Non-conventional Engineering Tools for the Treatment of Skin and Muscle Injuries

Ali Tamayol
Laboratory for Innovative Microtechnologies and Biomechanics (LIMB)
Department of Biomedical Engineering
University of Connecticut Health Center
atamayol@uchc.edu

Abstract

Conventional practices for the treatment of commonly observed medical problems such as chronic wounds and musculoskeletal injuries have shown limited effectiveness. To address this unmet need, micro- and nanoscale technologies are increasingly used. These technologies have merged with advanced materials to enable engineering constructs, which mimic the biochemical, topographical, and physical features of the native tissues. In addition, microfabrication technologies have enabled scientists to mimic the complexity of the native tissues through controlling cell-cell and cell-microenvironment interactions. Along with the advancements in understanding the pathophysiology of hard-to-treat wounds such as diabetic ulcers, new therapies have been devised to overcome the barriers preventing tissue healing and regeneration. During this presentation, I will highlight our research progresses in developing solutions for the treatment of volumetric muscle and bone loss. I will also discuss our research in the area of wound and skin care. The presented microengineered platforms will have broad applications in the fields of tissue engineering, drug delivery, and drug testing.

Biography

Ali Tamayol is an Associate Professor of Biomedical Engineering at the University of Connecticut Health Center. Prior to this appointment, he was an Assistant Professor at the Department of Mechanical & Materials Engineering at the University of Nebraska, Lincoln and an Instructor of Medicine at Harvard Medical School. He received his BSc from Shiraz University followed by MSc from Sharif University of Technology in Mechanical Engineering. He received his PhD from Simon Fraser University in 2011. He did one year of Postdoctoral Fellowship in Biomedical Engineering at McGill University and three years of Postdoctoral Fellowship at Harvard Medical School and Massachusetts Institute of Technology. His research involves design, fabrication, and characterization of microsystems and fibrous materials for emerging engineering applications such as tissue engineering, regenerative medicine, and wearable devices. He has authored more than 170 journal papers, 5 book chapters, and 14 patents. In addition, he has given over 90 seminars at various conferences and academic institutions. His publications have been cited more than 9,000 times and he has been the recipient of several awards including NSERC Postdoctoral Fellowship, BCIC Scholar Award, and the Alinasab Prize of ISME.