

ChiGel - A novel chitosan gel as a therapeutic wound healing device (Mor)

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Background

Chitosan, derived from chitin, is a well known natural polysaccharide. It is used in many diverse applications in agriculture, water purification, cosmetics and medical applications such as wound healing, artificial skin, artificial kidney and others.

Its therapeutic properties are based on chitosan's unique qualities: biocompatibility, biodegradability, non-toxicity, non carcinogenicity, anti-inflammatory and anti-bacterial.

As a linear polysaccharide, it chemically resembles the structure of natural body polysaccharides, except chitosan is positively charged, while other natural polysaccharides such as GAGs (glycosaminoglycans) are negatively charged. Due to the difference in polarity, chitosan is also bioadhesive (adheres to damaged tissue when applied).

Our solution

Based on chitosan, we have developed ChiGel, a novel approach that allows chitosan to remain soluble in neutral environments and transform to a gel at physiological conditions (37 C pH=7.4). This novel property is termed "Gel- Forming Liquid".

ChiGel opens new avenues for therapeutic uses. One such option is an injectable device, potentially loaded with healing agents, such as drugs, growth factors, as well as cells. Another usage may be as an advanced healing-promoting agent for damaged tissue. Classical chitosan is already used as a healing promoting agent and ChiGel is expected to show superior results as well as simplify the regulatory process.

ChiGel can be used in many potential indications. The project team has already tested its efficacy in several of these indications including wound healing, osteoarthritis and rotator cuff; and is now focused on further developing a promising use - diabetic wound healing.

ChiGel will be employed as a topical therapy, which will strongly adhere to the wound and help stimulate the natural healing process. ChiGel will, in addition, support the wound's moist environment while allowing critical gas exchange. Furthermore, ChiGel has inherent haemostatic and bacterio-static which further support wound healing. In vivo studies have shown that it stimulates and supports the intrinsic healing process of slow or non-healing wounds.

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