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NANOROBOTICS

Nanorobotics is a trendy direction in nanotechnology. It is also very popular in medicine. Doctors say that nanorobots are very promising, with their help they will be able to perform more complex and responsible operations, to diagnose the most dangerous diseases in the early stages.

Nanorobotics is the technology of creating machines or robots, close to the microscopic scale of a nanometer (10−9 meters). Nanorobotics refers to nanotechnology – an engineering discipline for designing and building nanorobots.

Scientists set specific tasks for nanorobots, and the work on their development is under the way. I'll dwell on the modern trends in robotics in a more detailed way.

Suppose you visit a doctor for a common disease treatment, instead of giving treatment he/she sends you to a special team who implants tiny robots in your bloodstream. These robots will recognise the cause of your illness and provide a dose of medication directly to an infected area. It feels awesome, when you get to know quickly about the cause of your problem. These robots are known as **nanorobots,** which greatly influence the future of **healthcare** and eventually cure everything from cancer to haemophilia.

According to research theories, nanorobots will possess at least two-way communication. These robots will receive power or even reprogramming instructions via sound waves from an external source and respond to **acoustic signals**. A special network of stationery nanorobots will be positioned throughout the body. It will keep track of each active nanorobot and then report the results. Physicians can not only monitor a patient's examination, but they can also change the instructions of nanorobots in vivo to the stage of recovery. After the treatment these nanorobots will be taken out from the body immediately.

Surgical nanorobots are inserted into the human body through the vascular system. They act as semi-autonomous on-site surgeons inside the human body and are programmed or directed by a human surgeon. These programmed surgical nanorobots perform various functions like searching for pathogens, and then diagnosis and correction of lesions by nano-manipulation, synchronized by an on-board computer while contacting with the supervisory surgeon via coded ultrasound signals.

Nowadays, the earlier forms of cellular nano-surgery are being explored. For example, a micropipette rapidly vibrates at a rate of 100 Hz micropipette, comparatively less than 1 micron tip diameter is used to cut dendrites from single neurons. This process is not going to damage the cell capability.

Medical nanorobots are used for diagnosing, testing and monitoring of microorganisms, tissues and cells in blood. They are capable of making records and reporting some vital signs such as temperature, pressure and immune system's parameters of different parts of the human body.

Nanorobots are also used for 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. The chromosomal replacement therapy is very efficient compared to the cell repair. An inserted repair vessel is inbuilt in the human body to perform the maintenance of genetics by floating inside the nucleus of a cell.

The supercoil of DNA is enlarged within its lower pair by robotic arms, the nanomachine pulls the strand which is unwounded for analysis; meanwhile the upper arms detach the proteins from the chain. The information which is stored in the large nanocomputer's database is placed outside the nucleus and compared with the molecular structures of both DNA and proteins that are connected through the communication link with the cell repair part. Abnormalities found in the structures are corrected, and the proteins are reattached with the Deoxy Nucleic Acid chain once again which reforms into their original form.

Blood clots can cause a number of troubles such as gangrene and paralysis. Nanorobots will be able to move to the thrombus and break it. This process is one of the most dangerous applications of nanorobots - the robot should be able to remove the bunch without losing any part of the blood stream that could hit the body and cause great problems. Nanorobot should also be small enough not to become an obstacle in blood.

Kidney stones can be extremely painful. The more a stone, the harder it is to get rid of it. Doctors remove large stones with ultrasound, but this is not always effective. A nanorobot could remove a kidney stone using a small laser.

All these things seem fantastic, but sooner or later nanotechnology will help to find the man his immortality. Another thing is whom these technologies will be available for and not.

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