

Table S1. Antibodies used for cytokine detection with Luminex system (Luminex 100SI, Biomedica, Vienna, Austria)

Luminex Microspheres Bead region	Standard			Antibody specificity	Capture Antibody			Biotinylated Detection Antibody		
	Standard entity	Catalog number	Company		Clone	Catalog number	Company	Clone	Catalog number	Company
006	IL-2	200-02-10µg	Peprotech	IL-2	MQ1-17H12	14-7029-85	eBioscience	Polyclonal	13-7028-85	eBioscience
021	IL-10	200-10-2µg	Peprotech	IL-10	JES3-9D7	14-7108-85	eBioscience	JES3-12G8	13-7109-85	eBioscience
035	IL-13	200-13-2µg	Peprotech	IL-13	JES10-5A2	501902	Biolegend	Poly5020	502001	Biolegend
048	GM-CSF	572902	Biolegend	GM-CSF	BVD2-23B6	502202	Biolegend	BVD2-21C11	502304	Biolegend
074	IFN γ	300-02-20µg	Peprotech	IFN γ	MD-1	507502	Biolegend	4S.B3	502504	Biolegend
041	TNF α	300-01A-10µg	Peprotech	TNF α	MAb1	502802	Biolegend	MAb11	502904	Biolegend

Table S2: The following table shows immune reconstitution data from all patients at baseline (= before first vaccination). Lymphocyte subgroups were differentiated by FACS (fluorescence-activated cell scanning) from unstimulated cells.

Patient	Lymphocytes	T-lymphocytes	CD4+ cells	CD8+ cells	CD4+ memory	CD4+ naive	CD8+ memory	CD8+ naive	B-Lymphocytes	class switched	non-class switched	naive	immature	transitional	plasma blasts
<i>Normal range</i>	<i>1000-4000</i>	<i>m 590-2000 f 770-2200</i>	<i>m 360-1350 f 310-1570</i>	<i>280-1000</i>	<i>35-89%</i>	<i>12-78%</i>	<i>8-29%</i>	<i>8-29%</i>	<i>110-530</i>	<i>7-39%</i>	<i>5-57%</i>	<i>NA</i>	<i>NA</i>	<i>NA</i>	<i>NA</i>
Unit	absolut/ μl	absolut/ μl	absolut/ μl	absolut/ μl	%CD4	%CD4	%CD8	%CD8	absolut/ μl	%CD19	%CD19	%CD19	%CD19	%CD19	%CD19
1	1568	1192	470	580	56.2	29.9	10.5	60.2	110	5.5	5.6	83.8	1.1	4.6	10.3
2	1376	716	358	330	21.8	42.9	2.9	82.0	592	0.7	4.3	92	0.3	7.2	38.2
3	1050	494	231	200	38.2	39.7	20.5	49.8	315	2.9	25.2	68.9	2.8	3.8	15.3
4	1026	523	257	267	69.3	18.1	54.3	22.0	380	1.1	4.5	79.7	1.5	2.2	28.7
5	2592	1555	337	1192	88.4	1.93	20.8	20.8	389	4.9	12	76.2	0.8	15.8	11.1
6	1840	1214	442	626	49.4	30.5	9.7	59.2	515	1	4.1	90.4	0.8	4.6	16.9
7	1430	1115	315	758	62.7	21.7	14.8	51.1	129	0.3	2.5	95.3	3.7	31.5	24.7
8	1204	999	518	482	40.5	23.0	22.5	30.8	157	3.9	16.6	70	1.6	14	7
9	1280	576	294	282	48.1	3.6	29.6	12.8	525	4.1	8	84.6	1.2	14	10.2
10	1700	867	527	340	67.4	12.9	21.1	41.9	442	0.4	2	94.3	3.6	38.9	1.3
11	1800	648	396	216	-	-	22.1	52.9	810	1.4	2.2	92.7	4.1	57.7	3.1
12	1178	766	306	424	66.3	20.2	31.9	30.9	224	5.6	6.3	76.7	1.3	72.7	4.4
13	1782	1568	321	1212	60.7	17.4	21	33.1	71	16.1	10.9	66.7	1.5	23.3	3.8
14	3224	1096	387	645	86.8	6.5	70.9	6.7	1709	4.9	1	86.4	0.9	65.9	17.1
15	2400	2232	72	2160	90.5	2.5	26.2	25.5	24	7.8	9.2	68	5.8	24.9	7.1
16	1634	1226	621	458	49.6	39.9	18.9	60.1	327	3.3	7.1	82	1.1	39.5	5.2
17	1972	1499	394	1124	65.2	15.2	4.4	62.6	434	1.7	3.7	90.1	1.9	61.8	10.1

Table S3: The following table shows immune reconstitution data from all patients at two different time points during the study period: 12 weeks after first vaccination and 9 to 11 months after baseline at the time of third vaccination. Lymphocyte subgroups were differentiated by FACS (fluorescence-activated cell scanning) from unstimulated cells.

Patient	Lymphocytes	Lymphocytes	T-lymphocytes	T-lymphocytes	CD4+ cells	CD4+ cells	CD8+ cells	CD8+ cells	B-lymphocytes	B-lymphocytes
<i>Normal range</i>	<i>1000-4000</i>	<i>1000-4000</i>	<i>m 590-2000 f 770-2200</i>	<i>m 590-2000 f 770-2200</i>	<i>m 360-1350 f 310-1570</i>	<i>m 360-1350 f 310-1570</i>	<i>280-1000</i>	<i>280-1000</i>	<i>110-530</i>	<i>110-530</i>
Unit	absolut/ μ l	absolut/ μ l	absolut/ μ l	absolut/ μ l	absolut/ μ l	absolut/ μ l	absolut/ μ l	absolut/ μ l	absolut/ μ l	absolut/ μ l
Time point	12 weeks post Baseline	9 to 11 months post Baseline	12 weeks post Baseline	9 to 11 months post Baseline	12 weeks post Baseline	9 to 11 months post Baseline	12 weeks post Baseline	9 to 11 months post Baseline	12 weeks post Baseline	9 to 11 months post Baseline
1	1431	1647	1116	1235	529	609	501	544	186	231
2	1273	1862	586	726	306	354	267	317	458	1005
3	1188	1560	594	827	273	359	249	374	261	390
4	1482	1539	904	877	415	431	489	431	430	477
5	2640	2109	1558	1202	449	380	1030	801	528	506
6	2184	2310	1310	1247	546	531	655	624	743	901
7	2550	-	1836	-	485	-	1275	-	459	-
8	1836	2021	1542	1556	771	869	771	687	239	404
9	1829	1464	750	498	311	264	439	220	695	703
10	1892	-	946	-	530	-	416	-	359	-
11	1798	-	575	-	342	-	216	-	971	-
12	1150	-	725	-	311	-	403	-	207	-
13	2163	2937	1925	2526	346	529	1514	1968	87	206
14	3509	3900	1263	1716	561	702	667	936	1790	1365
15	4230	2668	3807	1948	254	213	3596	1734	254	560
16	3569	2352	2356	1740	1356	917	785	612	1106	517
17	4410	2240	3396	1523	706	403	2690	1120	838	672

Table S4. The following table shows descriptive statistics (Mean, Standard Deviation, Median, 1st and 3rd Quantile, Minimum, Maximum and sample size N) for cellular data separately for patients and controls as well as overall. The p-values give the result for the Wilcoxon-Test comparing patients with controls. Lymphocyte proliferation has been standardized based on unstimulated control samples and is shown as stimulation index (SI).

Time: BL – Baseline; 2nd – after 2nd vaccination; 3rd – after 3rd vaccination. TBE: tick borne encephalitis antigen; CEFT: CMV, EBV, influenza virus and Clostridium tetani antigen mix; PMA/iono: phorbol myristate acetate plus ionomycin.

Variable	Time	Group	Mean	SD	Median	Q1	Q3	Min	Max	N	p-value
Age	BL	Control	32	12.81	29.5	22.75	34.25	21	60	8	0.3808
		Patient	38	14.34	31	26	53	22	61	17	
		overall	36.08	13.9	31	26	47	21	61	25	
BMI	BL	Control	22.48	2.86	21.65	20.75	24.65	18.5	26.6	8	0.0359
		Patient	27.48	6.44	26.9	23.1	29.9	19.1	43.1	17	
		overall	25.88	5.98	24.2	22.2	28.4	18.5	43.1	25	
TBE Proliferation	BL	Control	1.29	0.67	0.98	0.88	1.53	0.61	2.37	8	0.0019
		Patient	13.29	18.2	4.15	1.45	24.34	1.02	69.7	17	
		overall	9.45	15.92	2.22	1.04	9.42	0.61	69.7	25	
	2nd	Control	10.25	8.37	8.3	4.29	12.92	1.75	23.93	8	0.9773
		Patient	18.33	22.08	8.43	1.55	27.54	0.67	76.56	17	
		overall	15.74	18.98	8.43	1.75	22.8	0.67	76.56	25	
	3rd	Control	14.55	9.7	12.99	10.9	19.28	1.79	27.79	5	0.5663
		Patient	26.63	30.57	21.02	2.68	25.51	0.84	109.31	13	
		overall	23.28	26.7	17.24	4.74	25.32	0.84	109.31	18	
CEFT Proliferation	BL	Control	58.62	37.01	53.87	40.23	68.26	13.34	134.64	8	0.0003
		Patient	13.91	14.55	8.55	1.57	24.59	1.13	45.2	17	
		overall	28.21	31.52	21.69	2.61	45.2	1.13	134.64	25	
	2nd	Control	44.37	23.29	45.27	23.57	59.98	14.02	77.59	8	0.0005
		Patient	12.45	14.06	5.3	2	18.81	0.84	45.1	17	
		overall	22.66	22.82	14.02	4.38	37.69	0.84	77.59	25	
	3rd	Control	42.47	30.4	47.97	18.49	57.59	6.36	81.95	5	0.3359
		Patient	26.98	21.9	17.3	10.99	35.4	2.4	66.92	13	
		overall	31.28	24.64	18.41	11.57	53.43	2.4	81.95	18	
PMA/iono Proliferation	BL	Control	239	104.88	263.19	183.08	309.21	85.41	374.98	8	0.0109
		Patient	131.44	125.23	72.24	64.81	153.72	40.28	532.1	17	
		overall	165.86	127.62	94.69	67.64	255.1	40.28	532.1	25	
	2nd	Control	202.67	145.51	152.03	86.43	359.89	51.72	392.65	8	0.4063
		Patient	141.43	96.85	105.33	76.72	178.32	40.67	379.03	17	
		overall	161.03	115.24	129.72	76.72	208.53	40.67	392.65	25	
	3rd	Control	184.14	55.05	220.44	152.04	222	102.06	224.18	5	0.0194
		Patient	113.74	147.45	60.92	43.21	113.89	21.89	586.07	13	
		overall	133.3	130.81	105.47	48.56	150.11	21.89	586.07	18	
IFN γ	BL	Control	3.31	2.11	2.81	1.52	4.68	1.34	7.03	8	0.4063
		Patient	32.97	60.05	5.36	1.25	44.35	0.44	233.91	17	
		overall	23.48	51.04	4.65	1.39	8.47	0.44	233.91	25	
	2nd	Control	15.96	20.83	8.79	4.66	16.14	1.91	65.06	8	0.1747

		Patient	45.79	96.92	2.27	1.5	5.95	0.45	359.61	17	
		overall	36.24	81.18	5.2	1.91	14.71	0.45	359.61	25	
	3rd	Control	26.58	24.42	19.89	10.49	38.58	1.33	62.63	5	0.6331
		Patient	73.93	99.16	48.64	3	92.06	0.76	327.85	13	
		overall	60.78	86.94	29.24	3.05	68.5	0.76	327.85	18	
IL2	BL	Control	1.14	0.58	1	0.76	1.27	0.6	2.35	8	0.0266
		Patient	16.6	35.76	4.91	1.11	10.77	0.61	146.61	17	
		overall	11.65	30.11	1.19	0.94	6.36	0.6	146.61	25	
	2nd	Control	3.08	2.55	2.47	1.33	3.37	0.97	8.71	8	0.2622
		Patient	18.27	34.33	8.1	1.31	16.35	0.41	142.96	17	
		overall	13.41	28.98	3.04	1.31	14.28	0.41	142.96	25	
	3rd	Control	10.71	17.32	4.1	2.23	4.66	1	41.59	5	0.8490
		Patient	14.63	24.83	5.51	1.96	16.88	0.68	93.37	13	
		overall	13.54	22.56	4.38	2.02	16.38	0.68	93.37	18	
IL10	BL	Control	1.21	0.23	1.22	1.18	1.24	0.8	1.63	8	0.2770
		Patient	5.87	7.96	1.95	1	7.78	1	28.53	17	
		overall	4.38	6.87	1.22	1	3.64	0.8	28.53	25	
	2nd	Control	2.89	2.84	1.37	1.2	3.47	0.95	8.92	8	0.9302
		Patient	6.65	14.47	1.74	1	4.34	0.26	61.22	17	
		overall	5.44	12.05	1.51	1	4.34	0.26	61.22	25	
	3rd	Control	2.29	0.9	2.06	1.74	3.11	1.22	3.31	5	0.7670
		Patient	23.51	26.22	6.9	1	39.92	0.14	63.23	13	
		overall	17.61	24.1	2.59	1.05	35.86	0.14	63.23	18	
IL13	BL	Control	0.63	0.08	0.61	0.61	0.61	0.57	0.84	8	0.0001
		Patient	16.04	28.93	1	1	20.62	0.96	98.93	17	
		overall	11.11	24.73	1	0.61	2.87	0.57	98.93	25	
	2nd	Control	2.7	2.05	2.07	1.08	4.02	0.6	5.89	8	0.2779
		Patient	29.36	58.55	5.61	1	18.35	0.96	184.11	17	
		overall	20.83	49.48	2.16	1	11.27	0.6	184.11	25	
	3rd	Control	3.83	2.45	3.41	2.95	4.97	0.61	7.21	5	0.1390
		Patient	44.51	51.03	32.26	1	66.93	0.53	153.83	13	
		overall	33.21	46.81	8.44	1.49	40.64	0.53	153.83	18	
TNF α	BL	Control	0.87	0.54	0.71	0.56	1.18	0.28	1.93	8	0.0289
		Patient	7.54	15.16	1.43	1	3.97	0.29	47.44	17	
		overall	5.41	12.78	1.19	0.73	1.94	0.28	47.44	25	
	2nd	Control	1.13	0.55	0.94	0.76	1.36	0.52	2.08	8	0.3665
		Patient	5.79	8.43	1.48	0.73	3.54	0.2	23.19	17	
		overall	4.3	7.24	1.1	0.76	2.64	0.2	23.19	25	
	3rd	Control	1.2	0.38	1.32	1.28	1.35	0.55	1.51	5	0.1674
		Patient	8.29	9.52	3.42	1.09	12.68	0.51	27.1	13	
		overall	6.32	8.64	1.91	1.14	6.74	0.51	27.1	18	
GM-CSF	BL	Control	0.69	0.23	0.69	0.57	0.86	0.32	1	8	0.0109
		Patient	13.11	26.82	1.33	0.94	13.77	0.33	111.87	17	
		overall	9.13	22.68	1	0.69	8.63	0.32	111.87	25	
	2nd	Control	3.06	2.74	2.17	1.4	3.48	0.65	8.83	8	0.5875
		Patient	18.16	33.84	3.68	1	9.26	0.34	109.31	17	
		overall	13.33	28.59	2.61	1	8.77	0.34	109.31	25	

	3rd	Control	4.49	5.63	1.68	1.38	4.57	0.63	14.21	5	0.2460
		Patient	22.33	33.7	10.33	1.03	28.94	0.63	126.68	13	
		overall	17.38	29.61	6.82	1.11	24.68	0.63	126.68	18	

Table S5. The following table shows descriptive statistics for cellular data separately for humoral responders and non-responders (response was defined as an NT ≥ 10 and at least two-fold increase in titers after two vaccinations). The p-values give the result for the Wilcoxon-Test for the comparison between responders and non-responders.

Variable	Time	Responder	Mean	SD	Median	Q1	Q3	Min	Max	N	p-value
Age	BL	No	41.09	14.02	43	26.5	54	22	58	11	0.4493
		Yes	32.33	14.33	27	26.25	30	22	61	6	
		overall	38	14.34	31	26	53	22	61	17	
BMI	BL	No	28.55	5.86	27.8	24.1	30.7	22.7	43.1	11	0.2275
		Yes	25.53	7.54	23.25	20.4	27.6	19.1	39.1	6	
		overall	27.48	6.44	26.9	23.1	29.9	19.1	43.1	17	
TBE	BL	No	2.91	2.57	1.53	1.32	3.75	1.02	9.42	11	0.0002
Proliferation		Yes	32.33	19.35	27.93	25.11	30.35	13.06	69.7	6	
		overall	13.29	18.2	4.15	1.45	24.34	1.02	69.7	17	
	2nd	No	6.87	10.02	1.72	1.3	6.79	0.67	31.55	11	0.0019
		Yes	39.35	23.25	35.84	23.98	50.33	12.66	76.56	6	
		overall	18.33	22.08	8.43	1.55	27.54	0.67	76.56	17	
	3rd	No	22.45	39.41	2.68	1.8	20.36	0.84	109.31	7	0.1807
		Yes	31.52	18.06	23.77	21.46	38.21	14.8	63.05	6	
		overall	26.63	30.57	21.02	2.68	25.51	0.84	109.31	13	
CEFT	BL	No	6.77	10.59	2.21	1.46	6.01	1.13	36.13	11	0.0048
Proliferation		Yes	27	11.65	24.62	22.41	32.16	11.21	45.2	6	
		overall	13.91	14.55	8.55	1.57	24.59	1.13	45.2	17	
	2nd	No	4.86	5.49	2.79	1.48	5.26	0.84	19.44	11	0.0011
		Yes	26.38	14.6	26.61	13.09	36.87	11.08	45.1	6	
		overall	12.45	14.06	5.3	2	18.81	0.84	45.1	17	
	3rd	No	15.26	9.69	13.34	10.84	17.82	2.4	33.76	7	0.1014
		Yes	40.64	24.95	45.32	20.39	60.87	8.17	66.92	6	
		overall	26.98	21.9	17.3	10.99	35.4	2.4	66.92	13	
PMA/iono	BL	No	151.74	150.64	72.24	65.54	172.21	40.28	532.1	11	0.6605
Proliferation		Yes	94.23	47.26	72.52	62.97	118.79	54.37	171.94	6	
		overall	131.44	125.23	72.24	64.81	153.72	40.28	532.1	17	
	2nd	No	142.39	96.34	105.33	77.88	172.33	50.56	379.03	11	0.7325
		Yes	139.68	107	111.54	57.89	190.79	40.67	317.11	6	
		overall	141.43	96.85	105.33	76.72	178.32	40.67	379.03	17	
	3rd	No	151.92	196.19	60.92	50.17	139.29	37.55	586.07	7	0.3660
		Yes	69.2	39.6	66.14	39.49	103.93	21.89	113.89	6	
		overall	113.74	147.45	60.92	43.21	113.89	21.89	586.07	13	
IFN γ	BL	No	8.3	17.96	1.39	0.92	6.65	0.44	61.7	11	0.0031
		Yes	78.19	84.27	58.38	20.65	93.38	5.36	233.91	6	
		overall	32.97	60.05	5.36	1.25	44.35	0.44	233.91	17	
	2nd	No	16.45	48.65	1.57	1.33	2.25	0.45	163.11	11	0.0031
		Yes	99.58	141.28	32.01	5.84	136.65	5.2	359.61	6	
		overall	45.79	96.92	2.27	1.5	5.95	0.45	359.61	17	
	3rd	No	44.31	78.82	3	2.47	47.63	0.76	206.18	7	0.1014
		Yes	108.49	116.12	64.04	50.89	123.34	5.42	327.85	6	
		overall	73.93	99.16	48.64	3	92.06	0.76	327.85	13	

IL2	BL	No	2.55	2.52	1.19	0.93	3.75	0.61	7.55	11	0.0006
		Yes	42.35	53.37	20.07	12.71	43.25	6.12	146.61	6	
		overall	16.6	35.76	4.91	1.11	10.77	0.61	146.61	17	
	2nd	No	5.63	7.66	1.41	1.11	7.01	0.41	24.02	11	0.0071
		Yes	41.45	51.56	18.04	14.8	40.38	8.1	142.96	6	
		overall	18.27	34.33	8.1	1.31	16.35	0.41	142.96	17	
	3rd	No	15.28	34.48	1.96	0.9	4.57	0.68	93.37	7	0.0734
		Yes	13.87	7.21	15.87	8.95	18.98	3.34	21.46	6	
		overall	14.63	24.83	5.51	1.96	16.88	0.68	93.37	13	
IL10	BL	No	3.48	5.82	1	1	3.01	1	20.68	11	0.0352
		Yes	10.27	9.97	8.78	3.4	11.78	1.14	28.53	6	
		overall	5.87	7.96	1.95	1	7.78	1	28.53	17	
	2nd	No	1.64	1.3	1	1	1.98	0.26	4.09	11	0.0029
		Yes	15.83	22.6	7.13	4.61	12.25	1.74	61.22	6	
		overall	6.65	14.47	1.74	1	4.34	0.26	61.22	17	
	3rd	No	14.25	22.71	1	0.91	18.6	0.14	59.56	7	0.0985
		Yes	34.31	27.76	38.82	10.6	56.81	1	63.23	6	
		overall	23.51	26.22	6.9	1	39.92	0.14	63.23	13	
IL13	BL	No	1.21	0.57	1	1	1	0.96	2.87	11	0.0006
		Yes	43.21	36.16	23.64	20.75	65.66	13.63	98.93	6	
		overall	16.04	28.93	1	1	20.62	0.96	98.93	17	
	2nd	No	3.87	5.69	1	1	3.33	0.96	18.35	11	0.0017
		Yes	76.09	82.8	33.08	18.4	144.39	11.27	184.11	6	
		overall	29.36	58.55	5.61	1	18.35	0.96	184.11	17	
	3rd	No	17.62	26.71	1	0.94	26.51	0.53	66.93	7	0.0381
		Yes	75.89	56.58	69.99	32.32	112.44	15.16	153.83	6	
		overall	44.51	51.03	32.26	1	66.93	0.53	153.83	13	
TNF α	BL	No	1.27	0.97	1.11	0.89	1.37	0.29	3.97	11	0.0022
		Yes	19.04	22.1	7.16	4.09	37.39	1.94	47.44	6	
		overall	7.54	15.16	1.43	1	3.97	0.29	47.44	17	
	2nd	No	2.61	5.72	0.79	0.65	1.28	0.2	19.82	11	0.0042
		Yes	11.63	9.93	8.84	3.21	20.93	2.64	23.19	6	
		overall	5.79	8.43	1.48	0.73	3.54	0.2	23.19	17	
	3rd	No	5.09	9.76	1.09	0.62	2.86	0.51	27.1	7	0.0535
		Yes	12.02	8.49	9.95	5.76	19.77	2.69	22.13	6	
		overall	8.29	9.52	3.42	1.09	12.68	0.51	27.1	13	
GM-CSF	BL	No	2.61	5.29	1	0.63	1.21	0.33	18.43	11	0.0011
		Yes	32.35	39.49	18.79	12.18	24.22	8.63	111.87	6	
		overall	13.11	26.82	1.33	0.94	13.77	0.33	111.87	17	
	2nd	No	11.43	32.49	1.07	0.56	3.14	0.34	109.31	11	0.0048
		Yes	30.5	35.66	16.57	8.89	33.01	5.68	99.37	6	
		overall	18.16	33.84	3.68	1	9.26	0.34	109.31	17	
	3rd	No	24.65	46.43	1.03	0.91	21.18	0.63	126.68	7	0.3660
		Yes	19.64	11.07	22.08	9.65	28.52	6.39	31.08	6	
		overall	22.33	33.7	10.33	1.03	28.94	0.63	126.68	13	

Table S6. The following table shows descriptive statistics for cellular data separately for patients with related and unrelated donor. The p-values give the result for the Wilcoxon-Test for the comparison between groups.

Variable	Time	Donor	Mean	SD	Median	Q1	Q3	Min	Max	N	p.value
Age	BL	Non-related	45.12	13.71	50	39	55.25	22	58	8	0.101
		related	31.67	12.29	27	26	31	22	61	9	
		overall	38	14.34	31	26	53	22	61	17	
BMI	BL	Non-related	29.36	5.29	29.15	26.62	31.73	22.7	39.1	8	0.178
		related	25.81	7.2	24	23.1	26.9	19.1	43.1	9	
		overall	27.48	6.44	26.9	23.1	29.9	19.1	43.1	17	
TBE	BL	Non-related	4.8	9.57	1.45	1.17	1.7	1.02	28.45	8	0.004
Proliferation		related	20.84	21.12	13.06	5.15	27.41	3.35	69.7	9	
		overall	13.29	18.2	4.15	1.45	24.34	1.02	69.7	17	
	2nd	Non-related	8.27	17.89	1.6	1	3.48	0.67	52.4	8	0.015
		related	27.28	22.45	22.8	12.66	31.55	1.55	76.56	9	
		overall	18.33	22.08	8.43	1.55	27.54	0.67	76.56	17	
	3rd	Non-related	4.38	5.86	2.07	1.52	2.68	0.84	14.8	5	0.002
		related	40.54	31.74	25.13	22.35	47.78	15.21	109.31	8	
		overall	26.63	30.57	21.02	2.68	25.51	0.84	109.31	13	
CEFT	BL	Non-related	9.48	12.83	2.84	1.35	11.83	1.13	36.13	8	0.167
Proliferation		related	17.85	15.57	14.59	2.61	24.65	1.53	45.2	9	
		overall	13.91	14.55	8.55	1.57	24.59	1.13	45.2	17	
	2nd	Non-related	3.86	3.48	3.19	1.08	5.23	0.84	11.08	8	0.011
		related	20.09	15.68	18.81	9.51	34.41	1.84	45.1	9	
		overall	12.45	14.06	5.3	2	18.81	0.84	45.1	17	
	3rd	Non-related	16.44	11.27	15.38	13.34	17.3	2.4	33.76	5	0.354
		related	33.56	24.92	26.87	10.91	57.12	8.17	66.92	8	
		overall	26.98	21.9	17.3	10.99	35.4	2.4	66.92	13	
PMA/iono	BL	Non-related	117.12	93.64	71.89	65.91	118.69	54.37	322.35	8	1.000
Proliferation		related	144.17	152.67	77.4	61.41	153.72	40.28	532.1	9	
		overall	131.44	125.23	72.24	64.81	153.72	40.28	532.1	17	
	2nd	Non-related	107.21	57.05	90.51	71.84	123.58	50.56	208.53	8	0.370
		related	171.86	117.05	140.33	85.5	231.46	40.67	379.03	9	
		overall	141.43	96.85	105.33	76.72	178.32	40.67	379.03	17	
	3rd	Non-related	79.79	56.18	60.92	37.55	134.27	21.89	144.31	5	0.833
		related	134.96	184.74	71.23	46.01	110.14	38.25	586.07	8	
		overall	113.74	147.45	60.92	43.21	113.89	21.89	586.07	13	
IFN γ	BL	Non-related	11.52	24.75	1.89	1.14	5.86	0.44	72.41	8	0.139
		related	52.04	76.2	12.75	5.36	61.7	0.54	233.91	9	
		overall	32.97	60.05	5.36	1.25	44.35	0.44	233.91	17	
	2nd	Non-related	21.66	57.05	1.47	1.29	2.24	0.45	162.84	8	0.021
		related	67.24	121.82	5.81	3.68	58.07	1.5	359.61	9	
		overall	45.79	96.92	2.27	1.5	5.95	0.45	359.61	17	
	3rd	Non-related	67.35	145.63	2.79	2.16	3.19	0.76	327.85	5	0.127
		related	78.04	68.47	64.04	37.84	104.29	3	206.18	8	
		overall	73.93	99.16	48.64	3	92.06	0.76	327.85	13	
IL2	BL	Non-related	2.9	3.48	1.19	1.05	3.16	0.61	10.77	8	0.059

		related	28.77	46.83	7.55	6.12	21.6	0.66	146.61	9	
		overall	16.6	35.76	4.91	1.11	10.77	0.61	146.61	17	
	2nd	Non-related	3.65	6.55	1.24	1.01	1.88	0.41	19.73	8	0.004
		related	31.26	43.78	14.72	10.75	24.02	2.92	142.96	9	
		overall	18.27	34.33	8.1	1.31	16.35	0.41	142.96	17	
	3rd	Non-related	4.82	8.32	1.05	0.75	1.96	0.68	19.68	5	0.045
		related	20.75	30.1	10.92	5.04	18.03	3.34	93.37	8	
		overall	14.63	24.83	5.51	1.96	16.88	0.68	93.37	13	
IL10	BL	Non-related	2.99	3.94	1.22	1	2.7	1	12.45	8	0.184
		related	8.44	9.88	4.1	1.14	9.79	1	28.53	9	
		overall	5.87	7.96	1.95	1	7.78	1	28.53	17	
	2nd	Non-related	2	1.82	1	0.93	3.04	0.26	5.41	8	0.053
		related	10.78	19.37	4.09	1.19	8.85	1	61.22	9	
		overall	6.65	14.47	1.74	1	4.34	0.26	61.22	17	
	3rd	Non-related	9.32	16.11	1	0.83	6.9	0.14	37.72	5	0.091
		related	32.38	28.22	35.11	1.42	60.28	1	63.23	8	
		overall	23.51	26.22	6.9	1	39.92	0.14	63.23	13	
IL13	BL	Non-related	3.51	6.92	1	1	1.12	0.96	20.62	8	0.042
		related	27.17	36.55	13.63	1	26.13	1	98.93	9	
		overall	16.04	28.93	1	1	20.62	0.96	98.93	17	
	2nd	Non-related	4.64	10.28	1	1	1.01	0.96	30.08	8	0.011
		related	51.33	74.9	14.51	10.59	36.09	1	184.11	9	
		overall	29.36	58.55	5.61	1	18.35	0.96	184.11	17	
	3rd	Non-related	7.13	14.05	1	0.88	1	0.53	32.26	5	0.010
		related	67.88	52.25	55.14	28.18	109.12	9.68	153.83	8	
		overall	44.51	51.03	32.26	1	66.93	0.53	153.83	13	
TNF α	BL	Non-related	1.83	2.16	1.25	0.97	1.43	0.29	7.08	8	0.194
		related	12.62	19.85	3.1	1.11	7.23	0.46	47.44	9	
		overall	7.54	15.16	1.43	1	3.97	0.29	47.44	17	
	2nd	Non-related	2.39	4.75	0.76	0.59	1	0.2	14.13	8	0.014
		related	8.82	10.02	3.1	1.76	19.82	0.7	23.19	9	
		overall	5.79	8.43	1.48	0.73	3.54	0.2	23.19	17	
	3rd	Non-related	3.1	5.36	0.72	0.52	1.09	0.51	12.68	5	0.034
		related	11.53	10.38	6.25	3.24	22.13	2.3	27.1	8	
		overall	8.29	9.52	3.42	1.09	12.68	0.51	27.1	13	
GM-CSF	BL	Non-related	3.84	8.3	1.05	0.84	1.15	0.33	24.36	8	0.114
		related	21.35	34.87	11.65	2.82	18.43	0.44	111.87	9	
		overall	13.11	26.82	1.33	0.94	13.77	0.33	111.87	17	
	2nd	Non-related	5.22	12.47	0.78	0.52	1.25	0.34	36.05	8	0.004
		related	29.67	42.88	8.77	4.44	23.88	2.61	109.31	9	
		overall	18.16	33.84	3.68	1	9.26	0.34	109.31	17	
	3rd	Non-related	4.07	7.16	1.01	0.81	1.03	0.63	16.88	5	0.011
		related	33.75	39.12	28.11	9.56	31.32	6.39	126.68	8	
		overall	22.33	33.7	10.33	1.03	28.94	0.63	126.68	13	

Figure S1: Boxplots showing the median and distribution of lymphocyte proliferation as detected by thymidine incorporation assay (the stimulation indices are given) at three different time points for healthy controls (orange) and patients (green) after stimulation with CEFT antigen (CMV, EBV, influenza virus and Clostridium tetani antigen mix). Asterisk marks significant p-value (Baseline: $p < 0.001$; 2nd vaccination: $p < 0.001$).

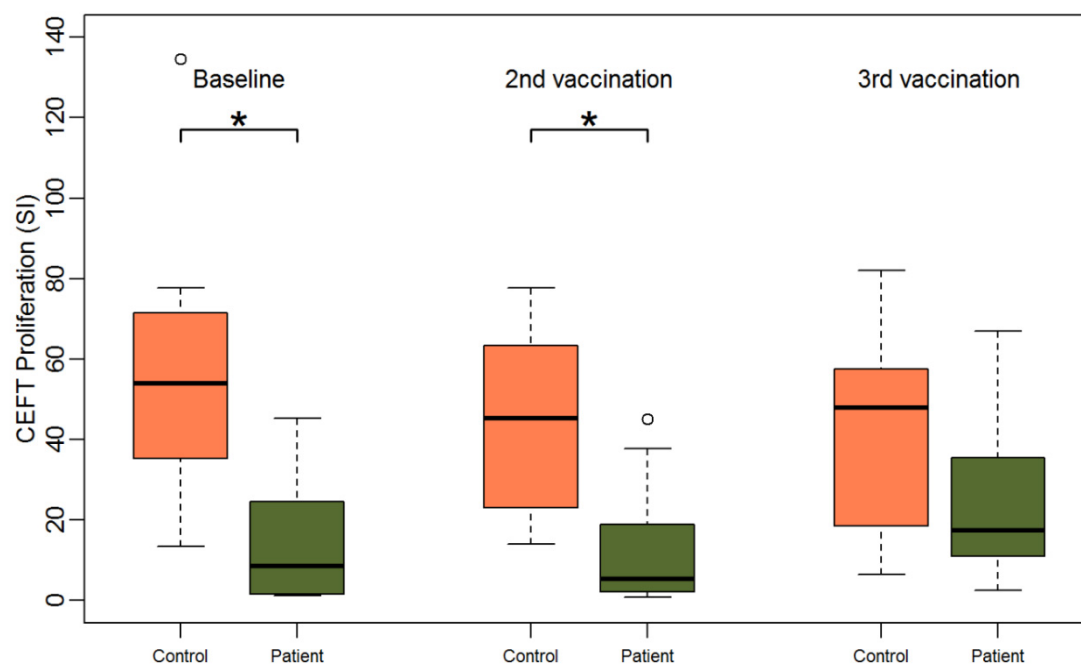


Figure S2: Boxplots showing the median and distribution of lymphocyte proliferation as detected by thymidine incorporation assay (the stimulation indices are given) at three different time points for healthy controls (orange) and patients (green) after stimulation with PMA (phorbole myristate acetate plus ionomycin). Asterisk marks significant p-value (Baseline: $p=0.01$; 3rd vaccination: $p=0.02$).

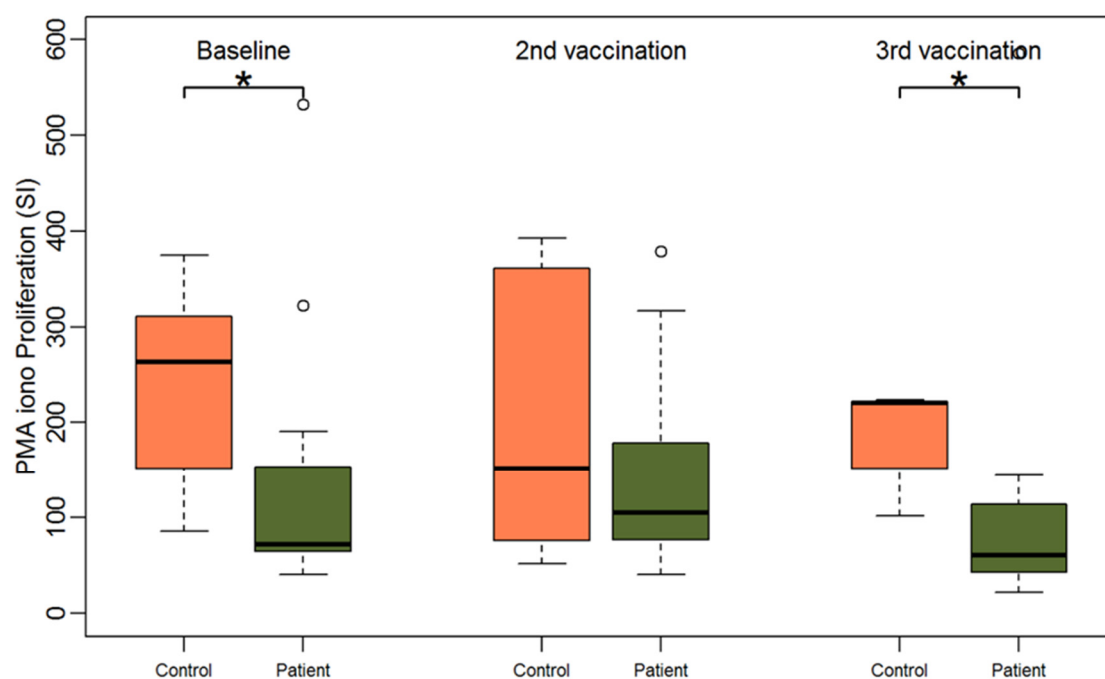


Figure S3: Boxplots showing the median and distribution of lymphocyte proliferation as detected by thymidine incorporation assay (the stimulation indices are given) at three different time points for humoral non-responders (orange) and responders (green) after stimulation with CEFT antigen (CMV, EBV, influenza virus and Clostridium tetani antigen mix). Asterisk marks significant p-value (Baseline: $p=0.005$; 2nd vaccination: $p=0.001$).

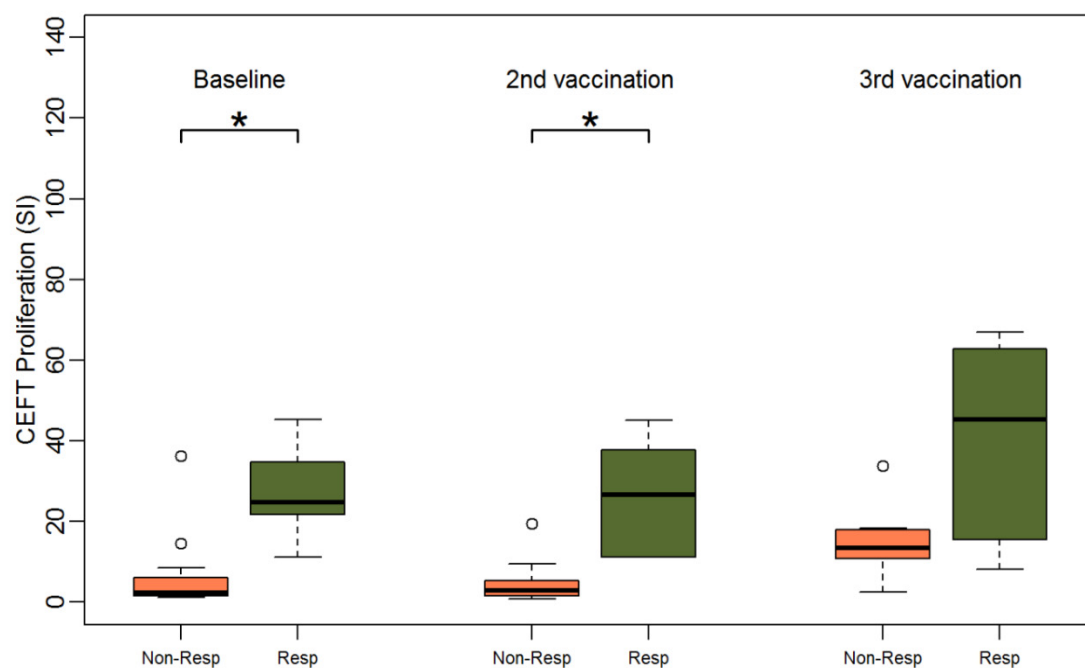


Figure S4: Boxplots showing the median and distribution of lymphocyte proliferation as detected by thymidine incorporation assay (the stimulation indices are given) at three different time points for humoral non-responders (orange) and responders (green) after stimulation with PMA (phorbole myristate acetate plus ionomycin).

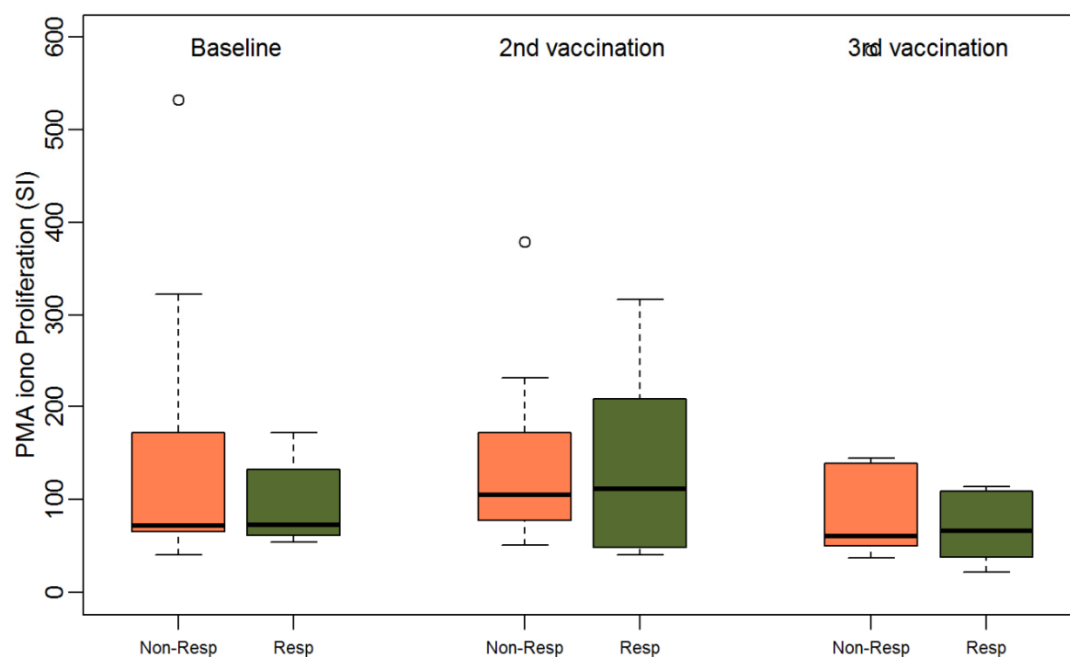


Figure S5: Correlation plot showing a significant correlation between TBE (tick-borne encephalitis antigen) lymphocyte proliferation and CEFT (CMV, EBV, influenza virus and Clostridium tetani antigen mix) lymphocyte proliferation values at baseline for patients ($p=0.001$, correlation coefficient: 0.71).

