Award ID:
RP150456

Project Title:
TAMU-UT Southwestern Partnership for Breast Imaging and Spectroscopy at 7 Tesla

Award Mechanism:
Individual Investigator

Principal Investigator:
Malloy, Craig

Entity:
The University of Texas Southwestern Medical Center

Lay Summary:

Breast cancer is a multi-faceted disease that is associated with substantial changes in cellular metabolism. Some of these changes such as rapid glucose uptake and excess production of lactic acid from glucose have been known for nearly 100 years. Based on this knowledge, some technology is now available for individualized patient care. For example, PET scanning is used to detect excess glucose uptake in cancer. However, all current technology for metabolic imaging of breast cancer requires ionizing radiation. More importantly, current imaging methods and even invasive biopsies provide little information about the biochemical processes that predispose to cancer or the changes in these processes in response to therapy. Compared to standard clinical magnetic resonance imaging (MRI) which operates at 1.5 to 3.0 Tesla, high field MRI at 7 Tesla (7T) provides improved sensitivity for metabolic processes. However, there are substantial engineering barriers to imaging patients at 7 Tesla. Recognizing the challenges as well as opportunities, Texas A&M University and UT Southwestern Medical Center established a collaboration to develop advanced MR imaging of the breast and breast masses at 7T. As a consequence of this collaboration and prior CPRIT investment (RP100625, now closed), essential new technologies are now available. More importantly, we have established a strong inter-institutional collaboration. The overall goal is capitalize on the complementary strengths of the two institutions and further develop breast imaging. The plan for workflow with a focus on engineering and coil construction at TAMU and coil testing at UT Southwestern is similar to our earlier project. Preclinical evaluation will be performed at UT Southwestern and will involve students from both sites, working together on the 7T MR scanner. The intent is to improve the imaging technology and perform the first-in-human studies of glucose metabolism in a small number of subjects.