

Nanoparticles Delivery of 'Suicide DNA' Kills Prostate Tumors

May 22 2007

Using nanoparticles developed by members of the Alliance for Nanotechnology in Cancer, a team of investigators at the Lankenau Institute for Medical Research, in Philadelphia, has developed a DNA-based therapeutic agent that has the potential to treat both enlarged prostates and localized prostate tumors. When tested in mice, this new agent specifically targeted prostate tissue, producing no toxic effects in surrounding tissues.

Writing in the journal *The Prostate*, a team of investigators led by Janet Sawicki, Ph.D., described its use of polymer nanoparticles to delivery a so-called suicide gene that codes for the production of diphtheria toxin. The biodegradable and biocompatible polymer nanoparticles were developed by Robert Langer, Ph.D., and his colleagues at the MIT-Harvard Center of Cancer Nanotechnology Excellence.

To make their suicide gene specific for prostate tissue, the investigators linked it to a gene regulator that responds only in the presence of a prostate-specific protein. Without this protein, the diphtheria toxin gene remains inactive, which makes it non-toxic to any cells but those in the prostate.

When injected directly into the prostate, this nanoparticle-encapsulated gene construct triggered a significant reduction in the size of the prostate gland and on the size of prostate tumors. The investigators showed that this shrinkage resulted from cells undergoing apoptosis, or programmed cell death. In fact, the researchers found that a single injection of

nanoparticles triggered apoptosis in 80 percent of tumor cells present in the tissue. In contrast, direct injection of the gene construct alone, that is, without the nanoparticle delivery vehicle, produced no effect on prostate tissue or tumors.

The investigators note that they expect multiple nanoparticle injections would trigger a greater percentage of prostate tumor cells to undergo apoptosis. They are now testing this hypothesis.

This work is detailed in a paper titled, "Nanoparticulate delivery of suicide DNA to murine prostate and prostate tumors." An investigator from the Harvard Medical School also participated in this study. An abstract of this paper is available through [PubMed](#).

Source: National Cancer Institute

Citation: Nanoparticles Delivery of 'Suicide DNA' Kills Prostate Tumors (2007, May 22)
retrieved 9 April 2024 from
<https://phys.org/news/2007-05-nanoparticles-delivery-suicide-dna-prostate.html>

<p>This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.</p>
--