

9.10 Statistical analysis

ELISpot – details on statistical analysis performed with GraphPad Prism 8.

Related to [Figure 6](#)

Group	Sidak's multiple comparisons test	Mean Diff,	95.00% CI of diff,	Significant?	Summary	Adjusted P Value
Control (mCorVac#15)	No peptide vs. S peptide	-4.938	-8.321 to -1,554	Yes	**	0.0041
	Control RNA vs. S RNA	2.125	-1.258 to 5.508	No	ns	0.2696
BNT162a1	No peptide vs. S peptide	-82.81	-103.4 to -62.26	Yes	****	<0.0001
	Control RNA vs. S RNA	-47.13	-67.67 to -26.58	Yes	****	<0.0001
BNT162b1	No peptide vs. S peptide	-748.2	-894.1 to -602.3	Yes	****	<0.0001
	Control RNA vs. S RNA	-734.5	-880.4 to -588.6	Yes	****	<0.0001
Control (mCorVac#16)	No peptide vs. S peptide	-14.50	-22.73 to -6.270	Yes	***	0.0007
	Control RNA vs. S RNA	2.438	-5.793 to 10.67	No	ns	0.7333
BNT162b2	No peptide vs. S peptide	-1177	-1314 to -1041	Yes	****	<0.0001
	Control RNA vs. S RNA	-1311	-1448 to -1175	Yes	****	<0.0001
BNT162c2	No peptide vs. S peptide	-1174	-1293 to -1056	Yes	****	<0.0001
	Control RNA vs. S RNA	-1171	-1290 to -1053	Yes	****	<0.0001

Flow cytometry – details on statistical analysis performed with GraphPad Prism 8.

Related to [Figure 7](#)

Group	Dunnett's multiple comparisons test	Mean Diff.	95.00% CI of diff.	Significant?	Summary	Adjusted P Value
CD8 ⁺ T cells	Control vs. BNT162a1	-1.250	-3.386 to 0.8864	No	ns	0.3001
	Control vs. BNT162b1	-1.225	-3.361 to 0.9114	No	ns	0.3130
	Control vs. BNT162b2	-10.63	-13.87 to -7.377	Yes	****	<0.0001
	Control vs. BNT162c2	-0.4321	-3.794 to 2.930	No	ns	0.9348
CD4 ⁺ T cells	Control vs. BNT162a1	1.188	-0.9863 to 3.361	No	ns	0.3445
	Control vs. BNT162b1	1.425	-0.7488 to 3.599	No	ns	0.2302
	Control vs. BNT162b2	11.06	7.473 to 14.65	Yes	****	<0.0001
	Control vs. BNT162c2	-0.7571	-4.473 to 2.959	No	ns	0.8463

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T _{FH} cells	Control vs. BNT162a1	-0.04500	-0.1701 to 0.08005	No	ns	0.6086
	Control vs. BNT162b1	-0.3726	-0.4977 to -0.2476	Yes	****	<0.0001
	Control vs. BNT162b2	-0.3828	-0.7397 to -0.02579	Yes	*	0.0350
	Control vs. BNT162c2	-1.190	-1.560 to -0.8208	Yes	****	<0.0001
B cells	Control vs. BNT162a1	7.813	5.540 to 10.08	Yes	****	<0.0001
	Control vs. BNT162b1	7.900	5.628 to 10.17	Yes	****	<0.0001
	Control vs. BNT162b2	14.64	9.503 to 19.77	Yes	****	<0.0001
	Control vs. BNT162c2	9.921	4.607 to 15.24	Yes	***	0.0005

Related to [Figure 8](#)

Group	Dunnett's multiple comparisons test	Mean Diff.	95.00% CI of diff.	Significant?	Summary	Adjusted P Value
CD44 ⁺ CD38 ⁺ PD1 ⁺ CD8 ⁺ T cells	Control vs. BNT162a1	-0.2575	-1.951 to 1.436	No	ns	0.9102
	Control vs. BNT162b1	-6.015	-7.708 to -4.322	Yes	****	<0.0001
	Control vs. BNT162b2	-28.05	-33.72 to -22.37	Yes	****	<0.0001
	Control vs. BNT162c2	-1.344	-7.222 to 4.533	No	ns	0.8115
ICOS ⁺ CD8 ⁺ T cells	Control vs. BNT162a1	-0.8663	-3.073 to 1.341	No	ns	0.5578
	Control vs. BNT162b1	-8.401	-10.61 to -6.194	Yes	****	<0.0001
	Control vs. BNT162b2	-40.48	-47.07 to -33.89	Yes	****	<0.0001
	Control vs. BNT162c2	-4.713	-11.54 to 2.109	No	ns	0.1998
ICOS ⁺ CD4 ⁺ T cells	Control vs. BNT162a1	-0.5650	-1.427 to 0.2973	No	ns	0.2304
	Control vs. BNT162b1	-2.551	-3.414 to -1.689	Yes	****	<0.0001
	Control vs. BNT162b2	-2.981	-5.174 to -0.7890	Yes	**	0.0078
	Control vs. BNT162c2	1.218	-1.051 to 3.488	No	ns	0.3555
ICOS ⁺ Tfh cells	Control vs. BNT162a1	-10.11	-18.24 to -1.987	Yes	*	0.0143
	Control vs. BNT162b1	-26.43	-34.55 to -18.30	Yes	****	<0.0001
	Control vs. BNT162b2	-12.49	-21.24 to -3.733	Yes	**	0.0054
	Control vs. BNT162c2	-19.20	-27.95 to -10.45	Yes	****	<0.0001

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Related to [Figure 9](#)

Group	Dunnett's multiple comparisons test	Mean Diff.	95.00% CI of diff.	Significant?	Summary	Adjusted P Value
CD8 ⁺ T cells	Control vs. BNT162a1	-337552	-833529 to 158426	No	ns	0.2084
	Control vs. BNT162b1	-420848	-916825 to 75130	No	ns	0.1019
	Control vs. BNT162b2	-683950	-1112484 to -255415	Yes	**	0.0021
	Control vs. BNT162c2	-75551	-504086 to 352984	No	ns	0.8818
CD4 ⁺ T cells	Control vs. BNT162a1	-749301	-1913693 to 415091	No	ns	0.2411
	Control vs. BNT162b1	-1246977	-2411369 to -82585	Yes	*	0.0352
	Control vs. BNT162b2	-1850559	-2886016 to -815102	Yes	***	0.0007
	Control vs. BNT162c2	-216563	-1252020 to 818895	No	ns	0.8389
T _{FH} cells	Control vs. BNT162a1	-2366	-7903 to 3171	No	ns	0.5051
	Control vs. BNT162b1	-14242	-19780 to -8705	Yes	****	<0.0001
	Control vs. BNT162b2	-46173	-60706 to -31640	Yes	****	<0.0001
	Control vs. BNT162c2	-4251	-18783 to 10282	No	ns	0.7150
T _{H1} cells	Control vs. BNT162a1	-7820	-18193 to 2552	No	ns	0.1541
	Control vs. BNT162b1	-13043	-23416 to -2671	Yes	*	0.0134
	Control vs. BNT162b2	-2268	-4564 to 28.31	No	ns	0.0531
	Control vs. BNT162c2	297.1	-1999 to 2593	No	ns	0.9339

Related to [Figure 10](#)

Group	Dunnett's multiple comparisons test	Mean Diff.	95.00% CI of diff.	Significant?	Summary	Adjusted P Value
B cells	Control vs. BNT162a1	-415609	-1302980 to 471763	No	ns	0.4459
	Control vs. BNT162b1	-1266693	-2154065 to -379321	Yes	**	0.0053
	Control vs. BNT162b2	-761299	-1089182 to -433417	Yes	****	<0.0001
	Control vs. BNT162c2	26360	-301523 to 354242	No	ns	0.9738
Plasma cells	Control vs. BNT162a1	-244.3	-18256 to 17768	No	ns	0.9992
	Control vs. BNT162b1	-20130	-38142 to -2117	Yes	*	0.0278

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	Control vs. BNT162b2	-4115	-9265 to 1034	No	ns	0.1206
	Control vs. BNT162c2	-79.67	-5383 to 5223	No	ns	0.9989
Class switched B cells	Control vs. BNT162a1	-69656	-150840 to 11528	No	ns	0.0977
	Control vs. BNT162b1	-280116	-361300 to -198931	Yes	****	<0.0001
	Control vs. BNT162b2	-509776	-672575 to -346977	Yes	****	<0.0001
	Control vs. BNT162c2	-18446	-186106 to 149214	No	ns	0.9444
Germinal center B cells	Control vs. BNT162a1	-66066	-140887 to 8755	No	ns	0.0871
	Control vs. BNT162b1	-267264	-342085 to -192443	Yes	****	<0.0001
	Control vs. BNT162b2	-509776	-673052 to -346500	Yes	****	<0.0001
	Control vs. BNT162c2	-18261	-186412 to 149889	No	ns	0.9457
IgG1+ Germinal center B cells	Control vs. BNT162a1	-17771	-40867 to 5325	No	ns	0.1444
	Control vs. BNT162b1	-67436	-90532 to -44340	Yes	****	<0.0001
	Control vs. BNT162b2	-152191	-198806 to -105575	Yes	****	<0.0001
	Control vs. BNT162c2	2178	-45830 to 50185	No	ns	0.9902
IgG2a+ Germinal center B cells	Control vs. BNT162a1	-52.50	-205.8 to 100.8	No	ns	0.6362
	Control vs. BNT162b1	-285.0	-438.3 to -131.7	Yes	***	0.0005
	Control vs. BNT162b2	-459.6	-678.2 to -240.9	Yes	***	0.0003
	Control vs. BNT162c2	-31.33	-256.5 to 193.9	No	ns	0.9132

Related to [Figure 11](#)

Group	Dunnett's multiple comparisons test	Mean Diff.	95.00% CI of diff.	Significant?	Summary	Adjusted P Value
T _{FH} cells	Control vs. BNT162a1	-943.6	-8833 to 6946	No	ns	0.9431
	Control vs. BNT162b1	-9561	-17451 to -1671	Yes	*	0.0170
	Control vs. BNT162b2	-47817	-74515 to -21120	Yes	***	0.0007
	Control vs. BNT162c2	35.88	-26661 to 26733	No	ns	>0.9999
Germinal center B cells	Control vs. BNT162a1	14390	-129166 to 157946	No	ns	0.9596
	Control vs. BNT162b1	-382477	-526032 to -238921	Yes	****	<0.0001
	Control vs. BNT162b2	-1601371	-2093312 to -1109430	Yes	****	<0.0001

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	Control vs. BNT162c2	-74428	-566369 to 417514	No	ns	0.9111
Class switched B cells	Control vs. BNT162a1	-228955	-468753 to 10843	No	ns	0.0622
	Control vs. BNT162b1	-476506	-716304 to -236708	Yes	***	0.0002
	Control vs. BNT162b2	-1445088	-1887202 to -1002973	Yes	****	<0.0001
	Control vs. BNT162c2	-60963	-503077 to 381151	No	ns	0.9254

Related to [Figure 12](#)

Group	Dunnett's multiple comparisons test	Mean Diff.	95.00% CI of diff.	Significant?	Summary	Adjusted P Value
IFN γ ⁺ CD8 ⁺ T cells	Control vs. BNT162a1	-1560	-18564 to 15444	No	ns	0.9660
	Control vs. BNT162b1	-77611	-94615 to -60607	Yes	****	<0.0001
	Control vs. BNT162b2	-140659	-195692 to -85625	Yes	****	<0.0001
	Control vs. BNT162c2	-79418	-134451 to -24384	Yes	**	0.0049
IL-2 ⁺ CD8 ⁺ T cells	Control vs. BNT162a1	-382.5	-2638 to 1873	No	ns	0.8899
	Control vs. BNT162b1	-9429	-11684 to -7174	Yes	****	<0.0001
	Control vs. BNT162b2	-5903	-10507 to -1298	Yes	*	0.0117
	Control vs. BNT162c2	-406.1	-5010 to 4198	No	ns	0.9685
TNF ⁺ CD8 ⁺ T cells	Control vs. BNT162a1	-591.5	-2201 to 1018	No	ns	0.5965
	Control vs. BNT162b1	-4292	-5901 to -2683	Yes	****	<0.0001
	Control vs. BNT162b2	-1403	-2898 to 91.18	No	ns	0.0670
	Control vs. BNT162c2	351.1	-1143 to 1846	No	ns	0.8023
IFN γ ⁺ CD4 ⁺ T cells	Control vs. BNT162a1	19.00	-1350 to 1388	No	ns	0.9992
	Control vs. BNT162b1	-3941	-5310 to -2572	Yes	****	<0.0001
	Control vs. BNT162b2	995.9	-2046 to 4038	No	ns	0.6600
	Control vs. BNT162c2	1282	-1760 to 4324	No	ns	0.5140
IL-2 ⁺ CD4 ⁺ T cells	Control vs. BNT162a1	-1472	-2850 to -92.56	Yes	*	0.0359
	Control vs. BNT162b1	-2276	-3655 to -897.3	Yes	**	0.0016
	Control vs. BNT162b2	-3755	-8093 to 583.6	No	ns	0.0944
	Control vs. BNT162c2	-774.8	-5113 to 3564	No	ns	0.8790

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IL-4 ⁺ CD4 ⁺ T cells	Control vs. BNT162a1	-377.1	-1961 to 1207	No	ns	0.7977
	Control vs. BNT162b1	-520.3	-2104 to 1064	No	ns	0.6583
	Control vs. BNT162b2	-654.0	-1345 to 36.86	No	ns	0.0647
	Control vs. BNT162c2	-71.88	-762.7 to 619.0	No	ns	0.9566
IFN γ ⁺ T _{FH} cells	Control vs. BNT162a1	70.25	-110.7 to 251.2	No	ns	0.5643
	Control vs. BNT162b1	-134.9	-315.8 to 46.04	No	ns	0.1597
	Control vs. BNT162b2	-147.3	-267.6 to -26.93	Yes	*	0.0160
	Control vs. BNT162c2	-19.63	-139.9 to 100.7	No	ns	0.8976

Multiplex protein quantification – details on statistical analysis performed with GraphPad Prism 8.

Related to [Figure 13](#)

Group	Sidak's multiple comparisons test	Mean Diff.	95.00% CI of diff.	Significant?	Summary	Adjusted P Value
IFN γ	Control (mCorVac#15)	-0,9662	-969,8 to 967,8	No	ns	>0,9999
	BNT162a1	-202,2	-1171 to 766,6	No	ns	0,9330
	BNT162b1	-2025	-2994 to -1056	Yes	****	<0,0001
	Control	-3,160	-20,63 to 14,31	No	ns	0,9548
	BNT162b2	-4780	-4798 to -4763	Yes	****	<0,0001
	BNT162c2	-4794	-4811 to -4776	Yes	****	<0,0001
IL-2	Control	1,260	-12,20 to 14,72	No	ns	0,9932
	BNT162a1	-27,52	-40,98 to -14,06	Yes	****	<0,0001
	BNT162b1	-27,35	-40,81 to -13,90	Yes	****	<0,0001
	Control	14,00	-15,79 to 43,79	No	ns	0,5549
	BNT162b2	-81,77	-111,6 to -51,98	Yes	****	<0,0001
	BNT162c2	-63,07	-92,86 to -33,28	Yes	****	<0,0001
IL-4	Control	0,000	-9,014 to 9,014	No	ns	>0,9999
	BNT162a1	-3,488	-12,50 to 5,526	No	ns	0,6953
	BNT162b1	-16,09	-25,11 to -7,079	Yes	***	0,0004
	Control	-4,335	-26,27 to 17,60	No	ns	0,9423

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	BNT162b2	-101,9	-123,9 to -79,98	Yes	****	<0,0001
	BNT162c2	-29,45	-51,39 to -7,513	Yes	**	0,0067
IL-5	n/a	n/a	n/a	n/a	n/a	n/a
	n/a	n/a	n/a	n/a	n/a	n/a
	n/a	n/a	n/a	n/a	n/a	n/a
	Control	3,553e-015	-7,207 to 7,207	No	ns	>0,9999
	BNT162b2	-24,75	-31,95 to -17,54	Yes	****	<0,0001
	BNT162c2	-6,075	-13,28 to 1,132	No	ns	0,1160
IL-18	Control	-0,4713	-355,8 to 354,9	No	ns	>0,9999
	BNT162a1	-667,2	-1023 to -311,9	Yes	***	0,0002
	BNT162b1	-1914	-2270 to -1559	Yes	****	<0,0001
	Control	-54,48	-627,7 to 518,7	No	ns	0,9929
	BNT162b2	-6801	-7374 to -6228	Yes	****	<0,0001
	BNT162c2	-7150	-7723 to -6576	Yes	****	<0,0001
GM-CSF	Control	0,000	-5,859 to 5,859	No	ns	>0,9999
	BNT162a1	-3,166	-9,025 to 2,693	No	ns	0,4398
	BNT162b1	-21,55	-27,41 to -15,69	Yes	****	<0,0001
	Control	-2,842e-014	-20,39 to 20,39	No	ns	>0,9999
	BNT162b2	-146,4	-166,8 to -126,0	Yes	****	<0,0001
	BNT162c2	-78,13	-98,53 to -57,74	Yes	****	<0,0001
n/a measured values < lower limit of quantification						

9.11 List of attachments

Attachment I includes the following raw data sets:

- Attachment_001_CorVac#15_phenotypic_analysis_blood_Freq_Report
- Attachment_002_CorVac#16_phenotypic_analysis_blood_Freq_Report
- Attachment_003_CorVav#15_phenotypic_analysis_Spleen_Freq_Report
- Attachment_004_CorVac#16_phenotypic_analysis_Spleen_Freq_Report
- Attachment_005_CorVav#15_phenotypic_analysis_LN_Freq_Report
- Attachment_006_CorVav#16_phenotypic_analysis_LN_Freq_Report
- Attachment_007_CorVac#15_phenotypic_analysis_Spleen_Counts_Report
- Attachment_008_CorVac#16_phenotypic_analysis_Spleen_Counts_Report
- Attachment_009_CorVav#15_phenotypic_analysis_LN_Counts_Report

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- Attachment_010_CorVav#16_phenotypic_analysis_LN_Counts_Report
- Attachment_011_CorVac#15_phenotypic_analysis_Spleen_gMFI_Report
- Attachment_012_CorVac#16_phenotypic_analysis_Spleen_gMFI_Report
- Attachment_013_CorVac#15_phenotypic_analysis_LN_gMFI_Report
- Attachment_014_CorVav#16_phenotypic_analysis_LN_gMFI_Report
- Attachment_015_CorVac#15_myeloid_Spleen_Freq_Report
- Attachment_016_CorVac#16_myeloid_Spleen_Freq_Report
- Attachment_017_CorVac#15_myeloid_Spleen_Counts_Report
- Attachment_018_CorVac#16_myeloid_Spleen_Counts_Report
- Attachment_019_CorVac#15_functional_analysis_Spleen_Freq_Report
- Attachment_020_CorVac#16_functional_analysis_Spleen_Freq_Report
- Attachment_021_CorVac#15_functional_analysis_LN_Freq_Report
- Attachment_022_CorVac#16_functional_analysis_LN_Freq_Report
- Attachment_023_CorVac#15_functional_analysis_Spleen_Counts_Report
- Attachment_024_CorVac#16_functional_analysis_Spleen_Counts_Report
- Attachment_025_CorVac#15_functional_analysis_LN_Counts_Report
- Attachment_026_CorVac#16_functional_analysis_LN_Counts_Report
- Attachment_027_CorVav#15_B-cell_Spleen_Freq_Report
- Attachment_028_CorVav#16_B-cell_Spleen_Freq_Report
- Attachment_029_CorVav#15_B-cell_LN_Freq_Report
- Attachment_030_CorVav#16_B-cell_LN_Freq_Report
- Attachment_031_CorVac#15_B-cell_Spleen_Counts_Report
- Attachment_032_CorVac#16_B-cell_Spleen_Counts_Report
- Attachment_033_CorVac#15_B-cell_LN_Counts_Report
- Attachment_034_CorVac#16_B-cell_LN_Counts_Report
- Attachment_035_CorVac#15_memB-cell_Spleen_Counts_Report
- Attachment_036_CorVac#16_memB-cell_Spleen_Counts_Report
- Attachment_037_CorVac#15_memB-cell_LN_Counts_Report
- Attachment_038_CorVac#16_memB-cell_LN_Counts_Report

Attachment II includes all gating strategies used for the analysis of flow cytometry data

Attachment III includes the following raw data sets:

- Attachment_039_CorVac#15_xCelligence_Report
- Attachment_040_CorVac#16_xCelligence_Report