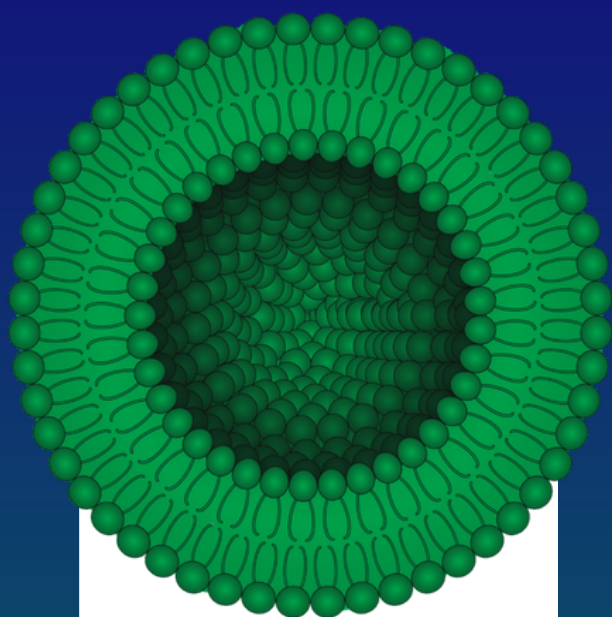
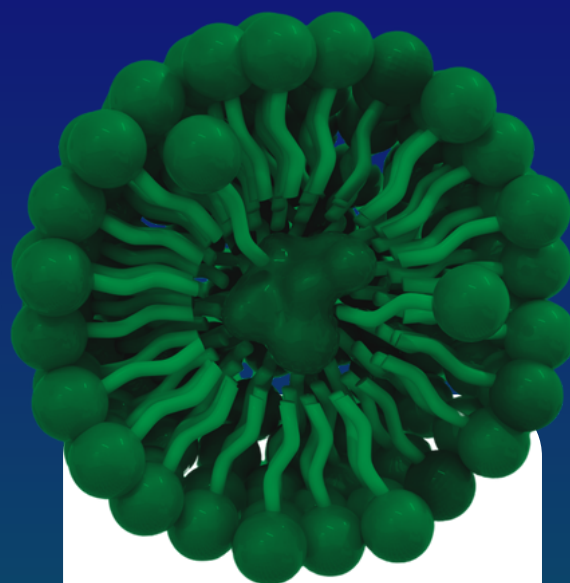


Lipid Formulation Morphologies



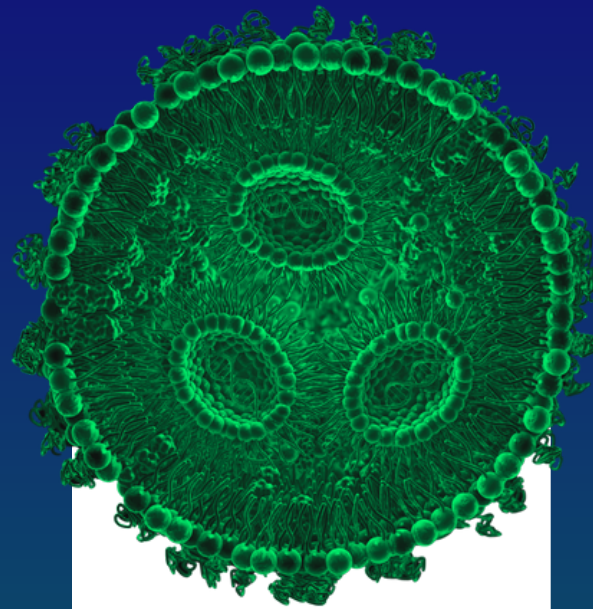
Liposomes

- Liposome is a general term for vesicles that are formed by a lipid bilayer and that contain an aqueous core.
- Materials can be loaded either into the aqueous core of the liposome (hydrophilic) or into the lipid bilayer (hydrophobic).



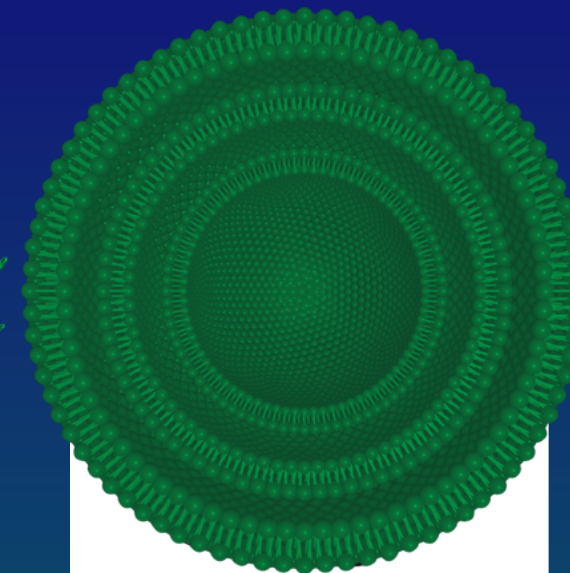
Micelles

- Micelles have hydrophilic head region in contact with the polar solvent and the hydrophobic tail region sequestered away from the solvent.
- Micelles have a solid lipid core, which can be used to sequester hydrophobic APIs.
- Micelles are usually formed by single-chain lipids or lipids with large headgroups due to lipid geometry and the high curvature of micelles.



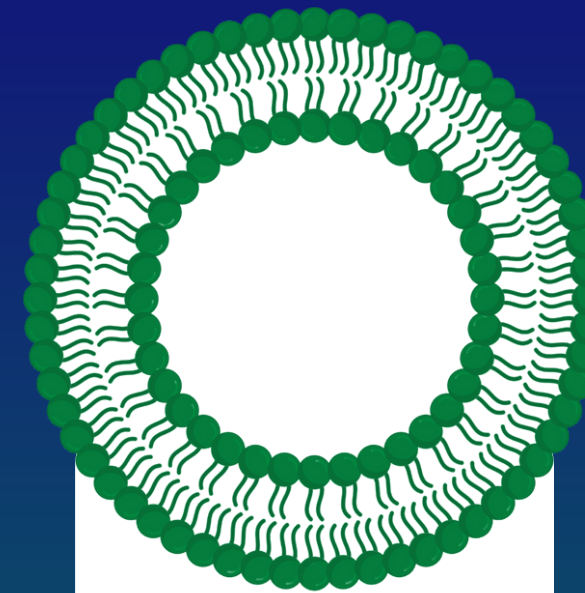
LNPs

- LNP specifically refers to solid-core lipid nanoparticles encasing nucleic acid materials
- LNPs are typically made using solvent injection.



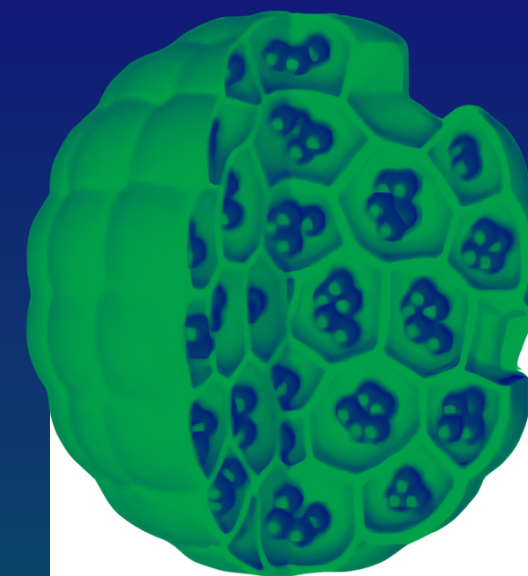
Multilamellar

- Multilamellar vesicles have many lamellae (or bilayers). Think of an onion! These are generally in the 1-5um size range. The benefit to MLVs is that you can typically have a higher drug concentration because you can pack drug into the aqueous layer between each bilayer.



GUVs

- GUVs, or Giant Unilamellar Vesicles, are microns-scale vesicles that have a single bilayer. Primarily used to observe lipid phase behavior and membrane events (fusion, fission) in synthetic biology with fluorescence microscopy. Methods of preparation: swelling, electroformation



MVLs

- MVLs, or Multivesicular liposomes, are large spherical vesicles with smaller polygon-shaped compartments, each containing API. These vesicles offer benefits such as increased drug loading, sustained release, and prolonged efficacy.