CANCER PREVENTION & RESEARCH INSTITUTE OF TEXAS

Award ID:
RP160617

Project Title:
Optimizing therapeutic strategies against lung cancer using Multi-Modality Imaging

Award Mechanism:
Individual Investigator

Principal Investigator:
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Entity:
The University of Texas at Dallas

Lay Summary:

Lung cancer remains the leading cause of cancer-related death in the US and worldwide. This is largely attributable to the lack of effective therapy against lung cancer. Lung tumors often become resistant to currently available therapeutic drugs after an initial positive response. The goal of this project is to find out how lung tumors become resistant to drugs and to find new strategies to block tumors' ability to develop resistance. We will use advanced imaging technologies to observe lung tumors in live animals as they are being treated with a drug, called bevacizumab and approved by FDA for treating lung cancer. This drug works by blocking the generation of new blood vessels that provide vital nutrients to tumors. However, in reality, these drugs can cause tumors to become more aggressive and invasive. Thus, we want to find out to what extent drug resistance is linked to changes in tumor blood vessels, the state of oxygenation, and the levels of heme and respiratory functions that are vital for cellular energy generation. We recently discovered that in cells of the most common type of lung cancer, non-small cell lung cancer, heme and respiratory functions are highly elevated. This elevation causes cancer cells to use more oxygen to make cellular energy for tumor growth and progression. Inhibiting heme and respiratory functions selectively interferes with the proliferation and migration of cancer cells. Thus, we want to find out the extent to which inhibiting respiratory function can delay or arrest the growth of lung tumors at various stages of tumor development in mice. We also want to know if inhibiting respiratory function can make resistant tumors to become sensitive to drugs blocking blood vessel generation. The success of the proposed research can lead to effective new strategies to combat lung cancer and the design and testing of a new class of drugs that block heme and respiratory functions.