Award ID:
RP110771

Project Title:
Acquisition of a Biomedical Cyclotron and Development of a Comprehensive Positron Emission Tomography Program at UT Southwestern for Cancer Research

Award Mechanism:
Shared Instrumentation Awards

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

Lay Summary:

A biomedical cyclotron is needed for the production of short-lived positron-emitting isotopes for synthesizing Positron Emission Tomography (PET) tracers and developing new imaging probes for noninvasive assessment of cancer and other biological abnormalities in humans and animal models. To date, PET imaging has become a standard-of-care tool for diagnosis, treatment planning, and therapeutic efficacy monitoring in cancer patients even though only one PET probe (FDG) is available from commercial sources for our patients. Due to its capability of absolute imaging quantification and superior sensitivity, PET has also been recognized as the main driving force of molecular imaging in the understanding of disease mechanisms, and following progression and remission after therapeutic interventions. We desperately need to make this cutting edge imaging technology available to our cancer investigators and implement new PET methods enabled by novel radiotracers that probe specific biological or metabolic pathways of cancer. To enable such PET imaging procedures, a positron-emitting isotope must be incorporated into a target seeking molecule or metabolite so that the real-time biological information can be revealed at the cellular or molecular level in living subjects. Because of the extreme short half-lives of the four conventional PET isotopes (15O: t1/2 = 2 min; 13N: t1/2 = 10 min; 11C: t1/2 = 20.3 min; and 18F: t1/2 = 110 min), an onsite biomedical cyclotron is absolutely essential. We request funds to purchase a GE PETtrace cyclotron and its essential components for the development of a dynamic cyclotron and radiochemistry program with the goal of making available a suite of existing and novel probes for PET imaging of cancer. The addition of such a program will have a substantial impact on existing cancer research programs at UT Southwestern in accelerating new basic research discoveries to positive clinical outcomes for cancer patients in North Texas.