Award ID:
RP130629

Project Title:
Genotype and Metabolic Phenotype in Pediatric Brain Cancer (Carson Leslie Award)

Award Mechanism:
Individual Investigator

Principal Investigator:
Maher, Elizabeth A

Entity:
The University of Texas Southwestern Medical Center

Lay Summary:

Malignant brain tumors are the second most common cancer in children. There has been improvement in overall survival for medulloblastoma over the past decade but it has come with significant long term toxicity. Despite the advances, for many patients with medulloblastoma and high grade glioma, there has been little change in outcome. Large scale genetic analyses of pediatric brain cancer over the past several years has provided a major leap forward in terms of understanding what genes are abnormal in these diseases, but we are a long way off from having new and improved therapies based on targeting a specific gene. A different approach to identifying possible ways of killing the cancer cell is by focusing on the "engine" of the cell, the metabolism that "fuels" ongoing cancer cell growth. The most direct way to do this is by giving glucose manufactured from "heavy carbon", a naturally occurring form of carbon in the environment that has the unique property of being able to be detected by MRI. We infuse the heavy carbon-labeled glucose in patients going to the operating room for removal of their brain tumor. It gets taken up by the tumor cell and then a small sample can be analyzed by MRI to see all the breakdown products of glucose that got the label. This is a very easy but highly sophisticated way of studying metabolism and has been very informative for adult brain tumors. Given the desperate need for identifying new targets in pediatric brain cancer, the current proposal is designed to get the metabolic information in medulloblastomas and gliomas directly using this same technique. It is so important to capitalize on this unique methodology, to generate the primary data in pediatric patients, and drive discovery rather than wait for targets to be developed in other cancers and apply them later to medulloblastoma and glioma. From this work we expect to be able to find new targets for treating these deadly brain tumors in children quickly.