

Bankhead-Coley Cancer Research Program

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*Cancer Research Institute
M. D. Anderson Cancer Center Orlando*

*2009 Program
New Investigator (3-year project)*

Project Title: Nanoceria: A Novel Nanoparticle Adjuvant Therapy to Increase the Efficacy of Radiotherapy for Lung Cancer Patients

Project Summary: The main treatment option for lung cancer is surgery, and complete removal of the tumor confers the best probability for long-term survival. However, in patients with locally advanced disease or in patients who are not candidates for surgery, radiation therapy plays an important treatment role. Unfortunately, radiation can cause significant injury to surrounding normal lung tissue, and therefore, the amount of radiation that can be used without significantly damaging the normal lung tissue may not be sufficient to eradicate the tumor. In previous reports, we demonstrate that cerium oxide nanoparticles (nanoceria) protect normal lung tissue from radiation without protecting the tumor tissue. In this grant, we will monitor the uptake and distribution of nanoceria using mice and profile the changes to proteins and the expression levels of proteins induced by nanoceria in lung tumors and normal lung tissue. We will also investigate the role of TGF- β , a key pathway involved in the adverse changes to normal lung tissue in response to radiation therapy. These studies will provide a better understanding of the distribution of nanoceria in tissue, the changes in protein expression caused by nanoceria, and how nanoceria protects normal tissue from radiation. Our ultimate goal is to apply nanoceria in conjunction with radiation for the treatment of lung cancer to maximize the effectiveness of radiation therapy and to increase the survival and quality of life of lung cancer patients.