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Q1 Faculty Information:

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Faculty Position:	Associate Professor
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Q2 Type of Research?

**Basic Science
Research**

Q3 Please describe your research interests:

Aging is the greatest risk factor for the development of neurodegenerative disease, however the aspects of the aging process that predispose to the development of brain pathology are largely unknown. Our laboratory is a pioneer in studying the role of cellular senescence on brain physiology during normal aging and neuropathology. Our studies indicate that human astrocytes activate the senescence program in response to oxidative stress, exhaustive replication and beta amyloid, and we have demonstrated that in the human brain the number of senescent astrocytes increases in patients suffering from Alzheimer's disease. We have evidence that astrocyte senescence is also accompanied by profound changes in their transcriptome, including the loss of brain-specific transcripts, which suggests the loss of differentiated function in senescent astrocytes.

Our research interests include the study mechanisms of aging that predispose to neurocognitive disorders. Specifically by using in vitro and in vivo approaches we study the role of cellular senescence in human brain in Alzheimer's disease and HIV-associated dementia.

Medical Student Research Opportunities

Q4 Please provide a brief description of research opportunity/project(s):

1) Title of project(s):

Effect of senescent astrocytes on neuron physiology

Brief Description:

The presence of senescent astrocytes in the human brain could be critical because they display an altered pattern of secretion known as the senescence-associated secretory phenotype (SASP), a complex mixture of factors that profoundly affect neighboring cells and tissues by creating a pro-inflammatory microenvironment. The project aims to evaluate the role of SASP from senescent astrocytes on neuron physiology including studies on marker of neuronal markers and mitochondrial function.

Duration:

1 year

Time commitment:

Variable between 5-10 hours week.

Specific Requirements:

Knowledge of some basic laboratory techniques such as Western blotting, cell culture and preparation of solutions is desirable.

Funded or unfunded (yes or no):

Yes

2) Title of project(s):

Role of tau protein on astrocyte senescence

Brief Description:

Tau is a hallmark of Alzheimer's disease and the protein increase in Cerebrospinal fluid (CSF) and blood of patients. Recent studies have indicated that oligomeric forms of tau are toxic to cells, and we propose that tau maybe involved in the induction of the astrocyte senescence program.

Duration:

1 year

Time commitment:

Variable between 5-10 hours week.

Specific Requirements:

Knowledge of some basic laboratory techniques such as Western blotting, cell culture and preparation of solutions is desirable.

Funded or unfunded (yes or no);

Yes

Q5 Please indicate the specific level of experience required, if applicable:

Open to all medical students
