Nanoparticle Technology in Cancer Care

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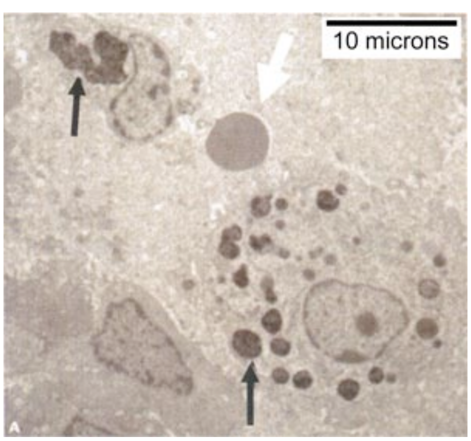
The traditional, well known, forms of cancer treatment are chemotherapy and radiation. Although these treatments are helpful in the fight against cancer, they are infamous for destroying normal cells and harming other organs in the process. Researchers are confident that nanoparticle technology will allow them to bring cancer treatment to another level

Scientists at the University of California in San Diego have developed nanoparticles that can illuminate and destroy hidden tumors. Thin non toxic silicon wafers are broken down by ultrasound into tiny nano-sized pieces that will glow under ultraviolet light and help pinpoint the location of a tumor. The nano-sized silicon pieces absorb the relevant cancer treating drugs before being coated in a thin layer of dextrose. The poisonous particles are then injected into the blood stream. The particles are small enough to slip through the blood vessels and lodge themselves in the tumor. As blood flows around the embedded nanoparticles the sugar coating dissolves and the anti-cancer drugs are released. These sugar-coated nanoparticles are successful in destroying cancer cells while leaving more healthy cells alive, compared to traditional chemotherapy.



Researchers at the National Institute of Standards and Technology (NIST) have been developing sugar coated iron oxide nanoparticles that interact with each other to destroy cancer cells. Nano-sized balls of iron oxide are coated with sugar molecules, which make them attractive to then resource- hungry cancer cells. Once the particles are introduced to the body the cancer cells ingest them. Researchers can then alter the magnetic field which in turn causes the iron oxide to heat up and kill the cancer cells locally without harming the surrounding tissues.

Similarly, Robert Ivkov and other scientist at Johns Hopkins have been experimenting with iron oxide particles in cancer treatment. Ivkov's studies show that alternating the magnetic field two to three days after the injection of the iron oxide particles, into mice with human breast tumor xenographs, increased the temperature enough to reduce tumor growth and did not cause significant side effects to the mice. Ivkov also researched the effectiveness of iron oxide nanoparticles in conjunction with radiation and chemotherapy. As previous research has shown, heat sensitizes cancer cells which make them easier targets for chemotherapy and radiation. Ivkov is hopeful that the increase of temperature due to the iron oxide nanoparticle therapy will also increase the effectiveness of traditional chemotherapy and radiation.

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