Improving the Mechanical Properties of Hard-Block Degradable Thermoplastic Polyurethanes for Vascular Tissue Engineering

P. Schwarzl[a,b], K. Ehrmann[a,b], R. Liska[a,b], S. Baudis[a,b]

[a]Institute of Applied Synthetic Chemistry, TU Wien, Vienna, Austria,

[b]Austrian Cluster for Tissue Regeneration, Austria

*philip.schwarzl@tuwien.ac.at

Introduction: Biodegradable scaffolds for tissue regeneration are getting more relevant, including small-diameter vascular implants [1]. It is often reported, that materials like thermoplasts show good degradation behaviour but too low mechanical properties for this application. Therefore, we developed new hard-block degradable thermoplastic polyurethanes (TPUs) based on a range of cleavable chain-extenders which gives us new insights on the enhancement of mechanical properties for thermoplasts [2-4].

Results and Discussion: Different TPUs were prepared by changing the hard-block components consisting of isocyanate and degradable chain-extender and by adjusting the ratio of these. The mechanical properties were improved by introducing moieties, which form strong microcrystalline structures.

Conclusion: In this study, we found a combination of chain extenders and prepolymer, which improved the mechanical properties, degradability and biocompatibility [2-4].

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