Inverse Micelle Preparation for Alginate-Based Drug Delivery Carriers

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Technology description

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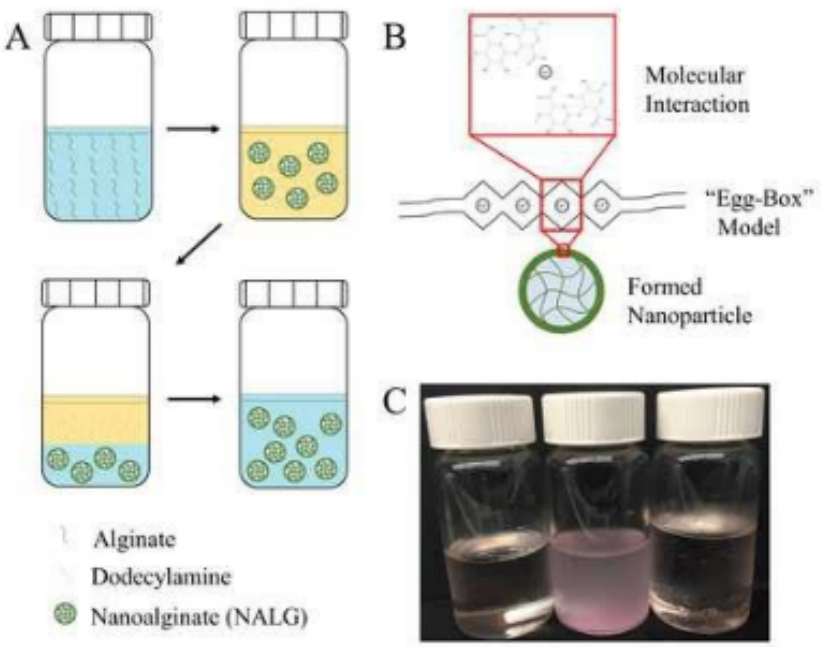
Oregon State University is seeking a licensee or industry collaborator for development and commercialization of a novel method of inverse micelle preparation for alginate-based nanocarriers. The simple process takes only a few hours and can be completed at room temperature, overcoming the challenges common in the field regarding formation difficulties and extensive time requirements. Inverse micelle properties are advantageous because they can encapsulate hydrophilic therapeutics and then be utilized as a drug delivery system. The preparation process includes: adding an aqueous alginate phase containing a hydrophilic therapeutic to a mixture of cyclohexane and dodecylamine, adding cross linking agents to gel the matrix, adding water to contain the nanoparticles in an aqueous layer, and then extracting the layer by pipette. In one example, the inventors encapsulated Doxorubicin (DOX) into the alginate nanocarriers and showed reduced side effects and high effectivity against 4T1 breast cancer cells.

Background of Invention

Converse to normal micelles, inverse micelles are arranged in organic solvent with their polar heads in and nonpolar tails out. Traditional methods of preparation require relatively high temperatures, at least an entire day, and many involved synthesis steps and reagents. This is a challenge in the field as inverse micelles have unique properties for applications in encapsulation of hydrophilic compounds, such as therapeutics. Alginate is a polysaccharide with inverse micelle capabilities, and its gelation properties allow effective encapsulation of a variety of water soluble molecules. The applications of using alginate nanoparticles in drug delivery are extensive, but a better method of their preparation is needed for highest efficiency and best quality of treatment.



Application area

Inverse micelle preparation
Drug delivery system for hydrophilic drugs
Potential breast cancer treatment

Advantages

Fast, simple technique for preparation of alginate inverse micelle nanocarriers at room temperature
Inverse micelles for encapsulation of hydrophilic therapeutics
Encapsulation of DOX for potential breast cancer treatment

Institution

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