

Enhanced Nanoparticle for Cancer Therapy

Ref. No. E-164-2012

Keywords: Vaccine, Therapeutic, cancer, drug delivery, imaging, nanoparticle, calcium phosphate, nanocore, core-shell, siRNA

Summary:

The National Cancer Institute (NCI) is seeking statements of capability or interest from parties interested in collaborative research to co-develop nanoparticles for anti-cancer therapy.

Technology:

Nanoparticles are being used as a method of drug delivery for the treatment of several diseases, especially for cancer. The use and versatility of these particles have increased over the years, and this discovery enhances the speed with which these particles can enter cancer cells and deliver drugs.

NCI [Surgery Branch](#) researchers have developed a method of modifying nanoparticles to markedly enhance their entry into cancer cells and their delivery of therapeutic drugs. The nanoparticles use a multi-shell calcium phosphate nanocore designed with target-specific siRNA and an endocytosis-enhancing agent. The researchers have shown that the intravenous systemic administration of the enhanced nanoparticles noticeably increases nanoparticle cell-entry along with concomitant delivery of siRNA to cancer cells *in vivo*. They further demonstrate that the composite calcium phosphate nanoparticle delivery of anti-cancer therapy can preferentially target *in vivo* tumors and cause tumor growth arrest. Consequently, these modified nanoparticles can exert a greater effect on cancer cells.

Potential Commercial Applications:

- Nanoparticle delivery of therapeutic treatments to cancers cells.
- Nanoparticle delivery of imaging agents for the identification and monitoring of tumor cells.

Competitive Advantages:

- Preferentially taken up by cancer cells and not normal cells
- Faster uptake into cells than other nanoparticles
- Tissue and/or cell specific
- Can be customized for targeted therapy
- Extremely versatile – can transport a variety of therapeutic agents and the constructs can incorporate siRNA, chemotherapy agents, targeted drugs, pro-drugs, tracers, and radioactive molecules.

Development Stage: Pre-Clinical, *in vitro* and *in vivo* animal data available.

Patent Status: U.S. Patent Application No. 61/648,735 filed 18 May 2012

Contact: Please submit an information request form at <http://techtransfer.cancer.gov> or contact John D. Hewes, Ph.D., (301) 435-3121, hewesj@mail.nih.gov.

Created: 09/05/2012

<http://ttc.nci.nih.gov>