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International Journal of Research Publication and Reviews

Journal homepage: www.ijrpr.com ISSN 2582-7421

A REVIEW ON NANOTECHNOLOGY AND 178 USING IMAGING AND DRUG DELIVERY.

BALA.R.V

B.PHARMACY. PALLAVAN PHARMACY COLLEGE,KOLLIVAKAM,KANCHEEPURAM-631502.

ABSTRACT:

Nanotechnology systems are relatively new but rapidly evolving science in which Nanoscale materials are used to serve as diagnostic tools or to deliver therapeutic agents to targeted sites in a controlled manner. Nanotechnology offers numerous advantages in the treatment of chronic human diseases. Diseases by delivering precise medicines to specific and targeted locations. The opportunities and challenges of Nanomedicine in providing drugs from synthetic/natural sources for their clinicalapplications are also discussed. We have also compiled information on trends and perspectives in the field of Nanomedicine. Future uses for HAI-178 antibody-conjugated fluorescent magnetic nanoparticles, including simultaneous treatment of in vivo early gastric cancer cells and targeted imaging, are very promising.

Keywords: Nanotechnology,178 imaging system , clinical application, Nano medicine.

INTRODUCTION :

Nanotechnology can be defined as the science and engineering concerned with the design, synthesis, characterization and application of materials and devices whose smallest functional organization is in the nanometer range or a billionth of a meter in at least one dimension. At thesescales, the consideration of individual molecules and groups of interacting molecules in relation to the overall macroscopic properties of the material or device becomes important because of control over the fundamental molecular structure,thus enabling control over the physical and chemical properties.

NANO BASED DRUG DELIVERY SYSTEM:

Recently, there have been tremendous developments in the field of delivery systems to deliver natural therapeutic so reagents to their target sites for the treatment of various diseases**.**

Currently, strategies using Nano carriers with different drug release profiles are being formulated to improve the specificity of nanostructures for target regions of the organism and to reduce immunogenicity through their coating or chemical functionalization with various substances such as natural polymers , polysaccharides, antibodies, cell membranes, and tunable surfactants, peptides, etc. In some cases, drugs donot show binding or affinity to a specific target certain barriers (e.g., blood-brainbarrier). These ligand-modified Nanocarriers were used. Penetrate the cell membrane and allow the drug to be administered in a specific e environment**.**

MERITS :

- It Can be used to deliver medicine as it is readily absorbed.
- Targeted drug delivery.
- It can be used in cosmetics because it penetrates deeper into the skin

DEMERITS:

- Being used to deliver medicine could mean nanoparticles could damage our cells as they can be easily absorbed.
- Nanoparticles could accumulate in organisms in over time and we are unaware of long term effect of this .
- Breathing in small particles should harm our lungs.

178 IMAGING SYSTEM :

In this study, we used HAI-178 monoclonal antibody-conjugated fluorescent magnetic nanoparticles to successfully image and treat gastric cancer in vivo. Immunohistochemistry was used to examine the expression of α-subunit of ATP synthase in 172 gastric cancer samples. We collected 172 gastric cancer tissues and used immune his to chemistry to examine the expression of the α-subunit of ATP synthase. Fluorescent magnetic nanoparticles were prepared and conjugated with HAI-178 monoclonal antibody, and the resultant HAI-178 antibody-conjugated fluorescent magnetic nanoparticles (HAI-178-FMNPs) were co-incubated with gastric cancer MGC803 cells and gastric mucous GES-1 cells. Gastric cancer-bearing nude mice models were created, injected with prepared HAI-178-FMNPs through the tail vein, and imaged using magnetic resonance imaging and a small animal fluorescent imaging system.

FUNDAMENTS OF NANOTECHNOLOGY ON DESIGNING DRUG:

Nanomedicine uses biocompatible nanoparticles and Nano robots for sensing, processing, vision, and actuation in living organisms. However, drugs with low solubility can cause distribution issues, such as decreased bio access after oral ingestion, lower outer membrane diffusion potential, increased intravenous dosage requirements, and adverse side effects. Drugs with low solubility cause a variety of biopharmaceutical distribution issues. Compared to conventional vaccines, oral ingestion has lower bio access, lower outer membrane diffusion potential, higher intravenous dosage requirements, and adverse side effects. However, many of these drawbacks could be mitigated by incorporating nanotechnology into the drug delivery system.

MECHANISM INVOLVED IN DRUG DESIGNING :

Drugs are primarily introduced into the structure's internal cavity via the hydrophobic effect, and when targeted to specific locations, the desired volume of the substance is released. Drugs are primarily introduced into the structure's internal cavity through the hydrophobic effect. When targeted to specific locations, the expected volume of the substance is released. The active ingredients released are specific. Drugs enter the structure's internal cavity due to its hydrophobic properties. Because encapsulated drugs have a low content in a hydrophobic environment, the expected volume of the substance is released when nanostructure materials are targeted to specific locations.

In contrast, the active ingredients to be released are specifically conjugated with the nanostructure carrier material, allowing for rapid distribution. The timing of release is critical in this strategy because the drug does not reach the target site and is rapidly released from the carrier. However, if it is released from its non carrier at the right time, its bioactivity and effectiveness are reduced. Another important feature is the targeted effect of the drug. , which uses nanomaterials or Nano formulations as drug delivery .

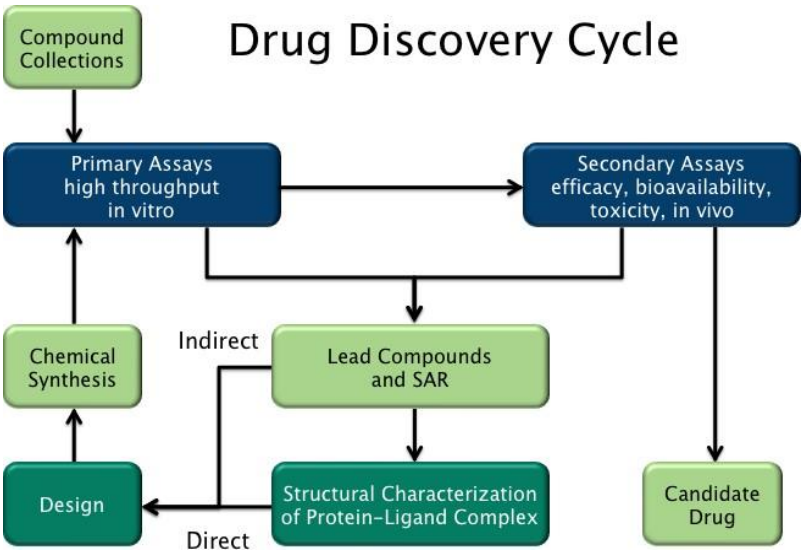

FIGURE 1 : MECHANISM INVOLVED IN DRUG DESIGNING;

NATURAL PRODUCT BASED ON NANOTECHNOLOGY IN DRUG DELIVERY :

The use of nanotechnology in natural products has a great development potential. Providing natural compounds in the treatment of cancer and other chronic human diseases can be beneficial through the use of nanoparticles and nanocarriers because they can increase bioavailability, targeted action, and controlled release. Providing natural compounds in the treatment of cancer and other chronic human diseases can be beneficial through the use of nanoparticles and Nanocarriers as they can increase bioavailability, targeted action and controlled release More over Profiles of these natural products.

NANOTECHNOLOGY FOR NATURAL PRODUCTS AGAINST CANCER:

As a promising interdisciplinary field, nanotechnology frequently draws on methods and instruments from biology, physics, engineering, chemistry, and medicine. Nanotechnology presents a remarkable, paradigm-shifting opportunity to significantly advance the use of natural products in cancer treatment and to reduce the negative side effects of traditional chemotherapy for patients. Nanotechnology offers an extraordinary, paradigm-shifting opportunity to make significant advances in the use of natural products in cancer treatment and to limit the side effects of conventional chemotherapy for patients.

APPLICATION OF NANOTECHNOLOGY:

- **PROTEIN DETECTION**

Gold nanoparticles are widely used in immune histo chemistry to identify protein-protein interactions. Proteins are an important part of the language, machinery, and structure of cells, and understanding their functionality is critical for improving human health. Gold nanoparticles are widely used in immune histo chemistry to identify protein-protein interactions .

- **CANCER THERAPY**

Photo dynamic cancer therapy is based on the destruction of cancer cells using laser-generated atomic oxygen, which is cytotoxic. Compared to healthy tissue, cancer cells absorb a larger amount of a special dye that is used to produce atomic oxygen.

- **TISSUE ENGINEERING**

The surface of natural bone typically has structures about 100 nm wide. If the surface of an artificial bone implant were smooth, the body would try to reject it.

- **MANIPULATION OF CELLS AND BIO MOLECULES**

Functionalized magnetic nanoparticles have found many applications including cell separation and probing ; These and other applications are discussed in a recent paper. Most of the magnetic particles studied so far are spherical, which somewhat limits the possibilities of making these nanoparticles multifunctional.

LITERATURE SURVEY :

- Nanotechnology-based drug delivery systems for cancer treatment by S. S. Kulkarni et al., 2019, Journal of Controlled Release, Volume 294, Pages 115-133.
- Targeted drug delivery using nanoparticles: A review by A. K. Singh et al., 2019, Journal of Pharmacy and Pharmacology, Volume 71, Issue 8, Pages 1031-1045

CONCLUSION:

- Pharmaceutical nanotechnology has emerged as a discipline with enormous spatial and temporal delivery of bioactives and diagnostics, as well as providing intelligence materials for tissue engineering. It offers new tools, opportunities, and scope that are expected to have a major impact on many areas of disease diagnosis, prognosis, and treatment through its nanotechnology tools. It offers new tools, opportunities and scope that are expected to have a major impact on many areas of diseases, diagnosis, prognosis and treatment of diseases through their Nano technological tools.
- Pharmaceutical nanotechnology is having a profound impact on disease prevention efforts by providing innovative tools for understanding the cell and the difference between normal and abnormal cells. It could shed light on the molecular basis of diseases.

REFERENCE:

1. Silva GA.Introduction to nanotechnology and its applications to medicine. Surge Neurol. 2004;61:216–20.
2. Mile E,Spinel GP,MilleE, DiFabrizioE, FerretsE, TomasS, GulinoA. Nanoparticle based delivery of small interfering RNA:challenges for cancertherapy. Into JNano med.2012;7:3637.
3. Torchilin VP.Multifunctional Nano carriers. Adv.Drug DevilRev.2012;64:302–15.
4. PelaB,delPineP,MuffleP,HartmannR,GalegoM,Rivera-FernandezS,delaFuente JM,NienhaosGU, ParkaWJ. Surface functionalization of nanoparticles with polyethylene glycol: effects on protein adsorption andcellularuptake. Acts Nano.2015;9:6996–7008.
5. GaoWW,ZhangLF. Coating nanoparticles with cell membranes for targeted drug delivery. JDrug Target.2015;23:619–26
6. MullerJ, Bauer KN, PropellerD, SimonJ, MainlanderV,WormFR,WinzeS,Land festerK.Coating nanoparticles with tunable surfactants facilitates control over the proteincorona.Biomaterials.2017;115:1–8.
7. GaoH, YangZ, ZhangS, CaoS, ShenS, PangZ, JiangX. Ligand modified nanoparticles increases cell uptake, alters endocytosis and elevates glioma distribution and internalization.SicRep.2013;3:2534
8. JainA , JainSK. Ligand-appended BBB-targeted Nano carriers(LABTNs).CristRevThereDrugCarrierSyst.2015;32:149–80.
9. Hawking A. Fundamentals of Nanotechnology-Based Drug Design Techniques. OrgChemoInJ.2021;15(5):17©2021TradeScience Inc.
10. A.Ramesh Kumaretal. ColloidsSurf.BBio interfaces(2013).

11. CollinearJP(Apr1996).“The role of structure-based ligand design and molecular model ling indrug discovery”.PharmacyWorld&Science.
12. CaoYC, JinR, NamJM, HaxtunCS, MarcinCA : Ramandye labeled nanoparticle probes for proteins.JACS2003, 125:14676-14677.
13. Roy I, Ohulchanskyy TY, Palaver HE, Berge EJ, Setoff AR, Morgan J, Dougherty TJ,Prasad PN: Ceramic-based nanoparticles entrapping water-insoluble photo sensitizing anticancer drugs : anovel drug-carrier system for photodynamic therapy. JAmCChemSoc2003,125:7860-7865.
14. HAI-178 antibody-conjugated fluorescent magnetic nanoparticles for targeted imaging and simultaneous therapy of gastric cancer