



CANCER PREVENTION & RESEARCH INSTITUTE OF TEXAS

Award ID:
RP120326

Project Title:
In-Situ PET Imaging for Adaptive Proton Therapy

Award Mechanism:
Individual Investigator

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

Lay Summary:

Proton therapy (PT) is a latest state-of-art radiation therapy that can focus high level radiations to a small target. In principle, this unique physical property will allow PT to become a targeted therapy for significantly improved therapy efficacy while simultaneously reduced dose to normal tissues and thus reduced treatment complications. However, PT could be more harmful than useful to a patient if the high dose were not delivered accurately. Currently, there is no noninvasive technology to monitor the distribution of radiation delivered inside a patient. This has forced clinicians take overly conservative treatment approaches in restricting doses to the tumor in order to ensure sparing of normal tissues. It is critically important to overcome this impediment in order to dramatically enhance PT therapeutic outcomes and achieve the full clinical benefits. This research project aims to develop and evaluate a new imaging system to monitor PT during the patient treatment. Many new technologies will be applied to overcome technical challenges and provide adequate performance. If successful, this project will change the current PT practice that is almost solely relied on a coarse prediction from a PT treatment plan without knowledge of the actual delivered dose distribution. Such a new imaging system would allow for clinical application and research for nearly any disease treated with radiation therapy including brain and spine tumors, lung cancer, gastrointestinal, breast and prostate malignancies. Knowledge of the in-vivo delivered doses would allow for increased rates of disease control with lower side effects. Clinically it is hoped that this would translate not only into improved cure rates but also increased quality of life for survivors. Overall, we believe the success of this project will have profound benefits to the cancer patients and lasting impact to the public healthcare and economy.