

BIOL 4395
Fall Semester 2023
Topics in Biology: CNS Disorders and Diseases

Instructor: Kyung-An Han, Ph. D.
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Hours: by appointment
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Class Meetings: 4:00 PM - 5:20 PM, MW

Classroom: Health Science/School of NURS 211

Course Objectives: Students are expected to gain contemporary knowledge and insights into the genetic, molecular, cellular and neural basis of the brain diseases that are relatively prevalent as listed below. Students are also expected to work on a collaborative research project on one of the diseases covered in the class. For the project, students are expected to develop a hypothesis on a potential environmental risk factor(s) for a selected disease and appropriate approaches to test the hypothesis in animal models or human subjects. Together, students are expected to acquire and advance science literature reading and presentation, analytical, logical, and creative skills among others.

Topics to be covered:

Autism Spectrum Disorders
Attention deficit hyperactivity disorder (ADHD)
Mental retardation
Addiction - substance use disorders (SUD)
Alzheimer's Disease and related dementias (ADRD)

Text: A general textbook – e.g *Neuroscience* (Purves et al., Sinauer Associates, 2017 or other Ed) or *Human Anatomy & Physiology* (Elaine N. Marieb & Katja Hoehn, Pearson Benjamin Cummings, 2018 or other Ed) - is recommended for background information on nervous system development, anatomy, and functions. Readings on review and primary research papers on selected topics will be provided.

Grading:

Class presentation and participation	50%
Homework	
Presentations	
Class attendance and participation	
Collaborative research project	50%
Overarching goal of the project	
Critical review of research papers for the project	
Hypothesis and approaches	
Significance and impact	

[Class presentations](#) are on concepts, background information, and primary research articles on the aforementioned diseases and will be done as a group as well as individually.

[Collaborative research project](#) is a collaborative team work to develop a research proposal in which each team develops a hypothesis on how a selected environmental factor contributes to one of the diseases covered in the class and how the hypothesis will be tested in an animal model or human subjects (design research approaches). The hypothesis and approaches require justification, which should be provided through critical review of published research papers and should include significance of the project and impact of potential findings. [The project shall be presented as a team \(oral ppt presentation; team task\) as well as submitted as an essay \(individual task\). The essay should be minimum 5 pages containing the following:](#)

Page 1: title of the project, name

Page 2-4: main content listed above

Page 5 or more: references (list all authors if less than 20, journal name, year, volume, page, doi)

Font : margins 1 inch, font 11, single spaced

Final grades will be assigned as follows: A=90-100, B=80-89, C=65-79, D=50-64, F=0-49

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Course Schedule

Lectures	Topic
Section 1	Overview of the class, Overview on the neurophysiology, neural structures, functions, and development (ref: any <i>Neuroscience</i> or <i>ANP</i> textbook)
Section 2	Alzheimer's Disease (review and research articles posted in blackboard)
Section 3	Autism Spectrum Disorders, ADHD, and mental retardation (review and research articles posted in blackboard)
Section 4	Addiction – substance use disorders (review and research articles posted in blackboard)

The schedule is subject to change. Please check Blackboard regularly for changes or important announcements.