An Application of Nanobots using health care industry is more focused on improving the quality of medical treatments

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Abstract

The purpose of this paper is to review the phenomenon of nanorobotics at a might apply to micro and Nano scale robotics is named nanorobotics. These miniature robots have unique advantages like accessing to unprecedented and little areas, increased flexibility, functionality and robustness, and being low cost), adaptive and distributed. Nanorobotics is that the technology of making machines or robots at or on the brink of the microscopic scale of a nanometre (10^{-9} meters). As no artificial non-biological Nano robots have yet been created, they continue to be a hypothetical concept. The names nanobots, ganoids, nanites or nanomites have also been wont to describe this hypothetical devices.in this paper is to review some applications of the nanorobotics as like: micro robotics, emerging drug delivery application, health care, bio-medical application, cancer therapy, Brain Aneurysm, Communication system, and new future Nano technologies. Etc.

1. INTRODUCTION

Nanotechnology is that the creation of fully mechanical machine with its physical or its components size very on the brink of the nanometre range. This kind is commonly known as nanorobotics. There are only concepts. i.e, if you check out the Nokia that's a replacement concept of futuristic mobile it's built of sensor types or means Nano robots hat can detect if the food are going to be safe to eat by checking if there are any impurities. These types mobile are called “Morph”. Robotics are generally used on different fields as like: communication, transportation, army, commerce and medicine. .currently, robots sizes have from tens of centimetres right down to millimetres thanks to limited nanoscale and integration capabilities of obtainable power sources, communication, control and computation schemes and tools, and coarse to fine motion mechanisms, sensors, manipulators, and actuators.

A Nano robot may be a computer-controlled robotic device constructed of nanoscale components to molecular precision and is microscopic in size. We can use this technology to creation of latest mechanisms and human protective devices. Robotics is that the branch of technology that deals with the planning, construction, operation, and application of robots, computer systems for his or her control, sensory feedback, and knowledge processing. Today, robotics may be a rapidly growing field, the Nano technological advances and continues, research, design, and creating new robots various practical purposes, whether domestically or militarily. Nanorobotics is that the technology of making machines or robots at or on the brink of the size of a nanometre (10^{-9}metres). Nano robots. Nano robots (nanobots or nanoids) are constructed of nanoscale or molecular components. As no artificial non-biological Nano robots have thus far been created, they continue to be a hypothetical concept at this point.

2. HISTORY OF NANOROBOTS

1980's by Nobel Prize laureate Richard Smalley. Smalley has extended his vision to carbon nanotubes, discovered by Sumio Iijima, which he envisions as the next super-interconnection for ultra small electronics. The term nanotechnology has evolved to mean the manipulation of the elements to create unique and hopefully useful structures,

December 29, 1959: Richard Feynman gives the famous "There's Plenty of Room at the Bottom" talk.

- First use of the concepts of nanotechnology. Describes an individual atoms and Molecules can be manipulated.

• 1974: Professor Norio Taniguchi defines nanotechnology as "the processing of, separation, consolidation, and deformation of materials by atom / molecule."

• 1980's: Dr. Eric Drexler publishes several scientific articles promoting nano scale phenomena and devices.

Nanotechnology by Dr. Eric Drexler is published. He envisioned Nano robots as self-replicating. A first book on nanotechnology.

3. APPLICATION OF NANOROBOTICS

The applications of the Nano robotics are more as: micro robotics, emerging drug delivery application, health care, bio-medical application, cancer therapy, Brain Aneurysm, communication system, and new future Nano technologies. Etc.

3.1 NANOMEDICINE APPLICATION

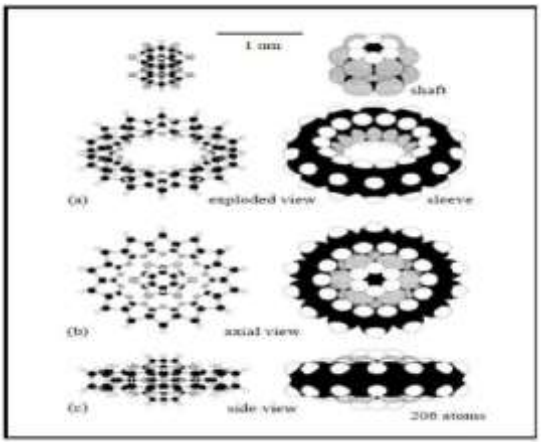
The major development of Nano medicine molecular nanotechnology (MNT) or nanorobotics. Just as biotechnology extends the range and efficacy of treatment available from application of nanomaterials, the arrival of molecule of nanotechnology will be again expand enormously the effectiveness, precision and speed of future medical treatments while at an equivalent time significantly reducing their risk, cost, and invasiveness. MNT will allow doctors to perform direct in vivo surgery of human cells. Nano medicine's which will easily traverse the physical body because Nano robots are so tiny. Scientists report that Nano robot constructed of carbon atoms during a diamonded structure due to its inert properties and strength. Glucose or natural body sugars and oxygen could be a source for propulsion, and it'll produce other biochemical or a molecular part depends on task. A large Potential applications for nanorobotics in medicine include early diagnosis and targeted drug delivery with treatmental medicine for cancer biomedical instrumentation, surgery, pharmacokinetics, monitoring of diabetes, and health care. In future medical technology is predicted to Nano robots injected into the patient to perform treatment on a cellular level.

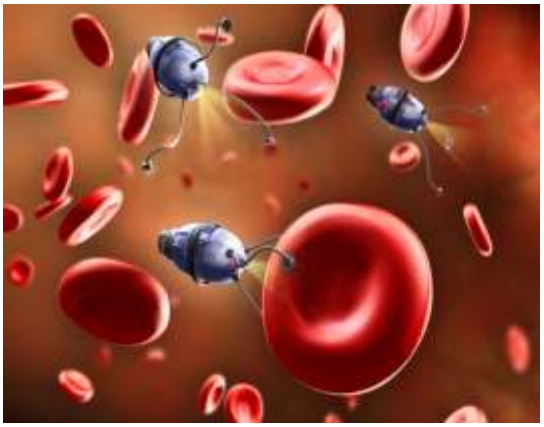
3.2 MECHANICAL APPLICATION

The Nano technology is given the foremost convenient bearings and gears. One of the classes' components. Examples are Drexler's overlap-repulsion bearing design. This bearing is made of a little shaft that rotates within a hoop sleeve of two .2 nm in diameter, its 206 no. of atoms of carbon, silicon, oxygen and hydrogen. The arranged of atoms in Nano shafts during a 6-folds. Similarly the ring has 14-fold symmetry, this mix is provides low energy barriers to shaft rotation. A 2808-atom strained shell sleeve bearing designed by Drexler and Merle 16 using molecular mechanics force fields to make sure that bond lengths, bond angles, van der Waals distances, and strain energies are reasonable. This 4.8-nm diameter bearing features an interlocking-groove interface which derives from a modified diamond (100) surface. In mechanical application of the nanorobotics during which includes bio-mechanics and Nano machines are present. The science of Nanorobotics vital role within the development of the robots, whose structure is made by using nanoscale components and its contents with within the basses of objectives and limitations. The nature of the component being within the Nano scale allows the researchers for the engineering of the mimic of citizenry. Which constitute the robots has been possible thanks to nanorobotics nanobotes, nanites, nanoids or nanomites are a number of the hypothetical devices created with the knowledge of the nanorobotics

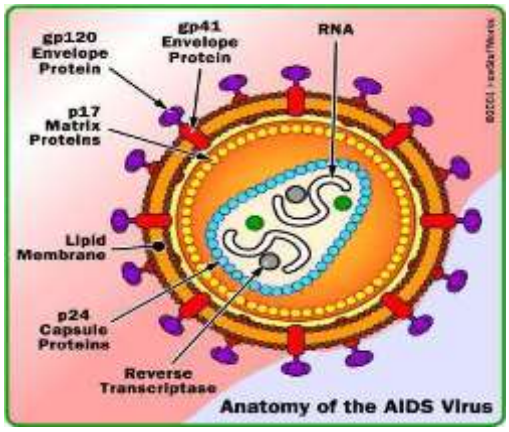
3.3 NANOROBOTICS USES IN HEALTH CARE

The nan robotics science in these experiment and research will give the very bright future. The Nano robotics is developing da y by day in medical industries. That's increase the human safety and health caring fields are expanding. They're many senior ill patients and their live by the utilization of the nanorobotical treatment method. HIV, cancer and other harmful diseases also are under progress for curing. The Nano robots will treat and find disease, and restore lost tissue at the cellular level. It is useful for monitoring, diagnosing and fighting sichness.In the health care field the nanorobotics is perform the good treatment by through biomedical. That is improving the technique of treatment methods. In future we'll found the decrement of massive ills. We are using the various field of the nanorobotics as like medical application, treatment of cancer, nanorobotics in gene therapy, Nano robots for brain aneurysm, Nano robots in dentistry, etc.





About the proteins, which envelope HIV.one among these proteins, named gp 120,"recognizes" a protein on helper T-cells named CD4, and physically associates with it. The CD4 protein may be a normal a part of a helper T-cell's membrane.



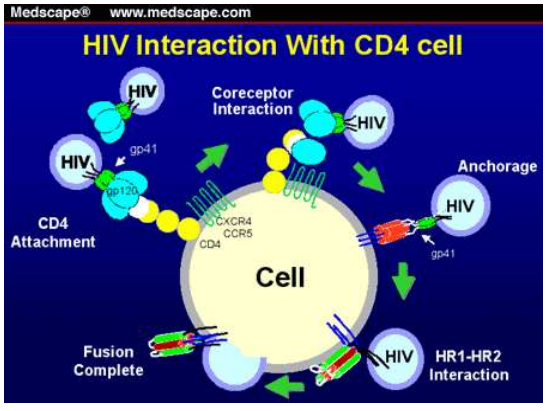


Figure (a): structure of aids virus.

Fig: b) Interaction of HIV with CD4 images

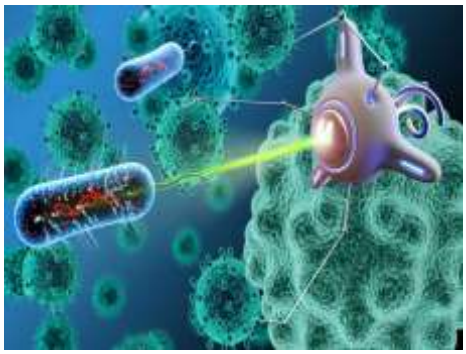
3.4 ANTI HIV USING NANOTECHNOLOGY

The system is comprised of two important cell types: the B-cell and therefore the T-cell. The B-cell is liable for the assembly of antibodies, and therefore the T-cell is responsible either for helping. The B-cell to form antibodies, or for the killing of damaged or "different" cells within the body and therefore the reform the T-cells are classified main two types the "helper-cell and the cytotoxic T-cell. The T-helper population is further divided into those which help B-cells (Th2) and people which help Cytotoxic T-cells (Th1).through nanorobotics treatment systems system and operation of HIV. The system is activated. Both B- and T-cell members answer the threat, which may be a end in the elimination of the substance or agent from our bodies. Normally, these actions are wonderfully protective folks. The effect of HIV on the system is that the results of a gradual elimination of the Th1 and Th2 helper T-cell subpopulation. Remember

Figure (b): Interaction of HIV with CD4 As a consequence of the interaction with CD4 on helper T-cells, HIV specifically infects the very cells necessary to activate both B-cell and cytotoxic T-cell immune responses. Consequently, the virus can multiply, and kill the helper T-cell during which it lives. The fight between the virus and therefore the system for supremacy is continuous until the body eventually succumbs, apparently due to the lack to any longer Produce T-cells. This leads to the entire inability of our body to ward-off even the weakest of the organisms. This acquired condition of immune deficiency is named, AIDS.

3.5 NANO ROBOTS IN CANCER TREATMENT

Cancer are often successfully treated with current stages of medical technologies and therapy tools with the assistance of the nanorobotics. Determine the clincher to chances for a patient with cancer to survive is: how earlier it had been diagnosed; another important aspect to realize a successful treatment for patients is that the development of efficient targeted drug delivery to decrease the side effects from chemotherapy. Considering the properties of Nano robots to navigate as blood borne devices, they will assistance on such extremely important aspects of cancer therapy. Nano robots with embedded chemical biosensors are often wont to perform detection of tumour cells in early stages of development inside the patient’s body. Integrated Nano sensors are often utilized for such a task so as to seek out intensity of E-cadherin signals. Therefore a hardware architecture supported Nano bioelectronics is described for the appliance of Nano robots for cancer therapy.



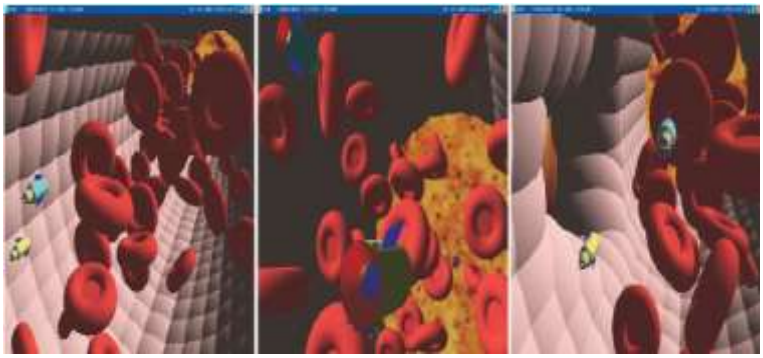


Fig : Cancer Tumr Killed By Nanobots

Fig : Working of Nanorobot on Brain aneurysm

The scientists have genetically modified salmonella bacteria that are drawn to tumors by chemicals secreted by cancers cells. The bacteria carry microscopic robots, about 3 micrometres in size that automatically release capsules crammed with drugs when the bacteria reach the tumor. By delivering drugs on to the tumour, the Nano robot, which the team named bacteriobot, attacks the tumor wile leaving healthy cells alone, sparing the patient from the side effects of chemotherapy. Bactiriobot can only detect tumor forming cancers, like breast cancers and colorectal, but the Nano robot will eventually be ready to treat other cancers also. A clincher to work out the probabilities for a patient with cancer to survive is: how earlier it had been diagnosed; what means, if possible, a cancer should be detected at least before the metastasis has began. Another important aspect to realize a successful treatment for patients is that the development of efficient targeted drug delivery to decrease the side effects from chemotherapy. Considering the properties of Nano robots to navigate as blood borne devices, they will assistance on such extremely important aspects of cancer therapy.

3.6 BIOMEDICAL APPLICATIONS OF NANOROBOTS

The enormous potential within the biomedical capabilities of Nano-Robots and therefore the imprecision and fewer side effects of medical treatments today make Nano-Robots very desirable. But today, we propose for Nano medical robots, since they're going to haven't any difficulty in identifying the target site cells even at the very early stages which can't be done in the traditional treatment and can ultimately be ready to track them down and destroy them wherever they'll be growing.

Nano robots are going to be applied in chemotherapy to combat cancer through precise chemical dosage administration, and an identical approach might be taken to enable Nano robots to deliver anti-HIV drugs. The use of SPMs to image and manipulate biological samples has had an incredible impact on the sector of biology in recent years. Studies of

single molecules by SPMs are advantageous because they will provide intrinsic properties of the individual molecules themselves as against just the majority properties of larger samples. SPM technology has become a useful tool for the understanding of biological structures and processes at the nanoscale. Examples of AFM applications in imaging and Nano manipulation include the extraction of chromosomal DNA for genetic analysis, the disruption of antibody antigen bonds, the dissection of biological membranes, and the Nano-dissection of protein complexes.

3.7 NANO ROBOTS IN GENE THERAPY

Medical Nano robots can readily treat genetic diseases by comparing the molecular structures of both DNA and proteins found within the cell to known or desired reference structures. In some cases, chromosomal replacement therapy is more efficient than in CY to repair. Floating inside the nucleus of a person's cell, an assembler built repair vessel performs some genetic maintenance. Stretching an excellent coil of DNA between its lower pair of robot arms, the Nano machine gently pulls the unwound strand through a gap in its prow for analysis. Upper arms, meanwhile, detach regulatory proteins from the chain and place them in an intake port. The molecular structures of both DNA and proteins are compared to information Stored within the database of a bigger Nano computer positioned outside the nucleus and connected to the cell-repair ship by a communications link. Irregularities found in either structure are corrected and therefore the proteins reattached to the DNA chain, which re-coils into its original form with a diameter of only 50 nanometres, the repair vessel would be smaller than most bacteria and viruses, yet capable of therapies and cures rather be beyond the reach of present-day physicians. “Internal medicine” would take on new significance. Disease would be attacked

At the molecular level and such maladies as cancer, viral infections and arteriosclerosis might be exhausted. Most human diseases involve a molecular malfunction at the cellular level, and cell function is essentially controlled by organic phenomenon and its resulting protein synthesis. One common practice of genetic therapy which has enjoyed only limited success is to supplement existing genetic material by inserting new genetic material into the nucleus, commonly using viral bacteriophage bacterial system cell plasmid/phospholipid microbubble cationic liposome, dendrimeric, chemical, Nano particulate or other appropriate transfer vectors to breach the cell wall. However, permanent gene replacement using viral carriers has largely failed so far in human patients thanks to immune responses to antigens of the viral carrier also as inflammatory responses, insertional mutagenesis, and transient effectiveness. Excess gene copies , repeat gene clusters , and partial trisomy’s and better polysemy’s can often cause significant pathologies, sometimes

mimicking aging .Attempting to correct excessive expression caused by these errors by implementing antisense transcription silencing on a whole-body, multi-gene, or whole-chromosome basis would be far less desirable than developing more effective therapeutic methods that did not require such extensive remediation.

3.8 NANO ROBOT FOR BRAIN ANEURYSM

The Nano robot for brain aneurysm prognosis, they're using computational nanotechnology for medical device prototyping. This is consisting of three main Equipment- (a) prototyping, (b) the manufacturing approach and (c) inside-body transduction. It is the computational nanotechnology provides a key tool for the fast and effective development of Nano robots, which is supports of investigation to deal with major aspects on medical instrumentation and device prototyping.

A similar approach was taken by industry to create racing cars, airplanes, submarines, ICs and medical devices. The bio molecules are too small to be detected reliably: instead the robot relies on chemical Nano biosensor contact to detect them. Brain aneurysms are taken for modelling the study of Nano robots sensing and interaction within the deformed vessel. Intracranial concentrations of NOS are small and a few false positives can even occur thanks to some positive functions of N-oxide with semi Cabazon (pNOS). The Nano robots must detect protein over expression and therefore the setup for sensing and control activation are often modified for various values, we treat any Nano robots not responding while within the workspace as if they didn't detect any signal, in order that they flow with the fluid because it leaves the workspace. If the Nano robot’s electrochemical sensor detects NOS in low quantities or inside normal gradient it generates a weak signal less than 50 nA.When activated, the Nano robots’ sensors also indicate their respective Position at the instant that they detected a high NOS protein Concentration providing useful information about the vessel bulb location and dimensions. For instance the proposed approach, the Nano robots must look for protein over expression signals so as to acknowledge initial stages of aneurysm. An advanced nano mechatronics simulator, employing a three- dimensional task-based environment, is implemented to supply an efficient tool for device prototyping and medical instrumentation analysis. Thus, supported clinical data and Nano bioelectronics, the proposed model offers details about how a Nano robot should help with the first detection of aneurysm.

3.9 NANOROBOTS TREATMENT OF DIABETES

Glucose carried through the blood stream is that the most vital role to take care of the human metabolism working for health, and its correct level may be a key issue within the diagnosis and treatment of diabetes. Intrinsically associated with the glucose molecules, the protein hSGLT3 has a crucial influence in maintaining proper gastrointestinal cholinergic nerve and

striated muscle function activities, regulating extracellular glucose concentration. The hSGLT3 molecule can serve to define the glucose levels for diabetes patients. The most interesting aspect of this protein is that the incontrovertible fact that it is a sensor to spot glucose. At a typical glucose concentration, the Nano robots attempt to keep the glucose levels ranging around 130 mg/dl as a target for the blood sugar Levels (BGLs). A variation of 30mg/dl are often adopted as a displacement range, though this will be changed supported medical prescriptions. In the medical Nano robot architecture, the many measured data are often then transferred automatically through the RF signals to the mobile carried by the patient. At any time, if the glucose achieves critical levels, the Nano robot emits an alarm through the mobile.

4. DISADVANTAGES

• The initial design cost is very high.

• The design of the Nano robot is a very complicated one.

• Electrical systems can create stray fields which may activate bioelectric-based molecular recognition systems in biology.

• Electrical Nano robots are susceptible to electrical interference from external sources or electric fields, EMP pulses, and stray fields from other in vivo electrical devices.

• Hard to Interface, Customize and Design, Complex

• Nano robots can cause a brutal risk in the field of terrorism. The terrorism and anti-groups can make use of Nano robots as a replacement sort of torturing the communities as nanotechnology also has the potential of destructing the physical body at the molecular level.

• Privacy is the other potential risk involved with Nano robots. As Nano robots deals with the designing of compact and minute devices, there are chances for more eavesdropping than that already exists.

• The Nano robot should be very accurate, otherwise Harmful effects may occur.

• The initial design cost is very high.

5. ADVANTAGES

• Currently there is no permanent vaccine or medicine is available to cure the disease. The currently available drugs can increase the patient's life to a couple of years only, therefore the invention of this Nano robot will make the patients to urge obviate the disease. And has no side affects

• As the Nano robot do not generate any harmful activities there is no side effect. It operates at specific site only

6. CONCLUSIONS

The paper is just a theoretical justification. But the recent advancement within the field of nanotechnology gives the hope of the effective use of this technology in medical field. This paper starts by giving an introduction to Nano robots and its importance as recognized by various other technocrats. Nanotechnology as a diagnostic and treatment tool for patients with cancer and diabetes showed how actual developments in new.

Manufacturing technologies are enabling innovative works which can help in constructing and employing Nano robots most effectively for biomedical problems. Consequently they're going to change the form of the industry, broadening the merchandise development and marketing interactions between Pharma, Biotech, Diagnostic and Healthcare industries. Future healthcare will make use of sensitive new diagnostics for an improved personal risk assessment.

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