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NANOTECHNOLOGY, NANOMEDICINE & NANOBOTS

A CURE FOR PARKISON AND ALZEHIEMER

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Abstract: Nanotechnology can be referred to as the study of everyday particles and matter that scales itself to extremely small natural structures, having a microscopic size of 0.1 to 100 nm. Nano medication is the new rising area of nanotechnological know-how and generation of medicine at the microscopic scale. Nanomedicine is the clinical application of nanotechnology. A quick clarification of various sorts of pharmaceutical Nano systems is given. Application of Nanotechnology in numerous fields which include health care, curing incurable diseases and medicinal drug delivery, is discussed in detail. Packages of Nano medical particles in drug transport are explained. A quick explanation about taking use of Nanobots is discussed in the element. Nanobot additives like extensive use of Nano Crystals, arborols, cascade molecules, carbon Nanotubes, Nano edible wire, Nanoshells etc. are defined beneath.

The advancement in the field of Nanotechnology facilitates the remedy of almost incurable neurodegenerative diseases which include Parkinson's sickness and Alzheimer's ailment. Programs and research of the Nano era in cancerous tuberculosis remedy, the scientific usage of nanotechnology in oral surgery and health dentistry, in the ophthalmology field, in surgery field, visualization of medical ailments and its cure, flesh structure and associating tissue engineering, observation of antibiotic resistance and its immune response are mentioned in this article.

I. INTRODUCTION

Nanotechnology: Nanotechnology is also widely referred to as nanotech in modern scientific terminology, which is working on a particle or matter at its molecular and supramolecular scale. Description of nanotechnology states the unique advancement in technology for the purpose of exactly manipulating atoms and molecules in order to fabricate matter at the microscopic and macroscopic scale and on its merchandise, also now referred to as the era of molecular study of science or nano-scale development and research technology.

Nanomedicine: Nano Medicine is a branch of medicinal drugs that uses the information and gear of nanotechnology to prevent and treat sicknesses. Nano Medicine includes using Nanoscale materials for diagnosis, shipping, sensing or actuation purposes in a dwelling organism.

Nanobots: Nano Robotics is the advancement in technology for fabrication and generating self-performing machines or programmed robots at or near the scale of a nanometer (10^{-9} meters). Greater, in particular, nano Robotics (instead of micro-robotics) refers back to the nanotechnology engineering discipline of designing and building nano Robots, with gadgets ranging in length from zero.1–10 micrometres and constructed of nanoscale or molecular components.

1.1: Nanotechnology in the field of electronics:

Industrial Nano electric semiconductor tool fabrication started out during the decade of 2010. In the year 2013, SK Hynix initiated commercial mass-manufacturing of a sixteen-nanometer production technique, TSMC initiated the production of a sixteen-nanometer FinFET method, and Samsung Electronics started out the production of a ten nanometer system. TSMC started manufacturing of a seven-nanometer method in 2017, and Samsung started production of a 5 nanometer manner in 2018. In 2019, Samsung introduced plans for the industrial manufacturing of a 3 nanometer GAAFET method in 2021. Industrial manufacturing of nano electronic semiconductor memory also started out in the 2010s. In 2013, SK Hynix began mass production of sixteen nanometer NAND flash reminiscence, and Samsung began manufacturing of 10 nanometer multi-stage mobile (MLC) NAND flash memory. In 2017, TSMC started manufacturing of SRAM reminiscence the use of a 7 nanometer manner.

2 : Nanotechnology in Pharmaceuticals and Health sector:

Even nowadays numerous sicknesses like diabetes, cancerous disease, Parkinson's sickness, Alzheimer's sickness, cardiovascular sickness and more than clinically isolated syndrome as well as extraordinary kinds of critical inflammatory or infectious diseases (e.g. HIV) represent an excessive number of great and complicated ailments that are posing primary trouble for the mankind. Nano-remedy is a utility of nanotechnology which fits inside the area of health and medicinal drug. The nano-medicinal drug makes use of Nano substances and Nano digital biosensors. In the future, Nano medication will gain molecular nanotechnology. The scientific place of Nano science application has many projected benefits and is potentially treasured for all human races.

With the assistance of Nano medicinal drug, early detection and prevention, progressed diagnosis, right treatment and observe-up of sicknesses are possible. sure Nanoscale debris is used as tags and labels, and biological may be executed fast, but the trying out has ended up greater touchy and greater bendy. Gene sequencing has turned out to be extra green with the invention of Nano devices like gold Nano particles, those gold debris while tagged with short segments of DNA may be used for the detection of genetic sequences in a pattern. With the help of nanotechnology, broken tissue can be reproduced or repaired. those so known as artificially stimulated cells are used in tissue engineering, which may revolutionize the transplantation of organs or synthetic implants.

superior biosensors with novel functions can be evolved with the assistance of Carbon Nano tubes. those biosensors can be used for astrobiology and may throw mild on have a look at the origins of existence. This era is also being used to develop sensors for cancer diagnostics. even though CNT is inert, it is able to be functionalized at the tip with a probe molecule. Their take a look at making use of AFM as an experimental platform.

2.1 : Drug Delivery :

In the field of Nano technology, it's the use of nano particles that allows for desired website drug transport. In this methodology, the desired dosage of the drug is used and facet consequences are reduced extensively because the lively agent is delivered and deposited within the morbid region handiest. This enormously selective method can cut down expenses and aches to the patients. As a result style of Nano debris including dendrimers, and Nano porous materials locate utility, and micelles generated from block co-polymers, are used for drug encapsulation.

It helps in transporting small drug molecules to the favoured place. Further, Nanoelectromechanical structures are applied for the energetic launch of the medicine. Iron Nanoparticles or gold shells are finding essential utility within the cancerous remedy. A focused remedy reduces drug usage and remedy cost, making the remedy of the patient's value-powerful.

Nano drugs used in drug transport, are made of Nanoscale debris or molecules that can up-perform drug bioavailability. For maximizing bioavailability both at the unique site inside the human body and over a time period, molecular targeting is performed through Nano engineered structures consisting of Nano robots. The molecules are centered and delivering of medicine is achieved with cellular precision. In vivo imaging, every other place wherein Nano equipment and devices are being advanced for Vivo imaging. The Use of Nano particle photos including in ultrasound and MRI, Nano particles are used for evaluation. The Nano engineered materials are being evolved for correctly treating ailments and illnesses along with cancer. With the advancement of nanotechnology, self-assembled biocompatible Nano devices can be created as a good way to locate cancerous cells and mechanically evaluate the disorder, which will remedy and put together reviews.

As a consequence, Nano debris is fruitful tool for the advancement of drug transport, such as diagnostic sensors and bioimaging. The bio-distribution of these nanoparticles is still not up to the mark as desired due to its complicated host's reactions to its Nano and micro-sized materials and its difficulty in targeting unique organs inside the body. Efforts are made to optimize and higher recognize the ability and boundaries of Nano particulate systems. Within the excretory device look at of mice dendrimers are encapsulated for drug transport of definitely-charged gold Nano particles, which have been observed to enter the kidneys while negatively-charged gold nanoparticles remained inside the important organs like the spleen and liver. The tremendous surface fee of the nanoparticle decreases the rate of opsonization of nanoparticles in the liver, as a consequence affecting the excretory pathway. due to their small size of five nanometer, Nano particles can get saved inside the peripheral tissues, and therefore can get gathered within the body through the years. as a result Nano debris can be used effectively and effectively for concentration and distribution, in addition, research can be completed on Nano toxicity so that its clinical makes use of can be increased and stepped forward.

2.2 : Nano Medicine in Treatment of Cancer:

Due to the small size of nano-sized particles, it may be of promising use in oncology, mainly in the imaging field. Nano-sized particles, together with quantum dots, in association with quantum confinement residences, which include length-tunable light emission, can be used at the side of magnetic resonance imaging, to provide tremendous pics of tumour websites. Compared to natural dyes, nano debris is an awful lot brighter and needs one light supply for excitation. As a consequence, using fluorescent quantum dots may want to produce a better contrast photograph and at a cheaper fee than organically produced dyes used as assessment media. However, quantum dots are commonly manufactured from hazardous toxic factors.

Nano debris has a special asset of elevated surface place to extent proportion, which allows diverse functional organizations to get connected to a Nano particle and as a consequence bind to sure cancerous tumour cells. Furthermore, the tenth to a hundred-

nanometer small size of nano particles permits them to be preferentially acquired at tumour websites as tumours lack a powerful lymphatic drainage machine. Multifunctional Nano debris may be synthetic that would come across, picture, and then treat a tumour in future most cancers treatment. Kanzus RF remedy attaches microscopic Nano-sized particles to most cancer cells and then "chefs" tumours in the human body with radioactive waves that warm best the nanoparticles and the adjacent (cancerous) cells.

Nanowires are used to put together sensors take a look at chips, that could hit upon proteins and other biomarkers left behind by way of cancer cells, and detect and make the analysis of cancer feasible within the early degrees from a unmarried drops of a affected person's blood .

Nano technology primarily based drug shipping is primarily based upon 3 statistics: i) green encapsulation of the drugs, ii) promising delivery of stated capsules towards a centred place of the body, and iii) a hit release of that drug there.

Nano shells of a hundred and twenty nanometer diameter, coated with gold have been used to kill most cancers tumors in mice with the aid of Prof. Jennifer at Rice university. These Nano-sized shells are focused to bond to cancer posing cells by way of conjugating antibodies or peptides to the Nano shell floor. The area of the tumour is irradiated with an infrared laser, which heats the gold sufficiently and destroys the cancer cells .

Cadmium selenide Nano sized particles in the shape of quantum dots are utilized in detection of most cancers tumors because whilst uncovered to ultraviolet mild, they glow. The health care provider injects those quantum dots into most cancers tumors and might see the glowing tumor, as a result the tumor can easily be eliminated.

2.3 : Nanomedicine in Treatment Of Parkinson's Diseases:

this may enhance cutting-edge remedy of Parkinson's ailment (PD). Parkinson's ailment (PD) is the second maximum commonplace neurodegenerative ailment after Alzheimer's ailment and impacts one in each 100 persons above the age of 65 years, PD is a sickness of the important frightened device; neuro inflammatory responses are worried and ends in severe problems with frame motions. The contemporary cure's goal to improve the functional potential of the affected person for so long as possible but can't adjust the development of the neurodegenerative procedure.

The goal of implemented nanotechnology is regeneration and neuro protection of the important worried system (CNS) and will extensively benefit from simple nanotechnology studies performed in parallel with advances in neurophysiology, neuropathology and cellular biology. The efforts are taken to broaden novel technologies that immediately or in a roundabout way assist in imparting neuro protection and/or permissive surroundings and active signalling cues for guided axon increase. with a view to decreasing the peripheral aspect-consequences of conventional kinds of Parkinson's disorder remedy,

2.4 : Nanobots:

Nanobots can be thought of as a technologically advanced version of a virus or microorganism. They may be biological or synthetic, but they are designed to fulfil predetermined duties at the atomic level. They are predicted to have a self-sustaining design and be fueled by a tiny cell, battery, or perhaps solar cells. The core concept behind nanobots is to have a tool that can interact at the nanoscale and help with knowledge acquisition or system manipulation at the nanoscale level. Nano contact and nanomanipulation are crucial to the advancement of nanobots.

Nanobots locate their initial and most outstanding programs in scientific technical knowledge when considering their capability.

EXPERIMENTS:

3.1 Application of Nanobots in Surgery :

In the method developed by Rice University, two pieces of chicken meat are fused using a flesh welder by placing them next to one another. In this method, the seam is allowed to drip with green liquid that contains gold-coated Nano shells while the pieces are welded together. Atherosclerosis-prone arteries that have undergone organ transplantation may be treated with this technique. The flesh welder can be used to flawlessly weld the arteries.

3.2 Application of Nanobots in Visualization:

Finding out how a medicine is metabolized and distributed can be done by watching motion. Scientists have coloured the cells in order to modify their motility at a particular location in the frame. the dyes that glow under a certain wavelength of light. Luminescent tags have been used to colour a wide variety of cell types. These proteins-affixed quantum dot tags are able to cross biological membranes. The different-sized dots have been on bio-inert fabric. As a result, sizes are selected so that each subsequent group of quantum dots fluoresces at the same light frequency as the preceding group.

3.3 Application of Nanobots in Tissue Engineering :

Nanotechnology can be used in tissue engineering to regenerate or repair damaged tissues. In organ transplants or artificial implant treatments, the application of the right nanomaterial-based scaffolds and growth factors can artificially encourage the proliferation of cells, extending life.

3.4 Application of Nanobots in Antibiotic resistance:

Through the use of Nano debris in combination therapy, antibiotic resistance can be decreased. By interfering with various proteins involved in antibiotic resistance or pharmacologic mechanisms of medicine, zinc oxide nanoparticles can reduce antibiotic resistance and enhance the antibacterial effects of ciprofloxacin against microorganisms.

3.5 Application of Nanobots in Immune response :

The Nano device Buckyballs had been employed to modify the immune/allergy response. They stop mast cells from releasing histamine into the blood and tissues because they have a stronger affinity for free radicals than any antioxidant, including vitamin E.

3.6 Application of Nanobots in Nano pharmaceuticals :

Nano medicines can be used to diagnose illnesses at a very early stage, and the diagnostic applications could improve on current methods by utilizing nanoparticles. In the emerging discipline of nanomedicine, drug particles or therapeutic transport systems operate on the nanoscale. In the pharmaceutical industry, it is still challenging to deliver the proper dosage of a specific active drug to a specific problem site. Nano pharmaceuticals are highly capable of addressing the shortcomings of conventional therapies that offer website online-specific targeting of active dealers. Nanotechnology-based prescription medications can improve patient compliance by reducing their hazardous systemic side effects.

CONCLUSION:

Nano materials have enhanced floor proximity and Nano scale outcomes, making them a viable tool for the development of medication and gene delivery, biomedical imaging, and diagnostic biosensors. In contrast to their bigger counterparts, nanoscale compounds have particular physicochemical and organic homes. Due to their peculiar size, form, chemical composition, floor shape, rate, solubility, and aggregation, the features of nanomaterials can greatly alter how they interact with biological molecules and cells. For instance, single-walled carbon nanotubes have been employed as high-performance transporters for biomolecules into cells, and nanoparticles can be used to produce stunning images of tumour areas.

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