Bankhead-Coley Cancer Research Program

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Internal Medicine
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2009 Program
Florida Research Challenge
(2-year project)

Project Title: Targeted Gene Therapy by SNAP Delivery Method for Treatment of Lung Cancer

Project Summary: This grant aims to develop a novel treatment for lung cancer that utilizes lung-targeting Sertoli cells (SCs) to deliver nanogene particles (SNAPs). Such particles are designed to express peptide(s) that inhibit atrial natriuretic peptide receptor A (NPRA), a novel anti-cancer target that was designated a 'lead discovery' in *Oncology* in 2008. Previously, chitosan nanocomplexes of gene(s) encoding NPRA inhibitor showed significant reduction of lung cancers in mice. The recent discovery of the SNAP method, which increases delivery of drug/gene therapeutics to tumors in deep lung, has led to the hypothesis that SNAP-delivered NPRA inhibitors may provide a novel means of treatment for metastatic lung cancer. The first aim of the project is to optimize and develop a robust, lung-targeted gene delivery and expression system by combining SNAP-mediated lung delivery using reporter genes. The second and third aims are to evaluate the efficacy of the SNAP delivery system using cancer cell-targeted, multi-functional nanoparticles (MCNs) carrying NPRA inhibitor in a model of lung metastasis and then in a model of lung cancer. Together, the studies are expected to lead to an effective, cell-based nanogene delivery system for metastatic lung cancers.