

# Nanomedicine and Nanotechnology in Health Care

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## Application of Nano-biomaterials in Healthcare

Sandip Bag\*

\*JIS College of Engineering, India

The Nanobiotechnology and nanomedicine are the new field of nanotechnology, is growing rapidly and the use of nanobiomaterials is becoming more common in modern day. Nanobiomaterials exhibit distinctive characteristics, including mechanical, electrical, and optical properties, which make them suitable for a variety of biological applications. Because of their versatility, they are poised to play a central role in nanobiotechnology and make significant contributions to biomedical research and healthcare. Nanobiomaterials are materials containing particles with one or more dimension between 1 and 100 nm, a scale comparable to atoms and molecules. Due to the specific properties such as solubility (for otherwise insoluble drugs), carriers for hydrophobic entities, multifunctional capability, active and passive targeting, ligands (size exclusion) and reduced toxicity, nanobiomaterials have the potential to detect diseases (as imaging tools), deliver treatments and allow prevention in new ways. Once in the body, nanomaterials can circulate through the body by moving in and out of blood vessels, enter cells and interact with biomolecules both on the cell surface and inside cells in numerous areas of the human body. The properties and behaviors of nanomaterials therefore allow the diagnosis, monitoring, treatment and prevention of diseases, such as cardiovascular diseases, cancer, musculoskeletal and inflammatory conditions, neurodegenerative and psychiatric diseases, diabetes and infectious diseases.

[sandipbag76@gmail.com](mailto:sandipbag76@gmail.com)

## Spatiotemporally Fabricated Core–Shell Nanofibers for Regulated Delivery of Biomolecules in Wound Therapeutics

Shoba Ekambaram\*, Rachita Lakra\*, Manikantan Syamala Kiran\* and Purna Sai Korrapati\*

\*CSIR-Central Leather Research Institute, India

The physiological and pathological complexity of the wound healing process makes it more challenging to design an ideal tissue regeneration scaffold. Precise scaffolding with high drug loading efficiency, efficient intracellular efficacy for therapeutic delivery, minimal nonspecific cellular and blood protein binding and maximum biocompatibility forms the basis for ideal delivery system. This paper describes a combinational multiphasic delivery system where in biomolecules are delivered through fabrication of coaxial electrospinning of different biocompatible polymers. The ratio and specificity of polymers for specific biofunction is optimized and the delivery system is completely characterized with reference to structural integrity of Bromelain (debridement enzyme) and Salvianolic acid B (angiogenesis and re-epithelialization). The *in vitro* release profile illustrated the sustained release of debriding protease and bioactive component in a timely fashion. In addition, *in vivo* studies confirm the efficacy of the fabricated scaffold. Our results, therefore opens up new venue for designing combinational multiphasic delivery system of biocatives to enhance wound healing.

[shobaekambaram@gmail.com](mailto:shobaekambaram@gmail.com)