3D Bioprinting Strategies for Building Body Parts: Biomaterials, Tissue Engineering, and Regenerative Medicine

Sang Jin Lee, Ph.D.

Wake Forest Institute for Regenerative Medicine, Wake Forest School of Medicine,
Medical Center Boulevard, Winston-Salem, NC 27157 USA

Address information
Email: sjlee@wakehealth.edu | Tel: +1-336-713-7288|
Web: https://school.wakehealth.edu/faculty/l/sang-jin-lee

Abstract

Tissue engineering and regenerative medicine strategies could offer new hope for patients with serious tissue injuries or end-stage organ failure. 3D bioprinting technologies combined with tissue engineering and regenerative medicine principle have been developed to offer the creation of biological tissue constructs that mimic the biological, structural, anatomical, and functional features of native tissues or organs. These cutting-edge technologies could make it possible to precisely deposit multiple tissue-specific cell types and biomaterials in a single 3D tissue architecture. Consequently, 3D bioprinting has rapidly become of the most attractive and powerful tool to provide more anatomical and functional similarity of human tissues or organs for future clinical applications. To support these strategies, current efforts in 3D bioprinting are focused on the development of bioinks that provide not only mechanical support but also tissue-specific microenvironmental cues. The presentation will discuss bioprinting technologies and their applications in tissue engineering and regenerative medicine.

Bio

I received my Ph.D. in Chemical Engineering at Hanyang University, Seoul, Korea in 2003 and took a postdoctoral fellowship in the Laboratories for Tissue Engineering and Cellular Therapeutics at Harvard Medical School and Children's Hospital Boston and the Wake Forest Institute for Regenerative Medicine where I am currently a faculty member. I am also cross-appointed to the Virginia Tech-WFU Biomedical Engineering and Science.

Synopsis of Area of Interest: Designing 3D microenvironments for tissue engineering applications; 3D integrated tissue-organ printing (ITOP) system for bioengineering complex, composite tissues and organs; bio-adhesion ad bio-integration between biomaterials and cell/tissue; drug/protein delivery system; bioconjugation and polymer synthesis; bioreactor system for preconditioning; *in vitro* microphysiological system; NIR fluorescence-based monitoring system.

.