



## **"NANOTECHNOLOGY FIGHTS CANCER AND GIVES NEW HOPES FOR LIFE"**

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### **ABSTRACT**

Nanotechnology has been a boon in medical field by delivering drugs to specific cells using nanoparticles. The new Nanotechnology techniques may have interesting applications for detecting cancer and may aid in giving patients more personalizing treatment protocols. Cancerous cells must travel long distances through the body to infect other organs. These metastasis' cells should become more flexible, will be able to over come all sort of physical obstacles in the blood stream and within tiny and complex cell matrices of cell tissue. The new technology can detect at the nano level and this softness or flexibility of the cancerous cells.

**Keywords:** Nanotechnology – detect – cure cancer-savelife

### **INTRODUCTION**

Cancer is a disease in which abnormal cells divide uncontrollably. These abnormal cells have the ability to invade, and destroy normal body tissues. The transformation of normal cell to tumor cell is a multistage process, which occurs as a result of interaction between persons genetic factors and some external agents such as physical, chemical and biological carcinogens. Most common types of cancer among the men are lung, stomach, liver, colorectal, esophagus and prostate cancer and among the women are breast, lung, stomach, colorectal and cervical cancer. Cancer is a leading cause of death world wide. Deaths from cancer worldwide are projected to continue rising, with an estimated 12 million deaths in 2030. If the cases were detected and treated early, about one-third of the cancer burden could be decreased. For some cancers such as breast cancer screening may be helpful in early detection, but most of the cancers are detected in the later stages because the symptoms may not be specific to the cancer.

***Importance of Nanotechnology in Cancer***  
***Nano technology can be used to fight cancer in two ways***

- 1) First, it will be used in detecting the presence of cancer for earlier and with greater precision than with standard diagnostic methods such as x-rays, MRIs and biopsies.
- ii) Second it will be used in the destruction of the cancer with greater precision and thoroughness, once it is detected the small size of nano particles (10-100 nanometer) allows them to preferentially accumulate at tumorsites and then "cooks" tumors inside the body with radiowaves that heat only the nanoparticles and the adjacent cancerous cells. Sensor test chips containing thousands of nanowires, able to detect proteins and other biomarkers left behind by cancer cells, could enable the detection and diagnosis of cancer in the early stages from a few drops of a patients blood.

***Every delivery is based upon three facts***

a) efficient encapsulation of the drugs.  
b) successful delivery of said drugs to the targeted region of the body, and  
c) successful release of that drug there. Prof. Jennifer west have demonstrated the use of 120nm diameter "Nanoshells" coated with gold to kill cancer tumors in mice. The nanoshells can be targeted to bond to cancerous cells by conjugating antibodies or peptides to the nanoshell surface. By irradiating the area of the tumor with an infrared laser, which passes through flesh without heating it, the gold is heated sufficiently to cause death to the cancer cells. John Kanzius has invented a radio machine which uses a combination of radio waves and carbon or gold nano particles to destroy cancer cells. When exposed to ultraviolet light Nanoparticles of cadmium selenide (Quantum dots) become glow and then seep in to cancer tumors. The surgeon can see the glowing tumor and use it as a guide for more accurate tumor removal. Baker developed a molecule called a 'dendrimer' it has over one hundred hooks on it, that allow it to attach to cells in the body for a variety of purposes, he attaches folic-acid to a few of the hooks, cancer cells have more vitamin receptors than normal cells. Baker's vitamin-laden dendrimer will be absorbed by the cancer cell, rest of the hooks place anti-cancer drugs that will be absorbed with the dendrimer into the cancer cells there by delivering the cancer drug to the cancer cell. Nanotechnology is the science of extremely tiny particles. It involves the study and use of materials on an unimaginable small scale. Our body is made up of millions of cells and these cells are nature's Nanomachines. A nano is a measure of one-billionth of meter. The nanostructures are studied with the help of AFS – Atomic Force microscopes or scanning tunneling microscopes. Atomic force microscopes scan surfaces with an incredibly fine tip. Where as scanning tunneling microscopes use a weak electric current to probe the scanned material. Qdots-using for identify the location of cancer cells. Nanoparticles – that delivers the anticancer medication directly to the cancer cells. Nanoshells – to destroy the cancer cells with minimal damage to the normal cells.

New method of detection cancer cells in nanotechnology is based on the measurement of physical adhesion of silica beads to malignant cells and cancer cells. All the cells including the cancer cells were surrounded by brush layers, these brush layers on the surface of the cells are important for interacting with the environment. Normal cells and the cancer cells have different brush layers, so the interaction to the environment will be different. This principle is used to detect cancer without biopsy and the cells were studied by using AFS. It is revealed that

- (i) there is a quantitative difference in the brush layer on the surface of the cells. Normal cells have brushes with one length, on the other hand cancer cells displayed long and short brushes with different densities.
- ii) The difference in the brush layer leads to differences in the adhesion of various particles to the cells, adhesion depends on the duration of contact between the particles and that cell surface. So different number of cells adhere to normal versus malignant cells.
- iii) Fluorescent silica beads used to make the detection easier by measuring the total amount of fluorescent light coming from particular area and achieved by using high sensitivity spectrometer.

'Nanobee' are another tiny particles design to destroy cancer cells by delivering a synthesized version of a toxin called "melittin" that is found in bees. Nanobee is less than 10 times the diameter of a red blood cell, though it is small enough to enter cell but big enough to carry large doses of drugs in the blood cells one hundred trillion nanobees can be delivered in a single dose, travel directly to tumor cells without harming any others. This therapy could become widely available in humans in about five years. Another technique imagined for treating cancer would involve nanocomputers literally rewriting the DNA of cancer cells to turn them back into normal cells. These devices would examine the DNA of cancer cells on the atomic level, comparing them to what the DNA of normal cells for the patient should be and then calling in nanorepair devices to fix the DNA. Liposomes, a first generation nanotechnology device, is being used to deliver drugs to treat certain kinds of

Fungal infections as well as some kind of cancer. For surgical treatment a flesh welder is used to fuse two pieces of chicken meat in to a single piece. The two pieces of chicken are placed together touching. A greenish liquid containing gold-coated nanosheets is dribbled along the seam.

An infrared laser is traced along the seam, causing the two sides to weld together. This could solve the difficulties and blood leaks caused when the surgeon tries to test the arteries during a kidney or heart transplant the flesh welder could weld the artery perfectly.

## CONCLUSION

Nanotechnology's greatest promise in medicine is its potential to destroy cancers that until now have been resistant to conventional treatments, one day it replaces radiation and chemotherapy. In future nanorobots could repair specific diseased cells, functioning in a similar wave to antibodies in our natural healing processes. The elimination of bacterial infection in a patient within minute instead of using treatment with antibiotic over a

period of week. The ability to perform surgery at the cellular level, removing individual diseased cells and even repairing defective portion of individual cells. Nanotechnology has greater potential to save lives than any other method that we can use today. Let me conclude that it is a great hope of better control of all the diseases in the coming decade 2030.

## ACKNOWLEDGEMENTS

Thanks to all the sources over internet and various Journals which opened an insight into the present concept and future interventions.

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