

Sample Disciplinary Honors in Biomedical Sciences Plan - Research Track

Questions regarding the research track should be directed to Dr. Doug Lobner, doug.lobner@marquette.edu.

Title: Role of the cystine/glutamate exchanger in neuronal death.

Research or Community Engagement Track: Research

Mentor: Dr. Doug Lobner

Summary of goals for the Honors experience:

My honors program revolves around the research I will be doing in the laboratory of Dr. Doug Lobner. This research is in the area of neuroscience, and specifically on mechanisms of neuronal death involved in neurodegenerative diseases. Therefore, each of the aspects of my proposal are focused on those areas. I will work with Dr. Lobner to develop a specific research question and design experiments to attempt to answer that question. I will give presentations on that research both during the Summer Research Program and through an independent study course (BISC 4995H). I will take the following elective courses Systems Neuroscience and Neuroanatomy to improve my knowledge of neuroscience. Additionally I will attend INRC and Biological Sciences seminars that are relevant to my research. Finally, I will engage in community service through working with high school students who tour the Marquette University gross anatomy lab by assisting with the neuroanatomy aspect of the tour. I believe that these activities offer me an experience that goes beyond normal coursework and will provide me with a comprehensive understanding of a specific area of neuroscience and an understanding of how scientific research is performed.

Research Project:

I will conduct research in the laboratory of Dr. Doug Lobner. The research will use cell cultures to study the role of the cystine/glutamate exchanger (system xc-) in neuronal death. System xc- regulates both intracellular glutathione levels and extracellular glutamate levels. Because of these actions system xc- can have effects on oxidative stress and excitotoxicity, both of which have been implicated in neurodegenerative disease. In the laboratory I will be involved in generating the cell cultures, performing the experiments, and analyzing the data.

Courses:

I will either take Honors Research in Biomedical Sciences (BISC 4995H) for two semesters (3 credits each semester) or will take Honors Research for one semester and participate in the summer research program for one summer (BISC 9007H).

I will take 2 of the following one credit honors courses: advanced biochemistry, physiology in depth, or advanced systems neuroscience. The courses that are chosen will depend on which are the most useful for my research project.

Since my research project is in the field of neuroscience my elective courses will focus on that area. I plan to take System Neuroscience and Neuroanatomy. Each of these courses will help me in understanding the science involved in my research project.

How will the writing component of the Honors Program be fulfilled:

Along with the presentation for the capstone course, I will also write a 5-10 page paper on my research in Dr. Lobner's lab. If possible this paper will be the foundation of a manuscript that will be submitted for publication.

Other research related activities:

I will attend any research seminars at Marquette University that are related to my research question. Specifically, I will attend the INRC seminars and those in the Biological Sciences seminar series that are related to my research.

Community engagement:

For community engagement I expect to be involved with the high school students who tour the gross anatomy lab, ideally by assisting with the presentations about neuroanatomy.