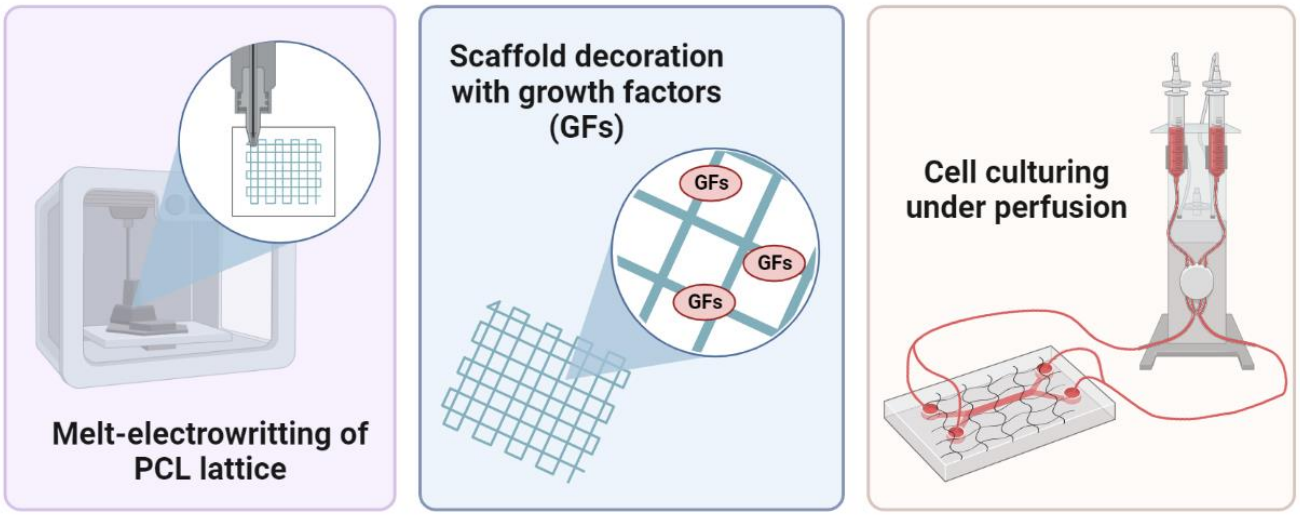
Melt-electrowritten (MEW) scaffold decorated with growth factors as a versatile matrix to guide angiogenesis

Lack of vasculature system within a three-dimensional tissue model can significantly hinder the practical application of such constructs, especially *in vivo*. Blood vessels are vital to ensure cellular survival and enable tissue restoration first *ex vivo* and then *in vivo*. Therefore, the project is guided by a hypothesis that the vascularization of the artificial tissue can be overcome by developing a melt-electrowritten substrate in a form of a lattice decorated with growth factors (GFs) that could help to guide angiogenic processes in matrices composed of different hydrogels for tissue regeneration. Briefly, the projects' tasks will cover, the design and fabrication of PCL (polycaprolactone) grids with different pore geometries utilizing melt-electrowritting technique, followed by a chemical modification of the polymer (amination) to ease the process of scaffolds decoration with GFs. Subsequently PCL scaffolds will be tested for their cytocompatibility, stability in simulated body fluid (SBF) and their resistance to tensile stress. MEW scaffolds showing best properties in terms of cells adhesion and durability will be further tested with in-house prepared PDMS chips, by subjecting the scaffolds to a continuous flow condition. Hopefully, the designed PCL scaffolds can become promising matrices for the guidance of angiogenic processes in hydrogel materials helping the creation of artificial tissues with clinically relevant dimensions.



Abstract of the Master thesis project' created in Biorender.com

Related literature:

- https://doi.org/10.1038/s41598-022-24275-6
- https://doi.org/10.3389/fbioe.2020.00793
- https://doi.org/10.1002/adhm.201800418

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