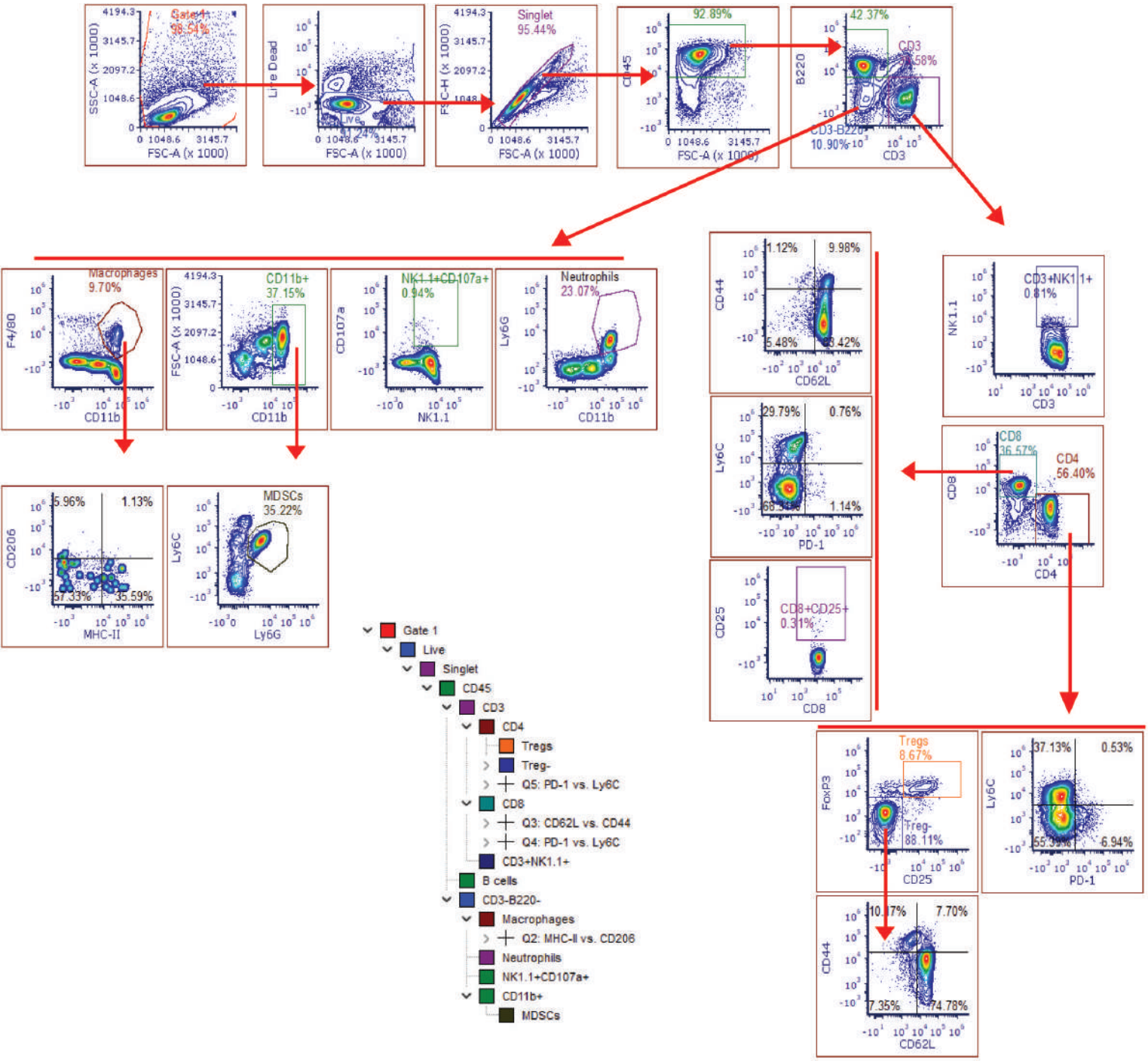
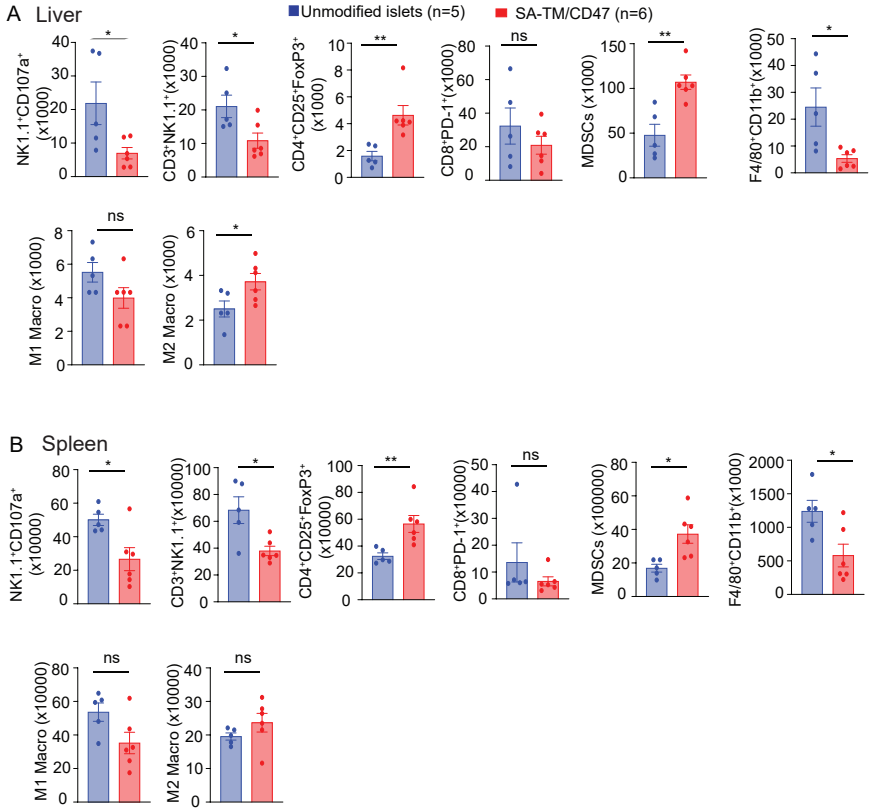


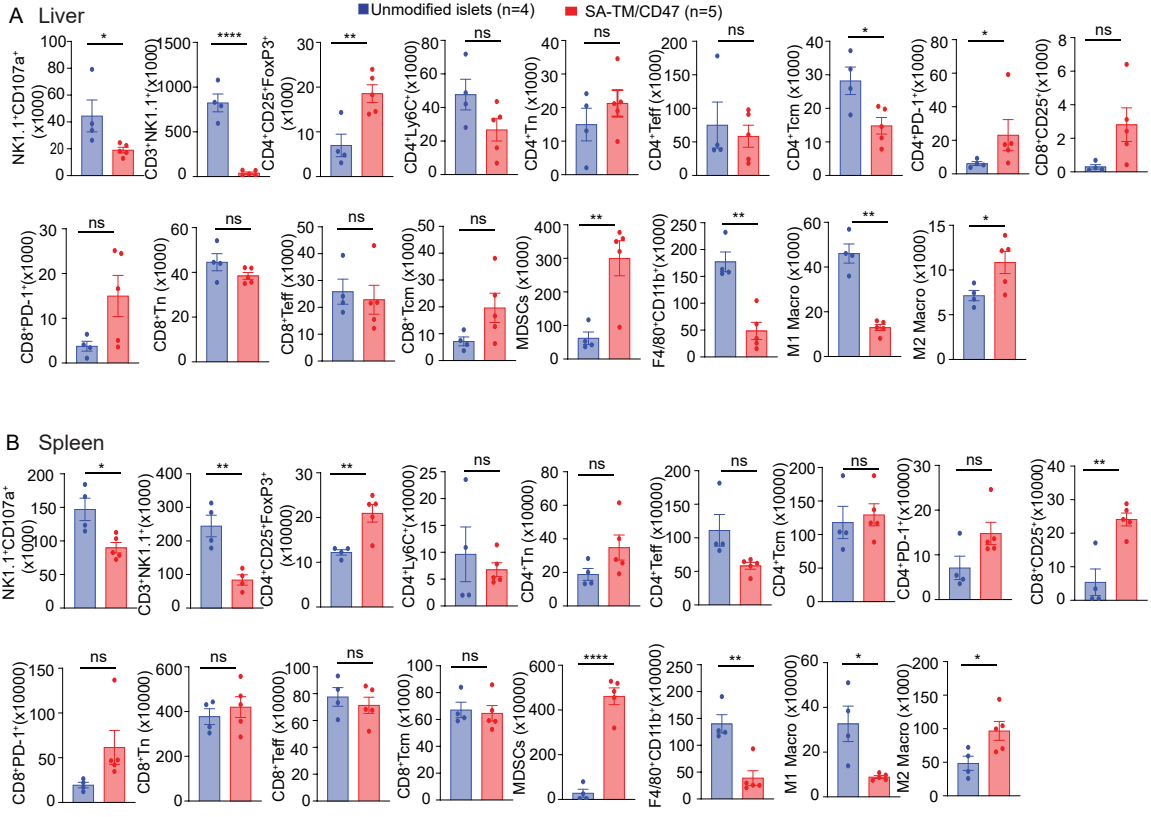
Supplementary Figure S1

Flow cytometry gating strategy for immune cell profiling: Flow cytometry gating strategy for immune cell profiling. Single-cell suspensions were first gated on FSC-A vs SSC-A, followed by exclusion of dead cells using a viability dye. Live cells were gated for singlets (FSC-A vs FSC-H) and subsequently for CD45$^+$ leukocytes. From CD45$^+$cells, T cells were identified as CD3$^+$ and further subdivided into CD4$^+$ and CD8$^+$ T cells. CD4$^+$ T cells were analyzed for regulatory T cells defined as CD4$^+$CD25$^+$FoxP3$^+$, and expression of PD-1 and Ly6C where indicated. CD8$^+$ T cells were further characterized for activation/memory status using CD44 and CD62L, and PD-1 expression; a minor CD8+CD25+ population is also shown. NK cells were identified as CD3$^+$NK1.1$^+$ and assessed for degranulation by CD107a expression. B cells were defined as CD3-B220$^+$. Myeloid cells were gated from the CD3$^-$B220$^-$ fraction, with macrophages identified as CD11b$^+$F4/80$^+$and further characterized by MHC-II (M1) and CD206 (M2) expression. Neutrophils were defined as CD11b$^+$Ly6G$^+$, and myeloid-derived suppressor cells (MDSCs) as CD11b$^+$Ly6G$^+$Ly6C$^+$.



Supplementary Figure S2

Supplementary Figure S2: Deep immunophenotyping shows tolerogenic immune response in mice transplanted with SA-TM/CD47-engineered allogenic islets. Diabetic C57BL/6 mice received intraportal transplants of 700 IEQ of either allogeneic unmodified islets or islets co-engineered with SA-TM/CD47. At day 12 post-transplantation, immunophenotyping of graft-infiltrating and splenic immune cells demonstrated a predominantly tolerogenic immune response in the engineered islet group as absolute numbers . (A) Liver and (B) spleen immune cell composition was analyzed via flow cytometry. The data represent the absolute numbers of immune cells per tissue, shown as mean ± SD from n=4-5 graft recipients. Statistical significance was determined using a one-tailed unpaired Student's t-test (*p < 0.05, **p < 0.01, ***p < 0.001, ****p < 0.0001).



Supplementary Figure S3

Supplementary Figure S3: Deep immunophenotyping shows tolerogenic immune response in mice transplanted with SA-TM/CD47-engineered allogenic islets. Diabetic C57BL/6 mice received intraportal transplants of 700 IEQ of either allogeneic unmodified islets or islets co-engineered with SA-TM/CD47. At day 12 post-transplantation, immunophenotyping of graft-infiltrating and splenic immune cells demonstrated a predominantly tolerogenic immune response in the engineered islet group as absolute numbers . (A) Liver and (B) spleen immune cell composition was analyzed via flow cytometry. The data represent the absolute numbers of immune cells per tissue, shown as mean ± SD from n=4-5 graft recipients. Statistical significance was determined using a one-tailed unpaired Student's t-test (*p < 0.05, **p < 0.01, ***p < 0.001, ****p < 0.0001).

S.N.	Antibody	Host	Clone	Company	Catalog No.	Lot No.	Dilution
1	V500 Syrian Hamster anti mouse CD3e	Hamster	500A2	BD Horizon	560771	8164558	1:50
2	BUV496 Anti-mouse CD4	Rat	GK1.5	BD Biosciences	612952	357490	1:200
3	BUV615-Anti-mouse CD5	Rat	53-7.5	BD Biosciences	751298	1172962	1:200
4	SparkViolet538 Anti-mouseCD8	Rat	QA17A07	BioLegend	155019	B329035	1:80
5	PerCP5.5 Anti-mouse-CD11b	Rat	M1/70	BD Pharmigen	550993	6112802	1:100
6	AF647 Anti-mouse CD11c	Hamster	N418	BioLegend	117312	B273696	1:100
7	BV570 Anti-mouse CD19	Rat	6D5	BioLegend	115535	B315920	1:50
8	PE/Cy5 Anti-mouse CD25	Rat	PC61	BioLegend	102010	B320333	1:200
9	BB700 Anti-mouse CD44	Rat	IM7	BD Biosciences	566506	1050286	1:60
10	APC Fire810 Anti-mouse CD45	Rat	30-F11	Biolegend	103174	B335319	1:50
11	AF594 anti-mouse/human B220	Rat	RA3-6B2	BioLegend	103254	B327137	1:200
12	BV711 Anti-mouse CD62L	Rat	MEL-14	BioLegend	104445	B317393	1:400
13	APC Fire750 Anti-mouse CD80	Hamster	16-10A1	BioLegend	104740	B310036	1:50
14	PerCP-eFluor 710-CD103	Hamster	2.00E+07	Fischer Scientific	46-1031-82	2332024	1:50
15	PE/Cy7 Anti-mouse CD107a	Rat	1D4B	BD Biosciences	560647	314075	1:800
16	BV785 Anti-mouse CD206	Rat	C068C2	BioLegend	141729	B329080	1:100
17	APC Anti-mouse PD-1(CD279)	Rat	29F.1A12	BioLegend	135210	B307869	1:200
18	AF700Anti-mouse NK1.1	Mouse	PK136	BioLegend	108730	B311346	1:800
19	BV605 Anti-mouse Ly6C	Rat	HK1.4	BioLegend	128036	B266313	1:20
20	BUV395 Anti-mouse Ly6G	Rat	1A8	BD Biosciences	563978	300815	1:100
21	Pacific Blue Anti-mouse F4/80	Rat	BM8	BioLegend	123124	B280040	1:100
22	Spark Blue 550 Anti-mouse I-A/I-E(MHC-II)	Rat	M5/114.15.2	BioLegend	107662	B320821	1:50
23	BUV563 Anti-mouse γδ T-Cell Receptor	Rat	V65	BD Biosciences	749464	1172963	1:20
24	BUV661, Anti-mouse CCR7	Rat	4B12	BD Biosciences	741677	1214113	1:50
26	Alexa Fluor488-anti-mouse/rat-FoxP3	Rat	FJK-16s	eBioscience	53-5773-82	2068006	1ul/10^6cells
27	BUV737 Rat Anti-Mouse CD335 (NKp46)	Rat	29A1.4	BD Biosciences	612805	1118991	1:30

Supplementary Table 1: Antibodies used for flow cytometry. A comprehensive list of antibodies utilized for multi-color flow cytometry analyses in this study. The table provides details of antibody specificity, host species, clone designation, supplier, catalog and lot numbers, and working dilutions.