

Cancer and Nanotechnology

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Abstract— Nanotechnology is the manipulation of matter at the atomic and molecular scale to create materials with new and advanced properties. Nanotechnology is being applied to cancer by the development of nanoparticles, which can be loaded with drugs or imaging agents and then targeted to tumors. Also, nanosensor devices are being developed for detecting the biological start of cancer.

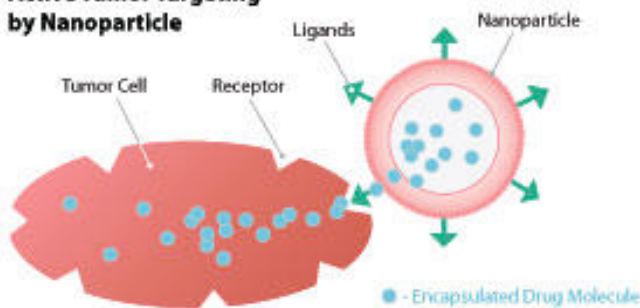
I. INTRODUCTION

The development of new technology led us to something we would have never have thought to come about: curing medical issues through the use of nanoparticles. Specifically, this abstract will introduce the use of nanoparticles to try and cure cancer. Cancer is the disease caused by an uncontrolled division of abnormal cells in a part of the body. The disease caused by an uncontrolled division of abnormal cells in a part of the body. Nanotechnology sparked hope that it could be effective.

II. METHODS

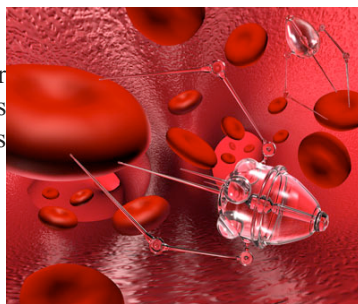
The nanoparticle is coated with polymerase so it can safely travel through the blood stream and target the accumulation of cancerous cells (the tumor).

Active Tumor Targeting by Nanoparticle



Once the nanoparticle binds to the tumor, it releases its contents, which leads to the destruction of the tumor. If scientists can load their cancer-detecting gold nanoparticles with anticancer drugs, they could attack the cancer exactly where it lives.

Nanotechnology cancer treatments use gold particles to carry anticancer drugs straight to the cancer.



III. RESULTS

The British Journal of Radiology released studies and research results of nanotechnology and cancer in February 2012. A sample of the results is shown in the graph below.

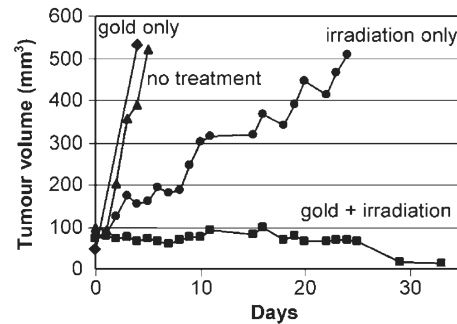


Figure 6. Triangles: tumour growth after no treatment (n512); diamonds: gold only (n54); circles: radiation only (30Gy, n511); squares: gold and radiation (n510). Reproduced with permission from Hainfeld et al [26].

IV. DISCUSSION

Nanotechnology has the following advantages:

- Protects drugs from being degraded in the body before they reach their target.
- Enhances the absorption of drugs into tumors and into the cancerous cells themselves.
- Allows for better control over the timing and distribution of drugs to the tissue, making it easier for oncologists to assess how well they work.
- Prevent drugs from interacting with normal cells, thus avoiding side effects.

The disadvantages of Nanotechnology include:

- Atomic weapons can now be more accessible and made to be more powerful and more destructive. These can also become more accessible with nanotechnology.
- Since these particles are very small, problems can actually arise from the inhalation of these minute particles, much like the problems a person gets from inhaling minute asbestos particles.
- Presently, nanotechnology is very expensive and developing it can cost you a lot of money. It is also pretty difficult to manufacture, which is probably why products made with nanotechnology are more expensive.

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