GMS 7795: Neurobiology of Behavioral Disorders

E-learning Canvas Online Course
3 Credit Hours

Course Instructors:
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Course Description
This course is intended for students enrolled in the Online Biomedical Neuroscience MSc Program in the Department of Neuroscience. This course focuses on the neurobiological basis of neurobehavioral disorders including autism spectrum disorder, obsessive-compulsive disorder, and attention deficit hyperactivity disorder. The course will cover the clinical presentation of these disorders as well as the genetics, neuropathology, structural and functional brain changes as indexed by neuroimaging, risk factors, biomarkers, relevant animal models, and biomedical treatments.

Course Objectives
After successfully completing this course, students will be able to:

- Distinguish the core clinical features of neurobehavioral and neurodevelopmental disorders.
- Identify the genetic etiology and neuropathological alterations associated with each disorder
- Describe key animal models relevant to each disorder and identify key translational findings from these models.
- Illustrate key neurobiological mechanisms that appear to mediate the expression of specific neurobehavioral disorders that have been identified from specific model systems
- Discuss the strengths and limitations of biomedical treatments for each disorder

This course is designed to integrate the clinical phenomenology of major neurobehavioral disorders with what is known about their genetic and neurobiological basis. A significant focus of the course will be the integration of pre-clinical and clinical literature, examining findings that range from molecular and cellular mechanisms to phenomenology. For each disorder, the objective will be to explore 1) clinical presentation, 2) risk factors (genetic, environmental) 3) clinical neuroscience (neuropathology and neuroimaging, neurochemistry) 3) relevant animal models and 4) biological treatments.

Course Disclaimer: This course (including all materials, ideas, research or clinical observations written or electronically conveyed) is for educational purposes only. The course does not substitute for and does not provide clinical or treatment recommendations or endorsements for the treatment of any individual person's condition. This course is simply a survey course whose intent is to familiarize the student with a wide variety of material relevant to the area of study and course participants should not use any of the course material as a basis for diagnosis or treatment of themselves or others. Any clinical intervention or treatment that the course participant elects to take is the sole responsibility of the course participant. Such clinically relevant decisions should always be discussed with the course participant's physician and/or other health care providers and the consequences of any action taken are the responsibility of

the course participant and his or her treating provider.

General Overview of Course Content: The course is divided into three modules. Each module introduces and presents a detailed treatment of a major neurobehavioral disorder. A typical lesson consists of:

- video lectures
- required readings
- quizzes
- one web post assignment, requiring a 250-word short answer (or a list of items, as indicated)
- one 100-word web posts to respond to or comment on classmates' web posts

Assignment due dates and times: Unless otherwise noted, all quizzes and web posts assignments are due on Mondays at 9 a.m. Eastern, on the dates specified in the course schedule below.

Point breakdown:
• quizzes
• one web post assignment, requiring a 250-word short answer (or a list of items, as indicated)
• one 100-word web posts to respond to or comment on classmates' web posts

Quizzes: (1 quiz x 10 pts each + 23 quizzes x 20 pts each) = 470 pts

Web posts (short-answer or list, as indicated) and responses to classmate's web posts: (4 posts x 20 pts each + 1 post x 10 pts) = 90 pts

Note that if you do not submit an assignment you will get a grade of zero for that assignment.
Total: 360 pts

Grading Scale: Final grades are determined by the following scale and will be posted in "Grades"
in Canvas.
A = 93% A- 90-92% B+ 87-89% B 83-86% B- 80-82% C+ 77-79% C 73-76% C- 70-72% D+ 67-69
D 63-66% D- 60-62 E < 60%

View the current UF Grading Policy
at https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx

Course Readings and Lectures
No text will be required but Charney and Nestler's Neurobiology of Mental Illness (5th ed.) is recommended as an optional text. Readings will be largely made up of recent review articles with some empirical research papers. The reading load will be moderately heavy.

Course Participant Evaluations
Performance of course participants will be evaluated based on quizzes (40%) and web posts. Course participation will count for 20% of the grade.

Course Schedule

Introduction to the Course and Review of syllabus (*Week 1*)

Module 1: Autism Spectrum Disorder (ASD)

ASD clinical presentation **(***week 1*)
Required readings: Lord et al., 2018; Dow et al., 2020; Lombardo et al., 2019; Tye et al., 2019; Schulz & Stevenson, 2019; Lee & Bo 2015

ASD risk factors (*week 2*)
Required readings: Tick et al., 2016; Ornoy et al., 2016; Rylaarsdam & Guemez-Gamboa, 2019; Taylor et al., 2020

ASD pathophysiology (*week 3*)
Required readings: Yankowitz et al., 2020; Supekar et al., 2018; Just et al. (2014); Lory et al., 2020; Corbett et al., 2019; Saurman et al. (2020)

ASD animal models (*week 4*)
Required readings: Crawley 2012; Mohrle et al 2020; Bevesdorf et al. 2019; Meyza et al. 2013

ASD biomedical treatments (*week 5*)
Required readings: Rasmussen et al. 2018; DeFilippis, 2018; Cole et al., 2019

Module 2: Obsessive-Compulsive Disorder (OCD)

OCD clinical presentation (*week 6*)
Required readings: Stein et al., 2019; Robbins et al., 2019; Nazeer et al., 2019

OCD risk factors (*week 7*)
Required readings: Purrty et al., 2019; Bellia et al., 2020; Brander et al., 2016

OCD pathophysiology (*week 8*)
Required readings: Lipton et al., 2019; Goodman et al., 2021; Shepard et al., 2021

OCD animal models (*week 9*)
Required readings: Pittenger et al., 2019; Zike et al., 2017; Monteiro & Feng, 2016

OCD biomedical treatments (*week 10*)
Required readings: Wu et al., 2020; Rapinesi et al., 2019; Vicheva et al., 2020; Szechtman et al., 2020

Module 3: Attention Deficit Hyperactivity Disorder (ADHD)

ADHD clinical presentation (*week 11*)
Required readings: Jerome & Jerome, 2020; Faraone et al., 2021; Karalunas & Nigg, 2020

ADHD risk factors (*week 12*)
Required readings: Pujol-Gualdo et al., 2021; Tistarelli et al., 2020;

ADHD pathophysiology (*week 13*)
Required readings: Tripp & Wickens, 2009; Samea et al., 2019; Gallo & Posner, 2016

ADHD animal models (*week 14*)

Required readings: Rahi & Kumar, 2021; Wickens et al., 2011; Russell, 2011

ADHD biomedical treatments (*week 14)*
Required readings: Pitzianti et al., 2020; Carucci et al., 2021; Rubio et al., 2016

Required readings will be provided within the Canvas online shell.