

**Developmental Neurobiology**  
**Fall 2021 – ½ semester**

**Course #: NEUSC 7750/ANAT 7750**

Tuesday, Thursday, Friday 10:45-11:35 am  
HSEB 2948

**Class will be held in person and livestreamed via ZOOM**

Classes will be recorded

All ZOOM links and recorded lectures will be available through Canvas

**Password: 7750**

**Course director:** Michael Deans, [michael.deans@utah.edu](mailto:michael.deans@utah.edu), office BPRB 390C

**Course Description**

This course covers major processes in the assembly of a functional nervous system, including neural induction, patterning of the central and peripheral nervous system, cell proliferation and differentiation, stem cells, cell death, axon guidance, and synapse formation. Emphasis will be on the cellular and molecular mechanisms involved in neural development, and the experimental approaches used to elucidate these mechanisms.

**Learning Objectives**

After completing the course, students should be able to:

- describe the major events in neural development, including neural induction, neurogenesis and gliogenesis, patterning of the CNS and PNS, axon guidance, synapse formation, and neuronal cell death
- describe experimental evidence for the major cellular and molecular mechanisms involved in these developmental processes
- describe the advantages and limitations of various model systems, and choose the appropriate system, for investigating issues in neural development
- understand how defects in neural development impact human health and disease
- read and understand original journal articles
- present a journal article to a group of scientific peers

**Important note:** This syllabus and the lecture schedule is not a contract and is subject to minor modifications. I will do my best not to make changes.

Date	Topic	INSTRUCTOR
10/19/2021	Intro to class and model organisms	Deans/Dorsky
10/21/2021	Genetic Tools	Nikki Link
10/22/2021	Genetic Screens	Nikki Link
10/26/2021	vertebrate embryology	Jan Christian
10/28/2021	neuralation / DV patterning	Jan Christian
10/29/2021	Discussion 1	Nikki Link
11/2/2021	neurogenesis/gliogenesis	Alex Shcheglovitov
11/4/2021	adult neurogenesis/iPSCs	Alex Shcheglovitov
11/5/2021	Discussion 2	Alex Shcheglovitov
11/9/2021	cortical development	Monica Vetter

11/11/2021	neurotrophins/neuron cell death	Monica Vetter
11/12/2021	<b>Exam 1 (topics 10/19 - 11/9)</b>	
11/16/2021	PNS development	Rich Dorsky
11/18/2021	Discussion 3	Rich Dorsky
11/19/2021	neuronal polarity and axon outgrowth	Michael Deans
11/23/2021	axon guidance/target selection	Michael Deans
11/25/2021	no class - thanksgiving break	
11/26/2021	no class - thanksgiving break	
11/30/2021	Discussion 4	Michael Deans
12/2/2021	synapse formation NMJ	Megan Williams
12/3/2021	Synapse formation CNS	Megan Williams
12/7/2021	Discussion 5	Megan Williams
12/13/2021	<b>Exam 2 (topics 11/11 - 12/7)</b>	

**Most lectures will not follow a specific text book.**

**Exams are based on material covered in lectures and discussions.**

However, you may find these textbooks helpful for supplemental information and to clarify key points:

Sanes, Reh & Harris (2012) Development of the Nervous System, 3<sup>rd</sup> ed.

The electronic version is available through the Univ. of Utah library.

*Also available at the library:*

Rao & Jacobsen (2005) Developmental Neurobiology, 4<sup>th</sup> ed.

Wolpert, L. and Tickle (2011) Principles of Development, 4<sup>th</sup> ed.

Kandel et al. (2013) Principles of Neural Science, 5<sup>th</sup> ed. (Marriott)

Squire et al. (2013) Fundamental Neuroscience, 4<sup>th</sup> ed. (Marriott); electronic version available

**Grading:** Assignment of grades will be based on 2 exams (60%), oral presentations (25%), and 5 quizzes (15%). **Graduate students must earn a B grade to pass the course.** This means an average score of at least 80%. If you are concerned about your grade at any time, please discuss it with the course director.

**Exams:** There will be two take home exams. Exams will cover the lectures and discussion papers for that section. Exams will be written and graded by participating instructors and the course director. You will be allowed to start exams at 10:45am on designated exam days, and exams must be submitted to the class director (Michael Deans) by the end of the day (11:59pm). Late exams will be penalized 10 points for each day late. Make-up exams will be administered with prior arrangement only and generally allowed only for a serious medical reason or uncontrollable circumstances. If you have questions about exam grading, please contact the course director within one week of receiving the graded exam. No exceptions will be made to these rules.

You ARE allowed to use class notes, books, papers, and the internet. You ARE NOT allowed to seek help from any other human being. This includes classmates, faculty, or lab members at the University of Utah or elsewhere including parents, friends, etc. The exams will consist of multiple long answer questions related to class material and concepts in which you will be asked to 'design an experiment' and/or 'interpret experimental outcomes'.

**Oral Presentations (Discussions):** Each discussion day will have 2-3 students assigned to present a critical review of a journal article from the primary literature. The paper will be selected by the instructor for each section and will be related to the lecture material. Oral presentations will be graded and feedback provided by the instructor. To earn full credit, you must have an organized, well-prepared presentation, give adequate background on the subject and present the paper critically. In most cases, groups will receive the same grade on the oral presentation. In the event of an obvious discrepancy in the effort contributed by an individual group member, separate grades may be received.

**Quizzes:** There will be a 3-point quiz administered to all students prior to each Oral Presentation to ensure that all students have read and thought about the assigned paper, and attend class on discussion days. Quizzes will occur during the first 5-minutes of class and make-up quizzes are not allowed without prior arrangement. This will generally only be allowed for serious medical reasons or uncontrollable circumstances.

**Student with disabilities:**

The University of Utah seeks to provide equal access to its programs, services and activities for people with disabilities. If you will need accommodations in the class, reasonable prior notice needs to be given to the Center for Disability and Access, 162 Olpin Union Building, 581-5020 (V/TDD). CDA will work with you and the instructor to make arrangement for accommodations. All written information in this course can be made available in alternative format with prior notification to the Center for Disability Services.

**Face coverings are required in all in-person classes or meetings for both students AND faculty:**

Based on CDC guidelines, the University of Utah School of Medicine (SOM) requires everyone to wear face coverings in shared public spaces on the SOM campus, including the HSEB building where our classroom is located. We will follow the most current SOM policies on face coverings during class. Please be aware that these policies may change or be updated during the course of the semester.