CANCER PREVENTION & RESEARCH INSTITUTE OF TEXAS

Award ID:
RP130272

Project Title:
The metabolic phenome of human lung cancer.

Award Mechanism:
Individual Investigator

Principal Investigator:
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Entity:
The University of Texas Southwestern Medical Center

Lay Summary:

Metabolism is the sum of processes by which cells produce energy and grow. Cancer cells must reprogram their metabolism to achieve rapid growth in aggressive tumors. Reversing these metabolic changes would limit tumor growth and provide the basis for an entirely new repertoire of chemotherapeutic agents. However, despite almost a century of research, our knowledge about cancer metabolism is limited to a small handful of pathways and has failed to produce an integrated view of how cancer-causing mutations reprogram metabolism in cancer patients. Using a previous CPRIT High Impact/High Risk Award, we developed sensitive and efficient methods to profile metabolism in cancer cells grown in culture or in intact tumors. This work led to the discovery of several new metabolic pathways that drive tumor cell growth, and confirmed that inhibiting these pathways could suppress tumorigenesis. We now propose to use these same techniques to profile tumor cells derived from more than one hundred individual lung cancer patients. These cell lines are also being analyzed for all the mutations that cause lung cancer in humans, and for sensitivity to all the chemotherapies currently used in cancer treatment. Therefore, the project is a unique opportunity to characterize cancer metabolism on a comprehensive scale and, crucially, to correlate metabolism with clinically-relevant aspects of cancer like tumor genetics, drug sensitivity and metastasis. Through this work, we will uncover the full range of metabolic activities used in lung cancer, producing by far the most complete metabolic database for any human disease. We will identify novel metabolic pathways that are confined to cancer cells and therefore are highly attractive as therapeutic targets. We will understand why and how the genetic changes that cause lung cancer reprogram metabolism, and most importantly, we will know how to use this information to optimize treatment of lung cancer patients.