5th International Conference on
Biomaterials and Nanomaterials
March 10, 2022 | Webinar

Thermoresponsive Sacrificial Inks for 3D Bioprinting

Silvia Santoni
Politecnico Di Milano, Italy

3D bioprinting is a promising technology that has been gaining growing attention thanks to its great potentiality in tissue engineering, regenerative medicine and in vitro disease modeling. Yet, the production of large-scale constructs is still challenging, because of many unsolved issues. Among these, one of the most compelling is the realization of a suitable vasculature, necessary to provide the nutrients to the whole 3D construct, thus allowing the realization of complex shapes and hence improved tissue and organ fidelity. The development of reliable strategies for the realization of the vasculature is therefore extremely urgent. In this study, a new thermoresponsive material is designed and developed as sacrificial ink to produce vascular channels in extrusion-based bio printed constructs. This bio ink shows the peculiar ability to turn from a gel to a liquid upon cooling. This allows the sacrificial polymer to be easily removed after the printing of the channels and crosslinking of the rest of the construct. The synthesis of the bioink is carried out by reversible addition-fragmentation chain transfer polymerization, which provides exceptional control over the main polymer physicochemical properties. Then, the printability of the formulation is assessed through in-situ imaging. The quality of the samples printed with this new thermoresponsive ink is characterized and compared with the one achievable using commercially available polymers. Finally, the biocompatibility was demonstrated by introducing endothelial cells in the constructs through extrusion-based bioprinting and evaluating the cell viability and cell distribution within the construct.

Speaker Biography

Silvia is working on an interdisciplinary PhD program on 3D bioprinting, a breakthrough technology at the intersection between additive manufacturing and biomedicine. Her research focuses on the synthesis of innovative bio ink formulations and novel solutions for in-situ monitoring for the optimization of the bioprinting process..

e: silvia.santoni@polimi.it

Notes: