PHOTOHYDROGELS PROMOTING NEOVASCULARIZATION FOR REGENERATVE MEDICINE

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Soft and hard tissue augmentation can be used for a range of therapies in modern medicine. The regeneration of large tissue defects demands the neovascularization of implants used for tissue augmentation. Therefore, generation of vascular networks within such implanted constructs is of utmost importance. As a potential matrix for the ingrowth of neo-vessels, photocrosslinkable hydrogels prove to be a promising approach. In this study, we implemented mimicry of placenta, a highly vascularized organ, within different gelatin (Gel)-hydrogels.

Different gelatin (Gel)-modifications, incl. Gel-norbornene (Gel-NB) [1] and Gel-allyl glycidyl ether (Gel-AGE) [2] were *in situ* crosslinked with D,L-dithiothreitol or ethoxylated trimethylolpropane tri(3-mercaptopropionate) as crosslinker in aqueous solution (2.5-10 wt%) and the crosslinking was monitored with photorheology.[4] The incorporation of placenta-specific factors within the hydrogel modifications resulted in vascular network formation with human umbilical vein endothelial cells. It could be proven, that the prepared hydrogels serve as an adjustable material platform to observe the formation of vascular networks. For the 3D fabrication of vascularization promoting hydrogel constructs, suitable system is to be found by variation of parameter (modification, crosslinker, gel content etc.).

[1] J.van Hoorick et al. *Macromol. Rapid Commun.* **2018**, *39*, e1800181.

[2] S.Bertlein et al. *Adv. Mater.* **2017,** *29* (44).

[3] S.Baudis. *Nachr. Chem.* **2016**, *64*, 406-410.

[4] C.Gorsche et al. *Anal. Chem.* **2017**, *89*, 4958-4968.