A Novel Alginate Hydrogel Based Controlled and Targeted Delivery System

Controlled drug delivery systems offer numerous advantages compared to conventional dosage forms including improved efficacy, reduced toxicity, and improved patient compliance and convenience. Controlled release systems aim to improve the effectiveness of drug therapy. This improvement can take the form of increasing therapeutic activity compared to the intensity of side effects, reducing the number of drug administration required during treatment, or eliminating the need for specialized drug administration. Controlled release over an extended duration is highly beneficial for drugs that are rapidly metabolized and eliminated from the body after administration. A diverse range of mechanisms have been developed to achieve both temporal and distribution controlled release of drugs using polymers. Hydrogels and solid polymeric microspheres, usually rely on drug release mechanisms that are based on passive diffusion, polymer degradation or both. Examples of these systems include polyester microspheres or alginate hydrogels.

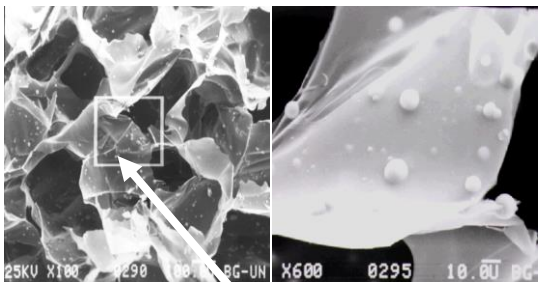
The Technology

The present technology relates to a pharmaceutical nanoparticle composition of a sulfated polysaccharide bio-conjugate. The engineering of alginate hydrogels for the spatially presentation and controlled delivery of heparin-binding proteins allows sustained release of bioactive peptides and reproduce the biological specificity exhibited in the body between heparin/heparin sulfate and heparin binding proteins such as growth factors. By generating sulfated alginates and hydrogels of mixed alginate/alginate-sulfate, high affinity of heparin-binding proteins to heparin/heparan sulfate was mimicked. Mixed hydrogels of alginate/alginate-sulfate sustained the release of basic FGF, with the release rate being dependent on the percentage of bFGF bound to the hydrogels. In vivo, the delivery of bFGF bound to alginate/alginate-sulfate scaffolds induced the formation of twice the number of blood vessels as compared to the delivery of bFGF adsorbed to the matrix.

Applications

Pharmaceutical carriers for delivery and sustained release of peptides, growth factors and siRNA for:

- treatment of diseases and
- tissue regeneration



Patent Status

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