IMPROVING DELIVERY AND SOLUBILITY OF ACETYLSALICYLIC ACID BY LIPOSOMAL ENCAPSULATION

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Application of nanotechnology in drug delivery systems has opened up new areas of research in sustained release of various drugs. Among the biodegradable and biocompatible nanocarriers, liposomes have promising perspectives. To synthesize effective and efficient liposomal carriers, different compositions of phospholipids and glycolipids were used and evaluated for encapsulation efficiency, pH effect and drug release.

Liposomes are made of various amphiphilic molecules which are able to form spherical structures upon hydration, resembling an array and have properties of natural phospholipid bilayers. Associating a drug with liposomes markedly changes its pharmacokinetics, delivers larger fraction to the target site by reducing exposure to normal tissues and prevents from early degradation. Liposomes containing drug can be used for treatment of various diseases.

The D-glucose was acetylated and reacted with β–sitosterol in order to synthesize glycolipid (β-sitosteryl-2,3,4,6-tetra-O-acetyl-β-D-glucopyranoside; liquid crystal). Phospholipid was extracted from egg yolk. Different compositions of the glycolipid and the phospholipid were used to prepare liposomes. Aspirin (1.5 mg) was encapsulated into liposomes by passive trapping technique. The encapsulated liposomes were separated and absorbance of aspirin in supernatant and 150 ppm solutions were measured at 295 nm. Then the encapsulation efficiency was determined. Aspirin release from liposomes was studied using dialysis method in deionized water, pH 8.6 and pH 2.0 buffer solutions.

The encapsulation efficiency of the drug for all the formulations was around 72-84 %. But the best encapsulation efficiency (83.2 %) was observed in liposomes with 1:1 composition of the glycolipid and the phospholipid. It confirmed modification of liposome vesicle using phospholipids and glycolipids enhanced the encapsulation efficiency of the drug. A good percent loading of the drug makes the delivery of drug clinically feasible.

Aspirin is one of the most widely used analgesics, but precipitation in stomach due to its low water solubility is responsible for many gastrointestinal side effects. Liposomes can entrap poor water soluble as well as water insoluble

drugs. Also it has slow release in acidic pH (2.0). It increases circulation lifetimes at the stomach and enhance the opportunity for liposomes, administered systemically, to leave the vascular compartment and enter certain extra vascular regions.