

Supplemental data

Suppl Table 1. Animal numbers for different treatment groups and time points.

	2 weeks*			5 weeks**			8 weeks			healthy mice (for Fig. 4D)
	w/o	SP6	CD19	w/o	SP6	CD19	w/o	SP6	CD19	
Animal numbers	6	5	5	7	6	5	5	6	6	7

*Blood and lymph node samples at 2 weeks were only taken from 2-3 animals.

**At 5 weeks only from 3 animals per group enough cells could be isolated from blood and lymph nodes for analysis of B cells.

Suppl Table 2. Antibody-list for flow cytometric measurements.

Antibody	Fluorophore	Clone	Company	Order number	Dilution
CD45.2	APC-Cy7	104	BioLegend	109824	1:200
B220 (CD45R)	BV421	RA3-6B2	BD	558108	1:200
CD19	FITC	6D5	BioLegend	115506	1:50
CD27	PerCP-Cy5.5	LG.3A10	BioLegend	124214	1:80
CD38	APC	90	BioLegend	102712	1:200
CD138	PE	281-2	BD	142504	1:200
anti-IgG1	PE-Cy7	RMG1-1	BioLegend	406614	1:200
CD16/32		93	BioLegend	101330	1:50
CD45.1	PE	A20	BioLegend	110708	1:80
CD3	APC	17A2	BioLegend	100235	1:200
CD4	BV421	GK1.5	BioLegend	100443	1:200
CD8a	PerCP-Cy5	53-6.7	BioLegend	100734	1:200
CD45	FITC	30-F11	Beckman Coulter	IM2816	1:200
CD11c	PE-Cy7	N418	Biozol	BLD-117318	1:200
CD11b	PerCP-Cy5	M1/70	eBioscience	45-0112	1:200
Ly-6G	AlexaFluor647	1A8	BioLegend	127610	1:200
F4/80	Pacific Blue	BM8	Biozol	BLD-123124	1:200
Ly6C	PE	HK1.4	BioLegend	128008	1:200
I-A/I-E	BV510	M5/114.15.2	BioLegend	107635	1:200

Suppl Table 3. Primerlist for RT-PCR

Name	Sequence	Length of amplicate
MmCD19-b-for	CTGACGACCTAGAACCAGCA	98 bp
MmCD19-b-rev	TGGGACCTAACGAAGTCCAG	
MmCD20-for_2	TGCTGATGATCCCCACAGG	132 bp
MmCD20-rev-2	CAGCTGCCAGGAGTGATCC	
mHprt fw	GTAATGATCAGTCAACGGGGGAC	176 bp
mHprt rv	CCAGCAAGCTTGCAACCTTAACCA	

PRE fwd	GAGGAGTTGTGGCCCGTTGT	95 bp
PRE rev	TGACAGGTGGTGGCAATGCC	

Supplementary table 4. Mean values of diagrams in figure 1.

CAR T cell number	w/o CAR T cells			SP6 CAR T cells			CD19 CAR T cells		
	2 weeks	5 weeks	8 weeks	2 weeks	5 weeks	8 weeks	2 weeks	5 weeks	8 weeks
spleen (*10 ⁶ /g spleen)	-	-	-	6.38	1.72	2.22	4.66	0.83	1.68
bone marrow (*10 ⁴ /leg)	-	-	-	1.25	2.14	1.62	1.84	2.14	2.88
lymph nodes (*10 ³ /7 lymph nodes)	-	-	-	6.43	2.55	1.44	1.82	0.80	1.78
blood (*10 ³ /100µl blood)	-	-	-	0.88	4.25	1.14	2.96	2.45	0.25
kidney (*10 ⁵ /g kidney)	-	-	-	1.43	0.42	0.16	1.50	0.48	0.07
Ct values									
spleen	33,50	32,58	32,09	25,37	26,59	25,57	24,91	26,39	24,63
kidney	32,81	32,12	32,41	27,25	26,99	28,37	26,53	28,4	27,56

Supplementary table 5. P values of diagrams in figure 1.

CAR T cell number	2 weeks		SP6	5 weeks		SP6	8 weeks		SP6
	CD19 vs SP6	CD19 vs w/o		CD19 vs SP6	CD19 vs w/o		CD19 vs SP6	CD19 vs w/o	
spleen	0.5476	-	-	0.5368	-	-	0.3095	-	-
BM	>0.9999	-	-	0.9307	-	-	0.4848	-	-
lymph nodes	n.d.	-	-	0.2000	-	-	0.0022	-	-
blood	n.d.	-	-	0.7000	-	-	0.0649	-	-
kidney	>0.9999	-	-	0.5368	-	-	0.8182	-	-
Ct values									
spleen	0.6905	0.0043	0.0043	0.7922	0.0025	0.0012	0.9372	0.0043	0.0043
kidney	0.2381	0.0043	0.0043	0.0519	0.0025	0.0012	0.0649	0.0043	0.0043

BM, bone marrow

Supplementary table 6. Mean values of diagrams in figure 2.

CD19 ⁺ B cell number	w/o CAR T cells			SP6 CAR T cells			CD19 CAR T cells		
	2 weeks	5 weeks	8 weeks	2 weeks	5 weeks	8 weeks	2 weeks	5 weeks	8 weeks
spleen (*10 ⁸ /g spleen)	0.41	1.24	2.27	0.50	1.13	2.16	0.01	0.02	0.05
bone marrow (*10 ⁵ /leg)	3.63	8.68	19.59	2.74	8.80	17.91	0.04	0.03	0.02
lymph nodes (*10 ⁴ /7 lymph nodes)	0.90	10.29	81.25	0.73	7.62	45.00	0.0005	0.005	0.08
blood (*10 ⁴ /100µl blood)	0.42	18.89	8.56	0.43	20.95	9.64	0.005	0.0009	0.02
kidney (*10 ² /g kidney)	-	-	3.81	-	-	5.06	-	-	0.99

Relative CD19 mRNA expression

spleen	1	2.98	4.72	0.63	1.85	3.65	0.006	0.011	0.01
kidney	1	4.60	5.08	0.79	2.77	6.21	0.44	0.32	0.27

Relative CD20 mRNA expression

spleen	1	3.91	6.26	0.94	2.62	5.09	0.005	0.008	0.006
kidney	1	4.23	4.18	0.87	2.31	4.90	0.26	0.25	0.23

Supplementary table 7. P values of diagrams in figure 2.

B cell number	2 weeks			5 weeks			8 weeks		
	CD19 vs SP6	CD19 vs w/o	SP6 vs w/o	CD19 vs SP6	CD19 vs w/o	SP6 vs w/o	CD19 vs SP6	CD19 vs w/o	SP6 vs w/o
spleen	0.0079	0.0043	0.7922	0.0043	0.0025	0.8357	0.0022	0.0043	0.9307
BM lymph nodes	0.0079	0.0173	>0.9999	0.0043	0.0025	0.6282	0.0022	0.0043	0.7922
blood	n.d.	n.d.	n.d.	0.1000	0.1000	0.7000	0.0043	0.0043	0.3095
kidney	-	-	-	-	-	-	0.0022	0.0043	>0.9999

Relative CD19 mRNA expression

spleen	0.0079	0.0079	0.5476	0.0043	0.0025	0.2343	0.0022	0.0043	0.4286
kidney	0.3095	0.0556	0.6905	0.0043	0.0025	0.4452	0.0022	0.0043	0.7922

Relative CD20 mRNA expression

spleen	0.0079	0.0079	0.8413	0.0043	0.0025	0.4452	0.0022	0.0043	0.2468
kidney	0.0079	0.0079	>0.999	0.0043	0.0051	0.6282	0.0022	0.0043	0.9307

BM, bone marrow

Supplementary table 8. Mean values of diagrams in figure 3.

Plasmablasts	w/o CAR T cells			SP6 CAR T cells			CD19 CAR T cells		
	2 weeks	5 weeks	8 weeks	2 weeks	5 weeks	8 weeks	2 weeks	5 weeks	8 weeks
spleen (*10 ⁸ /g spleen)	0.53	1.19	1.48	0.75	0.87	1.35	0.08	0.02	0.03
bone marrow (*10 ⁶ /leg)	0.28	1.62	1.40	0.27	0.76	1.23	0.10	0.18	0.26
kidney (*10 ³ /g kidney)	-	-	3.01	-	-	3.62	-	-	0.11

Intermediate plasma cells									
Plasma cells	w/o CAR T cells			SP6 CAR T cells			CD19 CAR T cells		
	2 weeks	5 weeks	8 weeks	2 weeks	5 weeks	8 weeks	2 weeks	5 weeks	8 weeks
spleen (*10 ⁷ /g spleen)	4.26	1.62	4.89	3.19	1.94	5.21	0.02	0.006	0.16
bone marrow (*10 ⁵ /leg)	5.40	6.89	11.92	3.29	6.89	12.61	0.09	0.14	0.47
kidney (*10 ³ /g kidney)	-	-	2.47	-	-	3.18	-	-	2.53

kidney ($\times 10^3/g$ kidney) - - 3.96 - - 1.96 - - 1.48

Supplementary table 9. P values of diagrams in figure 3.

	2 weeks			5 weeks			8 weeks		
	CD19 vs SP6	CD19 vs w/o	SP6 vs w/o	CD19 vs SP6	CD19 vs w/o	SP6 vs w/o	CD19 vs SP6	CD19 vs w/o	SP6 vs w/o
Plasma-blasts									
spleen	0.0079	0.0043	0.3290	0.0043	0.0025	0.2949	0.0043	0.0079	0.6623
BM	0.0079	0.1255	0.7922	0.1775	0.0025	0.1807	0.0022	0.0043	0.9307
kidney	-	-	-	-	-	-	0.0022	0.0043	0.9307
Intermediate plasma cells									
spleen	0.0079	0.0043	0.7922	0.0043	0.0025	0.7308	0.0043	0.0079	0.7922
BM	0.5476	0.2468	0.6623	0.3290	0.2020	0.5338	0.4848	0.7922	0.7922
kidney	-	-	-	-	-	-	0.4848	0.6623	0.5368
Plasma cells									
spleen	0.0317	0.0173	>0.9999	0.0823	0.0051	0.5338	0.2468	0.4206	0.9307
BM	0.5476	0.2468	0.6623	0.3290	0.2020	0.5338	0.4848	0.7922	0.7922
kidney	-	-	-	-	-	-	0.4848	0.0173	0.0519

BM, bone marrow

Supplementary table 10A. Mean values of diagrams in figure 4B-D.

Histology	Untreated mice (4D)	w/o CAR T cells			SP6 CAR T cells			CD19 CAR T cells		
		2 weeks	5 weeks	8 weeks	2 weeks	5 weeks	8 weeks	2 weeks	5 weeks	8 weeks
crests (%)	-	2.68	12.01	13.40	3.54	11.11	10.50	1.02	0.29	0.67
necrosis (%)	-	0.54	7.48	6.80	0.96	6.31	6.83	0.34	0	0.33
Influx into kidney ($\times 10^5/g$ kidney)										
neutrophils	-	5.12	1.49	1.86	4.56	2.07	0.95	6.49	1.67	1.51
monocytes	-	4.10	0.91	1.94	3.86	0.66	1.34	4.86	0.94	1.38
Urinary marker										
ACR (mg/g)	108.9	1093	1715	2066	660.1	1809	1163	544.8	737.2	1099
NGAL (ng/ml)	56.44	164.4	394.7	144.4	123.4	228.2	59.96	254.7	180.4	50.51

Supplementary table 10B. Mean values of diagram in figure 4E.

Weeks	0	2	5	8	0	2	5	8	0	2	5	8
anti-MPO-	2.503	2.386	2.07	1.744	2.508	2.191	1.853	1.459	2.544	2.385	1.487	0.9172

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Supplementary table 11. P values of diagrams in figure 4.

Histology	2 weeks			5 weeks			8 weeks		
	CD19 vs SP6	CD19 vs w/o	SP6 vs w/o	CD19 vs SP6	CD19 vs w/o	SP6 vs w/o	CD19 vs SP6	CD19 vs w/o	SP6 vs w/o
Crescents	0.4444	0.5758	0.9242	0.0043	0.0025	0.7308	0.0022	0.0043	0.5714
Necrosis	0.7222	0.8485	0.7727	0.0043	0.0025	0.7308	0.0022	0.0022	0.8896
Influx into kidney									
Neutrophils	0.5476	0.6623	0.7922	0.7922	0.7551	0.5338	0.0931	0.9307	0.3290
Monocytes	0.4206	0.2468	0.7922	0.4286	0.5303	0.7308	0.3939	0.7922	0.3290
Urinary marker									
ACR	>0.9999	>0.9999	>0.9999	0.0902	>0.9999	0.1570	0.8362	0.2236	>0.9999
NGAL	>0.9999	>0.9999	>0.9999	>0.9999	>0.9999	>0.9999	>0.9999	0.3891	0.8415
Linear regression of slopes: Are the slopes equal?				CD19 vs SP6	CD19 vs w/o	SP6 vs w/o			
anti-MPO-titer				0.0260	0.0100	0.0229			

Supplementary table 12. Mean values of diagrams in supplementary figure 3.

Plasmablasts	w/o CAR T cells			SP6 CAR T cells			CD19 CAR T cells		
	2 weeks	5 weeks	8 weeks	2 weeks	5 weeks	8 weeks	2 weeks	5 weeks	8 weeks
lymph nodes ($\times 10^3/7$ lymph nodes)	0.09	11.83	5.47	0.16	2.53	3.16	0.009	1.81	0.009
blood ($\times 10^4/100\mu\text{l}$ blood)	0.43	11.08	4.92	0.51	9.33	5.56	0.08	0.10	0.04
Intermediate plasma cells									
lymph nodes ($\times 10^4/7$ lymph nodes)	0.21	2.02	14.80	0.95	1.16	7.85	0.004	0.73	0.01
blood ($\times 10^4/100\mu\text{l}$ blood)	0.06	2.24	2.09	0.07	2.87	2.29	0.0008	0.0009	0.002
Plasma cells									
lymph nodes ($\times 10^2/7$ lymph nodes)	0.57	1.22	6.10	1.98	1.84	2.43	0.41	0.13	1.33
blood ($\times 10^2/100\mu\text{l}$ blood)	1.17	0.95	0.87	1.10	9.15	1.57	1.03	0.46	0.73

Supplementary table 13. P values of diagrams in supplementary figure 3.

Plasma-blasts	2 weeks			5 weeks			8 weeks		
	CD19 vs SP6	CD19 vs w/o	SP6 vs w/o	CD19 vs SP6	CD19 vs w/o	SP6 vs w/o	CD19 vs SP6	CD19 vs w/o	SP6 vs w/o
lymph nodes	n.d.	n.d.	n.d.	0.1714	0.1091	0.2343	0.0043	0.0043	0.3095
blood	0.3333	0.4000	>0.9999	0.0079	0.0025	0.7551	0.0022	0.0043	0.9307

Intermediate plasma cells

lymph nodes blood	n.d.	n.d.	n.d.	0.2571	0.1091	0.5338	0.0043	0.0043	0.3095
	0.3333	0.2000	>0.9999	0.0079	0.0025	>0.9999	0.0022	0.0043	0.7922

Plasma cells

lymph nodes blood	n.d.	n.d.	n.d.	0.1190	0.0788	0.7547	0.1775	0.0043	0.0952
	>0.9999	0.8000	0.8000	0.0159	0.5492	0.0189	0.9372	0.7922	0.9307

Supplementary table 14A. Mean values of diagrams in supplementary figure 4A.

	plasmablasts			intermediate plasma cells			plasma cells		
	2 weeks	5 weeks	8 weeks	2 weeks	5 weeks	8 weeks	2 weeks	5 weeks	8 weeks
CD19 ⁺ (%)	63.45	96.43	97.26	73.05	82.09	96.64	5.31	5.03	6.07

Supplementary table 14B. Mean values of diagrams in supplementary figure 4C.

	w/o CAR T cells			SP6 CAR T cells			CD19 CAR T cells		
	2 weeks	5 weeks	8 weeks	2 weeks	5 weeks	8 weeks	2 weeks	5 weeks	8 weeks
CD19 ⁺ PB (*10 ⁸ /g spleen)	0.23	1.15	1.32	0.26	0.80	1.20	0.00007	0.002	0.0002
CD19 ⁺ iPC (*10 ⁸ /g spleen)	0.41	0.17	0.41	0.35	0.18	0.45	0.0002	0.0002	0.0001
CD19 ⁺ PC (*10 ⁵ /g spleen)	0.79	0.92	0.61	0.80	0.57	0.52	0.20	0.26	0.57

Supplementary table 15A. P values of diagrams in supplementary figure 4A.

	plasmablasts			intermediate plasma cells			plasma cells		
	2 weeks vs 5 weeks	2 weeks vs 8 weeks	5 weeks vs 8 weeks	2 weeks vs 5 weeks	2 weeks vs 8 weeks	5 weeks vs 8 weeks	2 weeks vs 5 weeks	2 weeks vs 8 weeks	5 weeks vs 8 weeks
CD19 ⁺	0.0347	0.0018	0.7484	>0.9999	0.1090	0.3876	>0.9999	>0.9999	>0.9999

Supplementary table 15B. P values of diagrams in supplementary figure 4C.

	2 weeks			5 weeks			8 weeks		
	CD19 vs SP6	CD19 vs w/o	SP6 vs w/o	CD19 vs SP6	CD19 vs w/o	SP6 vs w/o	CD19 vs SP6	CD19 vs w/o	SP6 vs w/o
CD19 ⁺ PB (*10 ⁸ /g spleen)	0.0158	0.0235	>0.9999	0.0531	0.0035	>0.9999	0.0182	0.0088	>0.9999
CD19 ⁺ iPC (*10 ⁸ /g spleen)	0.0237	0.0166	>0.9999	0.0257	0.0077	>0.9999	0.0128	0.0133	>0.9999
CD19 ⁺ PC (*10 ⁵ /g spleen)	0.1006	0.0375	>0.9999	0.0864	0.0106	>0.9999	>0.9999	>0.9999	>0.9999

Supplementary table 16. Mean values of diagrams in supplementary figure 5.

w/o CAR T cells SP6 CAR T cells CD19 CAR T cells

	2 weeks	5 weeks	8 weeks	2 weeks	5 weeks	8 weeks	2 weeks	5 weeks	8 weeks
macrophages (*10 ⁶ /g kidney)	1.40	0.78	1.72	1.33	1.08	1.11	2.12	1.35	1.15
dendritic cells (*10 ⁶ /g kidney)	0.48	0.53	1.18	0.58	0.53	0.97	0.98	0.78	1.36

Supplementary table 17. P values of diagrams in supplementary figure 5.

	2 weeks			5 weeks			8 weeks		
	CD19 vs SP6	CD19 vs w/o	SP6 vs w/o	CD19 vs SP6	CD19 vs w/o	SP6 vs w/o	CD19 vs SP6	CD19 vs w/o	SP6 vs w/o
macrophages (*10 ⁶ /g kidney)	>0.9999	>0.9999	>0.9999	0.8506	0.0291	0.3597	>0.9999	>0.9999	0.9320
dendritic cells (*10 ⁶ /g kidney)	0.5521	0.1122	>0.9999	0.3098	0.1614	>0.9999	0.9934	>0.9999	>0.9999

Supplementary table 18. Mean values of diagrams in supplementary figure 6.

A) Flow cytometry	w/o CAR T cells			SP6 CAR T cells			CD19 CAR T cells		
	2 weeks	5 weeks	8 weeks	2 weeks	5 weeks	8 weeks	2 weeks	5 weeks	8 weeks
CD3 ⁺ (*10 ⁷ /g kidney)	0.10	0.30	0.10	0.41	0.34	0.06	0.67	0.60	0.07
CD4 ⁺ (*10 ⁶ /g kidney)	0.10	1.17	0.31	1.11	1.12	0.17	1.96	1.64	0.20
CD8 ⁺ (*10 ⁷ /g kidney)	0.01	0.10	0.02	0.20	0.16	0.01	0.36	0.31	0.02
B) ELISA									
IFN _γ (pg/ml)	7.18	8.20	6.84	6.34	7.02	8.63	6.43	8.12	8.73
IL-17A (pg/ml)	16.28	17.27	16.12	15.01	16.08	18.54	14.39	17.76	18.34

Supplementary table 19. P values of diagrams in supplementary figure 6.

A) Flow cytometry	2 weeks			5 weeks			8 weeks		
	CD19 vs SP6	CD19 vs w/o	SP6 vs w/o	CD19 vs SP6	CD19 vs w/o	SP6 vs w/o	CD19 vs SP6	CD19 vs w/o	SP6 vs w/o
CD3 ⁺ (*10 ⁷ /g kidney)	>0.9999	0.0340	0.1693	0.8646	0.3231	>0.9999	>0.9999	>0.9999	0.9320
CD4 ⁺ (*10 ⁶ /g kidney)	0.7765	0.1154	>0.9999	>0.9999	>0.9999	>0.9999	>0.9999	>0.9999	>0.9999
CD8 ⁺ (*10 ⁷ /g kidney)	>0.9999	0.0340	0.1693	>0.9999	0.2197	>0.9999	0.8322	>0.9999	>0.9999
B) ELISA									
IFN _γ (pg/ml)	>0.9999	0.9268	0.9268	>0.9999	>0.9999	>0.9999	>0.9999	0.4789	0.7042
IL-17A (pg/ml)	>0.9999	0.9943	>0.9999	>0.9999	0.8302	>0.9999	>0.9999	0.9796	>0.9999

Supplementary table 20. Mean values of diagrams in supplementary figure 7.

w/o CAR T cells SP6 CAR T cells CD19 CAR T cells

Peripheral blood analysis	2	5	8	2	5	8	2	5	8
	weeks	weeks	weeks	weeks	weeks	weeks	weeks	weeks	weeks
leukocytes (cells*10 ³ /μl)	2.87	2.60	3.86	4.68	2.85	4.50	3.07	1.25	2.71
lymphocytes (cells*10 ³ /μl)	0.64	1.23	2.43	1.95	1.34	3.11	1.21	0.362	0.95
neutrophils (cells*10 ³ /μl)	1.72	1.06	0.95	1.60	1.03	0.86	1.21	0.61	1.18
monocytes (cells*10 ³ /μl)	0.49	0.27	0.43	0.60	0.43	0.48	1.03	0.25	0.50
eosinophils (cells*10 ³ /μl)	0.03	0.04	0.05	0.08	0.06	0.06	0.05	0.03	0.09
erythrocytes (cells*10 ³ /μl)	8.29	8.24	8.81	7.95	7.39	8.66	8.33	8.83	8.72
hemoglobin (g/dl)	11.88	12.04	12.32	11.28	10.82	12.83	11.56	12.40	12.52
hematokrit (%)	38.97	36.21	39.08	35.74	32.73	39.7	36.94	37.52	38.45

Supplementary table 21. P values of diagrams in supplementary figure 7.

Peripheral blood analysis	2 weeks			5 weeks			8 weeks		
	CD19 vs SP6	CD19 vs w/o	SP6 vs w/o	CD19 vs SP6	CD19 vs w/o	SP6 vs w/o	CD19 vs SP6	CD19 vs w/o	SP6 vs w/o
	leukocytes	0.3095	0.5368	0.3290	0.0173	0.0025	0.4452	0.0649	0.4286
lymphocytes	0.7857	0.0519	0.1126	0.0541	0.0063	0.9452	0.0022	0.0043	0.5368
neutrophils	0.2302	0.5368	0.8896	0.0087	0.0051	0.4225	0.2403	0.5368	0.6623
monocytes	0.5952	0.1255	0.4286	0.1255	0.7235	0.0804	0.4719	0.5606	>0.9999
eosinophils	0.9365	0.1558	0.2987	0.3571	0.7816	0.4679	0.1883	0.1710	0.8874
erythrocytes	0.6905	0.9307	0.5368	0.4286	0.2677	0.6282	0.5887	0.5368	0.4567
hemoglobin	0.6905	0.5714	0.2684	0.4286	0.6061	0.6014	0.1970	0.9459	0.2662
hematokrit	0.2460	0.6623	0.0823	0.5043	0.7235	0.7599	0.1797	0.8290	0.6623