International Journal of Pharmaceutical Research and Applications
Volume 7, Issue 2 Mar-Apr 2022, pp: 497-508 www.ijprajournal.com ISSN: 2456-4494

A Review On: "Targeted Drug Delivery System"

Sumit S Wakchaure[*1], Ketaki R Yeralkar[2], Dnyaneshwari A Wable[3] ,Shraddha A Yadav[4,] Arpit R Suralkar[5]

Submitted: 15-03-2022 Accepted: 23-03-2022

ABSTRACT:
Targeted Drug Delivery is system of specifying the drug moiety directly into its targeted body area to overcome the aspecific toxic effect of conventional drug delivery, thereby the reducing the amount of drug required for therapeutic efficacy . TDDS sometimes called smart drug delilvery, is a method of delivering medication to a patients in a manner that increases the concentration of medication in some parts of the body relative to other.A niosome is a non-ionic surfactant-based vesicle.Cholesterol incorporation as an excipient.different excipients also can be used.They may be structurally similar to liposomes in having a bilayer, but, the substances used to prepare niosomes make them greater solid. Niosomes having vesicular carriers with size 10 and 1000 nm.these prepared by various methods. These Mainly used for as drug carrier, Leishmaniasis treatment.

Monoclonal antibodies produced by a single clone of cells or cell line and consisting of identical antibody molecules.To produce the desired Monoclonal Antibodies. The cells must be grown in either of two ways:
1) By injection into the peritoneal cavity of a suitably prepared mice (invivo method)
2) By in vitro tissue lifestyle culture.application of Monoclonal Antibodies, Diagnostic Imaging and Application, monoclonal antibodies (mABs) as medicinal agent.

Nanoparticles are the term in TDDS which deals with the study of molecular and atomic particles, technological development comprises on the nanometer scale, usually 0.1 to 100 nm.

Keywords: Leishmaniasis Disease , Niosomes, Nano-toxicology , Drug delivery system used in Liposomes , Vesicular Cholesterol,Bubble Method.

I. INTRODUCTION :

TDDS such as oral ingestion or intravascular injection , the medication is distributed throughout the body through the systemic blood circulation . TDDS seek to concentrated the medication in tissue of interest while reducing the relative concentration of the medication in the remaining tissues. As an instance, via averting the
host's defense mechanisms and inhibiting non-precise distribution inside the liver and spleen a system can attain the supposed website of motion in better concentrations.

1. Niosomes

Introduction:

- Many years, researchers have been working to find unique and better drug delivery system alternativesand
  this work will preserve until the
  drug delivery machine with minimum facet eff ect is discoved.There are no side effects and the therapeutic impact is optimal.Because of this, traditional dose forms are still in use.A high level of patient compliance, despite the fact that they are experiencing side effects. Vesicular systems, which offer a lot of potential, have recently been discovered.
- There are advantages to this approach over other drug delivery systems. The vesicular system consists of
- niosomes, liposomes Niosomes or non-niosomes.
- Ionic surfactant vesicles are ionic surfactant vesicles that act as drug carriers.The medicine will be delivered to the site of action by a carrier. Niosomes are a non-ionic surfactant vesicular carriers with size 10 and 1000 nm.
- Niosomes are an unique drug delivery technology that is chosen over existing vesicular systems due to their low toxicity, non-ionic nature, biodegradability, and increased availability,Good intrinsic skin penetration .It is possible to protect the medicine by encapsulating it in the niosome. acidic and enzymatic breakdown, the medication is avoided.

International Journal of Pharmaceutical Research and Applications
Volume 7, Issue 2 Mar-Apr 2022, pp: 497-508 www.ijprajournal.com ISSN: 2456-4494

Many attempts have been made to learn more

- NSAID's encapsulated in niosomes for improved absorption.
- Bioavailability, as well as improved skin.

Advantage:

1. More penetration in systemic circulation
2. The water-based vesicle suspension provides more flexibility.
3. They have a more osmotic activity.
4. They improve the entrapped drug stability.
5. Surfactants do not require any special handling or storage.
6. Increases drug bioavailability inside the mouth
7. Increases drug penetration through the skin
8. They can be used for oral, parenteral, and topical administration.
9. The surfactants are biocompatible and biodegradable. Instability of the body

about:

Disadvantages

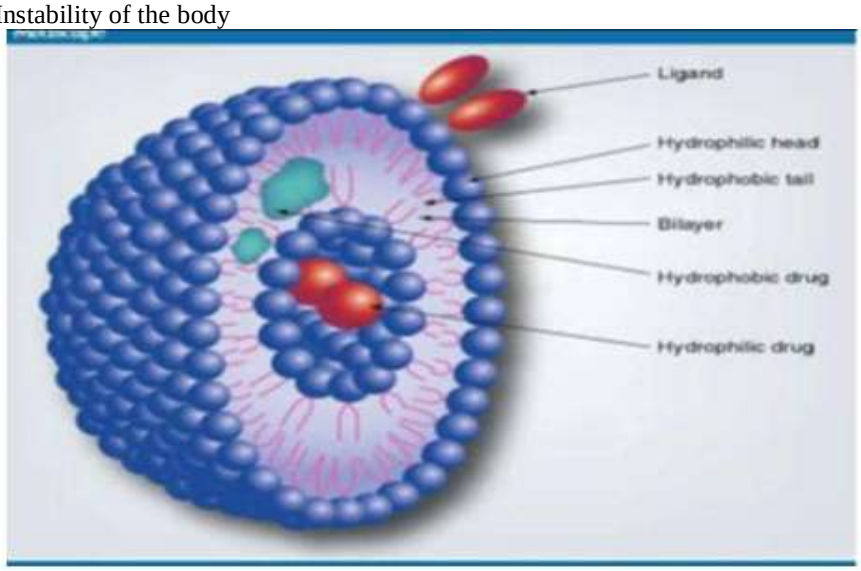
1. Unstable.
2. Show aggregation.
3. Entrapped drug leakage.
4. Drugs encapsulated in water are hydrolyzed, reducing their shelf life.

Types of Niosomes

Niosomes can be classed based on

- The number of bilayers (e.g. Mlv, suv)
- Or their size. (e.g. Luv, suv) or
- As a result of the preparation process.

(For example, REV and DRV). Niosomes come in a variety of shapes and sizes.
described in the following manner:



I) Vesicles with many lamellae (MLV)
2) Unilamellar vesicles of a large size (LUV)
3)Small unilamellar vesicles (SUV).

1) **Vesicles with many lamellae.**

- Separate container for lipidsthose are about the identical length the diameter of the vesicles ranges from 0.5 to 10 m. Vesicles with many lamellae are called multileveled vesicles.Niosomes are the most extensively utilisedniosomes.
- It's easy to make and delicious.When stored for lengthy periods of time, it is mechanically stable. TheseVesiicles are ideal medication carriers for lipophilic drugs.

2) **Unilamellar vesicles of large size (LUV)**

Because this sort of niosome has a high aqueous/lipid compartment ratio, it can hold more bioactive material.Materials can be entrapped using a very low-cost method.

- Method of preparation of niosomes.

Method for preparation of niosomes are

1) Ether Injection method.
2) Hand shaking technique.
3) Reverse phase evaporation technique.
4) Bubble method
5) Microfludization
6) Multiple membrane extrusion method
7) Membrane e extrusion method.
8) Signification.
9) Formation of niosomes from proniosome.

1) Method of Ether Injection:

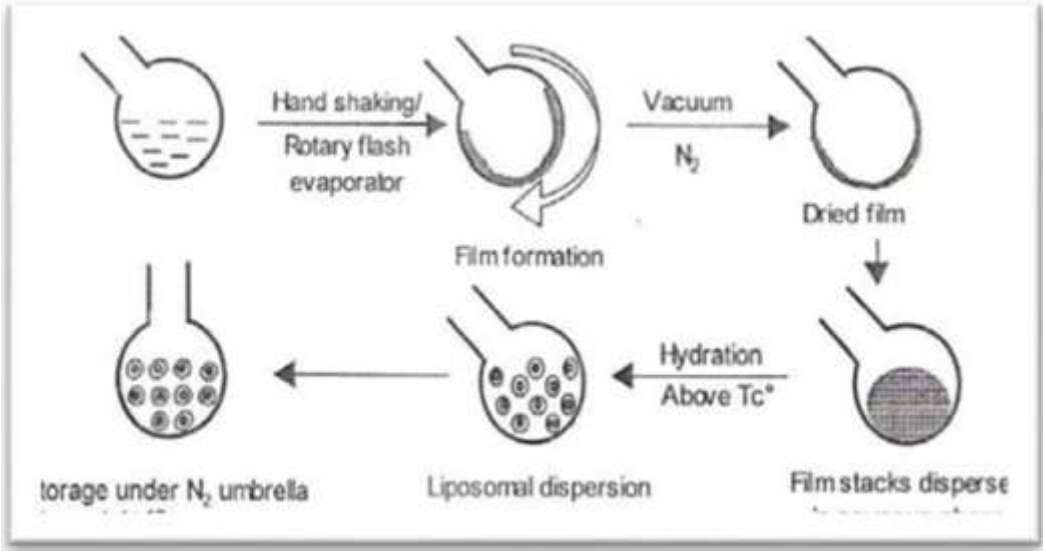
A solution of the surfactant is prepared by dissolving it in diethyl ether .After then, this solution add in water using 14 gauge .water or aqueous medium containing the medication kept at

International Journal of Pharmaceutical Research and Applications
Volume 7, Issue 2 Mar-Apr 2022, pp: 497-508 www.ijprajournal.com ISSN: 2456-4494

a constant temperature 60°C. The creation of ether vapour results from the vaporisation of the ether result into formation of single layer. It's size between 50 and 1000 micrometre.

2) Thin Film Hydration Technique (Hand Shaking Method):

This approach uses a combination of vesicle-forming chemicals like the cholesterol and surface active agent are dissolved in a volatile an organic solvent like diethyl ether or chlroform with a round bottom flask . At room temperature, the organic solvent is eliminated by a rotary evaporator leaving a thin film behind.A coating of solid mixture has formed on the flask's walls.After that, the dried surfactant film can be rehydrated with water.multilamellar formation in an aqueous phase with mild agitatio result in niosome formation.



3) Evaporation in the Reverse Phase (REV):

This approach entails making a solution of cholesterol and surfactant (1:1) in a combination of ether and water.as well as chloroform An aqueous phase that contains the medicine to be used.be loaded is added to this, and the two stages sonicated a temperature of 4-5°C.a sonicator was used. A transparent gel is generated, which is then further processed by sonication after phosphate buffered saline was added(PBS). The temperature is then raised to 40°C andTo remove the organic phase, the pressure is decreased. viscous niosome formed is viscous suspension . To this PBS is added for dilution .heated for 10 minutes in a water bath at 60°C. Then niosome is formed.

4) The Bubble Method :

It is a technique which has only recently been developed and which allows the preparation of niosomes without the use of organic solvents. The bubbling unit three neck round bottom flask and this is positioned in a water bath to control the temperature. Water-cooled reflux and thermometer is positioned in the first and second neck, while the third neck is used to supply nitrogen. Cholesterol and surfactant are dispersed together in a buffer (pH 7.4) at 70°C. This dispersion is mixed for a period of 15 seconds with high shear homogenizer and immediately afterwards, it is bubbled at 70°C using the nitrogen gas to yield niosomes.Micro fluidization is a recent technique used The "Bubble" Approach.

5)Microfluidization.

A term used to describe is a relatively new method that has been for producing unilamellar vesicles with a specific size distribution. The method is based on the submerged jet principle, which involves two submerged jets.At ultra-high velocities, fluidized streams interact.within the interaction, carefully defined micro channelschamber. A thin liquid sheet impinges on a solid surface.The energy delivered to the common front is structured in such a way thatThe system remains in the niosome formation zone.As a result, there is more homogeneity, smaller size, and superior quality.Noisy reproducibility is created.

6) Sonication:

International Journal of Pharmaceutical Research and Applications
Volume 7, Issue 2 Mar-Apr 2022, pp: 497-508 www.ijprajournal.com ISSN: 2456-4494

The sonication of a solution is a commonn method of producing vesicles. An aliquot of medication is used in this approach.The buffer solution is added to the surfactant/cholesterol mixture.In a 10 mL glass vial, combine the ingredients. The combination is examined.sonicated for 3 minutes at 60°C with a sonicatorNiosomes were discovered using a titanium probe.

7)Niosome Formation from Proniosomes:

Another way to make niosomes is to cover a water-soluble protein with them.sorbitol as a soluble carrier with surfactant The outcome of the coating procedure is prepare dry formulation. each of which thin film of dry is applied on a water-soluble particle.surfactant. "Proniosomes" is the name given to this preparation. The addition of aqueous phase at T > Tm and brief agitation are used to identify niosomes

Niosome are characterized by

Niosome Characterization

1. Size shape and Morphology

Surfactant-based vesicles have been seen in their structure.and were discovered using freeze fracture microscopy.The mean diameter determined using photon correlation spectroscopy.the vesicles' diameter For this project electron microscopy was used.while a laser beam is used to study the morphology of vesicles.Mean surface is commonly used to determine size dispersion.Niosome diameter and mass distribution .

Effectiveness of entrapment

Unentrapped medication is added to the niosomal dispersion after it has been prepared.dialysis, centrifugation, or gel filtration were used to separate the samples.as previously described, and the medication remained entrapped incomplete vesicle disruption determines the presence of niosomes.Using 50% n-propanol or 0.1 percent Triton X-100 and analysing the resultsby using an appropriate assay method for the resulting solution.

Where (Amount)% Entrapment Efficiency (% EF) = (Amount)% Entrapment Efficiency (Amount)% Entrapment Efficiency (Amount)% Entrapment Efficiency (Ax (total amount of drug entrapped/total amount of drug)Paraphrase without limits. The fusing of vesicles during the cycle may account for the increase in diameter.

2) Release in vitro:

The use of dialysis tubing is one type of in-vitro release rate investigation. A dialysis bag is cleaned and immersed in water that has been distilled Pipette the vesicle suspension into a bag.constructed comprised of tube that has been sealed The pouch in which theIn a 250 ml tube, vesicles are put in 200 ml of buffer solution.At 25°C or 37°C, shake the beaker constantly. At various times,The buffer is evaluated for drug content at regular intervals.a way for assaying that is acceptableCharge of the vesicle.

3) Charge of the vesicle:

In vivo and in vivo, the vesicle surface charge can have a big impact on how niosomes behave. Generally speaking,Chargedniosomes are more resistant to aggregation.Uncharged vesicles are more prone to fusion than charged vesicles. In order to receive zeta potential estimate surface using method.microelectrophoresis. pH sensitive flurophore can be used for zeta potential determination. Dynamic light alsodetermineThe zeta potential.

4) Niosomal drug release.

Recently, FRET was used to monitor release encapsuled matters in niosomes by using separate niosomal suspensions incorporating donor and acceptor. The simplest method to determine in vitro release kinetics of the loaded drug is by incubating a known quantity of drug loaded niosomes in a buffer of suitable pH at 370C with continuous stirring, withdrawing samples periodically and analyzed the amount of drug by suitable analytical technique. Dialysis bags or dialysis membranes are commonly used to minimize interference.

- **Applications of niosomes**

The application of niosomal technology is widely varied and can be used to treat a number of diseases.

- **Niosomes as Drug Carriers** :

Niosomes have also been used as carriers for iobitridol, a diagnostic agent used for Xray imaging. Topical niosomes may serve as solubilization matrix, as a local depot for sustained release of dermally active compounds, as penetration enhancers, or as rate-limiting membrane barrier for the modulation of systemic absorption of drugs.

- **Anti-neoplastic Treatment**

Most antineoplastic drugs cause severe side effects. Niosomes can alter the metabolism; prolong circulation and half life of the drug, thus decreasing the side effects of the drugs. Niosomes, is decreased rate of proliferation of tumor and higher plasma levels accompanied by slower elimination.

International Journal of Pharmaceutical Research and Applications
Volume 7, Issue 2 Mar-Apr 2022, pp: 497-508 www.ijprajournal.com ISSN: 2456-4494

- **Leishmaniasis:**

Leishmaniasis is a disease in which a parasite of the genus Leishmania invades the cells of the liver and spleen. Use of niosomes in tests conducted showed that it was possible to administer higher levels of the drug without the triggering of the side effects, and thus allowed greater efficacy in treatment.

- **Drugs Delivered in Peptide :**

The problem of circumventing enzymes in oral peptide medication administration has long been a problem.breakdown the peptide Using niosomes to achieve successprotect the peptides from peptides in the gastrointestinal tractThe cause of the breakdown is being explored. In an in vitro experiment,oral administration of a vasopressin derivative entrapped in niosomes revealed that the medication was entrapped in the niosomes.The peptide's stability was greatly improved.

- **Use in Studying Immune Response:**

Due to their immunological selectivity, low toxicity and greater stability; niosomes are being used to study the nature of the immune response provoked by antigens. Non-ionic surfactant vesicles have clearly demonstrated their ability to function as adjuvant following parenteral administration with a number of different antigens and peptides.

Niosomes as Carriers for Haemoglobin

- Niosomes can be used as carriers for haemoglobin within the blood. The niosomal vesicle is permeable to oxygen and hence can act as a carrier for haemoglobin in anaemic patients.

- **For sustained release**

With a low therapeutic index and low water solubility can benefit from the sustained release action of niosomes.since those might be kept in circulation via encapsulation of niosomes

Drug Action in a Specific Area:

One method for delivering drugs is through niosomes. Because of their small size and low concentration, they can accomplish localised pharmacological activity.via epithelium and connective tissue penetrability maintains the drug's localization at the point of administration.

2.Nanoparticles:

Introduction

The term "nanotechnology" refers to things having a diameter of a few nanometers.

Cells are the building blocks of living beings. These cells are Parts, on the other hand, are Nano-sized.Nanotechnology is a term used to describe a type of technology that focuses on nanotechnology design, production, and characterization.

particles of various sizes . Nanoparticles are very small particles. Objects that function as a single unit in response to their environment. Transport and property are two things that come to mind. The size of fine particles varies. Particles with a diameter of 100-2500nm and ultrafine particles with a diameter of 1-100nm. They can also be made to improve the quality of life. Drug's pharmacological and therapeutic effects. They also have a large surface area and can accommodate a large number of people. They will be assigned to functional groups, which will then be able to bind to cancerous cells. They've proven to be a great team. as a substitute for radiation and chemotherapy.

Synthesis of Nanoparticles

They are synthesized either biologically or chemically. Many harmful effects were associated with chemical synthesis method due to presence of some toxic chemicals absorbed on the surface. Biological synthesis method utilizes microorganisms, enzymes, fungus and plants or plant extracts.

They can be prepared from materials such as proteins, polysaccharides and synthetic polymers. Moreover, the presence of large secretory parts in fungi is the reason for their extracellular synthesis of nanoparticles. The matrix material selection depends on many factors such as size of nanoparticles, drug's inherent properties, aqueous solubility and stability, charge, permeability, biodegradability, biocompatibility, toxicity. drug release and antigenicity of the final product.

Nanoparticles Are Synthesized In One Of Two Ways: Biologically Or Chemically

Chemicals have been linked to a slew of negative consequences. Due to the existence of some hazardous compounds in the synthesis technique On the surface, it has been absorbed. Method of biological synthesis microbes, enzymes, fungi, and plants are used orextracts from plants. They range in age from 14 to 19, and can be made from a variety of materials. Proteins, polysaccharides, and synthetic polymers.

Examples – Further more the existence of large secretory components in fungus is thought to be beneficial.

Their extracellular production of nanoparticles. The matrix material selection is based on a number of factors .Numerous elements such as nanoparticle

International Journal of Pharmaceutical Research and Applications
Volume 7, Issue 2 Mar-Apr 2022, pp: 497-508 www.ijprajournal.com ISSN: 2456-4494

size, drug's intrinsic properties, etc. charge, aqueous solubility and stability, characteristics permeability, biodegradability, biocompatibility, and toxicity are among of the terms used to describe the properties of a substance. The final product's antigenicity and drug release.

Nanoparticles Types:

Silver Nanoparticles Silver ions are reduced by a factor of two in the presence of oxygen in the atmosphere.To make the silver, heat ethanol to 800°C to 1000°C. Nanoparticles. They're the most widely used kind of nanoparticles. They are antimicrobially effective and as a result, they're employed in the textile industry to make sunscreen creams and water purification23,24 According to research investigations, the production of silver nanoparticles in a beneficial way Azadirachta indica25, Capsicum annuum26, and other plants Carica papaya (carica papaya) is a type of papaya that Nanoparticles of gold. Gold is produced via a liquid chemical process. Reduction of chloroauric acid (HAuCl4) nanoparticles.

They're used for immunochemical research and detection. interactions between proteins They're also utilised to find out what's going on. aminoglycoside, presence of DNA in a fingerprint sample Grentamycin, streptomycin, and neomycin are examples of antibioticS,. different types of cancer stem cells.

Applications of Nanoparticles:

In Drug Delivery

* Firstly, the most significant advantages of nanoparticles used on drug carrier are high stability, high carrier capacity, expediency of accommodation of both hydrophilic , hydrophobic substances and various routes of administration including oral application and inhalation. Certain drugs cannot pass the first pass metabolism.

* The nanoparticles can be modified to overcome this and they also allow controlled sustained drug release from the matrix. These attributes can enhance the bioavailability of the drug and also in the reduction of the dosing frequency.

Quantum dots are miniature semiconductor particles of few nanometers in size. They are also called as artificial atoms with distinct electronic states. When light or electricity is applied to them, they emit light of variable frequencies. These frequencies can be altered by changing the dots' sizes, shapes and materials eliciting many applications in the process38,39

*. The most advanced approach of quantum dots technology associated with anticancer drug therapy is called ZnQ Quantum dots. The essence of this technology is that the quantum dots are loaded with anti-cancer agents and are encapsulated with biocompatible polymers. This is how the tumor targeted drugs are delivered and this is one of the important applications of Quantum dots technology.

* Verdun et al established that when mice were treated with doxorubicin integrated into isohexylcyanoacrylatenanospheres, there were higher concentrations of doxorubicin in liver, spleen and lungs than in mice which were treated with free doxorubicin.

* The greatest objection of using nanoparticles for tumour targeting is the prevention of particle uptake by mononuclear phagocytic system in liver and spleen. This was demonstrated by Bibby et al through the biodistribution and pharmacokinetics of a cyclic doxorubicin-nanoparticle formulation in tumour-bearing mice. These nanoparticles are been modified as delivery vehicles for many more therapeutic pharmaceuticals such as liposomal nanoparticles, layered double hydroxide, water soluble polymers drug conjugate to enhance half life with potent anticancer effect42-46. It is more difficult to deliver drugs to the central nervous system and brain but the nanoparticles can overcome these obstacles ensuring the success rate of the drug delivery in the brain.

Nanoparticles In Drug Delivery

To begin, the most major advantages of nanoparticles are as follows:

The terms "high stability" and "high carrier capacity" are used to describe drug carriers. the ease with which both hydrophilic and hydrophobic materials can be accommodated hydrophobic compounds and different routes of transport Oral application and inhalation are two methods of administration. Certain medicines are not metabolised in the first pass. To overcome this, nanoparticles can be changed. also enable for controlled, long-term medication release matrix.

These characteristics can help increase the bioavailability of a substance.the medicine, as well as a decrease in dose frequency. Quantum dots are tiny semiconductor particles with only a few electrons. Nanometers are the smallest units of measurement. Artificial atoms is another name for them. electrical states that are distinct When there is no light or electricity. When light of varying frequencies is applied to them, they emit light of varying frequencies.

Food

Encapsulation and emulsion are two significant areas where nanotechnology could be

International Journal of Pharmaceutical Research and Applications
Volume 7, Issue 2 Mar-Apr 2022, pp: 497-508 www.ijprajournal.com ISSN: 2456-4494

useful in the food industry.formation, in food contact materials, and in sensor materials development. Cultivation, production, packaging, and distribution. The use of nanoparticles in food preparation has been proven. Garber's nanofoodSome uses of FSAI were discovered by FSAI. Sensory enhancements are included in nanofood. (addition of flavour and colour, as well as texture change)

Nutritional absorption is improved, and nutrition is delivered in a more targeted manner. stabilisation of active substances, bioactive chemicals nutraceuticals in food sources, packaging, and so on. Improvements to the product to increase the life of the shell, as well as food sensors To remove pathogenic germs, safety and antimicrobials are required.in the food47,48Bionanocomposites are nanoparticle hybrids.with improved mechanical, thermal, and gas properties They are used in food packaging to extend the shelf life. This is it.It is environmentally friendly because it lowers the reliance on plastics.

In The Medical World

Nanomedicine aids in illness detection and prevention, as well as improved diagnosis and follow-up. The creation of Nanotechnology, such as gold nanoparticles, has revolutionised gene therapy.It's easier to sequence now. They're also utilised to find out what's going on.when they are attached to the short genetic sequences Segments of DNA Tissue that has been damaged can be restored or replaced.

Nanotechnology was used to replicate it. Transplantation of organs or The use of artificial implantation can change the field. nanotechnology. Magnetic nanoparticles have been shown to be useful in a variety of applications. isolating and grouping stem cells was a success. Quantum Dots, on the other hand, have been used to represent molecular structures.

for example - control of stem cell proliferation and differentiation is enabled by specially engineered nanoparticles. Nanotechnology also has the added benefit of regeneration.

Limitations Of Nanotechnology

A major drawback is that the nanoparticles might be undetectable after releasing them into the environment, whereby can cause problems if remediation is needed.

Therefore, analytical techniques are needed to be improved to detect nanoparticles in the environment. Sufficient information is needed regarding the relationship of surface area and chemistry to the functioning and toxicity of nanoparticles. Moreover, novel nanoparticles elicit a risk of exposure during manufacture or usage. So, complete risk assessments have to be taken into consideration. When there is a need to use the scarce material for the elaboration of the nanoparticles, an efficient strategy for recycling and recovery is needed. Therefore, further investigation is required to fill the wide knowledge gap in the area of nanotoxicity as this will aid to improve risk assessment.

Nanotechnology Limitations:

* The nanoparticles may be invisible after being released into the environment, which is a huge disadvantage. If cleanup is required, this can cause issues. As a result, analytical techniques must be enhanced.

* Nanoparticles in the environment to be detected Sufficient .There is a demand for knowledge on the surface-to-surface interaction

.* The impact of geography and chemistry on the functioning and toxicity of nanoparticles. Furthermore, new nanoparticles pose a threat of contamination.

* During the manufacturing or use of the product, there is a risk of exposure. So, it's a complete risk. Assessments should be taken into account. When For the elaboration, it is necessary to make use of the limited resources available.

* Nanoparticles, an effective recycling technique, and There is a need for recovery. As a result, more research is required. needed to close the vast knowledge gap in the field of such as nanotoxicity.

II. CONCLUSION:

Poorly soluble, poorly absorbed and labile biologically active substances are re-modified to promising deliverable drugs through the recent advancements of nanotechnology. The knack of nanotechnology to engineer matter at the smallest scale is re-developing areas such as information technology, cognitive science and biotechnology. Further research studies in nanotechnology, can be useful for every aspect of human life.

3. Liposomes:

Introduction

In 1906, Paul Ehrlich ushered in the era of targeted delivery when he proposed a medicinal delivery method that would route drugs directly to damaged cells, which he dubbed “magic bullets.” Liposomes are colloidal, vesicular structures composed of one or more lipid bilayers surrounding an equal number of aqueous

International Journal of Pharmaceutical Research and Applications
Volume 7, Issue 2 Mar-Apr 2022, pp: 497-508 www.ijprajournal.com ISSN: 2456-4494

compartments," according to the definition. A sphere-shaped casing encased a Liquid interior containing peptides and other things. Protein, hormones, enzymes, antibiotics, antifungals, and other substances. Antitumor drugs A free medicine that is injected into the bloodstream. Due to its brief duration, it usually approaches therapeutic levels. Excretion and metabolism Liposomes encapsulate a drug. As the medicine must first establish therapeutic levels for a lengthy period of time. Before metabolism and excretion, be released from the liposome.

Advantages Of Liposome

Immuno-Liposomes: CL or LCL with attached monoclonal antibody or reputation collection

Liposomes are biocompatible, absolutely Biodegradable, non-toxic and non immunogenicAppropriate for shipping of hydrophobic, amphipathic and hydrophilic tablets..Protect the encapsulated drug from the external Surroundings.

Reduced toxicity and extended stability-As therapeutic pastime of chemotherapeutic marketers may be improved through liposome encapsulation This reduces deleterious outcomes which can be observed at conc. Similar to or decrease than the ones required for max therapeutic interest.

Lessen exposure of touchy tissues to toxic pills.

DISADVANTAGES OF LIPOSOMES

Manufacturing price is excessive.

Leakage and fusion of encapsulated half of-lifestyle.

Quick half of-lifestyles.

Types Of Liposomes

A) Based On Structural Parameters:

1. Unilamellar vesicles

- Small unilamellar vesicles (SUV): size degrees from 20-40 nm
- Medium unilamellar vesicles (MUV}: length levels from 40-eighty nm.
- Large unilamellar vesicles (LUV): size ranges from a hundred Nm-1,000 nm

2. Oligolamellar vesicles (OLV)

These are made up of two-10 Bilayers of lipids surrounding a huge inner volume

3.Multilamellar vesicles (MLV):

They have got several Bilayers.

They could compartmentalize the aqueous extent in an infinite numbers of approaches. They range in line with way by using Which they're organized. The preparations may be onion like Arrangements of concentric spherical bilayers of LUV/MLV. Enclosing a massive wide variety of SUV etc.

A) Based On Method Of Liposome Preparation

1. REV: single or oligolamellar vesicles made with the aid of reverse- Phase Evaporation approach.
2. MLV-REV: Multilamellar vesicles made by opposite-segment Evaporation approach.
3. SPLV: strong Plurilamellar Vesicles
4. FATMLV: Frozen and Thawed MLV.
5. VET: Vesicles prepared by means of extrusion technique
6. DRV: Dehydration-rehydration method

B) Based Upon Composition And Utility

1. Conventiuonal Liposomes (CL): neutral or negatively Charged phospholipids and ldl cholesterol.
2. Fusogenic Liposomes (RSVE): Reconstituted Sendai virus Envelopes
3. pH touchy Liposomes: Phospholipids which includes PE or DOPE with either CHEMS or OA
4. Cationic Liposomes: Cationic lipids with DOPE

Long Circulatory (Stealth) Liposomes (LCL): they have polyethylene glycol (PEG) derivatives connected to their floor to decrease their detection by means of phagocyte system (reticuloendothelial machine; RES). The attachment of PEG to liposomes decreases the clearance from blood circulate and extends circulation time of liposomes within the frame. The attachment of PEG is also called pegylation.

4. Monoclonal Antibodies:

Monoclonal antibodies (mAbs or moAbs) are antibodies created by cloning a single white blood cell. Every subsequent antibody generated in this manner may be traced again to a unmarried determine mobile .Monoclonal antibodies can only attach to the same epitope and have monovalent affinity (the lpart of an antigen that is recognised by the antibody). Polyclonal antibodies, on the other hand, bind to many epitopes and are typically produced by various antibody-secreting plasma cell lineages. By extending the therapeutic targets of one monoclonal antibody to two epitopes, bispecific monoclonal antibodies can be created.

Monoclonal antibodies can be made to precisely attach to practically any acceptable substance, and then used to detect or purify it. Biochemistry,

International Journal of Pharmaceutical Research and Applications
Volume 7, Issue 2 Mar-Apr 2022, pp: 497-508 www.ijprajournal.com ISSN: 2456-4494

molecular biology, and medicine have all benefited from this potential. On a clinical level, monoclonal antibodies are used to diagnose and treat a variety of disorders.

History of monoclonal Antibodies

Monoclonal antibodies (MAbs) have evolved dramatically from research tools to effective human medicines over the last three decades. The first FDA-approved therapeutic MAb for the prevention of kidney transplant rejection was Muromonab CD3, a murine MAb. Since its introduction in 1986, the number of applications and approvals has decreased until the late 1990s, when the first chimeric Mab, Rituximab, was licenced for the treatment of low-grade B cell lymphoma in 1997. The rate of approval and monoclonal antibodies accessible on the market for the treatment of various diseases has increased considerably as licencing agencies have approved chimeric, humanised, and finally fully human monoclonal antibodies. The FDA has approved 60 MABs as of March 2017.

Advantages

- Monoclonal antibodies are less expensive to develop than conventional medications because they are based on proven technology.

• Using mice-human hybrid cells, side effects can be treated and decreased.

Disadvantages

1) Time consuming project takes time between 6 -9 months.
2)Very expensive and needs considerable effort to produce them.
3)Small peptide and fragment antigens may not be good antigens. monoclonal antibody may not recognize the original antigen.
4)Hybridoma culture may be subject to contamination.
5) System is only well developed for limited animal and not for other animals.
6) More than 99% of the cells do not survive during the fusion process reducing the range of useful antibodies that can be produced against an antigen.
7)It is possibility of producing immunogenicity.

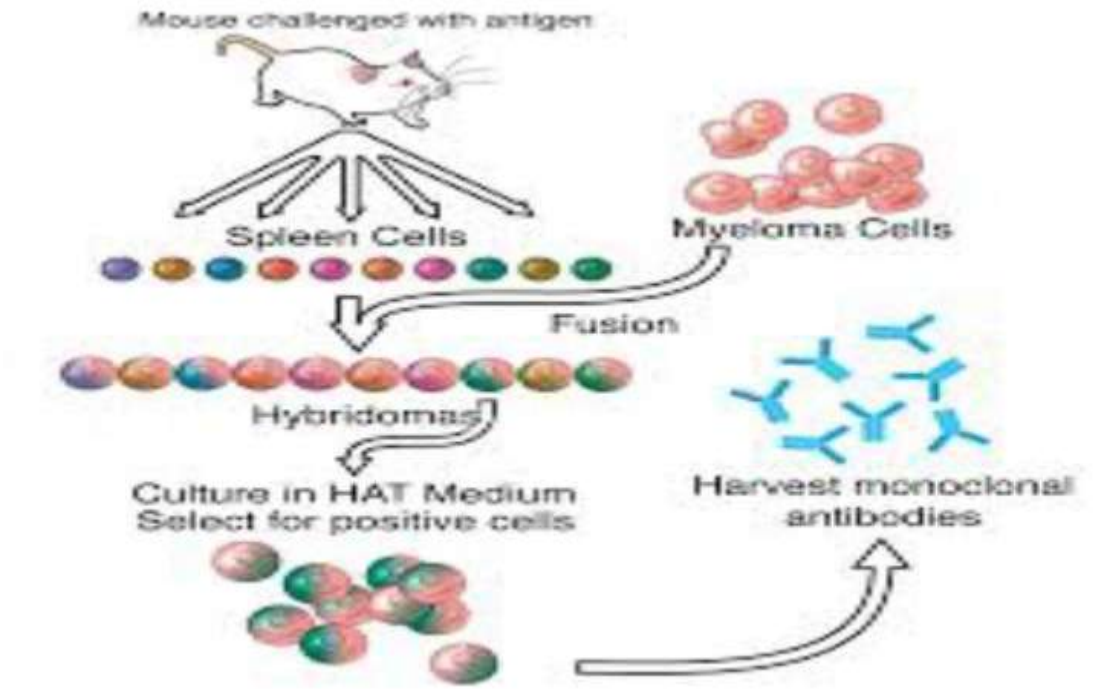
Method of preparation:

Monoclonal Antibody production or mAb is produced by using cellular traces or clones acquired from the immunized animals with the materials to be studied.Cell lines are produced by fusing B cells from the immunized animal with myeloma cells.

To supply the desired mAB, the cells ought to be grown in either of two approaches:

International Journal of Pharmaceutical Research and Applications
Volume 7, Issue 2 Mar-Apr 2022, pp: 497-508 www.ijprajournal.com ISSN: 2456-4494

1) By injection into the peritoneal cavity of a suitably prepared mouse (invivo method) or2) By in vitro tissue culture.• The vitro tissue tradition is the technique used whilst the cells are placed in lifestyle outdoor the mouse .The mouse's body in flask Cell lines or clones derived from vaccinated animals with the compounds to be examined are used to manufacture monoclonal antibodies, or mAb.B cells from the immunised animal are fused with T cells to create cell lines of myeloma.• The cells must be cultured in one of two methods to create the desired mAB:by injecting the substance into the peritoneal cavity of a properly prepared rodent (in mice)vivo technique) or tissue cultivation in vitro.• When cells are cultured in vitro, the procedure is called vitro tissue culture.outside the mouse's culture the body of a mouse in a flask.



Application of monoclonal Antibodies:

1) Analysis
Diagnostic Imaging
Diagnostic Applications
2) TherapeuticApplications are a type of application that is used to treat a
The use of monoclonal antibodies (MAbs) as medicinal agents.
Monoclonal antibodies (MAbs) as targeting agent.
3) protein purification.

1) Biochemical Analysis

In the laboratory, it's commonly employed in radioimmunoassays (RIA) and enzyme-linked immunosorbent assays (ELISA).These tests evaluate hormone concentrations in the blood (insulin, for example).growth hormone, progesterone, thyroxine, human chorionic gonadotropinThyroid stimulating hormone (triiodothyronine) and several additional tissue and cell hormones(antigens of blood groups, blood clotting factors, interferons, interleukins, etc.)indicators of tumour growth).
Pregnancy, for example, can be detected by measuring the levels of human chorionic gonadotropin in the urine.
Thyroxine and triiodothyronine thyroxine can be detected.
Colorectal cancer estimate of plasma carcinoembryonic antigen, and
For prostate cancer, there is a prostate specific antigen.

Diagnostic Imaging:

MAbs that have been radiolabeled are utilised in immunoscintigraphy, which is a device for diagnosing illnesses.Iodine—131 and technetium—99 are two radioisotopes routinely used to identify MAb. The patients obtain MAb with a radioactive tag administered intravenously.

International Journal of Pharmaceutical Research and Applications
Volume 7, Issue 2 Mar-Apr 2022, pp: 497-508 www.ijprajournal.com ISSN: 2456-4494

• These MAbs bind to specific places (such as a tumor) which can be detected using imaging techniques.the radioactivity's imaging Single photon emission has been computed in recent years(SPECT) cameras are utilised to provide a more sensitive three-dimensional image.The spots targeted by radiolabeled—MAbs have a three-dimensional look.

• Atherosclerosis, DVT, myocardial infarction, etc.

2) **Direct use of mabas therapeutic agent:**

MAbs aid in the destruction of disease-causing organisms by promoting effective opsonization and phagocytosis.

In the case of organ transplant immunosuppression:

In a typical situation,Immunosuppressive medicines such as cyclosporin and others are used in medical practise.

The drug prednisone is used to treat organ rejection transplantation.

3) Protein purification:

Monoclonal antibodies can be produced for any protein. And the so produced Mab can be without difficulty used for the purification of the protein against which it become raised.

MAbs columns can be organized through coupling them to cyanogen bromide activated Sepharose (chromatographic matrix). The immobilized MAbs in this way are very beneficial for the purification of proteins via immunoaffinity approach.

• There are certain advantages of using MAbs for protein purification. These include

the specificity of the MAb to bind to the desired protein, very efficienAny protein can be made into monoclonal antibodies. And the MAb created in this manner can be used to purify the protein against which it was developed.

• MAbs columns can be made by combining them with cyanogen bromide active cyanogen bromide.

REFERANCE:

[1]. PreethiSudheerandKar Kaushik Krupanidhi College of Pharmacy, #12/1, Chikkabellandur, Carmelaram Post, Bangalore - 560035, Karnataka, India

[2]. https://images.app.goo.gl/U6WbTPSNuz6kmscSA

[3]. Niosome:A Novel drug delivery system V.PolaChandu,A. Arunachalam. S.Jeganath,K.Yamini,K.Tharangini,G.Chaitnya Department of pharmaceutics, A.M Reddy Memorial college of pharmacy, Narasaraopet,Guntar, A.P. India Department of pharmaceutics,K.K college of pharmacy Chennai, Tamilnadu, India.

[4]. Niosome: a Novel Drug Delivery System Kshitij B. Makeshwar*, Suraj R. Wasankar Department of Pharmaceutics, Vidyabharti College of Pharmacy, Camp Road, Amravati ,Maharashtra 444602

[5]. https://www.google.com/imgres?imgurl=https%3A%2F%2Fwww.researchgate.net%2Fprofile%2FTushar-Rukari%2Fpublication%2F332104140%2Ffigure%2Ffig2%2FAS%3A742419012268034%401554017894441%2FFig-No-3-Hand-Shaking-Method-Ether-injection-method-This-method-provides-a-means-of.jpg&imgrefurl=https%3A%2F%2Fwww.researchgate.net%2Ffigure%2FFig-No-3-Hand-Shaking-Method-Ether-injection-method-This-method-provides-a-means-of_fig2_332104140&docid=v6VT8zcOSr6Q5M&tbnid=inst8Mc2YA4BsM&vet=1&source=sh%2Fx%2Fim.

[6]. Feynman R: There's plenty of room at the bottom. Science 1991,254:1300-1301.

[7]. Murray CB, Kagan CR, Bawendi MG: Synthesis and characterization of monodisperse nanocrystals and close-packed nanocrystal assemblies. Annu Rev Mater Sci 2000, 30:545-610

[8]. S. Majuru and O. Oyewumi, “Nanotechnology in Drug Development and Life Cycle Management,” Nanotech-nology in Drug Delivery,Vol. 10, No. 4, 2009, pp. 597-619. doi:10.1007/978-0-387-77668-2_20

[9]. C. Buzea, I. I. Pacheco and K. Robbie, “Nanomaterials and Nanoparticles: Sources and Toxicity,” Biointerphases, Vol. 2, No. 4, 2007, pp. 17-71.

[10]. M. Smola, T. Vandamme and A. Sokolowski, “Nanocar-riers as Pulmonary Drug Delivery Systems to Treat and to Diagnose Respiratory and Non Respiratory Diseases,” International Journal of Nanomedicine, Vol. 3, No. 1, 2008, pp. 1-19

[11]. R. Pandey and G. K. Khuller, “Nanotechnology Based Drug Delivery System(s) for the Management of Tuber-culosis,” Indian Journal of Experimental Biology, Vol. 44, No. 5, 2006, pp. 357-366.

[12]. https://images.app.goo.gl/6evVD8hdvAJZJyPWA

[13]. http://www.slideshare.net/HimalBarakoti/monoclonal-antibodies-130716465?from_m_app=android
[14]. Antibodies: a reviewSurjit Singh, Nitish K Tank, Pradeep Dwiwedi, JaykaranCharan, Rimplejeet Kaur, Preeti Sidhu, Vinay K Chugh.
[15]. . Alving C.R. Macrophages, as targets for delivery of liposome encapsulated antimicrobial agents. Adv Drug Delivery Rev, (1998); 2.
[16]. C. J. Chapman Allison, A.C., Gregoriadis, G, 1974. Liposomes as immunological adjuvant. Nature 252, 252.
[17]. Deamer, D. and Uster, P., Liposome preparation methods and monitoring liposome fusion. In: Baserga, R., Croce, C. and Royeza, G. (Eds.), Introduction of Macromolecules into viable Mammalian Cells, Alan R. Liss, New York, 1980,pp. 205 220.
[18]. de Marie, S., Janknegt, R., Bakker-Woudenberg, I.A.J.M.,1994. Clinical use of liposomal and lipid-complexed amphotericin B. J. Antimicrob.Chemother. 33, 907-916.
[19]. D.J.A Crommelin. Liposomes, Lasic, D.D., Papahadjopoulos, D., 1995. Liposomes revisited. Science 267, 1275 1276
[20]. Emanuel, N., Kedar, E., Bolotin, E.M., Smorodinsky, N.I.,Barenholz, Y., 1996. Preparation and characterization ofdoxorubicin-loaded sterically stabilized immunoliposomes.Pharm. Res. 13, 352-359
[21]. Felgner, J.H., Kumar, R., Sridhar, C.N., Wheeler, C.J., Tsai,Y.J., Border, R., Ramsey, P. Martin, M., Feigner, P.L.,1994. Enhanced gene delivery and mechanism studies witha novel series of cationic lipid formulations. J. Biol. Chem.269, 2550-2561.