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A MINI REVIEW ON NANOBOTS IN HUMAN SURGERY AND CANCER THERAPY

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Abstract:

In this review paper, usage of nanobots in surgery and in cancer therapy was discussed. This nanobots can able to identify and destroy the cancer cells present in the human organs or body. In cancer treatment, enzymes are used to overcome the cancer effects. This DNA nanobots are designed to seek out and destroy cancer cells, while leaving healthy cells unscathed. So far, they've only been tested in cell cultures and animal studies. Like white blood cells, the nanobots patrol the bloodstream, looking for signs of distress. DNA nanobots can currently identify 12 different types of cells in humans, ranging from solid tumors to the abnormal white blood cells associated with leukemia.

Key Words: Nanobots, Enzymes, DNA, Cancer & Surgery

1. Introduction:

Nanorobotics is an emerging technology in this century. It creating machines or robots whose components are at or close to the scale of a nanometre (10^{-9} meters). More specifically, nanorobotics refers to the nanotechnology engineering discipline of designing and building nanorobots, with devices ranging in size from 0.1–10 micrometres and constructed of nanoscale or molecular components.

The names nanobots, nanoids, nanites, nanomachines, or nanomites have also been used to describe these devices currently under research and development. Nano machines 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, capable of counting specific molecules in a chemical sample. The first useful applications of nanomachines might 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.

Another definition is a robot that allows precision interactions with nanoscale objects, or can manipulate with nanoscale resolution. Such devices are more related to microscopy or scanning probe microscopy, instead of the description of nanorobots as molecular machine.

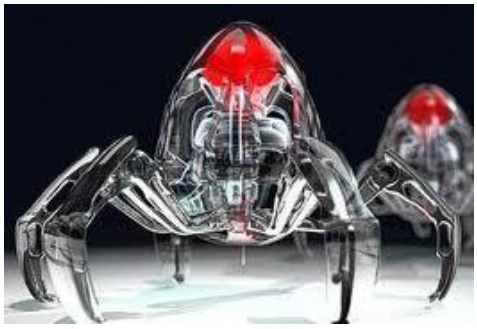

Figure 1: Nanobots in cancer theraphy

When the little device recognizes a target cell based on its surface proteins, the two halves swing open like a clam to deliver a tiny but deadly cargo of drugs or nanoparticles. These could be molecules that force cancer cells to self-destruct by interfering with their growth,

- ✓ To destroy the cancers cell in human body.
- ✓ To remove the blocks in blood vessels.
- ✓ Replacement of DNA Cells.

2. Classification of Enzymes used in Nanobot Cancer Treatment:

2.1. Red 65: This is an herbal formulation that uses an extract of the hirudin molecule from the salivary gland of Hirudo Orientalis, the Asian medicinal leech. Hirudin has long been recognized as one of the most effective Anticoagulant Agents ever found. While the focus of Red 65 has been for clearing toxins from your bloodstream and cleaning the blood of fibrin so that it flows better, Red 65 has consistently testing in our energetic testing as the best enzyme supplement to use for digesting cancer cells.

2.2. P-A-L Plus Digestive Enzymes: A stack of research shows that enzymes, when taken on an empty stomach, will go into the bloodstream and clean it up. They will also digest and kill any cancer cells they run into. P-A-L Plus Enzymes a plant based digestive enzyme that can be taken with meals to digest food, and on an empty stomach in higher doses, like 4 to 6 bottles a month dosage, to digest tumors.

2.3. Papaya Pro: The main ingredient in this formula is mature green papaya powder. Papain is the principal and most active enzyme in this powder. Papain possesses a very powerful digestive action superior to pancreatic, or pancreatic enzymes. Changes in intestinal alkalinity or acidity do not interfere with the unique digestive activity of papain. Taken on an empty stomach, it will work more aggressively than even the pancreatic enzymes in attacking and destroying cancer cells.

2.4. Catabolic Wasting Protocol: Catabolic wasting can occur in the end stages of cancer, aids and other serious illnesses. It is a major cause of death in cancer. No matter how much someone eats, how much nutrition they get, they lose weight and muscle mass. They are not able to metabolize or make protein. Recently scientists have figured out why this happens.

2.5. Endocar Elixir: Three bottles of this frequency enhanced water elixir is a month's supply. It stimulates cells to repair themselves, and more as it supports the body several ways. Endocar is a supercharged Regenerative Elixir that has been energy infused with instructions to support the body when it is in extremely poor health at the end stages of life.

2.6. Fulvitea: This is the second and most important supplement you need to use to reverse catabolic wasting and to start gaining some weight. In fact, in is one of the most important products to use whenever to liver is poorly functioning. And whenever the cancer is so bad that you are essentially starving to death. The pre-digested protein it supplies is usable by the body without the liver having to convert amino acids to protein.

3. Chemical Brain Controls Nanobots:

The molecular device - just two billionths of a metre across - was able to control eight of the microscopic machines simultaneously in a test. Writing in Proceedings of the National Academy of Sciences, scientists say it could also be used to boost the processing power of future computers. Many experts have high hopes for Nano-machines in treating disease. "If [in the future] you want to remotely operate on a tumour you might want to send some molecular machines there," explained Dr Anirban

Bandyopadhyay of the International Centre for Young Scientists, Tsukuba, Japan. "But you cannot just put them into the blood and [expect them] to go to the right place." Dr Bandyopadhyay believes his device may offer a solution. One day they may be able to guide the nanobots through the body and control their functions, he said. "That kind of device simply did not exist; this is the first time we have created a nano-brain"

4. Molecular nanotechnology (MNT):

Molecular nanotechnology is a technology based on the ability to build structures to complex, atomic specifications by means of mechanosynthesis.[1] This is distinct from Nano scale materials. Based on Richard Feynman's vision of miniature factories using nanomachines to build complex products (including additional nanomachines), this advanced form of nanotechnology (or *molecular manufacturing*[2]) would make use of positional-controlled mechanosynthesis guided by molecular machine systems. MNT would involve combining physical principles demonstrated by biophysics, chemistry, other nanotechnologies, and the molecular machinery of life with the systems engineering principles found in modern macro scale factories.

Figure 2: Structure of nanoparticle

5. Nanobot to Deliver the Cancer Drug:

It's quite right to say, developing a drug system that only target cancer cells while leaving healthy cells unharmed is the holy grail of cancer research. Two years back a group of scientists from Harvard's Wyss Institute made a huge advancement towards this goal by designing and fabricating nanobot that can autonomously target a cancer cell and deliver a payload of chemotherapy drugs.

Some of you may be used to the idea of nanobots from the 2009 movie, G.I Joe where cobra commandos tried to destroy the world with a warhead containing deadly nanobots called "Nano mites". However, the nanobots, developed at Harvard are much simpler, and instead of killing, it was designed to save lives. It's so simple and you wouldn't believe that to be a machine at the first sight. The device is extremely small and only 35 nanometre's in width. To make this length in to a perspective; it's around 200 times smaller than a red blood cell.

The fabricated nanobot looks like a nanocage similar to an open ended barrel. This molecular barrel has two halves which can open and close in a manner much similar to a clamshell. These two halves are connected to each other by molecular hinges and kept close by two molecular locks or latches that are actually made of DNA double helixes. The chemotherapy drug can be engaged in to the barrel core and secured by molecular anchors inside the nanocage. To do this scientist need to modify the drug molecule with a linker strand, again made with short strand of DNA molecule. Drug loading is carried out simply by mixing the nanobots and the drugs together. Chemotherapy drug simply diffuse in to the inner structure of the nanocage as a result

of the mutual attraction between the linker strand and the molecular anchors inside the nanocage.

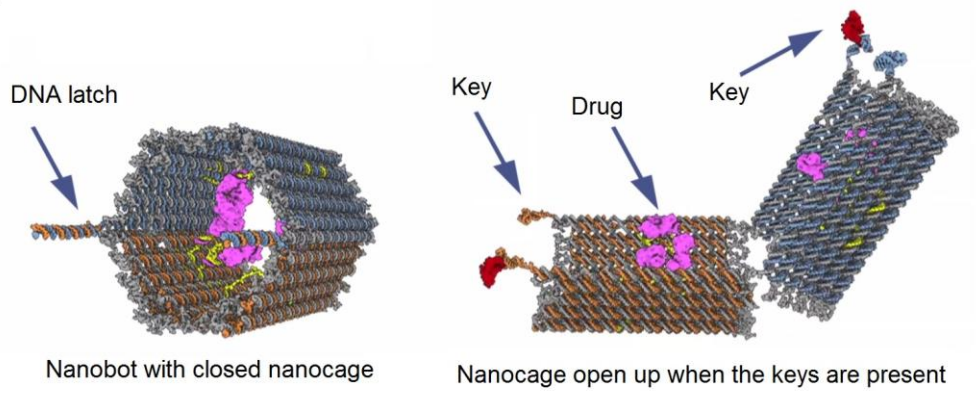

Figure 3: Structural representation of mechanism of nanoboats

6. Logical programing at molecular stage:

The real ingenuity of the discovery is in the DNA latches. Our ability to program these latches to open for a specific ligand or a marker is what makes this sophisticated nanocage in to nanobot. In the absence of the key, the DNA duplexes that function as latches are held sufficiently strong to keep the entire nanocage closed. However, when a specific biomarker is present, specially designed DNA binds with the biomarker key, unzipping the DNA duplex. When both these DNA latches are opened, entire structure will open up delivering the drug. This works much similar to a combination lock, but at the molecular stage.

Cancer cells are slightly different from healthy cells when the surface chemistry of the cell wall is considered. They have special molecular proteins that are not present in healthy cells. Scientists exploit this property and program DNA latches of the nanobot only to open when these markers or keys are present. This allows the nanobot to specifically attack small population of target cells that lives within a large population of other cells, which should be left alone. This is only possible because only those target cells express the correct set of keys that open up the nanocage releasing the toxins.

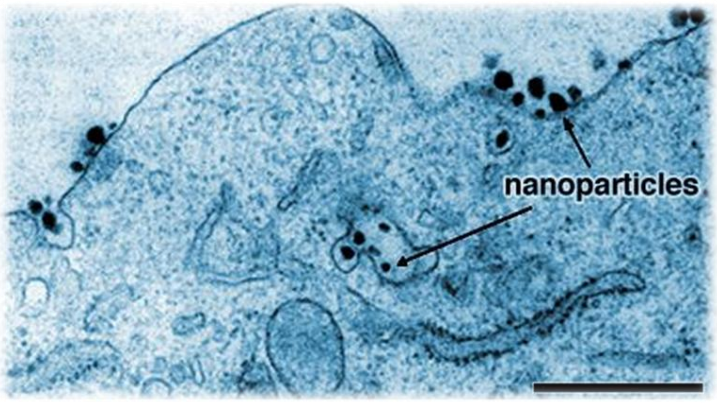

Figure 4: Nanoparticle dispersd in cancer cells

7. Statistics of Nanobot treatment:

In a normal state the tumor cell in patients is high and the usage of Nanobots reduced the tumor cell level in the body by using the enzyme that has the capability of destroying the Tumor cell. In a normal therapy the rate of destroy of the tumor cell is very slow than the rate of destroy of the tumor cell by the Nanobot technology. The graph given below will Nanobots activating with its Enzyme and Nanobot killing the

tumor cell, this gives the clear picture of the nanobots advantage over the other technology

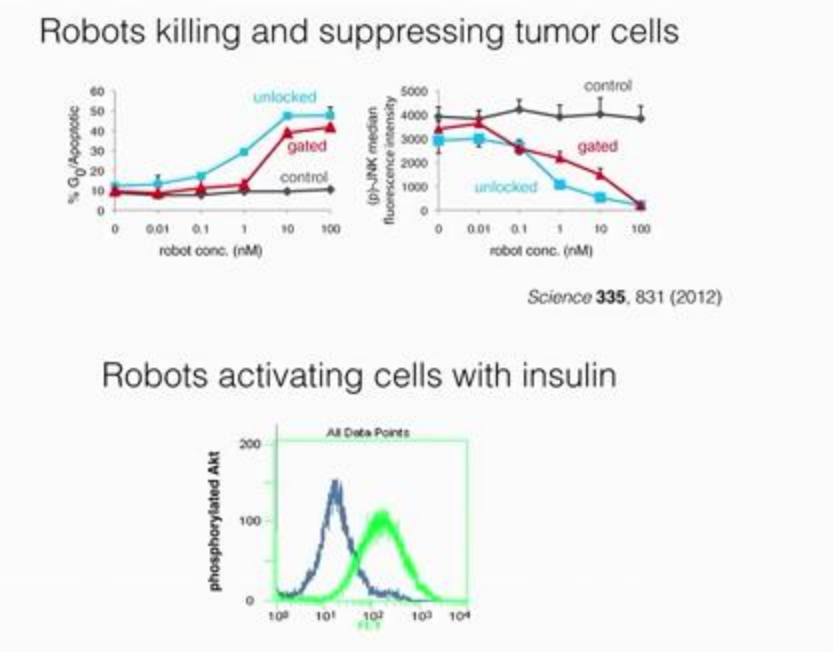

Figure 5: Activity of Nano boat in human cells

8. Conclusion:

Recent advancement in the field of Nanorobotics gives the hope of the effective use of this technology in medical field. Thus in future nanorobots will play an important role in both biological and technological field. Thus the nanobots in the future will be developed to cure HIV. Nanobots are the only field that as the capability of doing thing in invisible range. Recent Advancement in the nanotechnology lead to this nanobots this will lead to cancer less future.

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