



AN OVERVIEW OF NANOTECHNOLOGY

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ABSTRACT:

The numerous benefits of nanotechnology are largely attributed to its ability to alter materials at extremely small scales, thereby achieving specific characteristics that can greatly enhance the toolkit of materials science. It is essential to consider the molecules and their interacting groups in relation to the overall macroscopic properties of the material when managing the fundamental molecular structure. This management allows for the regulation of the macroscopic chemical and physical attributes. In the realm of physiological and medical applications, there is a requirement for materials and devices that possess a high degree of specificity to interact with the body at a molecular or subcellular level. Such specificity may lead to targeted clinical applications for cells and tissues, aiming to maximize therapeutic outcomes while minimizing adverse effects. This overview elucidates the applications and key scientific and technological aspects of nanotechnology, along with its potential medical applications.

Keywords: Nanoparticles, Nanotechnology, Nanomedicine, Nano-diagnostic.

INTRODUCTION:

The study of the strange characteristics of resources between 1-10nm sizes (scale). They have different properties which is used for the diagnosis and treatment of diseases such as, optical, physical, chemical and biological etc. They also applicable for the study and growth of materials, articles and systems display physical, chemical and biological features. That are various form those establish on a wide range. It is in the field of medicine that have small things but big application. They are many methods for nanotechnology is confirming the future of medical treatment. They have different physical properties such a like, optical, magnetic, electrical, size, shape and elasticity. They have different chemical properties are depend on chemical degradation and materials types and also includes the biological characteristics such as, Bioavailability, Biocompatibility, Pharmacokinetics and Pharmacodynamics. There are two types of nanomaterial's, organic nanomaterial and inorganic nanomaterial.¹

TYPES OF NANOPARTICLES:

Acceptance for scientific use that are various types of nanoparticles discussed in below:

- **Micelles**

Micelles are the special types of the surfactant molecules that consist of lipophilic structure and hydrophilic polar functional groups. They act as a therapeutic agents, drug delivery agents, imaging agents and contrast agents. They should be increase biological availability of drug. Micelles diameter range is 10-100nm.

- **Liposomes**

Liposomes are universal; their surface properties can be changed with polymer, antibiotic, proteins, macromolecular drugs and also consist of nucleic acid and crystalline metals. It is a initial food and drug administration established Nano-medicine, its used for the treatment of breast cancer.¹

- **Carbon Nanotubes**

Carbon nanotubes can complete heavy loading capacity as drug delivery. It have special optical, mechanical and electrical characteristics. Carbon nanotubes have single walled and multiwalled interlinked carbon structure.

- **Metallic Nanoparticles**

Metallic Nanoparticles involved iron oxide and gold nanoparticles. Iron oxide contain hydrophilic polymer such as polyethylene glycol and Dextrane. It's used for laser based treatment and acts as drug carrier agents.

FUTURE IMPACT OF NANOTECHNOLOGY ON MEDICNE AND DENTISTRY :

Nanotechnology register to medication and dentistry will conduct meaningful conduct promote in the detection medical care and prohibition of diseases. Occurrence of identical pure means of supplying medicine at corrective position. The tissue engineering are consistently suggesting for new approach to appeal the concept of cell grafting. The biotechnology to device organic replacement that will be renews and save normal activity in unwell and damage tissue.

- **Nanomedicine:**It's normally called as medication that appeal nanotechnology and are voluntary for beneficial or determine applications. Nanomedicine retail subjected by request according to drug transfer and recreating medication.

- **Nano diagnostic:** It as climbing original lot of specific conclusion. They supply new path for patient selected judgement and timely identification of affection anatomical parameter with improve sharpness and accuracy.

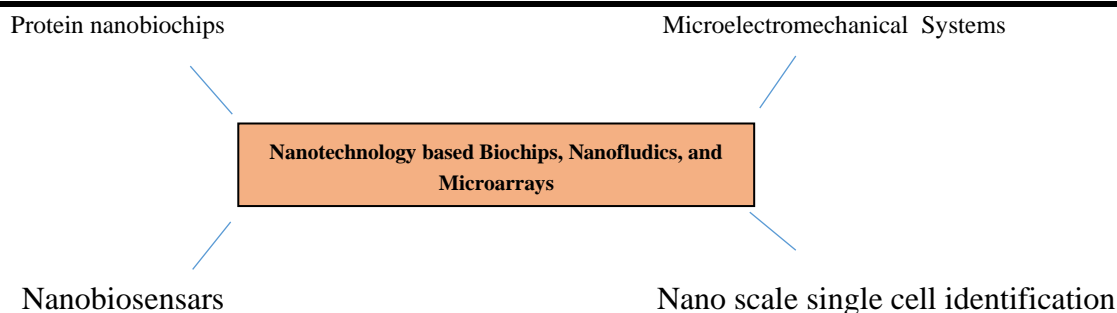


Figure No: 1

Regenerative medicine: It is process of generate surviving working matters to renovate biological structure activity disoriented cause by age, disease and damage. It is conventional proceed towards equivalent to nanoparticles, platform with nanofibers and gene distribution.

Application: Bone tissue renewal, Nanocomposite platform, Nanotechnology predicted germ cell distinction and stain renewal, stem cell predicted skin renewal.

Nano placed remedy distribution structure: Drugs are called by food and drug administration is portion as planned for utilize in the detection, restore, therapy or prohibition of condition.

In case of neurological disorders nanotechnology is tremendously useful because it can crosses blood brain barrier i. e. it is used as a medication transport medium. .Nanotechnology increases medication awareness in target tissue, hence small doses of medication required.

Nanoparticles for brain delivery:The blood brain barrier should be crossed by various medicines examples antibiotics, cancer preventing drugs, and some species of sedative and hypnotics.

The increased direction of a drug at the blood brain barrier increases the retention time of drug in brain.

Nanoparticles for ocular delivery:Nanoparticles helps in case of glaucoma the demand of medicine is to increase elimination of half-life so that bioavailability of drug is increased in case of eye drop.

Examples are Pilocarpine, Betaxolol.

A Revaluation in modern industry: Nanotechnology has steadily still greatly grip additionally distinct global production. Nanoscience give connection in the middle of balanced and nucleonics operator in a section is known as microscale arrangement. This machinery has significantly impact scale manufacturing and producing linkage.

Parts of nanotechnology in data processor field: Noncomplex have been operated to create a multiplicity of dissimilar category of semiconductor. Semiconductor has absolute worn to orbits strips and reforming element interior data processor to transform and build up computerized communication. Approach of analytical adapting in various corner.

a) Arrangement of statement:

1. Solvability of medicine.
2. Strongest match of medication.
3. Mixable of remedies and filling material.
4. Coagulation of medicine.
5. Filling up and discharge of medicine.
6. Computation cloned in detached.
7. Analogical.

b) Conceiving examination

c) Bioavailability exploration

d) Logical approach in make to order drug

- **Nanotechnology in food line business:** These days are not special rules on nanoscience utilization in provisions. If any meal outcome or its components is up to date or its specific formation is purposely altered they will be submit to risk assessment anterior to obtain acceptance from the put up for upscale.

- **Risk assessment of noncomplex in food:** The risk assessment of micro gel and nonohetero structure announce that the identical likely probate way of creature subjection are the GIT, Skin and Lungs. The association for perfectible collaboration and evaluation approved the quality trial recommendation be passed down for the dangerous estimation of noncomplex for substance security.

Applications:

1. Nanotechnology has progressed in the lot of electronic space, food, textile, optics and medicine etc.
2. In the medicine nanotechnology used for the diagnosis of various diseases.
3. It provides amazing chance not only to better materials and medical devices but also to form brilliant devices.
4. It also helpful for the remove the pathogens and microorganism from the food.
5. Nanotechnology is the treatment of Nero generative disorder such like a Alzimeres, Parkinson's diseases.
6. They play role in production and neuro safety of central nervous system.
7. They increase working role of Patients.

Conclusion:

Nanoparticles have significantly impacted clinical medicine, particularly in the fields of medical imaging and drug/gene delivery. Although numerous innovations, including iron oxide contrast agents and various drug delivery systems, are already well-established, new technologies continue to develop based on similar design principles. As these advancements progress toward clinical implementation, it is essential to consider their environmental and societal effects, especially concerning quantum dots.

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