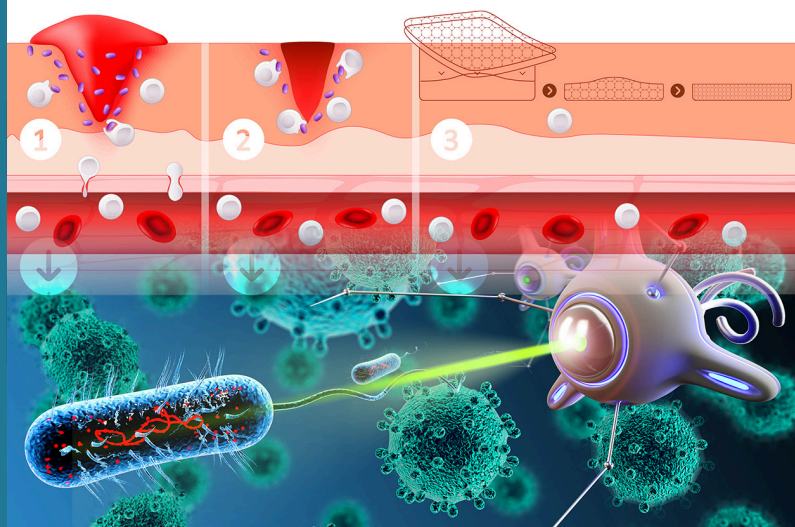


LIGNP4WOUND

Towards a smart bio-based dressing through lignin nanoparticles functionalised with peptides



INSPIRATION

From one person to another, healing processes can differ greatly in terms of effectiveness. In the case of severe wounds or diseases such as diabetes or immune disorders, a person may need specific dressings to help the healing process. While such medical products are already on the market, they have the disadvantage of containing silver or other heavy metals nanoparticles, which are known for their environmental and their cytotoxicity risks. Moreover, the increased resistance of pathogens strains to antibiotics underlines the need of finding alternatives to these compounds.

INNOVATION

The LIGNP4WOUND project aims to develop a breathable bio-based wound dressing by an unprecedented matrix composed of lignin nanoparticles functionalised with peptides. Together with their partners, LIST has the ambition to validate the stability, biocompatibility, as well as the antibacterial and healing effectiveness of these materials under in vitro conditions.

With a strong experience and past projects on lignin nanoparticles manufacturing, LIST researchers will design the functionalised nanoparticles and the matrix which will ensure their protection as well as their progressive diffusion. In order to guarantee the effectiveness of the bio-based wound dressings and to compare them with current products available on the market, they will also focus on the wet deposition process of the materials and perform characterisation tests on the final dressings. For example, LIST researchers will study the release of active agents on both their functionalised materials and commercial samples, but also the ageing of the dressings to identify their stability and storage capacity.

At the same time, their partners will develop a functionalised nanofiber-based polymer by electrospinning on which LIST materials will be deposited. To do so, they will make use of innovative processes such as plasma but will also provide alternatives to directly embed nanoparticles into nanofibers during the electrospinning process. LIST partners will also oversee characterisation tests (e.g. chemical, topographic...) and bioassays.

IMPACT

Throughout this FNR-INTER (M-ERA.NET) funded project, researchers will validate materials efficiency to foster healing and antibacterial effects under in vitro conditions. By already selecting processes capable of being produced in larger quantities, LIGNP4WOUND ensures the possibility of an industrial upscaling.

With a brand-new combination of lignin nanoparticles functionalised with peptides on biocompatible polymer electrospun nanofibers, LIGNP4WOUND will open the path to smart wound dressings while providing efficient, sustainable and non-toxic alternatives to common dressings.

Partners

ING Medical (CZ) , Brno University of Technology (CZ)

Financial Support

M-era.NET , Fonds National de la Recherche

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