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Isolation, Purification, and Characterization of Cell Membrane Vesicles

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Abstract

Biologically sourced nanoparticles have become a widely studied field in order to create solutions to long held difficulties in the biomedical field including drug delivery, cell targeting, intercellular communication, and circulation longevity. Although cell membrane derived vesicles have been successfully applied to several important biological functions, the mechanisms of formation, purification, stabilization, and characterization of these particles requires further elucidation. To ensure the efficacy of their function, it is important to be able to control vesicle parameters, including vesicle size, stability over time, and purity. Proposed herein are methods and experiments created to isolate, purify, and characterize cell membrane derived vesicles in a controlled manner. In order to exhibit control over these parameters, the central aims of this project are to create membrane vesicles approximately 100 nm in size, with high degrees of purity, through fabrication methods that are efficient, robust, and effective. This work will result in information that will facilitate the rapid growth of research into membranous nanoparticles, ultimately resulting in biomedical solutions to a variety of biological needs.