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Editorial

Enhancing Wound Healing and Skincare: The Therapeutic Potential of Shrimp Shell Derivatives

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Editorial

The intricate wound healing process encompasses several sequential phases, including hemostasis, inflammation, reepithelialization, proliferation, and remodeling. Thoughtful selection of specific materials for each type of wound is crucial to promote more effective healing [1].

Substances derived from shrimp shells, such as chitin, chitosan, and their derivatives, emerge as advantageous resources in wound treatment and skincare. This preference is largely due to their non-toxic, biodegradable, bioabsorbable, non-carcinogenic, and non-immunogenic properties, in addition to stimulating the healing process [2].

Chitosan, with its unique chemical structure, exhibits remarkable properties like polycationic nature, biodegradability, biocompatibility, and bioreabsorbability. These characteristics increasingly position chitosan as a relevant polymer in biomedical applications, including controlled drug release systems, dressings, tissue engineering, and antimicrobial agents [2].

Two crucial derivatives of chitin are glucosamine (GlcN) and its acetylated form, GlcNAc, both amino-monosaccharides. In addition to serving as essential biochemical precursors, these compounds display pharmacological properties, such as antioxidant, anti-inflammatory, antimicrobial activity, and the ability to accelerate healing by stimulating the synthesis of hyaluronic acid and collagen [3].

Beyond their biochemical functions, glucosamine compounds provide significant benefits to skin cells, promoting hydration, reducing wrinkles, exerting anti-aging effects, and enhancing the wound healing process [4,5]. GlcNAc, as a building block of hyaluronic acid (HA), has been shown to increase its synthesis and that of collagen. These components are fundamental in the

extracellular matrix (ECM) of the skin. HA plays a central role in skin hydration, regeneration, scar smoothing, and wrinkle reduction, owing to its viscoelastic and hydrophilic properties. Moreover, glucosamine compounds not only promote the production of extracellular matrix components but also the proliferation of skin cells, such as fibroblasts and keratinocytes [4].

The induced production of HA by glucosamine administration improves the wound healing process, especially in the early stages, by acting as an early inflammation promoter, an essential step in the overall skin healing process. HA synthesis stimulates the migration of keratinocytes to the wound site, in addition to increasing fibroblast proliferation and collagen synthesis. These combined effects result in the accelerated closure of the wound [4].

References

1. Dhivya S, Padma VV, Santhini E (2015) Wound dressings - a Review. Biomedicine 5(4): 22-22.
2. El Knidri H, Belaabed R, Addaou A, Laajeb A, Lahsini A (2018) Extraction, chemical modification and characterization of chitin and chitosan. Int J Biol Macromol 120: 1181-1189.
3. Dalirfardouei R, Karimi G, Jamialahmadi K (2016) Molecular mechanisms and biomedical applications of glucosamine as a potential multifunctional therapeutic agent. Life Sci 152: 21-29.
4. Papakonstantinou E, Roth M, Karakiulakis G (2012) Hyaluronic acid: A key molecule in skin aging. Dermato-Endocrinology 4(3): 253-258.
5. Da Silva MC, Da Silva HN, Alves Leal Cruz RC, Sagoe Amoah SK, De Lima Silva SM, et al. (2019) Acetyl-D-Glucosamine-Loaded Chitosan Filaments Biodegradable and Biocompatible for Use as Absorbable Surgical Suture Materials. Materials 12 (11).