

ADRIAN JONES ('18)

BIOMEDICAL ENGINEERING

Project

Ultrasound-Enhanced Molecular Therapy for Neurogenesis



Faculty Mentor

Damir B. Khismatullin, Ph.D.

Spinal cord injury (SCI) impacts 200,000 Americans annually. Many of those afflicted with a SCI experience loss of sensation or motor function below the site of spinal cord injury or severed nerve. Because there is currently no effective for nerve regeneration in the central nervous system (CNS), the damage of an SCI is chronic. Low intensity ultrasound (LIU) has been used to show accelerated growth and increased neurotrophic levels of peripheral nerves.

The goal of this project is to develop a non-invasive method to stimulate neurogenesis through low-intensity focused or unfocused ultrasound through varying certain acoustic parameters such as center frequency, acoustic power/intensity, duration, and duty cycle. In combination with ultrasound applications, molecular therapy will be applied to test the synergistic effects on neurogenesis. Current results of testing the ultrasound application without molecular therapy show that there is an increased neuron density from treated neurons in comparison to the control. In the future, we plan on combining synergistic effects to see if there is increased neurogenesis.