

# Electrospinning Nanofibers Production and its Medical Applications: Wound Healing, Drug Delivery and Tissue Regeneration

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## ABSTRACT

In the last years, the health-care services have registered worldwide an increased number of patients suffering from chronic wounds and ulcers. Current strategies to treat chronic wounds offer limited relief to the 7.75 million patients. Wound dressings play an important role in a patient's recovery from health problems, as unattended wounds could lead to serious complications such as infections or, ultimately, even death. To date, much progress has been made through the use of nano-medicine in wound healing due to the ability of such materials to mimic the natural dimensions of tissue. Electrospun materials are promising scaffolds due to their light-weight, high surface-area and low-cost fabrication, Electrospun nanofiber scaffolds have been shown to accelerate the maturation, improve the growth, and direct the migration of cells in vitro. Electrospinning is a process in which a charged polymer jet is collected on a grounded collector; a rapidly rotating collector results in aligned nanofibers while stationary collectors result in randomly oriented fiber mats. Recently, the aligned electrospun nanofibers used and reported for tissue regeneration purposes. Researchers are aiming to new heights for developing wound dressings with properties and a sophistication unheard of with the usage of various synthetic and natural polymers that are biocompatible and biodegradable and can actively support and supplement a quick deposition of healthy tissue. Moreover, using such materials and polymers at the nanoscale presents unprecedented properties such as high-surface area and Nano porosity valuable for the intended goal. With that goal in mind, researchers are using and developing different techniques to create composites by incorporating fibers with growth factors, vitamins and other biomolecules known to encourage a healthy healing process. In current review the progress in application of electrospinning nanofiber polymers, biopolymers and composites in wound healing and tissue engineering were discussed.

**Keywords:** Electrospinning, Nanofibers, Wound Healing, Biocompatible Polymers, Drug Delivery, Tissue Engineering

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