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Smart drug system for controlled release and improved bioavailability

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Abstract : The smart drug system enable release of active pharmaceutical ingredients to achieve desired pharmaceutical response convection drug delivery systems (Tablet capsule ointment etc.) suffer from poor bioavailability and fluctuation in pharm drug level and are unable to achieve sustained release. Given that the production of new drug is time consuming and costly pharmaceutical scientist seek to drug delivery system that is safe effective and stable it has good compliance targeted drug delivery systems is advanced method. That involved controlled and release drug at Target site. Carriers or vehicles which carry drug to specific receptor and ligand and physically modulated components the various drug carriers that can use in advanced drug delivery systems.

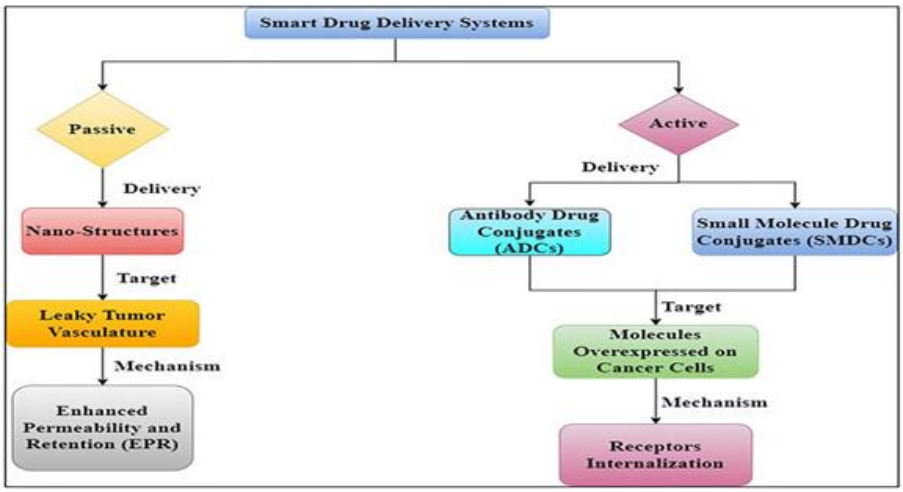
***IndexTerms* - drug delivery vehicles, smart drug delivery system, targeting moiety.**

I. INTRODUCTION

Drug delivery system is process administering a pharmaceutical compounds to achieve therapeutic effect in prevention of diseases using drug and it's ranks among the most important method of medicinal treatment together surgery radiation and physical treatment and physical treatment and physiotherapy.

drug delivery systems often have systematic side effect due to non biological distribution and controlled drug release characteristics. Since drug delivery systems have commercial and therapeutic value for health product, and has rapid in drug delivery over the past three decades. Controlled drug delivery is an essential in controlling and release of the required amount of drug. Drug delivery systems consists of ranging from implantable Electronic devices to single polymer chain are required compatible process in body (biocompatible) as well as with the drug to be delivered. DDS alter the bio distribution and pharmacokinetics of the associated drug that is the time depended percentage in the taken dose in the Different organ of the body. Delivery systems (DS) is used to localise maintain

Fig 1 Types of smart delivery systems



Active targeting system

Active targeting means specific interaction between drug . Drug carrier and the target cells commonly through specific ligand receptor interaction . Targeting a drug to a tumor site specific area not only enhance the efficacy of therapeutic drug.

Dual Targeting system

The target drug delivery systems is activated by stimuli such as temperature pH redox etc. Some type of malignancies possesses two stimuli around the tumor-targeted environment at the same time and alteration by the reduction in extracellular PH .

Passive targeting system

Passive targeting refers to the accumulation of a drug carrier or drug targeting at a precise site it may be attributed to chemical physical biological and pharmacological Aspect of the disease . Few drugs can be administered as inactive or pro drugs .

II. COMPONENTS OF TARGETED SMART DRUG DELIVERY SYSTEM:

drugs delivery vehicles

- drug delivery vehicles are also referred to as drug vector that are the most important entity required for successful transportation of the loaded drug. The most commonly used drug delivery vehicles including liposomes dendrimer .

Liposomes:- liposomes are small artificially designed vehicles components of phospholipid bilayers with the a small number of other molecule surrounding with the size ranging from 20 and 100 nm they have been used as delivery vehicles for stabilizing drug over coming barriers to cellular and tissue uptake.

Therapeutic drugs :- methotrexate doxorubicin and paclitaxel are the most popular chemotherapeutic drugs used to Target tumor using a smart drug delivery system and provide therapeutic action to the specific site.

Targeting moiety :- an ideal drug vehicle should be able to cross blood brain barrier and in case of tumor chemotherapy it should pass through tumor vasculature. It must be recognized by the target cell specifically and selectively. After recognition the carrier system should be release the moiety inside the target organs.

III. APPLICATION AND CHALLENGES OF SMART DRUG SYSTEM

Application

Glucose sensors :- one of the most popular application of pH sensitive polymers is the fabrication of insulin delivery systems for the treatment of diabetic patients. Delivering insulin is different from delivering other drugs since insulin has to be delivered in an exact amounts at the exact time enzyme is probably the most widely used in glucose sensing and makes it possible to apply different types of pH sensitive hydrogels for modulated insulin delivery.

Fig 2 Application and challenges of smart drug system

Cancer therapy:- chemotherapy is one of the most widely used strategies to fight cancer although it has disadvantages such as accumulation in healthy organ and lack of specificity by cancer cells .

Tissue engineering

Nanotechnology can be used as part of tissue engineering help to reproduce or repair or recharge damage tissue using suitable material based scaffolds and growth factors.

Challenges

Stimulus

comparison to the conventional DDSs, the smart controlled DDSs can effectively reduce the dosage frequency, while maintaining the drug concentration in targeted organs/tissues for a longer period of time.7 □□□ 2016ial the environment sensitive drug vehicles are leading to drug addition by internal or external local environment stimulus such as pH , glucose , low oxygen content and lysosome enzyme. And then temperature and magnetic field.

Biological barriers

The drug loaded vehicles face a series of complex biological barriers that greatly limit the site specific targeting biological barriers such as enzyme degradation mucosal membranes not only hinder accumulation.

Size and molecular weight of Nano particles

Smaller the size of drug vehicles the larger surface area which result in fast drug release . Inside the nanoparticles drug slow diffusion of larger particles occurs consequently smaller particles tend to aggregate during storage.

IV. CONCLUSION:-

DDSs, the smart controlled DDSs can effectively reduce the dosage frequency, while maintaining drug concentration in targeted organs/tissues for a longer period of time.new drug delivery system is an alternative to the conventional methods of administering drugs. In order to treat a patient, modern medicine first determines where in their body the disease is manifesting, and then delivers the medication directly to the area of the body where it will have the most effect.

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