9th International Conference and Exhibition on
TISSUE ENGINEERING AND BIOBANKING
&
9th International Conference and Exhibition on
TISSUE SCIENCE AND REGENERATIVE MEDICINE
April 23-24, 2018 Las Vegas, USA

Chitosan based scaffolds for skin regeneration prepared by alternative ionizing radiation technologies

Maria Helena Casimiro, G Rodrigues, J P Leal and **L M Ferreira**
Lisbon University, Portugal

In what concerns deep partial and full-thickness skin wounds, it is known that they do not spontaneously regenerate and to restore the normal function of skin, epidermal and dermal components have to be supplied to the wound bed. However conventional methods used in the treatment of these skin wounds provide only a temporary cover until grafting can be performed. Engineered scaffolds are designed to improve or replace damaged, missing, or otherwise compromised tissues or organs. The present work is part of a Coordinated Research Project from International Atomic Energy Agency (IAEA) and intends to engineer chitosan based matrices using ionizing radiation technology to simultaneously create/sterilize a skin substitute that leads to tissue regeneration. The advantage over more conventional methodologies would be the inexistence of initiators or solvents usage and the possibility of preparation and sterilization in one single step. Several chitosan based matrices with poly vinyl pyrrolidone were obtained by gamma irradiation from a Co-60 source. The influence of copolymer concentration, synthesis procedure and absorbed dose on matrices' physical, chemical and structural properties was evaluated. The cellular viability and proliferation of human Caucasian fetal foreskin fibroblast cell line was analyzed as a measure of their biocompatibility and ability to assist skin regeneration using AlamarBlue® Assay. Results show that, over the studied range values, -radiation dose, copolymer concentration and synthesis procedure can be used to tailor the matrices' morphology in terms of porosity and surface roughness. Results up to the moment show that all tested materials present a non-cytotoxic behaviour. Ongoing studies are currently evaluating cell morphology, as well as matrices invasiveness and colonization by the fibroblasts. In vivo regenerating studies in Wistar rats are already under authorization. We therefore expect to demonstrate that instructive matrices produced and improved by radiation technology bring to the field of skin regenerative medicine a supplemental advantage over more conservative techniques.

Biography

Maria Helena Casimiro is a researcher in the area of functionalization of polymeric materials for Biomedical, Environmental, and Conservation and Restoration areas. Her work has been focused on the functionalization of macromolecules (polymeric and hybrid materials) tailored for the particular application on demand using gamma-radiation as a green modifying tool. Concerning biomedical field, she has carried out research activity on development of chitosan based materials for drug delivery systems and for skin scaffolds. She has been involved in national and international projects, students' supervision, worked as reviewer for journals of international circulation and co-organized science promotion activities.

casimiro@ctn.tecnico.ulisboa.pt

Notes: