Juveria Fathima *et al*, International Journal of Pharmaceutical Sciences and Business Management,
Vol.1 Issue. 1, September- 2013, pg. 104-107 **ISSN: 2310-6913**

Special Drug Delivery Systems

Juveria Fathima

Hyderabad, India

Abstract- there are various special drug delivery systems that incorporate drugs in a dosage form that releases medication at a predetermined site or at a predetermined rate, over an extended period of time from a single application, have been developed. Some of them are here.

1. INTRODUCTION

There are many special drug delivery systems developed so far. Some of them are here which are of importance in today's medicinal practice. They are-

- The devices for slow and prolonged release of a drug for topical action- like ocusert, drug eluting stents, progestasert.
- For rapid delivery of anticonvulsant lorazepam to the cns
- Prodrugs
- Targeted delivery systems like antibody drug conjugates
- Liposomes.

2. TYPES OF DRUG DELIVERY SYSTEMS

Ocusert-placed under the upper eyelid, can deliver a steady flow of pilocarpine round the clock for seven days without causing much discomfort and avoiding the need for repeated eye drops. Another device called progestasert is a intrauterine contraceptive device. It produces controlled release of small quantities of progesterone in the uterus for an year or more.

Drug eluting stents- it consists of a metallic stent backbone and it is covered with a polymer, containing a drug (sirolimus or paclitaxel). The drug is released gradually in the next 14-30 days and modifies local healing response in the stented artery. They are used during coronary angioplasty and stenting. Because of these the incidence of restenosis has been reduced. The main drawback is they are much expensive.

Delivery of lorazepam intranasal using an atomizing pump reaches the brain rapidly through perineural pathways of trigeminal and olfactory nerves by passing blood brain barrier and acting within minutes.

Prodrug-it is an inactive chemical compound which after administration undergoes biotransformation into pharmacologically active drug. Prodrugs may overcome barriers in pharmaceutical phase or pharmacokinetic phase.

Propoxyphene napsylate is tasteless, stable and sparingly soluble derivative of propoxyphene. Dopamine does not cross blood brain barrier so L-dopa is used to treat Parkinson's disease to increase the dopamine content in cns.

Prodrugs are used to achieve longer duration of action. E.g.- esters of antipsychotic phenothiazine like flupenazine. Another important use of prodrugs is to provide site specific delivery of drugs. Meth amine is a prodrug for formaldehyde it is converted to formaldehyde and ammonia at the acidic urinary pH and used as urinary tract antiseptic.

Targeted delivery system- Anti cancer drugs using monoclonal antibodies against cancer cell antigens is one of the innovations in drug delivery. They home in on the cancer cells and deliver lethal concentrations of the drug selectively to cancer tissue. E.g.- transzumab

Liposomes- vehicle for targeted drug delivery. They are concentric, spherical shells of phospholipids in a watery medium, into which drugs are incorporated. Administered through iv route. Drugs administered by liposomes are usually anticancer drugs like daunorubicin and doxorubicin and antifungals like amphotericin B and antibiotic Gentamicin.

A drug administered in a particular dosage form via an appropriate route undergoes absorption, distribution, metabolism and excretion, which are important determinants of the drug concentration in systemic circulation. This in turn, determines the concentration at the site of action. Pharmacological effects of drugs are proportional to the target concentration.

Loading dose of the drug is the initial dose that is higher than the subsequent doses and is administered for achieving desired plasma concentration quickly.

Maintenance doses are required for maintaining a steady state plasma drug concentration in therapeutic range.

3. CONCLUSION

There are many special drug delivery systems used in India. The commonly used delivery systems are ocusert, progestasert, prodrugs and computerized miniature syringe pumps for insulin delivery in diabetics. Liposomes are under evaluation.

References:

1. Allen, Theresa M., and Pieter R. Cullis. "Drug delivery systems: entering the mainstream." Science 303.5665 (2004): 1818-1822.
2. Mezei, Michael, and Vijeyalakshmi Gulasekharam. "Liposomes—a selective drug delivery system for the topical route of administration: gel dosage form." Journal of Pharmacy and Pharmacology 34.7 (1982): 473-474.
3. Neuberger, Tobias, et al. "Superparamagnetic nanoparticles for biomedical applications: possibilities and limitations of a new drug delivery system." Journal of Magnetism and Magnetic Materials 293.1 (2005): 483-496.
4. Dharap, S. S., et al. "Tumor-specific targeting of an anticancer drug delivery system by LHRH peptide." Proceedings of the National Academy of Sciences of the United States of America 102.36 (2005): 12962-12967.
5. Sahatjian, Ronald. "Drug delivery system making use of a hydrogel polymer coating." U.S. Patent No. 5,304,121. 19 Apr. 1994.

6. Mi, Fwu-Long, et al. "Chitin/PLGA blend microspheres as a biodegradable drug-delivery system: phase-separation, degradation and release behavior." Biomaterials 23.15 (2002): 3257-3267.

