

ADVANCED HEALTHCARE MATERIALS

Supporting Information

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Biodegradable, Self-Reinforcing Vascular Grafts for In Situ Tissue Engineering Approaches

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	Forward primer	Reverse primer
αSMA	GAGGTATCCTGACCCTGAAGTA	CACACGCAGCTCATTGTAGA
β-Catenin	CTCAGATGGTGTCTGCCATAG	TGGTGGAAAGGTTGTGTAG
CC12	GTCTCAGCCAGATGCAGTTAAT	CTGCTGGTATTCTCTTGTAGTT
CC122	AAGGCTCAGCAAACCTATC	AGGCTTCACAGAGTGACAAC
CC13	GAGATTAGAGGCAGCAAGSAA	CTTGGCAGCAAACAGCTTATAG
CCR7	GACTGAAGACCATGACGGATAC	CACAGGTAGGCACCAAAAGAT
CD11b	GAGCACCATCTGGGACATAAA	GGCATCAGAGTCCACATCAA
CD163	GCCTCCCAAGAATGACTTTAGA	GGCAATGAGAAGGACCAATAGA
CD68	CTTGGCTCTCTCATTCCCTTAC	TGTATTCCACTGCCATGTAGTT
CD80	CCATCGCCATCATCATCTTCT	GTTTCTCTGCTTGCCCTATTTC
FG11	GACAGAGACAACGACAACATA	CTCTGAGGGACCTTGGTAGTA
ICAM-1	GTATCCATCCATCCACAGSAA	CAGTTGTGCCACTCGATAGTT
IL-10	AGTGGAGCAGGTGAAGAATG	GAGTGTACGTAGGCTTCTATG
IL-1α	GAGGCCATAGCCCATGATTA	CTCCTGCTTGACGATCCTTATC
IL-2	GCAGGCCACAGAATTGAAAC	CCAGCGCTTCCAAAGTGAA
IL-4	GTCAACCTGTTCTGCTTCT	GACCTGGTCAAAGTGTGATG
LC3	GTGTGATGTCCCTGGTTTAT	GAGTACAGGTGTCTACAATGG
Ly6G	CTCAACCCAGCTCAGAAACA	ACGTCTCCCACTGACTCTAT
MMP-2	GGCACCCATTTACACCTACA	CCAAGGTCAATGTGAGGAGAG
MMP-3	GGACCAGGGATTAATGAGATG	TGAGCASCAACAGGAATAG
MMP-9	GAGCSTTACTCGCTTGATAA	AATAGGCCTTGTCTGAGTAGG
MPO	TGGCTACCTACTCCCATAA	CACAGASAGCACAAGCAACTA
CD206	GGGATAGTAAGGCTGCTTGT	TAGCGGTGTGAGACTGTAATG
NE	GAGCCCACTCGACAAATCTT	CTGAGCCATTGAGCTGGATAA
NFκb1	AGACATCCTTCCGCAAACTC	TAGGTCCATCCTGCCATAA
p62	CTAGGCATCGAGGTTGACATT	CTTGGCTGAGTACCCTCTTATC
Podoplanin	GAAACGCAGSACCACAGATAAGA	TCCCTCCAATGAAGCCAATG
ROCK1	AGGCGGTGATGGCTATTATG	ACTGTACGTCCCAACCAAAG
ROCK2	GGATTGCAGGGTGAAGTAAGA	GAGAATCAGTAGCAGTCAAGGG
TIM1	GTCTTGATGCTCAGTGTCTCTA	CCTGCTCTCTCCCTTCTTTC
TIMP-1	CTAGAGACAGCTAGAGCAGATA	CAGCTACAGGCTTTACTGGAAG
TIMP-2	GACGTTGGAGGAAAGAAATTA	TGTCCAGGGCACAATAAAG
TNF-α	ACCTTATCTACTCCAGGTTCT	GGCTGACTTCTCCTGGTATG
ULK1	GGCTTACAGACTGCCATTGA	GATACCAGCTGGCCTTATAC
VCAM-1	CACCAGACTGTACGATCCTTTC	CTGAACTCCTTGCACTCTACTT
VEGF-A	GCTCCTTCACTCCCTCAAATTA	GGTCTCTCTCTCTCTCTCTTC
VEGF-C	GAACTGTCAATGCACAGAAAGAC	CCAGTCCATCCACAGTAATC
Vimentin	CCAGGACCTGCTCAATGTAAA	TTGSAAGAGGCAGAGAAATCC
GAPDH	GGCAAGTTCACCGCACAG	CGCCAGTAGACTCCAC GAC

Figure S1: Primers used for gene expression analyses of PVATs and graft implants.

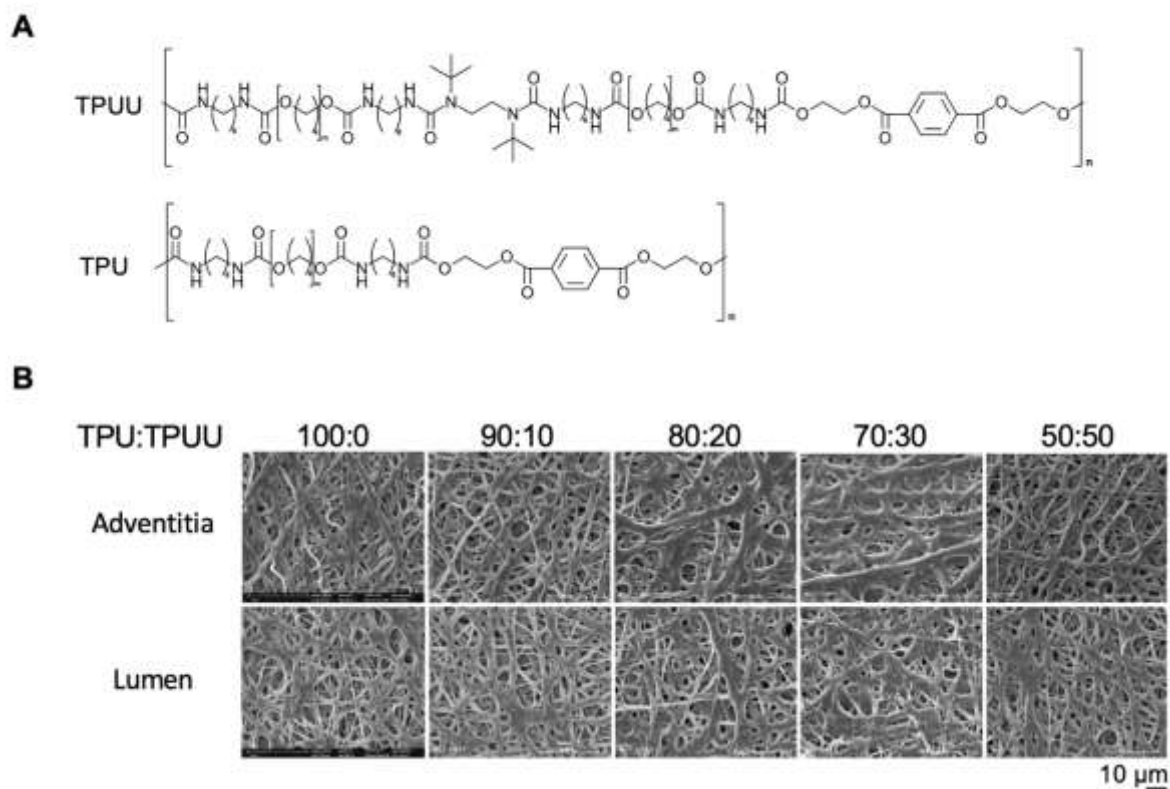


Figure S2: Polymer structure and evaluation of the different TPU/TPUU blend ratios in terms of fiber structure. Figure S2A shows the structural formulas of TPUU and TPU. Different TPU/TPUU blend ratios were tested to determine a favorable fiber structure for grafting. The tests showed that a 50:50 blend ratio is most favorable for fiber alignment (B).

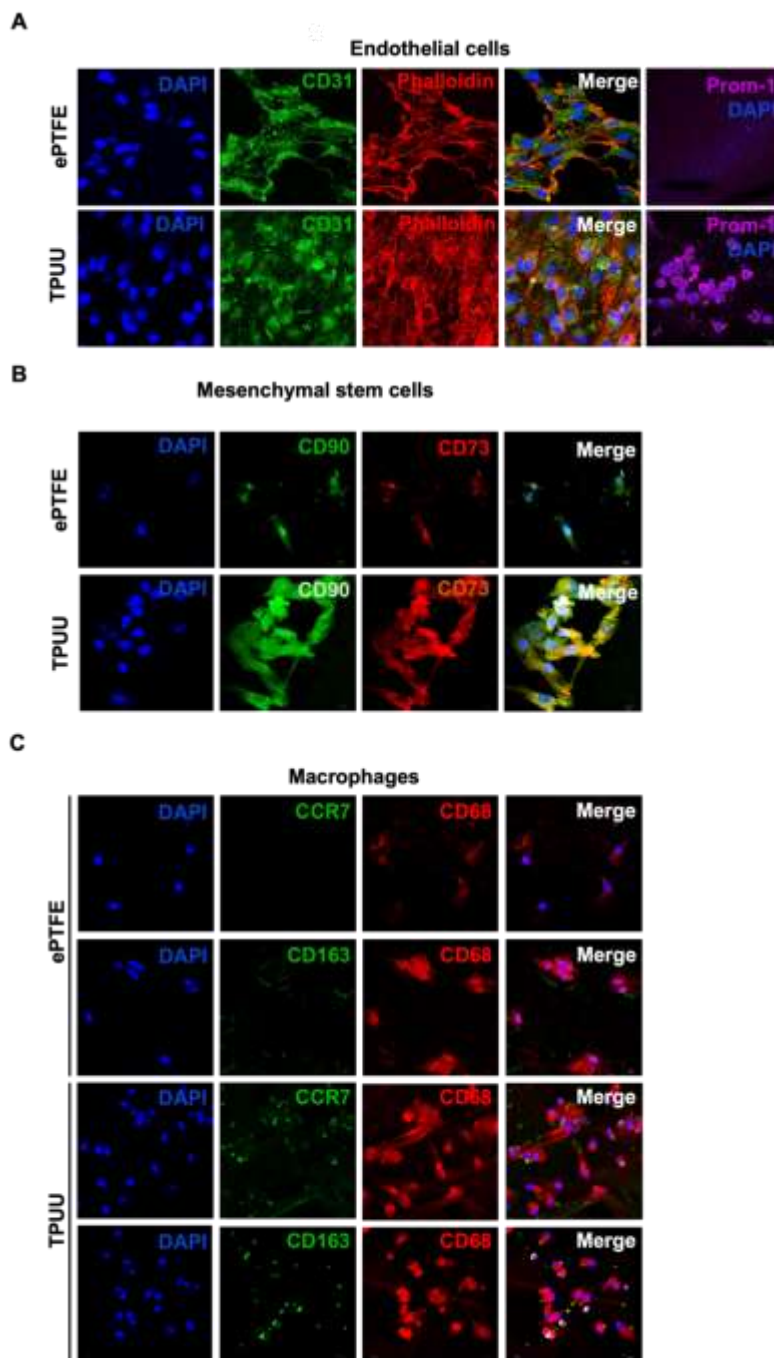


Figure S3: Cell-specific marker expressions of cells seeded to TPUU. Endothelial cells showed marked expression of CD31 cytoplasmic domain on ePTFE and TPUU surfaces (A). Mesenchymal stem cells exhibited higher expression of the markers CD90 and CD73 (B). Macrophages did not show significant marker expression for CCR7 or CD163, but all expressed CD68 (C).

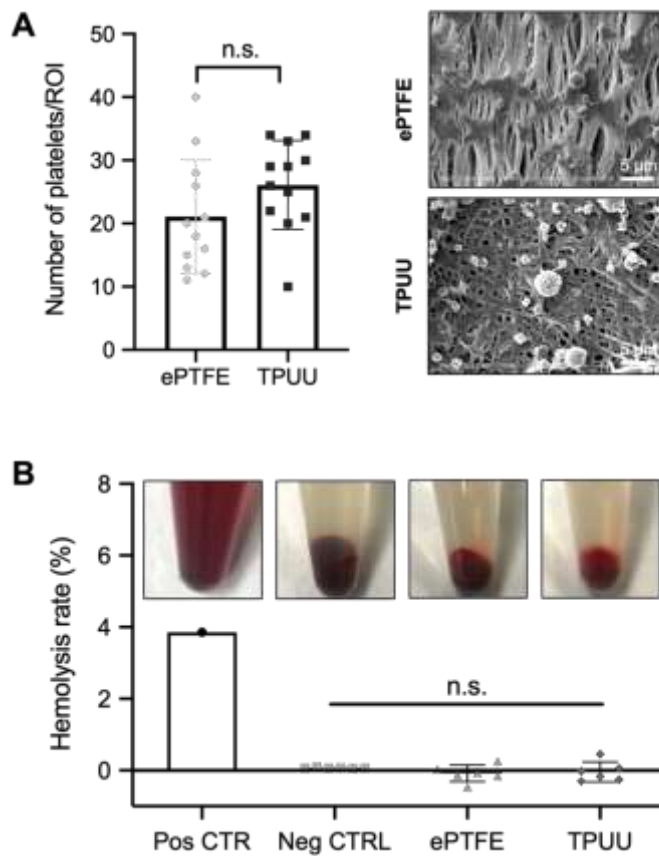


Figure S4: Hemocompatibility of TPUU grafts. Platelet adhesion was slightly but not significantly increased on TPUU compared with ePTFE (A). Neither ePTFE nor TPUU showed hemolytic potential (B). Statistical analysis: t-test, n.s.= not significant, mean \pm SD

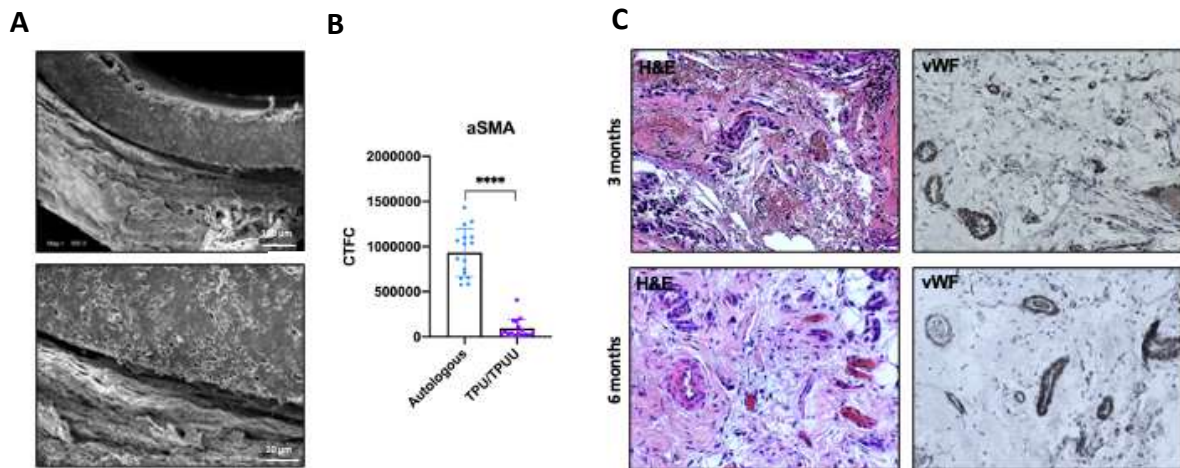


Figure S5: Evaluation of vascular graft regeneration and endothelialization. The neointima was not firmly attached to the graft (A). The aSMA expression was significantly lower in TPU/TPUU implants at 3 months compared with autologous controls (B). Immunohistochemical staining revealed vascularized structures in the perivascular adipose tissue of TPU/TPUU after 3 and 6 months of implantation (C). Statistical analysis: t-test, ****: $p \leq 0.0001$, mean \pm SD