Editorial
Volume 8:3, 2022

Journal of Cosmetology & Trichology

ISSN: 2471-9323

Open Access

Recent Improvements in Skin Repair, Regeneration and Protection Using Chitosans and Nanochitosans

Jennifer Schoch*

Department of Dermatology, University of Florida College of Medicine, 4037 NW 86th Terrace, Gainesville, USA

Editorial

Chitosan has a dual role in the production of pharmacological bioactive molecules and metal ions, serving as both an active component and/or a carrier for these compounds. This biopolymer's hydroxyl- and amino-reactive groups, as well as the degree of acetylation, may be utilised to modify its physicochemical and pharmacological characteristics in a variety of forms, such as scaffolds, nanoparticles, fibres, sponges, films and hydrogels, among others. Chitosan combination with various polymers and the immobilization or trapping of bioactive substances is efficient methods for pharmacological applications to obtain desired biological effects.

By coating chemotherapy drugs, chitosan-based nanomaterials can treat skin conditions like acne, inflammatory manifestations, wounds and even tumorigenesis by maintaining or reconstructing skin architecture through topical or systemic delivery of hydrophilic or hydrophobic pharmaceuticals at controlled rates [1]. This article presents and discusses chitosan's production, its physical properties, chemical alterations and interactions with bioactive substances. By overlaying the actions organised by the signalling molecules released by various cell types to reconstitute healthy skin tissue structures and components, the molecular processes involved in chitosan skin protection and recovery are brought to light.

Since ancient times, natural polymers have been used in numerous industrial fields, including clothing, energy production, construction, furniture, paper, wastewater treatment and bioremediation [2]. They can be found in a variety of natural materials, including wood, leaves, fruits, seeds, insects, algae, crustaceans and animal skins. The manufacturing of fine chemicals, biomedical goods and pharmaceutical formulations are just a few of the sophisticated applications that these polymers have been employed in recently. They are also used in packaging materials for food and biodegradable food. Natural polymers have also been applied to the rebuilding of human tissue in order to restore, preserve, or enhance organ and tissue functioning. The behaviour of composites used with live creatures is determined by the structure and chemical properties of each polymer [3].

The latest breakthroughs in science and technology with regard to chitin and its deacetylated polymer derivative, chitosan, derived from biological sources and marine trash and containing some of the most common D-glucosamine polymers found in nature and commercially available. By modifying and functionalizing chitosan chains, it is possible to create molecules, chitosan composites, or nanochitosan composites with unique physicochemical characteristics and biological activity. The structural alterations of novel medications developed using chitosan nanocomposites, such as electrostatic interactions, chemical crosslinking and metal ion coordination, will be described. Chitosan can enhance the efficacy of skin care products in a variety of forms.

Varied producers sell chitin and chitosan with low, medium, or high molecular weights and various levels of deacetylation that are derived from fungi and marine debris, such as the exoskeletons of crab or shrimp. Between 2016 and 2020, the global chitin and chitosan market saw a compound annual growth rate (CAGR) of 15.4%, reaching a value of USD 42.29 billion. According to projections, this amount will increase at a CAGR of 5.07 percent from 2021 to 2028, reaching USD 69.297 billion. Global market research firms predict that new biomedical applications, such as protein entrapment, pharmaceutical thickeners and the creation of biodegradable composites, will be the primary drivers of this expansion.

The processing of gels, membranes, nanofibers, spheres, microparticles, nanoparticles, scaffolds and sponges is appropriate for both chitin and chitosan. Despite having at least one dimension that is smaller than 100 nm in size, nanostructured chitosans are better suited for use as excipients in medication and gene delivery systems for human tissue recovery and repair engineering because they promote enhanced component interaction. In addition to being highly functional, resistant and an ideal facilitator for drug encapsulation, nanochitosans also display three-dimensional architectural structures with open and interconnected pores [4].

Chitosan has a number of naturally occurring pharmacological properties, including antioxidant, antimicrobial and antitumor properties, which can be improved and expanded by chemical alterations or physicochemical interactions. This promotes the use of chitosan for healthy purposes, particularly in assisting and promoting skin tissue repair and regeneration. Because nanochitosans have high surface-to-volume ratios, chitosan effectiveness can be increased after nanoencapsulation.

Unique polymeric substances called chitosans are derived from fish waste and have several uses. Chitosan may take on a variety of physical shapes, such as films, sponges, hydrogels, fibres and nanoparticles, due to its physicochemical properties, varied molecular weights and degree of deacetylation. This protects the active ingredients from damage while they are being digested in the GI tract, absorbed in the intestinal tract and when they are in the bloodstream. It also makes hydrophobic compounds more soluble and helps to regulate their release [5].

Acknowledgement

None.

Conflict of Interest

The author shows no conflict of interest towards this manuscript.

References

1. Gonzalez, Ana Cristina De Oliveira, Tila Fortuna Costa, Zilton de Araújo Andrade and Alena Ribeiro Alves Peixoto Medrado, et al. "Wound healing-A literature review." *An Bras Dermatol* 91 (2016): 614-620.

2. Visha, M.G. and Monika Karunagaran. "A review on wound healing." *Int J Clin Diagn Pathol* 3 (2019): 50.

***Address for Correspondence:** Jennifer Schoch, Department of Dermatology, University of Florida College of Medicine, 4037 NW 86th Terrace, Gainesville, USA; E-mail: drjschoch01@dermatology.med.ufl.edu*

Received: 21 April, 2022, Manuscript No. JCTT-22-68009; **Editor assigned:** 24 April, 2022, PreQC No. P-68009; **Reviewed:** 27 April, 2022, QC No. Q-68009; **Revised**: 03 May, 2022, Manuscript No. R-68009; **Published:** 10 April, 2022, DOI: 10.37421/2471-9323.2022.8.181

3. Siritientong, Tippawan, Apichai Angspatt, Juthamas Ratanavaraporn and Pornanong Aramwit, et al. "Clinical potential of a silk sericin-releasing bioactive wound dressing for the treatment of split-thickness skin graft donor sites." *Pharm Res* 31 (2014): 104-116.

4. Selig, Harald F., David B. Lumenta, Michael Giretzlehner and Marc G. Jeschke, et al. "The properties of an "ideal" burn wound dressing–what do we need in daily clinical practice? Results of a worldwide online survey among burn care specialists." *Burns* 38 (2012): 960-966.

5. Homaeigohar, Shahin and Aldo R. Boccaccini. "Antibacterial biohybrid nanofibers for wound dressings." *Acta Biomaterialia* 107 (2020): 25-49.

How to cite this article: Schoch, Jennifer. "Recent Improvements in Skin Repair, Regeneration and Protection Using Chitosans and Nanochitosans." J Cosmo Tricho 8 (2022): 181.