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Liposomes as carriers of anticancer drugs in drug delivery systems

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Abstract

Introduction: Nowadays, cancer is one of the most important issues in global health and for the time being, it is one of the reasons for 12%of all deaths worldwide. Some scientific research has been done in the cause of cancer، its recognition, and medical treatment up to now. But unfortunately due to the increasing of resistance of the cancer cells against the chemotherapy drugs, the attempts ended in failure. For this reason, scientists are looking for the methods to increase the response to the cancer cells to anticancer drugs and also find the best methods with less side effects. Currently, the usage of liposomes are notable as one of the most famous and the most stable nanocarriers in drug delivery system. Liposomes are colloidal substances with two or more phospholipid membrane which are created by the mixture of lipids and other amphipathic molecules such as cholesterol. Common medicinal compounds that use of liposome for defeating in cancer disease, including Doxil and Evacet that both of them consist of chemotherapic drug "doxorubicin". To design an efficient nanocarrier for drug delivery system, we should consider the actions to maximize performance and prolong liposome circulation time in the blood stream such as the ability to protect it from immune system, the way that exhibits greater stability and diminished toxicity of liposomes and target the area of the purpose tissue in the body and release drugs in a controlled manner.

Methods: All the methods of preparing the liposomes involve four basic stages:1-Drying down lipids from organic solvent. 2- Dispersing the lipid in aqueous media. 3- Purifying the resultant liposome. 4- Analyzing the final product. The following methods are used for the preparation of liposome based on drug loading:1-Passive loading techniques 2-Active loading technique. Passive loading techniques include three different methods: 1-Mechanical dispersion method. 2-Solvent dispersion method. 3-Detergent removal method

Results and discussion: Despite the many disadvantages of liposomes as drug carrier like high production cost, low efficiency in trapping the drugs and slow drug release, they have lots of benefits. Liposomes are non-toxic, flexible, biocompatible, completely biodegradable, and they help reduce the exposure of sensitive tissues to toxic drugs

Conclusion: Despite the limitations and drawbacks that exist today, science and research go towards the use of nanocarriers and drug delivery system for the treatment of cancer and it is hoped that in the near future drug delivery systems, will be problem solver of treatment of many patients with incurable diseases.

Keywords: Liposomes, drug delivery, anti-cancer drugs, nano-carriers, doxorubicin

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