



Contribution ID : 1

Type : not specified

On the formation and properties of lipid vesicles

Wednesday, 7 July 2021 17:30 (90)

Lipid vesicles (also called liposomes) are spherical polymolecular assemblies that form in aqueous solution upon dispersing a bilayer-forming amphiphile (for example 1,2-dioleoyl-sn-glycero-3-phosphocholine, DOPC), or mixtures of amphiphiles that stabilized a bilayer (for example oleic acid and sodium oleate). Some of the phase diagrams of bilayer forming amphiphiles will be discussed for explaining the difference between a self-assembled lamellar phase and dispersed lamellar phases. Vesicles of uniform size and lamellarity usually represent dispersed lamellar phase and are only kinetically stable and not thermodynamically. For this reason, for obtaining unilamellar vesicles of a desired average size (for example 100 nm or 20 μm), a specific method of preparation needs to be applied. Therefore, vesicles are obtained by guided assembly. General concepts of some of the key methods for the preparation of unilamellar vesicles will be presented as well as some of the properties of vesicles in terms of temperature dependency, lipid dynamics and membrane permeability.

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Session Classification : Tutorial