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Literature Surevey

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ABSTRACT:-There are many Drug delivery systems are under development. The main aim of Drug delivery system is to reduce drug degradation and loss and to prevent side effects to improve bioavailability. Drug delivery system to target organs or tissues has become one of the challenges of the new century. This type of delivery methods provides major advances in specific delivery. Now day's Recent advances in the understanding of pharmacokinetic & pharmacodynamic behavior of drug have offer a more rational approach to the development of optimal drug delivery system. Now it's appreciable that future success in Drug delivery research will largely be result of multidisplinary efforts**.**

If any therapeutic agent that can be the more efficacious and safe using and improved drug delivery system represent both lucrative marketing opportunities for pharmaceutical company and advancement in the treatment of diseases of mindkind. An ideally design drug delivery system delivers a specified amount of drug to target particular site at an appropriate time and rate as dictated or desired by the etiological and physiological needs of the body.

KEYWORDS: drug delivery systems, therapeutic agent, diseases, target site, body fluids, non-targeting tissues, drug etc.

I. INTRODUCTION :

Drug delivery system is defined as "Formulation of the Drug in to suitable form like oral administration form (Tablet) or Intravenous form (solution). These new approaches can reduce solvency problems and protects the drugs from the external environment, for example, photo degradation and pH changes, while reducing dumping by controlling the discharge profile.Additionally, controlled focusing at the site of activity and lessened time of introduction at non- focusing on tissues in-wrinkles the viability of medications and diminish harmfulness and symptoms in this manner enhancing tolerant consistence and comfort.Novel drug delivery systems .

The new system Recent advances in the understanding of pharmacokinetic & pharma codynamic behaviour of drug have offer a more rational approach to the development of optimal drug delivery system. the novel drug delivery systems (NDDS) are carriers which maintain the drug concentration in therapeutic range for longer period of time There are several advantages of novel drug delivery systems over conventional drug delivery.

1. Optimum therapeutic- drug concentration in the blood or in tissue may be maintained over a prolonged period of time.
2. Pre- determined release rates of extended period of time may be achieved.
3. Duration for short half- life drug may be increased
4. By targeting the site of action, side effects may be eliminated.
5. Frequent dosing and wastage of the drug may be reduced or excluded.
6. Better patient compliance may be ensured.

Novel drug delivery systems

Various drug delivery systems have been developed and some of them under development with an aim to minimize drug degradation or loss, to prevent harmful side effects and to improve drug bioavailability and also to favour and facilitate the accumulation of the drug in the required bio- zone (site). There are no. Of novel carries which have been established and documented to be useful for controlled and targeted drug delivery. It is important to critically evaluate different terms used under the differentbroad categories of novel drug delivery system.

- Sustained- or controlled- drug delivery systems provide drug action at a pre determined rate by providing a prolonged or constant (Zero-order) release respectively, at the therapeutically

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effective levels in the circulation.

- Localized drug delivery devices provide drug action through spatial or temporal control of drug release (usually rate- limiting) in the vicinity of the target.
- Rate- pre-programmed drug delivery systems provide drug action by manipulating the release of drug molecules by system design which control the molecular diffusion of drug molecules.
- Targeted drug delivery provides drug action by using carries either for passive or active targeting or one base or self programmed approach, usually anchored with suitable sensory devices, which recognize their receptor at the target.

II. TYPES OF DRUG DELIVERY SYSTEMS :

New drug delivery systems are under investigation to improve the potential of the respective drug. On the other hand, scientists mainly focus on the microenvironment of the cells and their interaction with these new drug dosage

Drug delivery systems are classified as follows:-

- Transdermal Delivery Systems
- Carrier Based Delivery System
- Variable Release Delivery Systems
- Implantable Delivery Systems
- Nasal Delivery Systems

A) Transdermal patch :-

Is a medicated adhesive patch that is placed on the skin to deliver a specific dose of medication through the skin and into the bloodstream.

Painless method of delivering drugs systemically by applying a drug formulation onto intact and healthy skin.

Improved bioavailability, more uniform plasma levels, longer duration of action resulting in a reduction in dosing frequency, reduced side effects and improved therapy due to maintenance of plasma levels up to the end of the dose.

Low molecular weight (less than 1000 Da), affinity for lipophilic and hydrophilic phases, low melting point, have a short half-life and non-irritating.

Salonpas pain relief patch is the first and only FDA approved over-the- counter topical pain patch for the temporary relief of mild to moderate muscles and joints aches and pains associated with arthritis, sprains, strains, bruises and simple backache.

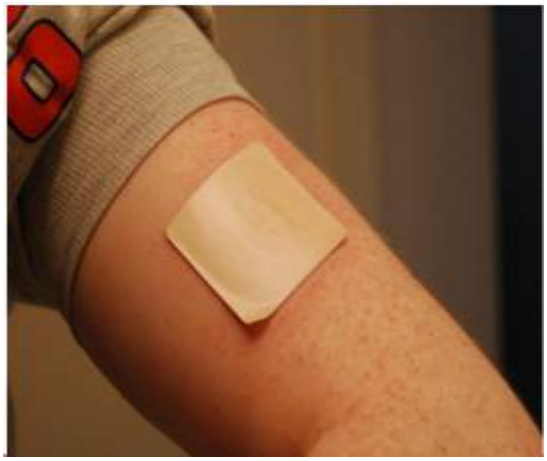

Fig:-Transdermal patch

B) DRUG DELIVERY CARRIERS

In recent years the wide advances in drug delivery systems have enabled simpler routes of administration. To deliver the medicine to their specific target tissues, drug carriers (the substances that play crucial role in vital delivery and effectiveness of drugs) are used.. A large variety of organic systems like liposomes, micelles, vesicles, nerve fiber polymers, nanoparticles, liquid crystals, microspheres, Implants etc., are used that have vital blessings and few limitations.

They are:-

- Liposome
- Nanoparticles
- Microspheres
- Polymeric micelle formulations
- Implants
- Liposomes

Liposomes:-

Liposomes are mixture, perishable and spherical vesicles whose size varies from low micrometres vary to tens of micrometers . They carry with it a bilayer membrane entrapping associate degree binary compound core. Then membranes of liposomes are sometimes derived from phospholipids with mixed lipoidchains and head teams or pure artificial lipids with outlined chemical group chains and head teams.

The medicine may be either entrapped at bilayer interface, in binary compound volume or in phospholipids bilayer. Liposomes that are fashioned from phospholipids are largely accustomed modify the pharmacokinetic profile of medication, enzymes etc.

This specific drug carrier is extremely advantageous in enhancing the therapeutic result of

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anti-cancer agents through increasing drug concentration levels in growth cells and decreasing the exposure to traditional cells. Liposomes play a crucial role in solubility sweetening, bioavailability, targeting sites and prolonged unleash of drug.Liposomes are made up of lipids or fat molecules are surrounded by water core. These types of liposomes are widely used for cancer treatment, infectious diseases and for vaccine preparation .

Microspheres :-

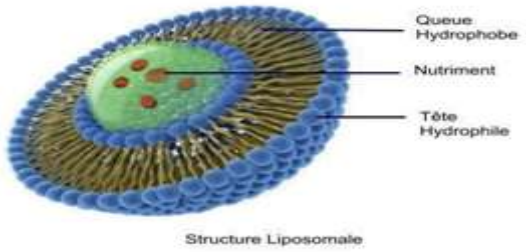

Fig.Liposome

There are varied drug delivery systems to deliver a drug to focus on the site during a sustained controlled release fashion. One amongst the strategies is exploitation microspheres as drug carriers. These are created from solid chemical compound matrices for endovenous and intra-arterial targeted drug delivery systems. Microspheres are spherical in form and size varies from 1-300 µm. There are totally different types of polymers that are used for fabrication of microspheres are albumin, starch, gelatin, dextran, polypropene etc. The administration of drug mediate by these microspheres is controlled by degradation and dissolution of matrix. The drug delivery is affected by the polymer type, size of matrix .

There are various kinds of strategies to provide these small particulate systems such as evaporation technique, cross linking and high blending technique.The precise benefits of those small particulate systems are they will be injected or ingested and also conjointly theyproduce sustained release action and site specific delivery.

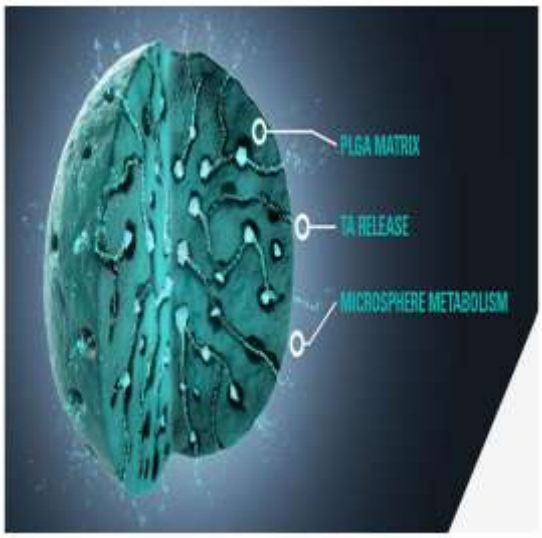

Fig:-Microspheres

Polymeric Micelle Formulations :-

The polymeric micelle consists of fine pharmaceutical properties and is simply manageable. They are the superb drug carrier that contains inner hydrophobic core and outer hydrophilic corona. The inner core is capable of solubilizing lipophilic substances and it's stabilized by hydrophilic chemical compound chains that are towards aqueous surroundings. The outer corona acts as an interface between inner core and binary compound surroundings.

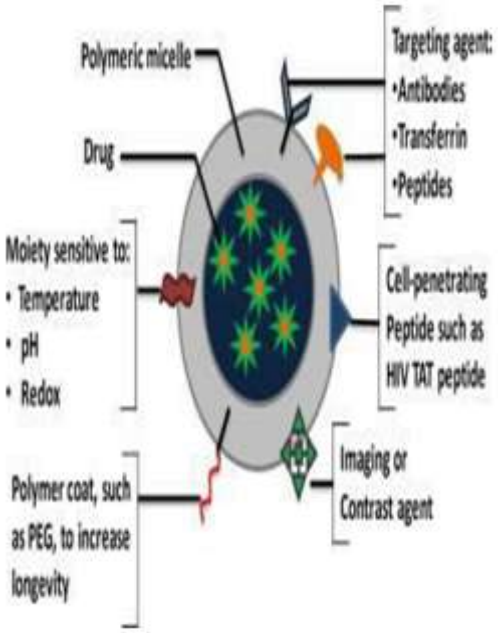

Fig:-Polymeric Micelle Formulations

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Implants :-

Implants measure the compound devices that are used for the sustained drug release or to focus on high drug concentrations to the encompassing space of target tissue. These implants typically applied once when chronic medical aid is indicated in things like chemical castration in prostatic adenocarcinoma treatment, in hormones replacement.

The Implants are extremely viscous liquids or semisolid formulations that are directly placed within the body fluids, injected or impregnated with biodegradable polymers.

Implantable drug delivery systeman introduction Implantable drug delivery systems are placed completely under the skin usually in a convenient but inconspicuous location. The patient is aware of only a small bump under the skin.designed to transmit drugs and fluids into the bloodstream without the repeated insertion of needles. well suited to the drug delivery requirements of insulin, steroids, chemotherapeutics, antibiotics, analgesics, total parenteral nutrition, and heparin There is little chance of infection or interference with daily activities Because the device is completely subcutaneous, with no opening in the skin

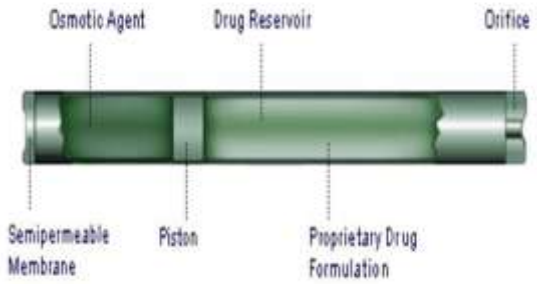

Fig :-Implants

Hydrogels :-

Hydrogels are capable of binding large amount of water or biological fluids. The compositions of hydrogels are homopolymers or copolymers. These are insoluble in the presence of chemical cross links and physical cross links. Hydrogels as drug delivery systems can be very important materials if is combined with the molecule.

A hydrogel is a network of crosslinked polymer chains that are hydrophilic, sometimes found as a colloidal gel in which water is the dispersion medium.

A three-dimensional solid results from the hydrophilic polymer chains being held together by cross-links. The crosslinks which bond the polymers of a hydrogel fall under two general categories: physical and chemical. Physical crosslinks consist of hydrogen bonds, hydrophobic interactions, and chain entanglements (among others). Because of the inherent cross-links, the structural integrity of the hydrogel network does not dissolve from the high concentration of water. Hydrogels are highly absorbent (they can contain over 90% water) natural or synthetic polymeric networks.

Solid Lipid Nanoparticles :-

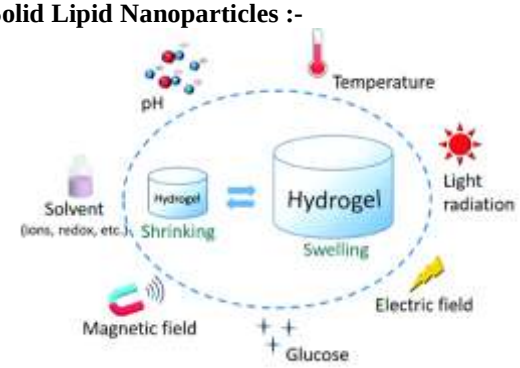

Fig:- Hydrogels

Nanoparticles like nanospheres and nanocapsules are used as carrier for drug delivery systems. Nanoparticles can able to adsorb or encapsulate a drug and protecting it against chemical and enzymatic degradation. These nanoparticles are act as carriers of DNA in gene therapy and genetic engineering studies. Other nanoparticles like nanotubes, nano wires, nanoshells and nanopores are used in drug delivery systems. These types of nanoparticles are used as marker in cancer studies.

Solid lipid nanoparticles have recently materialized as a novel approach to oral and parenteral drug delivery systems. SLNs combine the advantages of lipid emulsion and polymeric nanoparticle systems while overcoming the temporal and in vivo stability issues that troubles the conventional as well as polymeric nanoparticles drug delivery approaches. It has been proposed that SLNs combine numerous advantages over the other colloidal carriers i.e. incorporation of lipophilic and hydrophilic drugs feasible, no biotoxicity of the carrier, avoidance of organic solvents, possibility of controlled drug release and drug targeting, increased drug stability and no problems with respect to large scale production. A recent study

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has demonstrated the use of solid lipid nanoparticles as a platform for oral delivery of the nutrient mineral iron, by incorporating the hydrophilic molecule ferrous sulphate ($FeSO_4$) in a lipid matrix composed of stearic acid. Carvedilol-loaded solid lipid nanoparticles were prepared using hot- homogenization technique for oral delivery using compritol and poloxamer 188 as a lipid and surfactant, respectively. Another example of drug delivery using SLN would be oral solid SLN suspended in distilled water.
which was synthesized to trap drugs within the SLN structure. Upon indigestion, the SLNs are exposed to gastric and intestinal acids that dissolve the SLNs and release the drugs into the system.

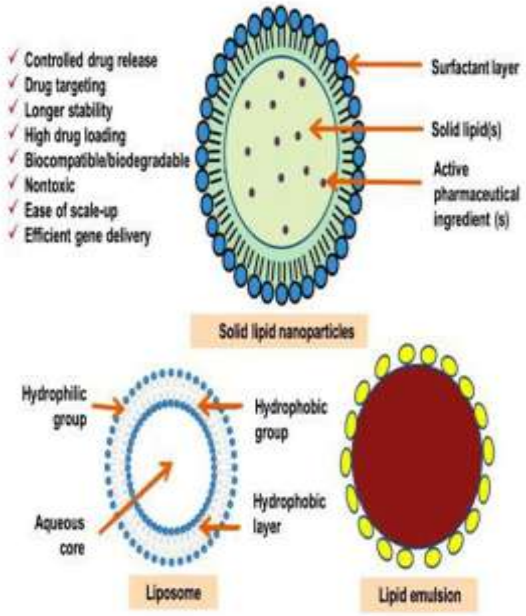

Fig.Solid lipid nanoparticles

Nanoparticles :-

Nanoparticles are sub-micron sized particles having size of 10 to 200 nm are within the solid state either in amorphous or crystalline type (Figure 2). The nanoparticles are wide used as carriers because of their stability and future storage. They will encapsulate or take up the drug and facilitate in protective it from chemical and catalyst degradation.Nanoparticles embrace nanocapsules and nanospheres. The nanocapsules are sac systems in which drug is restrained or engulfed in a cavity enclosed by chemical compound membrane.
Whereas the drug is uniformly unfold within the nanosphere matrix systems. The nanoparticles are terribly economical indelivering each deliquescent and hydrophobic medication.

In the recent years the biodegradable polymeric nanoparticles have gained a big attention as potential drug carrier within the applications of targeted drug delivery system, and as an economical carrier of DNA in factor medical aid and conjointly capable to handle proteins, peptides and genes through pre-oral route.

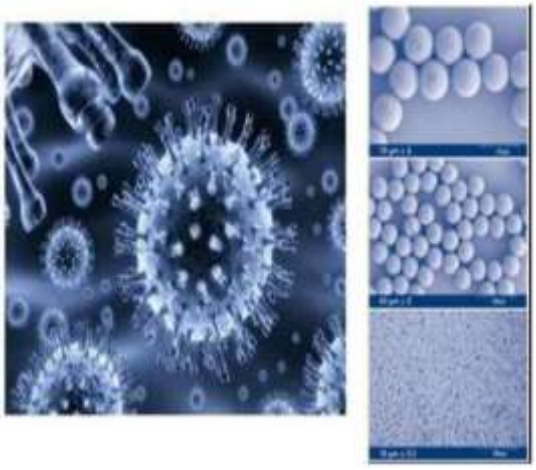

Fig. Nanoparticles

Polymeric Micelle Formulations :--

The polymeric micelle consists of fine pharmaceutical properties and is simply manageable. They are the superb drug carrier that contains inner hydrophobic core and outer hydrophilic corona.

The inner core is capable of solubilizing lipophilic substances and it's stabilized by hydrophilic chemical compound chains that are towards aqueous surroundings. The outer corona acts as an interface between inner core and binary.

Drug Loaded Erythrocytes :-

It is one of the powerful systems for delivery of drugs. Erythrocytes are long circulation can be used with different biologically active substances. Carrier erythrocytes are prepared by using blood sample form organism and separated bydifferent physical and chemical methods.

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Fig:-Novel Drug Delivery System.

Applications Of Novel Drug Delivery Systems :-

Sustained and controlled- drug delivery Controlled release of drug or encapsulated bioactives could be achieved using NDDS. Desired release pattern will definitely improve the pharmacokinetics and hence pharmacodynamics of drug. The controlled delivery of antibiotics in the treathment of H. Pylori via NDDS is an effective process compared to conventional one. Similarly, slow and sustained release oF drug from implants avoids regular administration of drug hence ensures patients compliance. Numerous applications of NDDS is sustained and controlled delivery of drug are enumerated. Some of them have already been discussed in preceeding sections.

Deport formulations of short -acting peptides have been successfully developed using microparticle technology. Such peptides include leuprorelin acetate and triptoreline, Both lutenizing harmone releasing hormone agonist. Leuprorelin polylactided acid co-glycolide microspheres may be used as a monthly and three monthly dosage forms in the treatment of advancement prostrate cancer, endometriosis and other hormone responsive conditions. These microspheres effectively halt the progression of prostate cancer or endometeriosis in patients and are currently marketed as prostap SR.

Other peptides formulated as sustained release microparticles include the angiotensin receptors- antagonist, L -158809, for the treatment of hypertension, thyrotropin releasing hormone for central nervous system stimulation, salmon calcitonin for the treatment of hypercalcemia or postmenopausal oeteoporosis and the immunosuppressant drug cyclosporin A. There are no. Of products available in the market for clinical studies as

III. CONCLUSION :-

New technologies have been developed for the treatment of Different diseases. The use of Drug delivery systems in developing drugs for bringing lots of hope in the field of Pharmacology and Medical research. Nanoparticle drug delivery devices have advantages which show higher efficiency than other particle drug delivery systems. But, toxicity of the nanoparticle formulations should be avoided. Full proof procedures should be established to know both the short-term and long-term toxicity analysis of the nanoparticle drug delivery systems.

Novel Drug delivery System (NDDS) NDDS is a combination of advance technique and new dosage forms which are far better than conventional dosage forms. Advantagesof Novel Drug Delivery System are: Optimum dose at the right time and right location, Efficient use of expensive drugs, excipients and reduction in production cost, Beneficial to patients, better therapy, improved comfort and standard of living. Basic modes of novel drug delivery systems are: Targeted Drug Delivery System, Controlled Drug Delivery System etc.

Novel Drug delivery & drug targeting is new techniques which is used in pharmaceutical science. Like targeting drug delivery, vaccine delivery, Gene therapy, commercial development of novel carries .

IV. RESULT:-

Novel Drug delivery System (NDDS) NDDS is a combination of advance technique and new dosage forms was studies

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