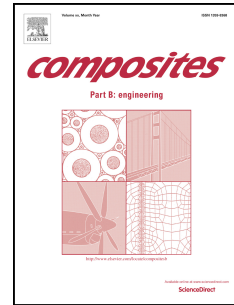


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3D Bioprinting of Soft Materials-Based Regenerative Vascular Structures and Tissues

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Abstract

Vascularization is a leading limitation for the clinical application of in vitro engineered tissue constructs because of the insufficient blood supply in the initial phase after implantation. In spite of decades of progress in the tissue engineering field, vascularization is a major issue that remains unsolved. The advent of 3D bioprinting technology provides a powerful means to resolve the vascularization problem for its advanced time and spatial control, capacity to be changed in size or scale, as well as reproducibility, compared to traditional fabrication processes.

This paper aims to review the recent progress of 3D bioprinting technology in the fabrication of blood vessel, vasculature and vascularized tissue constructs. 3D bioprinting methods and the engineered bioinks for vascular-structure constructions are discussed and compared, followed by a concise discussion of limitations and challenges encountered towards current 3D bioprinting of vascularized tissue. Finally, future research directions on the development of 3D bioprinting processes and bioinks for natural tissue constructions are also discussed.

Keywords: 3D bioprinting, bioinks, vascular, vascularized tissue, soft materials

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