Chitosan

Chitosan is a sugar that comes from the outer skeleton of shellfish, including crab, lobster, and shrimp. It's used as medicine and in drug manufacturing. Chitosan is a fibrous substance that might reduce how much fat and cholesterol the body absorbs from foods. It also helps blood clot when applied to wounds.

Gene therapy is a promising strategy for treating challenging diseases. The successful delivery of genes is a critical step for gene therapy. However, concerns about immunogenicity and toxicity are the main obstacles against the widespread use of effective viral systems. Therefore, nonviral vectors are regarded as good alternatives to viral vectors. Chitosan is a natural cationic polysaccharide that could be used to create nonviral gene delivery vectors. Various methods have been developed to improve the properties of chitosan related to gene delivery. A review introduces the features of chitosan in gene delivery, summarizes current progress toward methods promoting the properties of chitosan related to gene delivery, and presents different applications of chitosan in gene delivery vectors. Finally, future prospects of gene vectors based on chitosan are discussed [1].

Natural materials such as collagen and alginate have promising applications as dural substitutes. These materials are able to restore the dural defect and create optimal conditions for the development of connective tissue at the site of injury. A promising material for biomedical applications is chitosan-a linear polysaccharide obtained by the deacetylation of chitin. It has been found to be nontoxic, biodegradable, biofunctional and biocompatible in addition to having antimicrobial characteristics.

In a study Pogorielov et al., designed new chitin-chitosan substitutes for dura mater closure and evaluated their effectiveness and safety. Chitosan films were produced from 3 % of chitosan (molar mass-200, 500 or 700 kDa, deacetylation rate 80-90%) with addition of 20% of chitin. Antimicrobial effictively and cell viability were analysed for the different molar masses of chitosan. The film containing chitosan of molar mass 200 kDa, had the best antimicrobial and biological activity and was successfully used for experimental duraplasty in an in vivo model. In conclusion the chitin-chitosan membrane designed here met the requirements for a dura matter graft exhibiting the ability to support cell growth, inhibit microbial growth and biodegradade at an appropriate rate. Therefore this is a promising material for clinical duroplasty [2].

Berce et al. aimed to synthesize a polymer-based sponge containing chitosan-sodium hyaluronate-resveratrol (CHR) and to evaluate its regenerative potential. The process of synthesizing the CHR polymer was described before microtomography analysis was conducted and the density and porosity of the obtained sponges was assessed. The cytotoxicity was evaluated in vitro. By undertaking the in vivo testing of the CHR polymer, we aimed to determine the CHR sponge's potential to stimulate tissue regeneration after inflicting a controlled, reproducible and measurable skin wound in an animal model. Skin punch biopsies were harvested from the healed area and were subjected to histopathological evaluation. The results obtained in this study confirmed that this polymer accelerates the formation of granulation facilitating wound healing, while also achieving a

bacteriostatic outcome [3].

Unclassified

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