



Short Review of Liposome Composition and Methods of Preparation

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Editorial

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Abbreviation: CL: Conventional Liposomes.

Editorial

Liposomes are amongst the various nano-carriers that are used to target drugs to a specific tissue. They are colloidal, vesicular structures of phospholipid molecules that are surrounded by equal number of aqueous compartments. The lipid bilayer encapsulates an aqueous interior which can be loaded with cargo such as peptides and proteins, hormones, enzymes, antibiotics, antifungal and anticancer agents. This structural property of liposomes makes it an important nano-carrier for drug delivery [1]. The advantages and disadvantages of liposomes reported in literature:

Advantages of Liposomes

- Liposomes are biocompatible and completely biodegradable. They are also non-toxic and non-immunogenic
- Due to their amphipathic nature, they can deliver both hydrophobic and hydrophilic drugs
- Drug encapsulation in liposomes is possible which thereby enables protection from external environment
- Liposomes help reduce the exposure of sensitive tissues to toxic drugs
- Flexibility to couple with site-specific ligands to achieve active targeting
- Liposomes increases efficacy and therapeutic index of drugs (Actinomycin-D)

Disadvantages of Liposomes

- Liposomes have low solubility.
- They possess a short half-life.

- Leakage and fusion of encapsulated drug/molecules.
- Their production cost is high.

Composition and Preparation of Liposomes

They are composed of natural and/or synthetic lipids (phospho- and sphingo-lipids) and may also contain other bilayer constituents such as cholesterol and hydrophilic polymer conjugated lipids. Liposomes can be classified in terms of composition and mechanism of intracellular delivery into 5 types as i) Conventional Liposomes (CL) ii) pH-sensitive liposome iii) cationic liposomes iv) immune liposomes v) long-circulation liposomes [1,2].

General Methods of Liposome Preparation Include:

- Drying lipids from organic solvent
- Dispersing lipid in aqueous medium
- Purifying the resultant liposome
- Analyzing the final product.

Liposomes are generally prepared using various procedures in which the water soluble (hydrophilic) materials are entrapped by using aqueous solution of these materials as hydrating fluid or by the addition of drug/drug solution at some stage during manufacture of the liposomes [1,2]. Preparation of liposomes depends on the following parameters: a) Physicochemical characteristics of the materials to be entrapped and those of the liposomal ingredients. B) The nature of the medium in which the lipids are dispersed c) effective concentration of the encapsulated substance and its potential toxicity d) optimum size, polydispersity, and shelf life of the vesicles for the intended application e) production reproducibility and large-scale production of safe and efficient liposomal products. Fabrication of liposomes is based on Active and Passive

loading techniques [1,2]. Passive loading includes Mechanical dispersion, Solvent dispersion, and Detergent removal methods. Active loading is based on the encapsulation property of drugs.

Conclusion

Liposomes are multifunctional drug carriers especially in treating diseases. The composition and method of preparation of liposomes are the two most basic and important aspects scientists must focus on while developing a liposomal formulation. Special emphasis must be given to the method of preparation as it serves as the gateway to encapsulate drug in the liposome. There are numerous studies and complex experiments conducted using liposomes which

propel the advancement of liposomal drugs and increases the therapeutic potential of these drug delivery systems.

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