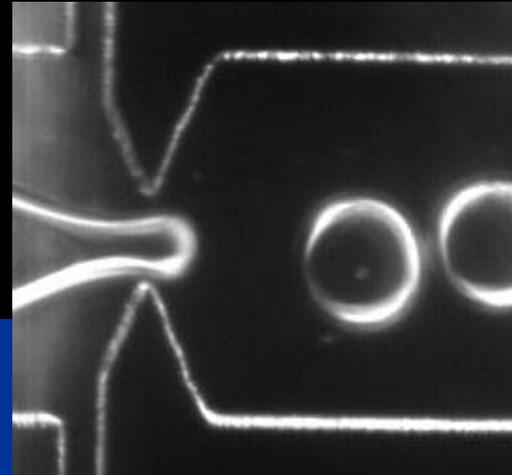


A Nanodroplet Process for Advanced Microencapsulated Drug Formulations

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Identification and Significance of the Innovation

- Exploit the properties of immiscible fluids in microfluidic geometries for nanodroplet synthesis of lipid encapsulated protein drugs for targeted drug delivery.
- Yield multifunctional nanoparticles stabilized with protein drugs and surface functionalized with cell specific receptors for targeting infectious or diseased cells.
- Analysis of the process under microgravity conditions may lead to perfectly spherical droplets and improved homogeneity of drug encapsulation.



Liposome Formation in a Nanodroplet Generator

Technical Objectives

1. Design and fabricate a microfluidic apparatus for liposome production.
2. Synthesize nanoscale (200 nm) sized liposomes with encapsulated therapeutic and antibody functionalized surfaces.
3. Characterize liposome size, encapsulation and surface antibody incorporation

Work Plan

Task 1: Nanodroplet processor design and fabrication

(Mos 1-2)

Task 2: Liposome synthesis (Months 2-5)

Task 3: Liposome characterization: (Month 6)

NASA Applications:

Drug storage
Point of care mixing
Custom drug synthesis

} For extended manned flights

Non-NASA Applications

Point of care drug delivery
Targeted therapies
Complex formulations

Firm Contacts:

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