

Scaffolds Based on Electrospun Nanofibers for Wound Healing

Giuseppina Sandri*, Silvia Rossi, Maria Cristina Bonferoni and Franca Ferrari

*Department of Drug Sciences, University of Pavia, Italy

Centre for Health Technologies, University of Pavia, Italy

Electrospinning is a one-step and simple method to manufacture membranes based on (nano) fibers having diameters ranging from 20 nm up to 1 mm and more. Scaffolds based on nanofibrous membranes could allow protecting chronic skin lesion them from microbial contamination and optimal wound hydration and gas exchanges, crucial for healing, and should be a substrate able to induce cell adhesion and growth, speeding up the healing process.

Given this premises the aim was the development of electrospun nanofibers based membranes as scaffolds to enhance cutaneous wound healing of chronic lesions and burns.

The nanofibers were prepared starting from aqueous polymeric solutions to obtain insoluble membranes in aqueous fluids able to act as a support for cell growth, migration and proliferation.

Nanofibers were loaded with either silver nanoparticles or norfloxacin, as antimicrobial agents.

Chitosan and a glycosaminoglycan (hyaluronic acid or chondroitin sulfate) were selected as biomaterials. The developed scaffolds based on biopolymers are characterized by flexible area and shape with suitable elasticity and mechanical properties, are able to maintain optimal hydration and to absorb excess of fluids, to form barrier against microbial contaminations and to release antimicrobial agents. The presence of antimicrobials agents do not impair cell adhesion (fibroblasts and endothelial cells) and proliferation in an in vitro models.

The in vivo evaluation in murine burn model suggests that scaffolds are effective to enhance wound closure without signs of inflammation and adverse effects.

Biography:

Dr. Giuseppina Sandri (PhD in Chemistry and Pharmaceutical Technology) is Associate Professor at Drug Science Department (Faculty of Pharmacy) at University of Pavia, Italy.

Current research concerns the development medical devices and antimicrobials based formulations based on electrospun nanofibers for skin and hearth regeneration. Her research activities were awarded with national and international awards and were founded with public and private grants. She takes part in joint research projects with Universities and pharmaceutical companies. She serves as reviewer for several scientific journals.

Total number of referred publications: 86 contributions published on scientific journals, 12 book chapters, 3 patents; H-index: 25 (Scopus).