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NANOROBOT: The Vast Achievement in Medical

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***Abstract*— Nanorobot, an applications of nanotechnology. Nano-robots also shows an necessary part in critical care submission in medicine and health. Its superior role as a substitute to conventional medical care is investigated, as well as its absence of side effects while effecting the cure. This work evaluates the potential of inorganic and organic nanobots for their diagnostic, and therapeutic role of under different critical care condition with examples. Nanorobotics is an emerging field of nanotechnology which deals with design and construction of devices at an atomic, molecules or cellular level. These hypothetical nanorobots will be extremely small and would transverse inside the human blood. As these nanorobots would have special sensors to detect the target molecules, it can be programmed to diagnosis and treat fatal diseases. Application of nanorobots in the treatment of cancer is one of the fascinating fields of research.**

Keywords*: Nanorobot, diagnostic, critical care.*

I INTRODUCTION

Nano-robot, plays an essential role in critical care application. Nanorobot, or nanobot, an emerging technology of the current time, is literally, a robot or machine, of nanoscale dimension that can be viewed under microscope. Such devices are constructed of nanoscale or molecular components. Advances in technology have increased our ability to manipulate the world around us on an ever-decreasing scale. Nanotechnologies are rapidly emerging within the realm of medicine, and this subfield has been termed nanomedicine. Use of nanoparticle technology has become familiar and increasingly commonplace, especially with pharmaceutical technology. An exciting and promising area of nanotechnological development is the building of nanorobots, which are devices with components manufactured on the nanoscale. Progression in science and medicine has been marked by the ability of researchers to study and understand the world around us on a progressively smaller scale. With each order of magnitude of access to smaller dimensions, new therapeutic possibilities and frameworks of understandings were developed. These developments included the germ theory and microbiology.

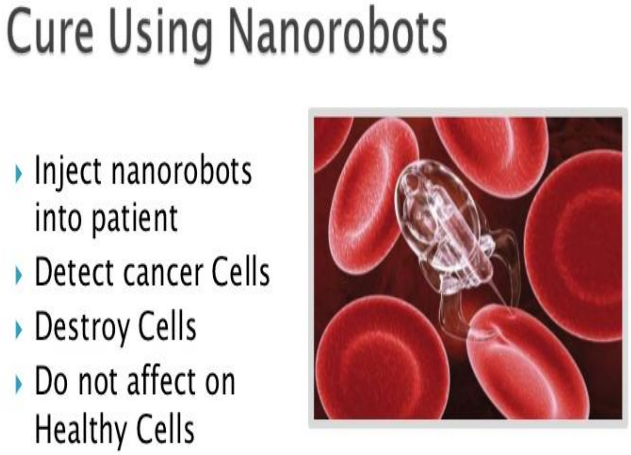
II NANOROBOTICS

Nanorobotics is an emerging technology field creating machines or robots whose components are at or near the scale of a nanometre (10^{-9} meters). Nanomachines are largely in the research and development phase, but some primitive molecular machines and nanomotors have been tested. An example is a sensor having a switch approximately 1.5 nanometers across, able to count specific molecules in a chemical sample. The first useful applications of nanomachines may be in nanomedicine. For example, biological machines could be used to identify and destroy cancer cells. Another potential application is the detection of toxic chemicals, and the measurement of their concentrations, in the environment. Rice University has demonstrated a single-molecule car developed by a chemical process and including Buckminster fullerenes (buckyballs) for wheels. It is actuated by controlling the environmental temperature and by positioning a scanning tunneling microscope tip. Nanorobot, one of the most revolutionary applications of nanotechnology, has versatile applications in areas as material defect detecting and repairing, oil resources extraction, oil spill clean up, solar power harnessing, repair of the depletion of ozone layer thus protecting the environment.

III APPLICATION IN MEDICAL TREATMENT

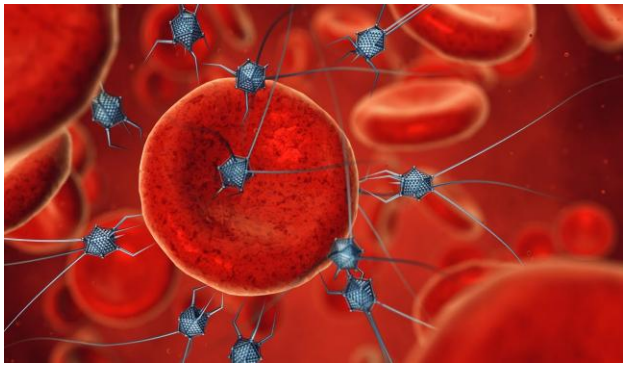
1. CANCER

Nanorobots can distinguish between the malignant and the benign cells. The nanorobots sense surface antigens and their move is directed by chemotactic sensors embedded in the machine. Nanorobots have excellent specificity, they target only cancerous cells and heal them by biochemically and biophysically acting upon them. Thus a cell's abnormal biochemical behaviour of overgrowth may be checked, and the cell may be repaired to a natural healthy state. Nanobots do not harm healthy, normal cells as is done in conventional methods, thus preventing sickening and damaging side effects. Nanobots do not harm immune system, (being localized) thus, making patient healthier throughout treatment. Nanorobots are highly effective and can be reused and reprogrammed for treatment of various cancer affected cells



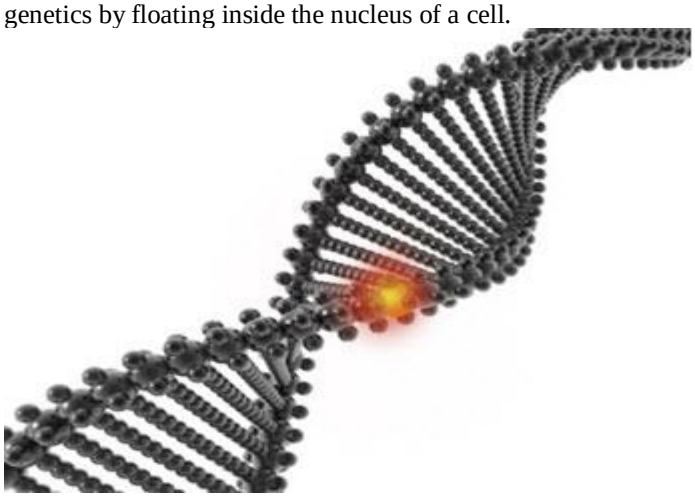
1. TUMOR

This is usually caused by excessive unwanted tissue growth. This can be treated by a first set of nanorobots inflaming the tumor infested tissues and a second set of nanorobots detecting the inflamed tissues and releasing the payload – which is the chemotherapy drug - to heal the tissue.



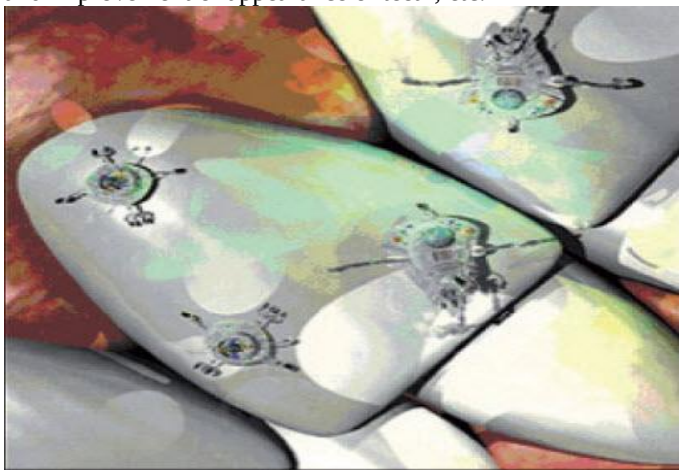
2. NANOROBOTICS IN GENE THERAPY

Nanorobots are also applicable in treating genetic diseases, by relating the molecular structures of DNA and proteins in the cell. The modifications and irregularities in the DNA and protein sequences are then corrected (edited). The chromosomal replacement therapy is very efficient compared to the cell repair. An assembled repair vessel is inbuilt in the human body to perform the maintenance of genetics by floating inside the nucleus of a cell.



3. NANODENTISTRY

Nanodentistry is one of the topmost applications as nanorobots help in different processes involved in dentistry.These nanorobots are helpful in desensitizing tooth, oral anesthesia, straightening of irregular set of teeth and improvement of the teeth durability, major tooth repairs and improvement of appearance of teeth, etc.



IV ADVANTAGES OF NANOROBOTES

1. More than million people in this world are affected by this dreaded disease. 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 few years only, so the invention of this nanorobot will make the patients to get rid of the disease.
2. As the nanorobot do not generate any harmful activities there is no side effect. It operates at specific site only.
3. The initial cost of development is only high but the manufacturing by batch processing reduces the cost.

V FEATURES OF NANOROBOTS

Nanorobots are often less than 100nm in length and the pieces or components that make up the machine are as generally as small as 1nm. The component pieces are created primarily of carbon most often in the form of diamondoid or fullerene nanocomposites, that is, carbon nanotubes. A very smooth exterior coating of passive diamond shields the device from being attacked by the host's immune system4. Nanorobot is programmable machine, that can be programmed or set in order to perform the desired operation inside the body. After being injected into the body, it is steered or remote controlled from outside the human body according to which the device roams or navigates through the whole body accessing to remote sites where access is impossible without invasive surgical techniques and performing its desired operation.

VI CONCLUSION

The scientific community is in the midst of a breakthrough in developing technology on a scale orders of magnitude smaller than ever before. As our technology advances, and as we explore on smaller and smaller scales, we are able to gain increased control of the world around us and ourselves. In the past, developing the ability to manipulate the world on a smaller scale brought transformative changes to the scientific community, and the world at large. Whether it was the age of microscopes ushering in the area of bacteriology, or the beginning of the atomic age with the study of particle physics, nanotechnology is poised to change many of the paradigms with which we think about disease diagnosis, treatment, prevention, and screening. Outside the bounds of medicine, nanotechnology will affect our lives in countless other ways through industries such as telecommunications and agriculture.

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