

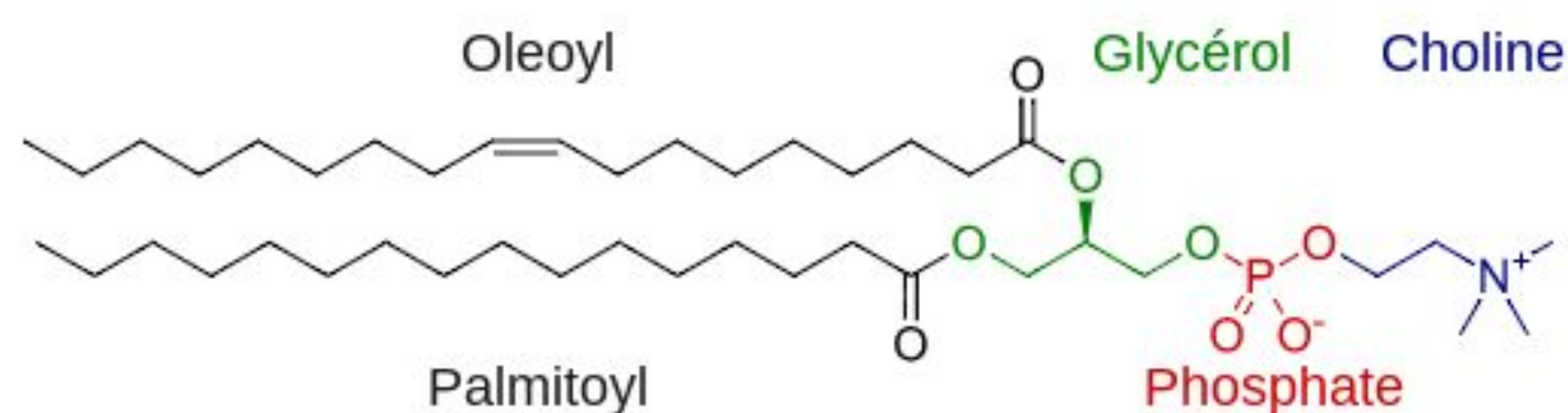
Preparation of Alginate Encapsulating Nanoliposomes for Drug Delivery

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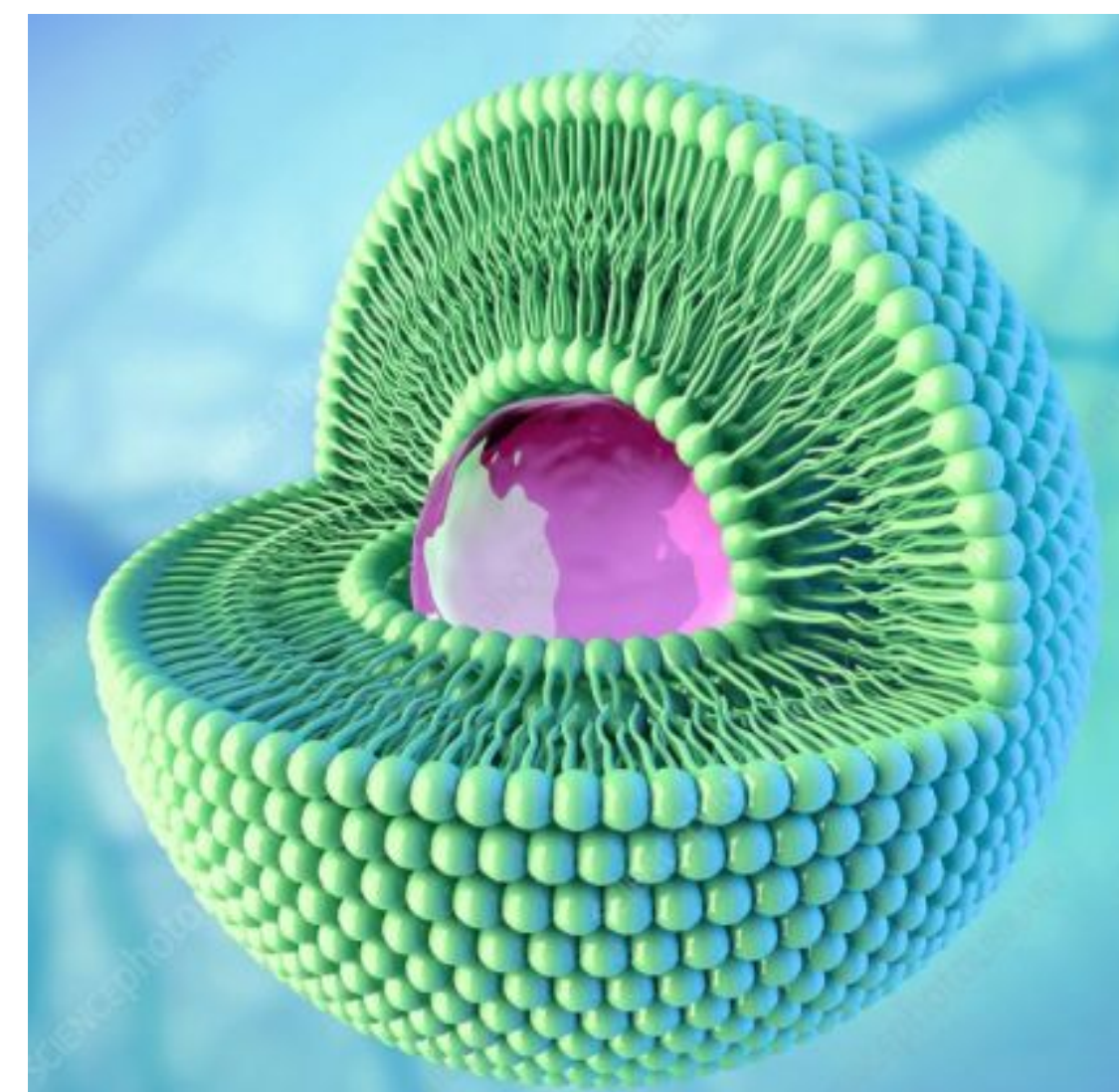
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Introduction & Background

- Nanomedicine field focuses on the development of nanoscale carriers which will effectively deliver therapeutics drugs to the diseased sites. Amongst the promising carriers developed to date are
 - Nanoliposomes
 - Polymeric nanoparticles
- Nanoliposomes are accepted in our bodies due to their lipid bilayer structure, which mimic the outer membrane of cells.
- However, nanoliposomes lack physical stability that limits their success. In contrast, polymeric nanoparticles such as hydrogels have excellent stability and offer tunable mechanical properties (1).
- By combining nanoliposomes and polymeric nanoparticles, the hydrogel encapsulated liposomes provide more stability and adjustable mechanical properties for successful drug delivery (2).
- The elastic modulus of a nanoliposome is determined depending on its ability to withstand deformation while under stress.
- Tuning particle elasticity has shown to
 - improve circulation time
 - alter biodistribution
 - enhance cellular interaction
 - direct tumor accumulation

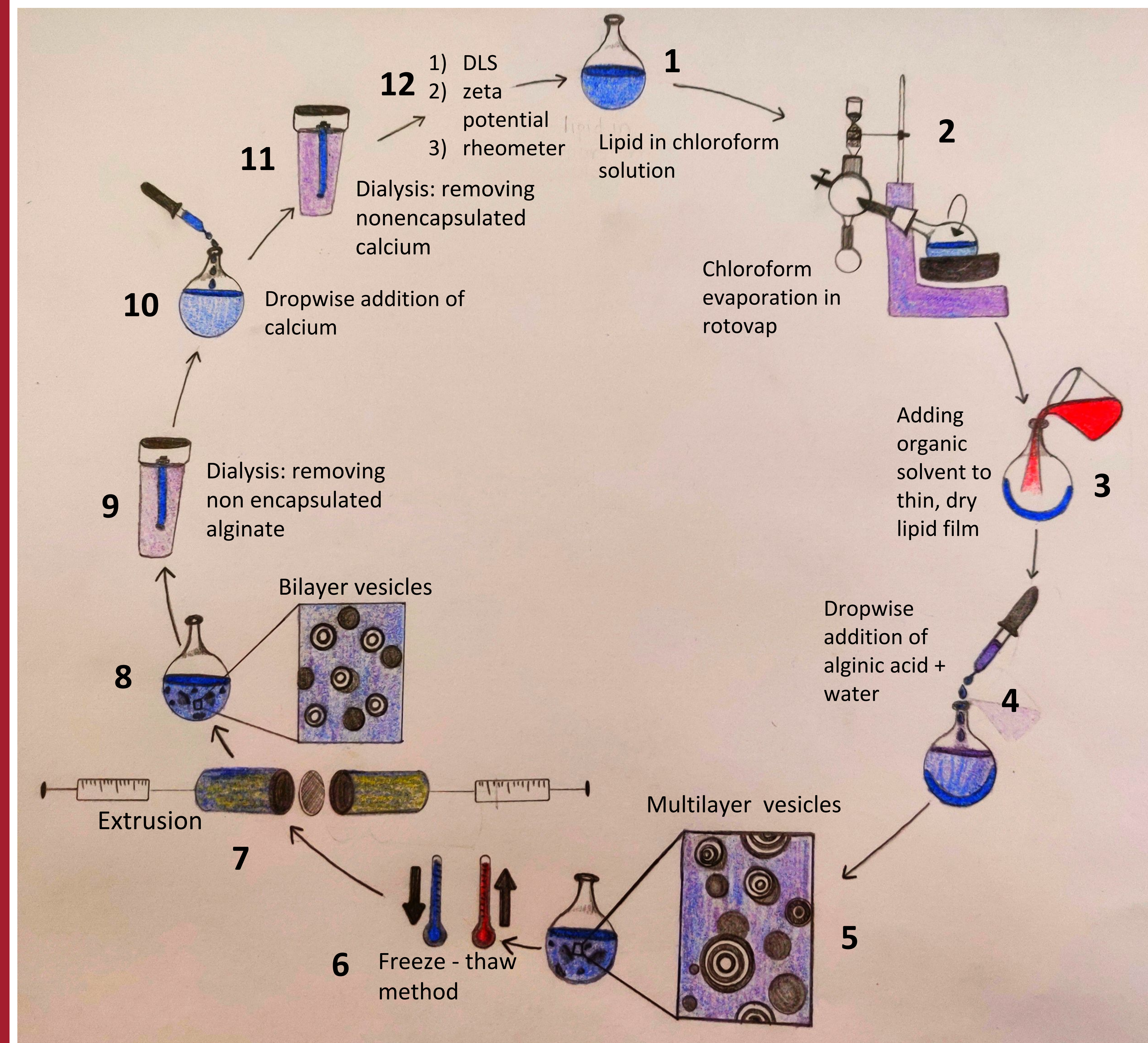


Chemical structure of POPC lipid
(1-palmitoyl-2-oleoyl-sn-glycero-3-phosphocholine)



Schematic of liposome

Methodology



Results & Discussion

- Expect to produce alginate hydrogel within liposomes by the fabrication technique
- Expect to produce monodispersed liposomes ranging from 100 nm-200 nm
- Expect to characterize elasticity of hydrogel in bulk form by utilizing rheometer
 - Aiming for elasticity range from 1Pa - 100 kPa

References

- 1) Guo, P., et al., *Nature communications*, 2018, 9(1), 1-9.
- 2) Mirab, F., et al., *2019 41st Annual International Conference of the IEEE, EMBC* (pp. 3935-3938).

Acknowledgment

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