

Special Topics Course: Environmental Effects on Brain Development

Instructor: Margarita Kaplow

email: mkaplow@nyu.edu

Meeting Time: Monday, Wednesday 10:00am-11:15 am - Meyer 807

Office Hours: Monday, Wednesday 1:00pm-2pm - Meyer 801 or by appointment

Prerequisites: *INTRONS (NEURL-UA 100), Molecular and Cellular Biology I (BIOL-UA 21)*

Co-requisites: *Behavioral and Integrative Neuroscience (NEURL-UA 220)*

Course Objective: The focus of this class will be to learn the environmental effects, including the epigenetic modification, on nervous system development. Students will learn the mechanisms of early neural development, including important signals that organize the nervous system. The course will reveal the effects of chemicals on altering nervous system development and function. Students will study the impact of external factors such as stress and positive social interactions on gene expression, and, in turn, how these factors influence brain development. Students will discuss and analyze scientific papers pertaining to the effects of the environment on nervous system development. Students will develop scientific writing skills through writing a review on scientific journal articles.

Grading and Evaluation

Quizzes- 25%

Case Studies (Homework assignments), Attendance, Class participation- 25%

Paper Presentation- 25%

Written Review- 25%

Required Reading:

Chapters from:

- 1) Textbook: Dan Sanes, Thomas .A Reh, and William .A Harris, Development of the Nervous System (2012) Third Edition
- 2) Scientific review articles will be posted on NYU classes
- 3) Some case study assignment will involve reading and analyzing primary research articles.

Supplemental Books:

- 1) Textbook: Scott Gilbert, Developmental Biology (2010) 10th Edition

Quizzes- There will be four quizzes given throughout the course. Quizzes will be based on lectures and class discussions. Quizzes will compose of 2-3 questions and will be given during the first 15 minutes of class time.

Case study/ homework assignments- Students will have assigned homework each week. Assignments will involve reviewing a particular study involving neural development. Students will be asked a series of questions relating to the study. For example, what approaches should be used to understand a new neurodevelopment disorder and why? What are the limitations of a particular study? Why did scientists use a specific method to study a developmental process? Assignments may also ask students to analyze or interpret a particular data set from a scientific study. Homework assignments are meant to stimulate class discussions. Only physical copies of assignments will be accepted.

Attendance and Participation- Active participation is essential for enriching the learning environment of class and is a component of your overall grade in the class. Questions, comments, critiques are welcome in the classroom. Attendance is mandatory. Please do not be late to class as this is disruptive during presentations and discussions. Students arriving more than 15 minutes late to class will not be permitted to attend class and will be considered absent for the lecture.

Final Project- Students will research a relevant scientific paper related to the impact of external factors on the brain. Scientific paper must be approved by the instructor two weeks before the presentation date. Scientific paper chosen must pertain to the one of the subtopics (Modules) discussed throughout the course: *Mechanisms in Early Development; Genes and Brain Development; Chemicals and the Brain; Injury and damage to the developing brain*

Powerpoint presentation- After choosing a paper students will be required to present the study to the class. Presentation will encompass evaluating figures of the scientific article and discussing the significance of the scientific paper. Students will critique the presentation of their peers. The format of the presentation will be discussed in detail during class.

A written review of your scientific paper- You will be required to write a one page summary of your scientific paper. Emphasize the significance of the journal article. Write this review as if you are writing a piece for the general public. You will have the opportunity to revise your scientific review. 10% of your grade will be from your original draft and 10% of your grade will come from the revised version of your review.

Please note that syllabus schedule is subject to change. Class discussions may go overtime which causes a delay in class schedule

Lecture	Date	Topic
1	1/25/2016	Introduction to the Course Syllabus and Neural Development
	<i>MODULE 1</i>	<i>MECHANISMS DURING EARLY NEURAL DEVELOPMENT</i>
2	1/27/2016	Early signaling molecules / maternal contribution nervous system
3	2/1/2016	Case Study 1
4	2/3/2016	Neuralation and Neural Tube Defects
5	2/8/2016	Case Study 2
	<i>MODULE 2</i>	<i>GENES AND BRAIN DEVELOPMENT</i>
6	2/10/2016	(QUIZ 1) Genetic Programs in Development
7	2/15/2016	NO CLASS
8	2/17/2016	Case Study 3
9	2/22/2016	Epigenetics and Development
10	2/24/2016	Case Study 4
	<i>MODULE 3</i>	<i>CHEMICALS AND THE DEVELOPING BRAIN</i>
11	2/29/2016	(QUIZ 2) Neurochemical, Toxicity and Addiction
12	3/2/2016	Case Study 5
13	3/7/2016	Hormones, Stress and the Brain
14	3/9/2016	Case Study 6
	3/14/2016	NO CLASS
	3/16/2016	NO CLASS
	<i>MODULE</i>	<i>(QUIZ 3) INJURY, BRAIN DAMAGE, AND REGENERATION</i>
16	3/21/2016	Physical injury and the brain
17	3/23/2016	Case Study 7
18	3/28/2016	Motor Neuron Degenerative Diseases
19	3/30/2016	(QUIZ 4) Case Study 8
20	4/4/2016	Guest Lecturer or (QUIZ 4)
21	4/6/2016	<i>Student Final Project Presentations for module 1</i>
22	4/11/2016	<i>Student Final Project Presentations for module 1</i>
23	4/13/2016	<i>Student Final Project Presentations for module 2</i>
24	4/18/2016	<i>Student Final Project Presentations for module 2</i>
25	4/20/2016	<i>Student Final Project Presentations for module 3</i>
26	4/25/2016	<i>Student Final Project Presentations for module 3</i>
27	4/27/2016	<i>Catch up</i>
28	5/2/2016	<i>Student Final Project Presentations for module 4</i>
29	5/4/2016	<i>Student Final Project Presentations for module 4</i>