

Summer Research Fellowship Proposal for 2020

FACULTY INFORMATION:

NAME: Dr. Anna Radomska-Pandya
DEPARTMENT: Biochemistry and Molecular Biology

LOCATION: Barton 6R27

PROJECT INFORMATION:

TITLE: The Effect of Natural and Synthetic Cannabinoids on Cancer Cells

LOCATION OF THE PROJECT: Barton 6R27

BRIEF DESCRIPTION OF THE PROJECT:

Cancer cells have the capacity to proliferate extensively and metastasize. The commonly used treatments administered to cancer patients involve chemotherapy and radiation, which are very toxic to the patient. This project will investigate the effects of classical cannabinoids, specifically Δ^9 -tetrahydrocannabinol (Δ^9 -THC), cannabidiol (CBD), cannabinol (CBN), on cancer cells. Additionally, the effects of select synthetic cannabinoids (SCBs) will also be used. SCBs are rapidly emerging drugs of abuse as they possess psychoactive properties, and their use has exploded in many sections of the population including teenagers and first time drug users. Investigations into the effects of these compounds on proliferation, cell viability, and cytotoxicity towards cancer cells will be performed. This project will also develop our previous mechanistic studies that show that all compounds under investigation bind to and activate cannabinoids receptors (CBRs), CB1 and/or CB2. The binding to CB1 and CB2 with significant affinity, and activation and/or suppression of downstream target genes, might result in the regulation of cancer cell proliferation. Those mechanistic studies will be further developed with both classes of compounds. If the results of our studies are successful, the CBR could constitute a novel molecular target, and the most active compounds could be used as effective, non-toxic alternatives that could be developed as treatments for various types of cancer.

STUDENT'S RESPONSIBILITIES-DUTIES IN THE PROPOSED PROJECT:

The students will be working under the supervision of Dr. Radomska-Pandya's lab members. Initially, the students will be educated about the natural and synthetic cannabinoids that will be used in these studies, and this will be followed by an introduction to the specific methods used to study cancer cell response to those cannabinoids. Students will be mentored in the calculation of the results of these experiments and how to present the experimental data in the form of tables and figures. Students will participate in seminars given in the Department of

Biochemistry and Molecular Biology. Finally, they will present their data in seminars related to the SRI program.

Students will investigate the effects of several natural and synthetic cannabinoids on cancer cells (breast and pancreatic cancer cells). The techniques used for this investigation will include proliferation, cytotoxicity, flow cytometry, microscopy, DNA damage, and colony formation. While much of the cellular biology work will be performed by the students, the other investigations will be performed by the core facilities at UAMS. The core facilities are specialized laboratories where personnel carry out specialized analyses, and then provide the data to the students for interpretation.

ESTIMATED TIME FOR PROJECT COMPLETION: 5-6 weeks

DOES THE WORK INVOLVE ANIMAL RESEARCH? YES -----
NO ----X-----