Current Topics in Neuroscience: Stress and the Brain

Spring 2013 – NSCI667-010

M 3:30-6:30pm, Sharp Lab Room 120

Instructor: Dr. Tania Roth

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Office Hours: Wolf Hall 131, W & F 2-3pm

Course description and objectives:

This course will survey clinical and experimental research to understand the impact of stress and experience on brain development, brain function, and behavior. Biological perspectives on psychopathology and treatment will also be addressed.

Course materials:

Primary textbook: *Stress- From Molecules to Behavior*. 2010. Soreq, Friedman, Kaufer (Eds). Wiley Blackwell.

Additional readings will be posted on the course website (Sakai). I will post power points prior to each lecture.

Course format:

I will begin each class with a lecture centered on the textbook readings/topic of the day. The second part of each class will be student led discussions of research articles. You are expected to read and think about the assigned readings before each class. You are also expected to actively participate in class lecture and discussions. You cannot be an active participant if you are not here. Bottom line- come to class and bring the reading materials with you! If you miss a lecture, you are responsible for obtaining lecture/discussion notes from one of your classmates.

Assessment and grading:

Your course grade will be based on a total of 500 points.

3 exams, each worth 100 pts *Exam format: multiple multiple choice, short answer, essay.*

1 Presentation, worth 50 pts

2 writing assignments, each worth 50 pts

Class participation – 50 pts These points come from completing peer evaluations of presentations, in-class group activities, speaking up in class, and class attendance.

Grade scale:

A	100-94%	500-468
A-	93-90%	467-448
B+	89-87%	447-433
B	86-84%	432-418
B-	83-80%	417-398
C+	79-77%	397-383
C	76-74%	382-368
C-	73-70%	367-348
D+	69-67%	347-333
D	66-64%	332-318
D-	63-60%	317-298
F	59-0%	297-

Presentation:

This project has been designed to give you some experience at giving oral presentations and critically reviewing scientific research. Student led seminars will consist of a detailed description of a single published research article (chosen by the instructor) describing an experiment/study related to the course.

For your presentation, be sure to include the following.

Introduction – This is where you will give the background of the paper. This includes information/previous research for why the paper is important. Topic leaders will need to research material beyond the literature provided. Typically an article's introduction is written for an audience with more expertise than your audience will have. This is the section of the talk where you will also state the hypothesis of the article.

Methods – Here you will give the overall picture of the materials and methods used in the study.

Results – This is where you will go through the results/figures of the article, and note what the results mean with respect to the research questions and overall hypothesis.

Discussion – Give the main conclusion and note whether the hypothesis was supported. Here you should also discuss the implications of the results, how it relates to topic, and future directions.

Your grade will be based on: clarity of presentation, ability to answer questions, ability to engage your audience, and ability to evaluate the research. Your presentation is worth 50 pts.

Writing assignments:

These assignments have been designed to give you some experience at scientific writing, in which you will summarize a block of information in a concise, organized manner. You will need to find 2 recent (published 2009 or after) empirical (where authors conducted a study/series of experiment, not a literature review) articles that are relevant to any of the ideas/research we have discussed. <u>They cannot be ones listed on the syllabus/presented in class.</u> You will write a 1-2 page summary for each article, in which you will summarize the article (question addressed, overview of methods, results and conclusion) and discuss how it relates to this course and understanding the neurobiology of stress responses. Each summary is worth 50 pts.

Your 1st article summary is due: April 1 – Please hand in to instructor at beginning of class

Your 2nd article summary is due: May 6 – Please hand in to instructor at beginning of class

No late summaries accepted! Additional details will be posted on Sakai.

Suggested databases of where to look for articles:

http://www.ncbi.nlm.nih.gov/pubmed

http://www.lib.udel.edu/db/index.php?A=LIF

Statement for students with disabilities:

Any student who thinks he/she may need an accommodation based on a disability should contact me personally as soon as possible, as well as contact the Disability Support Service (DSS) office. The DSS office is located at 119 Alison Hall, Phone: 302-831-4643, www.udel.edu/DSS.

Statement on academic integrity:

"All students must be honest and forthright in their academic studies. To falsify the results of one's research, to steal the words or ideas of another, to cheat on an assignment, or to allow or assist another to commit these acts corrupts the educational process. Students are expected to do their own work and neither give nor receive unauthorized assistance. Any violation of this standard will be reported to the Office of Student Conduct."

Statement regarding cell phones

You are expected to silence your cell phone and stow it during class. Receiving/placing calls or texts during class is disruptive and discourteous to both the instructor and classmates. Using your cell phone during an exam may result in the immediate expulsion from the quiz/exam.

Approximate schedule of topics, readings, and tests:

Date	Topic and Assigned Readings
Feb 4	Introduction and review of syllabus
Feb 11	Stress defined, evolution, catecholamines, acetylcholine Ch 1-3 **Presenter: Dr. Roth** - Optogenetics and depression article
Feb 18	Hippocampus function and neurogenesis Ch 4, 5 **Presenter: Dr. Roth** - Fragmented maternal care and LTP article **Presenter: Dr. Roth** - Socioeconomic status hippocampal effects article
Feb 25	Individual differences, resiliency/ CORT, gene variants, environmental Inputs Ch 6, 7 **Presenter: Ariel Williamson** - Bullying and *5-HTT* gene variant article **Presenter: Tom DiChiara** - Genetic predisposition and early-life trauma article
Mar 4	Gene-environment interaction via epigenetics *Ghost in your Genes* video **Presenter: Carly Yasinski** - TSST and epigenetic responses article
Mar 11	**Test 1 (Introduction, Ch 1-7, articles)**
Mar 18	CORT, CRF, and memory Ch 8, 9 **Presenter: Brianna Alonzo** - Effects of CORT on human brain processing article **Presenter: Kimberly Swezey** - Dose effect of CORT on memory article
Mar 25	*Spring Break – NO CLASS*
Apr 1	Early life stress **Writing Assignment #1 Due** Ch 10 **Presenter: Dr. Roth** - Child neglect and telomere length article **Presenter: Elizabeth Meade** - Institutional rearing and emotion article
Apr 8	Immune responses Ch 11-13 **Presenter: Andrew March** COMT epigenetics, lifetime stress, and human PFC article **Presenter: Dr. Roth** - Early-life handling and IL-10 responses article
Apr 15	**Test 2 (Ch 8-13, articles)**
Apr 22	PTSD, animal models, and gene-environment interactions Ch 14 **Presenter: Dr. Roth** - Hippocampal epigenetic changes in rodent PTSD model **Presenter: Kerry Criss** - *FKBP5* DNA methylation x child-hood trauma interaction
Apr 29	Cholinergic dysfunction, neurodegeneration Ch 15, 16 **Presenter: Samantha Rosenberg** - Stress and changes in AD-related markers **Presenter: Luke Niarhos** - microRNAs and stress vulnerability
May 6	Therapeutics **Writing Assignment #2 Due** Ch 17 **Presenter: Dr. Roth** - Antidepressant effects of DNMTi **Presenter: Dr. Roth** - Exercise and telomere length
May 13	**Test 3 (Ch 14-17, articles)**