



Nanotechnology and Tissue Engineering

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Science and technology at the nanoscale is capable of providing unprecedented understanding, control and manipulation of matter at the atomic and molecular level. Nanotechnology has by now emerged into one of this century's most important enabling technologies and has permeated all walks of our life. Nanotechnology has already had a significant impact on modern medicine through the development of novel targeted therapies, diagnostic and imaging techniques. The tremendous advances in biomedical nanotechnology during the past decade have significantly impacted the area of tissue engineering also, opening up new avenues to realize the dream of regenerative medicine. The extracellular matrix (ECM) which plays a key role in cellular assembly and tissue regeneration has a complex hierarchical structure that span several orders of magnitude from nanometers to centimeter scale. Unique nanofabrication techniques give us the ability to mimic these biological structures with nanoscale precision and thereby controlling or modulating cellular functions for accelerated tissue regeneration. I will discuss some of the nanostructures that have been developed for tissue engineering and wound healing applications and cellular behavior towards these structures.

Dr. Lakshmi S. Nair is Assistant Professor of Orthopaedic Surgery and Chemical, Materials and Biomolecular Engineering Departments at the University of Connecticut. Dr. Nair did her graduate training in the area of biomaterials and post doctoral training on developing novel polymeric biomaterials as well as nanostructured materials for tissue engineering. Dr. Nair's laboratory at the University of Connecticut Health Center is engaged in developing a range of novel stimuli sensitive hydrogel based biomaterials for soft tissue regeneration and novel fabrication techniques to form nanostructures for a variety of biomedical applications. She has more than 80 publications and several patents in the area of biomaterials, nanotechnology and tissue engineering and has edited two books on biomedical nanotechnology. She has also developed a completely online gradual level course on biomedical nanotechnology through the Commonwealth Graduate Engineering Program (CGEP) and the participating universities include The University of Virginia, Virginia Tech, The College of William and Mary, George Mason University, and Virginia Commonwealth University.

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