



Laboratoire(s) d'accueil : Laboratoire d'Ingénierie des Biomolécules (LIBio, UL), Laboratory for Innovative Microtechnologies & Biomechanics (LIMB, University of Connecticut Health Center)

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Nature de la Bourse : LUE Internationale

Transdermal delivery of new generation of active vectors

State of art

Chronic wounds are one of the most devastating complications of diabetes and are the leading cause of non-traumatic limb amputation. Despite the progress in identifying factors and promising in vitro results for the treatment of chronic wounds, their clinical translation has been limited. Given the range of disruptive processes necessary for wound healing, different pharmacological agents are needed at different stages of tissue regeneration. In addition, our strong preliminary data shows the importance of the point of the delivery of drugs and biological factors on the healing of chronic wounds. One overlooked criterion is the importance of the point of delivery on the effectiveness of therapeutics in wound healing. Chronic wounds are typically covered by a crust and a layer of necrotic tissue, where the live tissue is located below them. Such wounds are also exuding which can wash out the topically delivered therapeutics or deactivate them due to the presence of various enzymes and protein. Overall, these conditions are expected to reduce the bioavailability of drugs at the healing tissue. We hypothesized that shortening the traveling distance of therapeutics by direct delivery of drugs into the live tissues could improve their effectiveness.

Objectives

The goal of this proposal is to study the interaction of nanoliposome carrying drugs and human or animal tissues once actively delivered transdermally. This fundamental research enables us to understand the possibility of uniformly distributing nanoliposome within the targeted tissue and controlled-releasing of their payload. The successful completion of this proposal will be a paradigm shift in the treatment of a number of skin and musculoskeletal diseases and injuries.

This Ph.D proposal will be realized between two universities (Université de Lorraine and University of Connecticut Health Center)