Biobehavioral Prosem, Part 2: Behavioral Neuroscience  
(PSYC 303 A)  
Fall 2014

Professor:  
Donna Toufexis  
Dewey Hall 302  
E-mail: dtoufexi@uvm.edu  
Office hours: By appointment

Meeting Time & Location:  
Dewey Hall 100  
Wednesdays (October 15-December 3), 8:30 am-11:30 am

Course Description  
Biobehavioral Prosem is designed to be an advanced survey and analysis of behavioral and biological psychology, with special emphasis on learning theory (Part 1) and behavioral neuroscience (Part 2). Behavioral neuroscience can be defined as “the study of how neural systems work together to produce behavior”. Some people use the term “behavioral neuroscience” to refer to the study of nervous system-behavior relations in non-human animals and “cognitive neuroscience” to refer to the study of nervous system-cognition-behavior relations in humans (and perhaps other primates). These are very loose distinctions and not universally agreed upon but you should be aware of them. In this part of Prosem, we will focus mostly on rodent work because rats and mice are the most commonly used species to study nervous system-behavior relations, but we will also talk about work in non-human primate. Course Objectives

You should leave this course with a basic understanding of research in behavioral neuroscience. By the end of this portion of Prosem, everyone should have some working knowledge of some of the approaches and questions in behavioral neuroscience. While it’s impossible to give you a full overview of behavioral neuroscience in only six weeks, you should get enough of an overview to support further exploration of these topics in our Biobehavioral seminars. It is also hoped that the topics we discuss will give you “food for thought” for how behavioral neuroscience-related approaches might contribute to your own area(s) of research interest.

Course Structure

Most meetings will be a mixture of lecture and discussion. Generally, I will lecture for about the first half of class. At this point, we’ll take a short break and then come back and spend the rest of class discussing the readings and how to write a ‘specific aims’ section of an NRSA grant.. Reading for a particular class will be on blackboard a week before and should be read before coming to class.

Course Requirements

50% of your final grade : the writing of a NRSA NIH Grant-style Specific Aims Page:  Due on Wednesday, November 5th will be a two-sentence description of your
“Specific Aims” topic. I will give you feedback on this by the next class so you’ll have time to incorporate this feedback into your Specific Aims (due into me by the Friday before Thanksgiving break November 21st, So I can give you feedback if needed! Final Specific Aims due the Friday after class ends December 5th)

I can be flexible on the topic you choose so that you can try to relate it to your own area(s) of research interest but it must incorporate some aspect of behavioral or cognitive neuroscience (e.g., animal models, imaging) and be translational in nature (e.g., one possibility is to include an animal model and human clinical component; another possibility is to include an imaging component to elucidate mechanisms and a component to translate these findings to people in an institutional or community setting of some sort.

Format should be: 1” margins all around, 11 pt Arial font, single line spacing. This will likely start with a brief background and significance for human health, a short description of what you propose to study and why, and then 2-3 aims.

The other portion of your grade (40%) will be based on a short take home exam (about 2-3 pages of short essays answers) given out on the last day of Class (December 3rd) based entirely on the class readings and due the next Friday (December 12th) AND class participation (10%), which means showing up to class and indicating that you have done the required reading.

Course Outline

NOTE: the articles should be read in the order specified for the optimal learning experience!

Readings will be available on the Blackboard course site

Week 1 – Introduction (Oct 15th)

Go over syllabus and discuss goals and requirements of this portion of the course. Lecture1 : Overview of basic neuroscience

Readings (to be done before class)


- These two readings are meant to help you with your Specific Aims and are not for discussion in class
Lecture 2. How to put together a Specific Aims Page

Week 2 – Fear and Anxiety Circuits in the Brain (October 22nd)

Readings (to be done before class)
- **Fear Conditioning, Synaptic Plasticity, and the Amygdala: Implications for Posttraumatic Stress Disorder (2012)** Amy L. Mahan and Kerry J. Ressler
- **Role of the bed nucleus of the stria terminalis versus the amygdala in fear, stress, and anxiety (2003)** David L. Walker, Donna J. Toufexis, Michael Davis
- **Mechanisms of estradiol in fear circuitry: implications for sex differences in psychopathology (2014)** KK Cover, LY Maeng, K Lebrón-Miladand MR Milad

Specific aims writing continued

What makes a topic ‘translational’ discussed.

Week 3 – The Neurobiology of Addiction (October 29th)

Brief Lecture on brain circuits involved in addiction

Readings (to be done before class)

- **Addiction: failure of control over maladaptive incentive habits (2013)** David Belin, Aude Belin-Rauscent, Jennifer E Murray and Barry J Everitt
- **Sex differences in addictive disorders (2014)** Liana Fattore, Miriam Melis, Paola Fadda, Walter Fratta

Week 4– The Neurobiology of Stress (November 5th)

Brief lecture on the Stress response

Readings (to be done before class)

- **Resilience and vulnerability: a neurobiological perspective (2013)** Ilia N. Karatsoreos, Bruce S. McEwen
Movie on stress!!!!

**Week 5- The Neurobiology of Learning and Memory (November 12th)**
Readings (to be done before class)

Movie on basic neurobiology of learning

- **Update on Memory Systems and Processes (2014)**
  L. Nadel, O. Hardt

**Week 6 and 7 NO Classes!! (Society for Neuroscience convention and Thanksgiving) Draft of Specific Aims due Friday November 21st)**

**Week 8-Wrap-up : Formal feedback on Specific Aims**

and take home exams given out.