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A Short Assessment on “Novel Drug Delivery System”

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ABSTRACT: Evolution of an existing drug molecule from a conventional form to a novel delivery system can significantly improve its performance in terms of patient compliance, safety and efficacy. In the form of a an existing drug molecule can get a new life. An appropriately designed Novel Drug Delivery System can be a major advance for solving the problems related towards the release of the drug at specific site with specific rate. The need for delivering drugs to patients efficiently and with fewer side effects has prompted pharmaceutical companies to engage in the development of new drug delivery system. This article covers the basic information regarding Novel Drug Delivery Systems and also different types of the same.

KEYWORDS: Drug release, Dosage forms, Novel drug delivery system, herbal formulations

I. INTRODUCTION

The method by which a drug is delivered can have a significant effect on its efficacy. Some drugs have an optimum concentration range within which maximum benefit is derived, and concentrations above or below this range can be toxic or produce no therapeutic benefit at all¹. On the other hand, the very slow progress in the efficacy of the treatment of severe diseases, has suggested a growing need for a multidisciplinary approach to the delivery of therapeutics to targets in tissues.

From this, new ideas on controlling the pharmacokinetics, pharmacodynamics, non-specific toxicity, immunogenicity, biorecognition, and efficacy of drugs were generated. These new strategies, often called drug delivery systems (DDS), which are based on interdisciplinary approaches that combine polymer science, pharmaceuticals, bioconjugate chemistry, and molecular biology. To minimize drug degradation and loss, to prevent harmful side-effects and to increase drug bioavailability and the fraction of the drug accumulated in the required zone, various drug delivery and drug targeting systems are currently under development¹. Controlled and Novel Drug Delivery which was only a dream or at best a possibility is now a reality. During the last decade and half pharmaceutical and other scientists have carried out extensive and intensive investigations in this field of drug research

Two major mechanisms can be distinguished for addressing the desired sites for drug release:

- (i) Passive and;
- (ii) Active targeting

An example of passive targeting is the preferential accumulation of chemotherapeutic agents in solid tumours as a result of the enhanced vascular permeability of tumour tissues compared with healthy tissue. A strategy that could allow active targeting involves the surface functionalization of drug carriers with ligands that are selectively recognized by receptors on the surface of the cells of interest. Since ligand–receptor interactions can be highly selective, this could allow a more precise targeting of the site of interest (see fig. 1)



FIGURE 1: TYPES OF DRUG DELIVERY

Such a definition implies that there are a vast number of members in this group. Many of them may not even be feasible, while many others may not be relevant. So, the set of most relevant new drug delivery systems is deduced as follows:

Various Drug Delivery Systems:

Carrier based Drug Delivery System:

- A) Liposomes
- B) Nanoparticles
- C) Microspheres
- D) Monoclonal antibodies
- E) Niosomes
- F) Resealed erythrocytes as drug carriers

Transdermal Drug Delivery Systems:

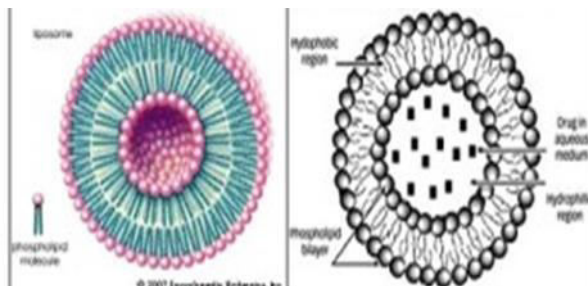
- A) Sonophoresis
 - Mucoadhesive delivery systems
 - Supramolecular delivery systems
 - Variable release delivery systems
- B) Osmotic pump
- C) Microencapsulation

Drug Delivery Carriers:

Colloidal drug carrier systems such as micellar solutions, vesicle and liquid crystal dispersions, as well as nanoparticle dispersions consisting of small particles of 10–400 nm diameter show great promise as drug delivery systems.

Liposomes:

Liposomes are a form of vesicles that consist either of many, few or just one phospholipid bilayers. The polar character of the liposomal core enables polar drug molecules to be encapsulated. Amphiphilic and lipophilic molecules are solubilised within the phospholipid bilayer according to their affinity towards the phospholipids.



Nanoparticles:

Nanoparticles (including nanospheres and nanocapsules of size 10-200nm) are in the solid state and are either amorphous or crystalline. They are able to adsorb and/or encapsulate a drug, thus protecting it against chemical and enzymatic degradation.

Carbon nanotubes:

Carbon nanotubes can be modified to circulate well within the body. Such modifications can be accomplished with covalent or non covalent bonding. Modifications can increase or decrease circulation time within the body. Carbon nanotubes no significant toxicity when they have modified so as to be soluble in aqueous body type fluids. They enter readily into the cells.

Microspheres:

Microspheres are characteristically free flowing powders consisting of proteins or synthetic polymers which are biodegradable in nature and ideally having a particle size less than 200 μm . Materials used for preparing Microspheres are polymers. They are classified into two types:

1. Synthetic Polymers
 2. Natural polymers
1. Synthetic polymers are divided into two types.
 1. Non-biodegradable polymers
 - Poly methyl methacrylate (PMMA)
 - Glycidyl methacrylate
 - Epoxy polymers
 1. Biodegradable polymers
 - Lactides, Glycolides & their co polymers
 - Poly alkyl cyano acrylates

II. SYNTHETIC POLYMERS:

Poly alkyl cyano acrylates is a potential drug carrier for parenteral as well as other ophthalmic, oral preparations. Poly lactic acid is a suitable carrier for sustained release of narcotic antagonist, anti cancer agents such as cisplatin, cyclo phosphamide, and doxorubicin.

Natural polymers:

Albumin is a widely distributed natural protein. It is considered as a potential carrier of drug or proteins (for either their site specific localization or their local application into anatomical discrete sites). It is being widely used for the targeted drug for the targeted drug delivery to the tumour cells.

Resealed Erythrocytes as Drug Carriers:

Erythrocytes, the most abundant cells in the human body, have potential carrier capabilities for the delivery of drugs. Erythrocytes are biocompatible, biodegradable, possess very long circulation half lives and can be loaded with a variety of chemically and biologically active compounds using various chemical and physical methods.

Immature RBC are called "RETICULOCYTES."^[20]



Niosomes:

In niosomes, the vesicles forming amphiphile is a non-ionic surfactant such as Span – 60 which is usually stabilized by addition of cholesterol and small amount of anionic surfactant such as dicetyl phosphate. Niosomes and liposomes are equiaxial in drug delivery potential and both increase drug efficacy as compared with that of free drug. Niosomes are preferred over liposomes because the former exhibit high chemical stability and economy.

Transdermal Drug Delivery System:

Transdermal drug delivery is defined as self contained, discrete dosage forms which, when applied to the intact skin, deliver the drug, through the skin at controlled rate to the systemic circulation. Transdermal drug delivery system (TDDS) established itself as an integral part of novel drug delivery systems²⁸. Delivery via the transdermal route is an interesting option because transdermal route is convenient and safe.

Mucoadhesive Drug Delivery Systems:

Bioadhesion may be defined as the state in which two materials, at least one of which is biological in nature, are held together for extended period of time by interfacial forces. In pharmaceutical sciences, when the adhesive attachment is to mucus or a mucous membrane, the phenomenon is referred to as mucoadhesion.

The potential of mucoadhesive polymers was shown in ocular, nasal, vagina and buccal drug delivery systems leading to a significantly prolonged residence time of sustained release delivery systems on this mucosal membranes. In addition, the development of oral mucoadhesive delivery systems was always of great interest as delivery systems capable of adhering to certain gastrointestinal (GI) segments would offer various advantages³⁴.

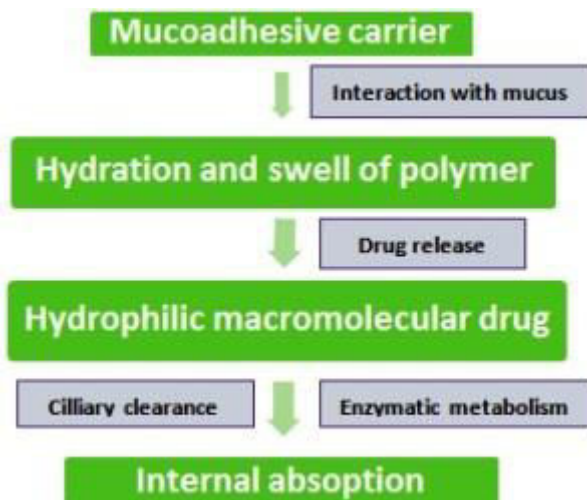


FIGURE 6: MECHANISM OF MUCOADHESION

Microencapsulation:

Microencapsulation is the process in which small droplets or particles of liquid or solid material are surrounded or coated by a continuous film of polymeric materials. Firstly the microencapsulation procedure was discovered by Bungen burg de Jon and Kan in 1931 and which were deal with the preparation of gelatin spheres and use of a gelatin coacervation process.

The controlled drug delivery system has used to reduce the problems associated with conventional therapy and to improve the therapeutic efficacy of a given drug. The maximum therapeutic efficacy can be achieved by delivering of the active agent in the optimal rate to the target tissue, then causing little toxicity and minimum side effects.

REFERENCES

1. Reddy. P.D., SwarnalathaD.Recent advances in Novel Drug Delivery Systems. IJPTR, 2010; 2(3): 2025-2027.
2. Muller.C.C. “Physicochemical characterization of colloidal drug delivery systems such as reverse micelles, vesicles, liquid crystals and nanoparticles for topical administration”, European Journal of Pharmaceutics and Biopharmaceutics. 2004; 58(2): 343-356.
3. <http://www.azonano.com/oars.asp>
4. Sharma A. International Journal of Pharmaceutics. 1997;154; 123-140.
5. Lau JR, Geho WB, Snedekar GH, Inventors; SDG INC, An Ohio Corporation, Assignee; Targeted Liposomal Drug Delivery System. US Patent 20100209492. 2010 Aug 19.
6. Takagi A, Yamashita N, SonobeT,Inventors; Astellas Pharma INC Tokyo, Assignee; Intracellular Drug Delivery Improving Liposomes. US Patent 20070286898. 2007 Dec 13.
7. Lau JR,Geho WB, Snedekar GH, Inventors; Targeted Liposomal Drug Delivery System. US Patent 20070104777. 2007 May 10.
8. Zhang Y, Luo B, Iyer L, Inventors; Liposomal Delivery Vehicle For Hydrophobic Drugs. US Patent 20070014845. 2007 Jan 18.



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