

REPPERGER RESEARCH INTERN PROGRAM

RESEARCH PROJECT #: AFRL-RHD-24-05

Cellular Responses to Biochemical and Physical Stressors

PROJECT DESCRIPTION: Our current research aims to determine how radio frequency (RF) electromagnetic fields (EMFs) interact with biological cells and intracellular structures. One of the goals is to assess the RF-EMF frequencies and intensities that positively or negatively modulate the neuronal cells and networks, alone and in combination with other agents. Specifically, we seek to provide a scientific basis to answer if RF-EMFs can be exploited to provide cellular resilience through stimulation of adaptive responses (hormesis phenomenon). Our current research investigates the response of neuronal cells to RF-EMFs by directly applying tuned fields to neuronal cells in vitro. We examine the cellular stress response mechanisms, assessing endpoints such as cell viability/death, change in MTs dynamics and stress granules formation, alteration in gene expression and epigenetic patterns, etc. The study employs an array of techniques in cellular and molecular biology, in genomics and bioinformatics, in microscopy, and in modeling and simulations. The student intern will have the opportunity to gain skills in cell and molecular biology techniques, biophysics experiments, fluorescent microscopy, and image processing. The student will also collaborate to develop a real-time analysis pipeline that yields rapid insights into the cell stress response state.

ACADEMIC LEVEL: Doctoral; Masters; Undergraduate

DISCIPLINE NEEDED:

- Biology
- Biomedical Engineering
- Biophysics

RESEARCH LOCATION: JBSA-Fort Sam Houston, San Antonio, Texas

RESEARCH MENTOR: Ibtissam Echchgadda, PhD
Biology, University of Texas Health Science Center, 2003



Dr. Ibtissam Echchgadda is a Senior Research Biological Scientist in the Radio Frequency Bioeffects Branch at the Air Force Research Laboratory (AFRL), 711 Human Performance Wing, Joint Base San Antonio-Fort Sam Houston, TX. She serves as a principal investigator on several projects that focus on understanding the biophysical and biochemical mechanisms that govern radio frequency electromagnetic fields interaction with biological systems, including coupling to intracellular molecules and potential impact on the natural cellular processes. Dr. Echchgadda has over 20 years of experience in different basic science and applied research. Before joining AFRL, she worked as a defense contractor for General Dynamics and before that, she served as a Research Faculty at the University of Texas Health Science Center San Antonio. Dr. Echchgadda received multiple honorable awards and her work has been published in peer-reviewed journals and has been presented at several national and international conferences.

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