



## CANCER PREVENTION & RESEARCH INSTITUTE OF TEXAS

Award ID:  
RP150356

Project Title:  
Peripheral nerve tolerance to single-session stereotactic irradiation

Award Mechanism:  
Individual Investigator

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

### Lay Summary:

Stereotactic body radiation therapy (SBRT) is a rapidly expanding treatment modality in which a large dose of radiation is delivered to a tumor in one to five outpatient sessions. SBRT represents a fundamental shift from the traditional approach of Radiation Oncology that embraced protracted fractionation (commonly 25-44 sessions). SBRT is proving effective at tumor control but neural structures in close proximity to tumors are at risk of debilitating toxicity if their radiation dose tolerance levels are exceeded. At least five institutions have reported their experience with peripheral nerve toxicity following SBRT in recent years and our group has managed 11 unreported cases. Very little is known regarding the tolerance of peripheral nerves in the setting of SBRT, thus, current recommendations are based more on opinion than scientific evidence. A study is proposed to determine the radiation tolerance of the peripheral nerves so that clinicians can prescribe maximally effective doses while avoiding nerve injury to patients. This study incorporates pigs as a model to study radiation tolerance as they are considered to be a close analog to humans for this purpose, for example, pigs have already been used to study the principles and limits of radiation dose to the spinal cord. Once completed, this study will provide a scientific basis for recommendations on the maximally tolerated dose to the peripheral nervous system. This study will also determine if the maximally tolerated dose is strongly dependent on the volume of nerve irradiated, as has been demonstrated for the spinal cord. The relationship between dose tolerance and volume irradiated has great significance clinically as it influences the prescribed dose for many tumors treated with radiation. Ultimately, the results of this study will translate into cancer patients receiving the best chance for survival with a high quality of life while maintaining a very low rate of neurologic toxicity.