

BIODEGRADABLE PROTEIN PATCHES FOR HEALING OF CHRONIC WOUNDS

Fields of use

Medical Technology / Biomedical Engineering, Single Use Products and Consumer Goods, Medical Biomaterials, Micro- and Nanotechnology related to Biological sciences, Veterinary Medicine, Therapeutic services, Drug delivery and other equipment, Disposable products, Pharmaceuticals/fine chemicals, Other medical/health related (not elsewhere classified)

Current state of technology

Available for demonstration

Type of cooperation

License agreement, Research cooperation agreement

Intellectual property

Secret Know-how

Developed by

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Summary

A Slovenian research institute developed protein patches applicable for healing chronic skin wounds rapidly and cost efficiently. Patches are biodegradable – disappearing in the wound, leaving no residue and no scars behind, also enabling a targeted and controlled release of therapeutic substances. License agreements and/or research cooperation are sought to enter veterinary market, while clinical trials are sought to enter human medical market.

Description of the invention

Slovenian research institute developed the patch for treating chronic skin wounds. The basic goal of research was to improve the procedures of healing the severely painful chronic wounds that may, in case of serious conditions, result in the amputation of extremities. Current solutions are insufficiently effective and time consuming, as the bandage treating the wounds needs to be exchanged daily. Some of the patches that already exist on the market are capable of controlled drug release, but mostly made out of synthetic material, known to express low biocompatibility with human tissue. With elderly patients, that means everyday visits to the doctors or for the nursing personnel to visit the patient. In both ways the current treat is also less economical.

The protein patch developed by the team of Slovenian researchers is a combination of three dimensional highly porous scaffold and a film, both made of protein obtained from silk. The scaffold is capable of withholding the active substances or stem cells in the target area, while the film prevents the scaffold to stick to the bandage. The silk protein patch is also biodegradable. The team of Slovenian researchers is capable of pilot fabrication up to 100 pieces a month.

Main know-how is related to the procedure of preparation of the material, more precisely a protein network as a base for construction of the scaffolds and films, having suitable physical and chemical properties resulting in ability to withhold and release therapeutic substances simultaneously during its biodegradation in a controlled manner. By manipulating the quantity of material applied to the skin (e.g. thickness of the individual patch) it is possible to control the rate of biodegradation of these patches and the release of the therapeutic substances simultaneously. Therefore there is no need to exchange the patches on a daily basis (e.g. conventional therapies). If needed the treatment can be prolonged with another application of the patch containing therapeutic substance and/or stem cells.

The protein patch was already used in the animal study, combined with animal stem cells that were provided by collaborator - a Slovenian company performing animal stem cells treatments. The test, on cell lines and on large animals, provided crucial information for improvement of the patches regarding the material processing and scaffold design.

The information obtained from the animal studies also gives good insights for application of these patches with human stem cells for human patients. In vitro cell tests on biocompatibility and larger animal studies are in progress in the framework of existing research cooperation with Slovenian partners.

For veterinary applications license agreement and research cooperation are sought. In the context of license agreement the knowledge on materials characterization, synthesis and scaffold design may be transferred to third party interested into production and commercialization of the patches for veterinary applications.

Research cooperation should include testing of the product with different therapeutic substances and types of stem cells, adjusting the product to the customer needs and further development of the patches with active substances to be applied easily by animal owner, without assistance of the medical personnel.

To expand the product to human medical market additional research cooperation is sought with partners capable of conducting clinical trials. In order to compensate the financing of the clinical trials Slovenian institute is interested into research cooperation in the framework of EU projects. Alternatively, the research cooperation agreement may include the elements of licensing agreement under favourable conditions for the partner who is willing to finance the clinical trials and commercialize the product.

Main Advantages

The natural silk-protein patches offered are biodegradable, disappearing in the wound, leaving no residue and no scars behind. They can be infused with therapeutic substances – medicine or stem cells – enabling targeted and controlled release of the substances into the wound simultaneously during the biodegradation.

Although the patches must be applied by the medical personnel, there is no need for daily bandage and the time of healing is proved to be shortened resulting in lower costs comparing to the conventional therapies.

Partner Sought

Academic and industrial partners - researchers, clinicians and companies developing and commercializing single use medical biomaterials, are sought.

Role:

- Veterinary medical market: manufacture and commercialization of the patches under license agreement and / or research cooperation that includes testing of the product with different therapeutic substances and stem cells, adjusting the product to the customer needs and further development of the patches with active substances to be applied easily by animal owner, without assistance of the medical personnel. In case of interest to apply joint H2020 projects the partner's role in research cooperation would be to incorporate the offered technology into the proposal and coordinate the project.

- To expand to human applications: Research cooperation as explained above, which includes also conducting and financing of clinical trials. Licensing agreement under favourable conditions for the partner who is willing to finance the clinical trials and commercialize the product.