A Technology Opportunity of the University of Liège

Innovative chitosan-based biomimetic scaffold for wound repair and tissue engineering

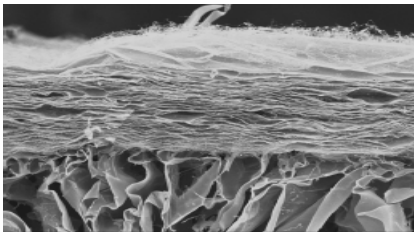
The primary function of a wound dressing is the protection against the environment. For extended wounds or hard-to-heal ulcers, additional properties would be highly desirable, such as the stimulation of the healing process or the improvement of the overall quality of the repaired tissue.

Description

Our scientists have developed a tridimensional-layered **chitosan** scaffold made of:

- a **porous** support (sponge) allowing absorbance of exudates;
- a **nanofiber** membrane allowing adhesion and proliferation of endothelial cells, keratinocytes and fibroblasts.

The nanofiber membrane is **electrospun** onto the porous support layer. The whole device is stabilized by the **fusion** of the 2 layers.



Cross section of a multilayer dressing visualized by scanning electron microscopy. Nanofibers of chitosan are visible at the top of the chitosan sponge.

Advantages

- Fully biocompatible
- Allows adhesion, growth and differentiation of the main cell types of the skin
- Progressive integration and remodeling of the nanofibrillar compartment in vivo
- Stimulation of the closure of skin wounds in vivo
- Easy manipulation of the whole device
- Possibility to peel off the support (sponge) layer, keeping the wound bed intact during the renewal of the dressing and allowing use of the chitosan nanofibrillar scaffold as a guide to facilitate tissue repair

Potential Applications

- Wound Repair, in particular chronic ulcer treatment
- Tissue engineering
- Biomaterials

Opportunities

Research collaboration and/or license agreement

Patent Status

Ongoing european patent procedure

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Research Team: Laboratory of Connective Tissues Biology, GIGA-Research
Dr. Alain Colige

The research projects in the Laboratory of Connective Tissues Biology (LCTB) aim at investigating the molecular mechanisms used by cells to detect and react to environmental physico-chemical signals, including the composition and the mechanical properties of the extracellular matrix.

The LCTB is also interested in the molecular mechanisms involving several classes of proteins (such as RhoGTPases, ADAMTS enzymes and growth factors, especially VEGF) during tumor progression, normal and pathological angiogenesis, wound healing and fibrosing processes. The LCTB participates also, in collaboration with several clinical departments, in studies concerning diverse acquired and heritable diseases such as asthma, aortic aneurysms and mitral valve prolapse.

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- ❑ I am interested in learning more about the general aspects of this technology. Please contact me.

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