CANCER PREVENTION & RESEARCH INSTITUTE OF TEXAS

Award ID:
RP160713

Project Title:
Amino Acid Sensing: Directing Cell Growth through mTORC1

Award Mechanism:
High Impact/High Risk

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

Lay Summary:

Growth is an essential process whereby cells and organisms accumulate mass and increase in size. Cells grow by responding to environmental cues that trigger signaling pathways to regulate growth. When these signaling pathways are constitutively turned on, the cell grows uncontrollably leading to cancer. One signaling pathway implicated in cancer is the mTORC1 pathway. In fact, mTORC1 is often referred to as the “master regulator” of cell growth. The mTORC1 pathway is constitutively active in many human cancers, and therapeutics like rapamycin that target and block the mTORC1 pathway, have shown promise in cancer patients in several clinical trials. Currently there are two rapamycin analogs, Everolimus and Temsirolimus, approved by the FDA to treat renal and breast cancer. Thus, understanding how the mTORC1 pathway is regulated is of great concern. Our laboratory is interested in understanding how the mTORC1 pathway senses nutrients such as amino acids to control cell growth and cancer. We recently discovered a new pathway where glutamine can regulate mTORC1. This is important because most cancer cells require glutamine for cell growth and proliferation. This proposal seeks to identify novel components involved in glutamine signaling to mTORC1 that can be therapeutically targeted. We anticipate that the findings from this research will reveal new promising therapeutic targets in the treatment and fight against cancer.