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*Long-term strategies in
biomedical technologies:
priorities and challenges*

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Bioprinting 3D vascularized tissue flaps

Speaker:

Prof. **Shulamit Levenberg**, Faculty of
Biomedical Engineering, Technion, Israel

April 5, 2022

h. 2.30-3.30 pm CET

Zoom Platform

Abstract

Engineering vascularized constructs represents a key challenge in tissue engineering. Sufficient vascularization in engineered tissues can be achieved through coordinated application of improved biomaterial systems with proper cell types. We have shown that vessel network maturity levels and morphology are highly regulated by matrix composition and analyzed the vasculogenic dynamics within the constructs. We also explored the effect of mechanical forces on vessels organization and demonstrated that morphogenesis of 3D vascular networks is regulated by tensile forces. Revealing the cues controlling vascular network properties and morphology can enhance tissue vascularization and improve graft integration prospects.

Creating complex vascular networks with varying vessel sizes is the next challenge in engineering vascularized tissue flaps. 3D bioprinting, the controlled and automatized deposition of biomaterials and cells, represents a very attractive approach to solve this issue. This technique allows for combining different bioinks in an organized fashion to attain native-tissue mimicking structures. We showed that bioprinting macro-vessels with self-assembled micro-vessels allows fabrication of multi-scale vascular networks.