

Biofunctional injectable hydrogels for orthopaedic applications

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As the goals of the field of tissue regeneration evolve from individual tissues to multi-tissue systems and organs the corresponding challenges evolve as well. Regenerative engineering seeks to define these challenges as the integration of tissue engineering with advanced materials science, stem cell science and developmental biology toward the regeneration of complex tissues, organs, or organ systems. Injectable hydrogels are attractive candidates for cell delivery as they provide mild, extracellular mimic environment to the encapsulated cells. Biofunctional hydrogels that can activate specific cell signaling pathways in the encapsulated cells in a controlled manner could play a significant role in promoting tissue regeneration. Our studies on injectable hydrogels with anti-apoptotic and mitogenic properties as bio-functional materials will be discussed.

Biography

Nair received her Ph.D. in "Polymer Chemistry and Biomaterials" in 2000 from "SCTIMST", Kerala, India. She joined the chemical engineering department at Drexel University in 2001, for her post doctoral training in tissue engineering with a focus on musculoskeletal tissue engineering. In 2004 she joined the Department of Orthopaedic Surgery at the University of Virginia as a Research Assistant Professor. In 2008 she moved to Connecticut and joined the Department of Orthopaedic surgery at the University of Connecticut Health Center (UCHC) and the Department of Chemical, Materials and Biomolecular Engineering at the University of Connecticut (UConn) as an Assistant Professor. She is also a core faculty member of the Institute for Regenerative Engineering at UCHC. Dr. Nair's current research program aims at identifying unique biologically active molecules and developing biofunctional biomaterial constructs as artificial tissue microenvironments which can favorably modulate cellular responses to promote tissue regeneration and/ repair as well as for eliciting host immune defense to promote tumor regression. Dr. Nair's laboratory is currently supported by funds from federal and state agencies such as US-Army, NIH, NSF, Connecticut Stem Cell Initiative and Connecticut Science and Technology Council.

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