CANCER PREVENTION & RESEARCH INSTITUTE OF TEXAS

Award ID:
RP160229

Project Title:
Imaging-based quantitative analysis of vascular perfusion and tissue oxygenation to improve therapy of hepatocellular carcinoma

Award Mechanism:
Individual Investigator

Principal Investigator:
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Entity:
The University of Texas M.D. Anderson Cancer Center

Lay Summary:

Primary liver cancer is the most rapidly increasing cause of cancer mortality in the United States. Unfortunately, only less than 20% of the patients are candidates for curative surgery. The rest of the patients undergo treatments designed to slow down the disease. Despite recent advances in drugs designed to deprive the tumors from oxygen by inhibiting new blood vessel growth, overall improvement is found to be only temporary. We now understand that cells deprived of oxygen play a central role in tumor growth and treatment failure. Given these new discoveries, areas of low oxygenation in tumors are of great interest in cancer research, including the potential to exploit them during cancer treatment. Photoacoustic ultrasonic (PAUS) imaging is a rapidly evolving imaging tool that does not involve the use of any invasive techniques and is able to calculate the amount of oxygen within a tumor. The technique can be safely and easily repeated at low cost. This is a major advance in the imaging of liver tumors. This information will be correlated with magnetic resonance imaging and pathology data, thus establishing a validated imaging platform for evaluation of oxygen levels and blood flow. This approach will be used to understand the mechanisms that help tumor cells survive.Finally, we will study drugs that are designed to specifically target areas of the tumor showing low oxygen levels. These drugs have showed promise and are currently being explored in clinical trials. We will study the combination of these promising new agents with current treatments, in order to improve the results of liver cancer therapy. Using the knowledge gained by imaging the oxygenation within tumors, we will be able to better understand why treatments fail and to potentially stop treatment for those patients who are no longer benefiting from these drugs. We will also be able to select best candidates for drugs that target treatment resistant cells in the tumors.