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Project Title:	A combinatorial approach for pain and wound management in patients with RDEB via a functionalized collagen-based hydrogel dressing with controlled release of painkillers
Research Area:	Pain Management
Start Date: Feb 2023	End Date: Feb 2025
Funded by:	DEBRA Ireland and the Health Research Board

Lay Summary

Recessive Dystrophic Epidermolysis Bullosa (RDEB) is an inherited disease affecting the skin. Children born with the disease are called ‘butterfly children’ as their skin is seen to be as delicate and fragile as that of a butterfly’s wings. We propose a research program that will address the significant problem of wound healing and pain management in RDEB patients.

The goal of this proposed project is to develop an advanced dressing system for the treatment of RDEB wound, which function not only as a wound healing device but also as a local release device for the delivery of painkillers.

The basis of this wound dressing will be a miniature injectable hydrogel device known as collagen-based hydrogel. Collagen is one of the main components of the skin; thus, this hydrogel mimics the properties and microenvironment of normal skin. The hydrogel is loaded with pain killers which will be released from the hydrogel directly into the wounds soothing the pain.

The hydrogel can be applied by injection through a syringe or tube to wounds and cover and protect the wound site. The dressing can be easily removed from wound site by simply washing the wound area. Pain can be caused by the areas of skin loss, wounds and dressing changes. By applying the pain killer loaded hydrogel dressing, pain killers will be slowly released from the hydrogel in a controlled manner. Thus, painful interventions will be managed by easily applying a gel on wound site.

One major outcome from this proposed project will be the development of a new generation of wound dressing in combination with a topical painkiller that is capable of promoting wound healing while reducing pain.

Project Abstract

Patients with Epidermolysis Bullosa (EB) have a broad spectrum of need for pain and wound treatment, varying with the type of EB, the severity within that type, and the particular physical, emotional, and psychological milieu of each individual. EB research has advanced considerably in the past decade, and wound and pain management have been improved. Promotion of wound healing, Protection of dressing change induced extra trauma, and Prevention of pain are the Primary goals of the treating physician (3Ps). However, none of the current pain and wound management strategies can achieve the 3Ps.

In this proposed project, we aim to design and develop a functionalised collagen-based hydrogel dressing encapsulated with painkillers, which could accelerate wound healing, alleviate pain, and avoid extra wounds. Hydrogel is a commonly used wound dressing for RDEB (a very severe type of EB) wound care, which possesses the advantages of cooling, reducing pain, keeping tissue moist, and offering a conformable shape.

The removal of hydrogel dressings causes minimal pain and discomfort to the patients. Most of the current hydrogel dressings are fabricated from synthetic polymers and have minimal bioactive function for hard-to-heal wounds, such as RDEB wounds. In this project, a functionalised collagen and chitosan based hydrogel will be designed and developed. This approach has promise for addressing the causes of chronicity of RDEB wounds, such as hyperproliferative keratinocyte (failure of epithelialization), excessive inflammatory factors, the disordered cellular activity, etc. Meanwhile, the painkiller will be encapsulated for controlled release from the hydrogel within a 3-day time period to fit the need of a common EB wound dressing change requirement.

We believe that the successful development of this novel combined hydrogel dressing would promote wound healing and reduce extra trauma and pain, which would significantly improve the patients' quality of life

Blog post written about project for website

*Not blog but part of project application: 'How this project will make a difference to the lives of those with EB and their families'

Quotes we have from Researchers

None

Researcher (s) Bio

Same as above
