
Serum_IgA_CoV_2_NTD_BL (AU/ml)	1650 [404, 2710]	229 [150, 408]	1920 [437, 2830]	1270 [656, 2640]	2190 [2080, 3220]	1820 [841, 2680]
Serum_IgA_CoV_2_N_BL (AU/ml)	403 [217, 1030]	346 [234, 2210]	375 [178, 970]	471 [318, 927]	288 [245, 595]	539 [230, 907]
Serum_IgA_CoV_2_RBD_BL (AU/ml)	5170 [2410, 9120]	694 [453, 2700]	4270 [1720, 7300]	9040 [7700, 9610]	6970 [5170, 9570]	6310 [2540, 10700]
Serum_IgA_CoV_2_S_BL (AU/ml)	7470 [3230, 13300]	886 [546, 3180]	7600 [2870, 11700]	12100 [10900, 14000]	12600 [8400, 13900]	7210 [5280, 15300]
Serum_IgG_CoV_2_NTD_BL (AU/ml)	2160 [656, 3180]	56 [40.8, 87.1]	3280 [1430, 4610]	2230 [1980, 3260]	2850 [2420, 3050]	2130 [1280, 2860]
Serum_IgG_CoV_2_N_BL (AU/ml)	4640 [1990, 10400]	3510 [1580, 5670]	3120 [1800, 4780]	3390 [860, 6720]	7790 [3460, 10700]	8440 [2730, 19300]
Serum_IgG_CoV_2_RBD_BL (AU/ml)	73300 [28900, 127000]	1440 [1300, 3610]	92700 [45300, 135000]	94400 [67800, 166000]	132000 [72800, 165000]	74500 [61500, 114000]
Serum_IgG_CoV_2_S_BL (AU/ml)	132000 [44000, 198000]	4080 [3330, 8160]	170000 [80100, 239000]	158000 [128000, 266000]	194000 [129000, 229000]	135000 [67700, 159000]
Serum_IgM_CoV_2_NTD_BL (AU/ml)	27.1 [17.9, 42]	20.8 [13.5, 42.2]	37.2 [27.7, 46.8]	28.6 [21.3, 30.8]	31.7 [21.5, 54.6]	18.3 [11.5, 31.4]
Serum_IgM_CoV_2_N_BL (AU/ml)	792 [623, 1200]	1050 [720, 1410]	741 [617, 1160]	812 [728, 850]	749 [601, 2290]	710 [533, 1170]
Serum_IgM_CoV_2_RBD_BL (AU/ml)	454 [252, 1540]	7100 [2900, 8010]	998 [413, 1770]	428 [336, 810]	479 [241, 605]	253 [172, 427]
Serum_IgM_CoV_2_S_BL (AU/ml)	356 [196, 840]	1150 [603, 1790]	796 [382, 1320]	332 [207, 848]	378 [264, 587]	196 [165, 261]