

BIBB 430-601 : Neurobiology of Autism, Spring 2012

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Monday 6:30pm-9:30 pm **Classroom:** DRL 3C8

Office hours: Mondays 5:30-6:15 pm/ by appointment. TRL 2231-7

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Course Description

This course examines the neurobiological processes underlying autism spectrum disorders. In this seminar style course, we will first examine the brain phenotypes associated with ASD, in addition to investigating the genetic and environmental contributions to the etiology and pathophysiology of Autism Spectrum disorders (ASD). After initial examination of clinical literature and research, we will focus on animal models of ASD and investigate changes in neurotransmitter systems and synaptic dysfunction in the brain in these models.

Course Objectives

The central objective of this course is to expose the students to the range of neurobiological research related to ASD that is taking place, today. In addition to gaining knowledge through lectures and secondary literature, the students will develop skills at addressing research questions through critical review of the recent primary literature, including evaluating results of research designs and communicating information orally.

Specifically, the following objectives will be achieved through lectures, analysis of scientific literature, class discussions, group presentations, and/or written assignments.

- 1) Students will gain a deep understanding of the neurobiological differences in ASD on a clinical and basic research level.
- 2) Students will understand and be able to present informed opinions on a variety of clinical and basic research papers in the field of ASD.
- 3) Students will be able to analyze and critique journal articles.

CLASS POLICIES

Required Reading: There is no standard text. The class readings are selected from the books, journal articles and/or popular media perspectives available on topics related to Autism Spectrum disorders. This course utilizes the Blackboard website for distribution of journal articles and other assigned readings. Please visit: <https://courseweb.library.upenn.edu/> to

make sure you can access the course site. Students are encouraged to explore the scientific literature while locating specific assigned articles.

Course Format: This seminar class will meet once a week for three hours. The learning activities will include lectures, class discussions of assigned reading, and group presentations. Course grades will be based on one midterm exam (25%), one oral presentation (25%), a final exam (25%) as well as quizzes (15%) and class attendance and participation (10%).

In the first portion of the semester, the class will be divided into periods reserved for lecture, journal club style paper discussions and quizzes (not necessarily in this order). During the second part of the semester, the class will include student presentations in addition to all of the above.

Grading:

Participation/Attendance: 10%

Attendance: Please do not be late or leave early. Both tardiness and leaving the class early will be considered absences for that class.

Neurobiology of Autism is a seminar course designed to familiarize students with current research in the field. Primary journal articles will be read and discussed. The journal club format necessitates student attendance and participation, which will be monitored. Participation in class discussions is required. Students who prepare for and participate fully in relevant and collaborative ways in class discussions and activities will receive higher grades. To this end, read all the papers well beforehand and make relevant notes. Bring your copies of the paper to class.

General class policies include no cell phone use during lectures and discussions.

Quizzes & Homework: 15%.

Students will be quizzed on the assignment due for that class. This includes the in-class discussion paper, the background paper for the lecture and/or information from the student presentation from the previous class. Please bring in extra paper to write down answers for quizzes.

The lowest quiz grade will be dropped. If you miss a class, you will get a 0 for that quiz and it will be automatically dropped. Approximately 10-15 mins will be allotted for each quiz, which will be 2-4 questions long. ***Quizzes are subject to cancellation without notice.***

Sporadically, homework papers (1-2 pages single spaced, Arial 11 point) may be assigned. They will be due in class during the next class period. If assigned, the homework & quizzes together, will make up 15 % of your class grade.

Presentation: 25%

Starting Week 8, there will be student presentations (group of 4 students each) on material covered in lecture from the previous class. The instructor will provide references. Please sign up for one of the 5 presentations on BlackBoard by **February 10, 2012**.

Presentations should focus on one or more research articles published within the last 10 years in the assigned area (A list of references will be provided by instructor). Presentations should be 30-40 minutes in length plus 5-10 minutes for discussion. Presentations are generally given in PowerPoint format, but other mediums may be used with prior instructor approval. Presentations should include: a short introduction to the topic, a discussion of the methods, results and conclusions of the paper(s), a general conclusion incorporating the results of all the material presented and speculations on future directions as well as alternative explanations. Students are required to meet with a speaking advisor from Communication Within the Curriculum (CWIC) at least 2 days prior to their in-class presentation.

Midterm Exam: 25%

The mid-term exam will consist of short answer questions designed to assess basic knowledge of the concepts discussed in class as well as the ability to apply that knowledge to novel research questions. The student should understand the material in sufficient depth to be able to integrate information from different lectures. The exam will include all lecture and reading materials covered until the day of the exam.

Final Exam: 25%

The final exam will involve analysis of a novel research article. Students will be expected to demonstrate understanding of the article as it relates to other papers discussed in class as well as the ability to critique the paper.

Missed exams will only be given at a later date with an authorized university absence. If an exam is submitted for a re-grade, it must be done in writing within *one week* of receiving the graded exam. All submitted exams will be re-graded in their entirety and the resulting score may higher or lower than the original grade. A fraction of exams are photocopied before being returned to the students. If an exam is found to have been altered before submission for re-grading, the student will be reported to the Office for Student Conduct.

In general, it is expected that students will follow the Code of Academic Integrity. *Academic activities that have the effect or intention of interfering with education, pursuit of knowledge, or fair evaluation of a student's performance are prohibited.*

http://www.upenn.edu/provost/PennBook/academic_integrity_code_of

IMPORTANT NOTE: *I will communicate with the class through Blackboard email. Communications may include changes or cancellations in class, assignments, office hours, or meeting rooms/times. Please confirm that the email address listed in Blackboard is the email you will be reading on a daily basis.*

Date	Quizzes	(Prepare for these before class)	Student Presentation	Lecture Topic
		In class Paper discussion		
1/23/2012 Lecture #1		Wang et al 2009; Tabet et al 2012 (Genetics of ASD)	None	Introduction, Genetics of ASD,
1/30/2012 Lecture #2	Quiz #1 (will include Papers from Lecture #1, Lecture #1 and Papers from Lecture #2).	Mirror Neurons: Dapretto et al 2005 Nature Neuroscience; Keyzers et al 2011 Biological Psychiatry.	None	Guest Lecture: Dr. Michele Villalobos, CAR./Etiology 6:30-7:30pm; Neuroanatomy of Autism (lecture)
		Neural signatures of Autism: Kaiser et al 2010 PNAS; Spencer et al 2011 <i>Translational Psychiatry</i> (2011) 1, e19; doi:10.1038/tp.2011.18		
2/6/2012 Lecture #3	Quiz #2.	Villalobos references (TBA)	None	Animal models in ASD: Mouse & Rat. Neuroanatomy of Autism (part 2)
2/13/2012 Lecture #4	Quiz #3	In class discussion based on last lecture: Panksepp paper and Yizhar et al 2011 Nature 477, 171-178 September 08, 2011. Background for today's lecture: Croen et al 2011 AD use in pregnancy, Levitt response Arch Gen Psych 2011; Oberlander review 2009.	None	
2/20/2012 Lecture #5	Quiz #4	In class discussion based on last lecture: McKay commentary;	None	Serotonin in Autism
		Bonnin et al Nature 2011 Apr 21: 472(7343):347-50; Review: Bonnin A and Levitt O Neuroscience 2011 Dec 1; 197:1-7;		
		Bonnin and Levitt Neuropsychopharmacology 2012 Jn; 37(1) 299-300.		
2/27/2012				MIDTERM EXAM (includes all lectures, papers and discussions until today)

				SPRING BREAK
3/12/2012 Lecture #6	Quiz #5	Background: Zoghbi review on Rett; Discussion: Carlson papers	No Student Presentation	Guest lecture: Dr. Greg Carlson/Developmental Regression in Mouse models of Rett Syndrome; “Rett syndrome: Can a complex monogenetic disorder provide a key to Autism?”
3/19/2012 Lecture #7	Quiz #6	In class lecture & discussion: Guy et al 2007 Science; Samaco 2012	No student presentation	Guest Lecture: Dr. Darren Goffin/ Epigenetic control of neurodevelopment: insights from a mouse model of Rett syndrome
3/26/2012 Lecture #8	Quiz #7	In class: Fragile X papers	Fragile X/ Treatment options	Reelin/TSC
4/2/2012 Lecture #9	Quiz #8	In class: Reelin/TSC papers	Reelin/TSC	Intro to Synaptic cell adhesion molecules
4/9/2012 Lecture #10	Quiz #9	Nlgn4/Nlgn3R451C/Cntnap2	Synaptic cell adhesion presynaptic	Synaptic cell adhesion molecule Part 2 / Oxytocin and ASD
4/16/2012 Lecture #11	Quiz #10	Shank 3 Nature paper/PSD95	Synaptic cell adhesion-postsynaptic	Oxytocin and ASD
4/23/2012 Lecture #12	Quiz # 11	Cytokines & Autism Oxytocin and ASD	Oxytocin mouse models/treatment options	TBA/Final Review
4/30/2012				FINAL EXAM: 4/30/2012