Drug Addiction

NROD66H3

(Friday 10:00-12:00 pm; BV361)

Instructor: Suzanne Erb

Office: SW-531

Office hours: Tues 1-3 pm

E-mail: erb@utsc.utoronto.ca

COURSE DESCRIPTION

This course is designed to provide an overview of current topics in the field of drug addiction research, with a specific focus on the major phases of the addiction cycle, including drug use (intoxication), withdrawal, and relapse. Consideration will be given to what basic motivational and corresponding neurobiological processes influence behavior during the various phases of the addiction cycle, by examining the empirical findings within the context of some of the major theoretical models guiding the field. A series of seminars, led by students, will highlight recent and exciting advances in the field, and will emphasize complimentary work carried out in human subjects and laboratory animals. In addition to leading a seminar, students will develop a research proposal based on their seminar topic. These two assignments are intended to provide students with the opportunity to engage in an in-depth exploration and critical analysis of a relevant topic in the field of addiction research, and to consider the implications of the literature for future research.

SUMMARY OF COURSE COMPONENTS AND EVALUATION

	Percent of final grade
Mid-term test	20
Seminar	20
Thought papers	10 X 2 = 20
Class participation	10
Research Proposal	30

Note: Information on individual course components are provided at the end of this document.

SUMMARY OF IMPORTANT DATES

Sept 23

Submit requests (top 3 choices) for seminar dates/topics in class.

Oct 7

Article selection for seminar presentations during class. Students are required to search for articles in advance of class, and to bring a selected article that they would like to present on plus one to two alternative articles to class.

Oct 14

Mid-term test. The test will be written during class time.

Nov 4

Thought Paper 1 due <u>at start of class</u>. Late papers will incur a penalty of 5% per day late.

Nov 25

Thought Paper 2 due <u>at start of class</u>. Late papers will incur a penalty of 5% per day late.

Dec 1

Research Proposals due (4:30 pm in Prof Erb's office. Late papers will not be accepted).

Week 1   **INTRODUCTION AND OVERVIEW**
Sept 9

Week 2   **LECTURE**
Sept 16   The reinstatement procedure: A model of relapse that encompasses the cycle of
                 addiction

Week 3   **LECTURE (Hour 1)**
Sept 23   Two contrasting theories of addiction

                 SMALL GROUP DISCUSSION (Hour 2)
                 Discussion will be based on a series of questions related to the assigned readings
                 that will be given in advance of class.

Week 4   **CLASS DISCUSSION (Hour 1)**
Sept 30   This discussion will be a continuation of the small group discussions from Week
                 3.

                 LECTURE (Hour 2)
                 Guidelines for seminars and research proposal assignment

Week 5   **GROUP MEETINGS FOR SEMINARS**
Oct 7

Week 6   **MID-TERM TEST**
Oct 14

Week 7   **STUDENT SEMINARS**
Oct 21   Laboratory studies of drug craving: A focus on human studies of stress- and cue-
                 induced craving

Week 8   **STUDENT SEMINARS**
Oct 28   Studies of drug craving induced by pharmacological stress: Comparative analysis
                 of approaches in humans and laboratory animals

Week 9   **STUDENT SEMINARS**
Nov 4   The "incubation" phenomenon: Animal studies of the effects of passage of time
                 after drug withdrawal on indices of drug craving

Week 10   **STUDENT SEMINARS**
Nov 11   Context and drug seeking: Animal studies of the role of context in precipitating
                 relapse to drug seeking

Week 11   **STUDENT SEMINARS**
Nov 18   The role of conditioning in drug-induced sensitization: A comparative analysis of
              human and laboratory animal studies

Week 12   **STUDENT SEMINARS**
Nov 25   Non-substance addictions: Current approaches to studying the neurobiology of
              addictions other than drug addiction

ASSIGNED READINGS

Week 2
Sept 16   Shaham Y, Shalev U, Lu L, De Wit H, Stewart J. The reinstatement model of
              drug relapse: history, methodology and major findings. Psychopharmacology
              (Berl). 2003 Jul;168(1-2):3-20.

Week 3 and 4
Sept 23/30   Koob GF. Neurobiological substrates for the dark side of compulsivity in
              addiction. Neuropharmacology. 2009;56 Suppl 1:18-31.

              Robinson TE, Berridge KC. Review. The incentive sensitization theory of
              addiction: some current issues. Philos Trans R Soc Lond B Biol Sci. 2008 Oct
              12;363(1507):3137-46.

Week 7
Oct 21   Sinha, R. (2008) Modeling stress and drug craving in the laboratory:
              Implications for addiction treatment development. Addiction Biology, 14: 84-98.

Week 8

Oct 28   See, R.E., Waters, R.P. (2011) Pharmacologically-induced stress: A cross-
              species probe for translational research in drug addiction and relapse. American
              Journal of Translational Research, 3: 81-89.

Week 9
Nov 4   Pickens, C.L., Airavaara, M., Theberge, F., Fanous, S., Hope B.T., and Shaham,
              Y. (2011) Neurobiology of the incubation of drug craving. Trends in
              Neuroscience, 34: 411-420.

Week 10

Nov 11   Crombag, G.S., Bossert, J.M., Koya, E., and Shaham, Y. (2008) Context-
              induced relapse to drug seeking: A review. Philosophical Trnasactions of The
              Royal Society B Biological Sciences, 363: 3233-3243.

Week 11

Nov 18   Vezina, P., Leyton, M. (2009) Conditioned cues and the expression of stimulant sensitization in animals and humans. Neuropharmacology, 56: 160-168.

Week 12

Nov 25   Frascella, J., Potenza, M.N., Brown, L.L., and Childress, A-R. (2010) Shared brain vulnerabilities open the way for nonsubstance addictions: Carving addiction at a new joint? Annals of the New York Academy of Science, 14: 84-98.

DESCRIPTION OF COURSE COMPONENTS

MID-TERM TEST   **20% of final grade**

The mid-term test will consist of short answer and/or essay style questions based on the lecture material and assigned readings from the first 4 classes.

SEMINAR   **20% of final grade**

Scheduling

Each student will make a 20 minute presentation on an article from the primary literature that relates to one of the 6 topics (and related assigned review article) scheduled for Weeks 7 through 12 (Oct 21-Nov 25) of the course. Approximately 4 students will present each week. During class on Week 3 (Sept 23), students will submit a first, second, and third choice for which seminar week (and corresponding topic) they wish to present on. By Week 4 (Sept 30), seminar assignments will be posted on the intranet.

Content

Each student will select one article from the primary literature to present on. The article must be recent (published within the past 5 years) and related to a key idea in the corresponding review article assigned for that week. Meetings with members of each seminar group are scheduled for Week 5 (Oct 7) of class in order to ensure that the selected articles are relevant and that each student in a group is presenting on a different article. Thus, each student should bring several articles that are of interest to them; Prof Erb will provide final approval on the selections during this class.

Each presentation should provide an overview of the background (including research question and hypotheses), methods, results, and discussion of the findings pertinent to the article. In addition, it should be made clear how the article relates to the ideas presented in the corresponding review article assigned for that week.

The citations for all articles to be presented in a given week will be posted on-line in advance.

THOUGHT PAPERS   **20% of final grade**
                                                        (10% per paper)

For 2 of the 6 seminar topics, students will be required to write a "thought" paper of <u>no more
than 500 words (or 2 type-written, double-spaced pages)</u>, describing one central idea, theme,
problem, or question that relates to the review article assigned for that topic, and collection of
articles from the primary literature presented on. Students may select any 2 topics to write on,
<u>except that</u>:

1. Students <u>may not</u> select the topic they are presenting on.

2. At least one of the two papers must be selected from the first 3 topics.

The first thought paper is due at Nov 4; the second thought paper is due Nov 25. **Electronic
submissions will not be accepted; late papers will incur a penalty of 5% per day late.**

CLASS PARTICIPATION   **10% of final grade**

Students will be graded for attendance and participation in class discussion. A major factor in
this component of the evaluation will be the <u>quality of participation</u>; students' contributions
should reflect a good level of familiarity with and comprehension of assigned readings.

RESEARCH PROPOSAL   **30% of final grade**

Students will write a research proposal, based on a question that clearly emerges from their
seminar topic. More information about the research proposal will be provided in class on Sept
30.

Evaluation of the research proposal will be based on the originality and quality of the research
question/s, identification and synthesis of the relevant literature (including scope and currency of
the literature review), appropriateness and feasibility of the proposed experiment/s (including
experimental design), and general stylistic and formatting considerations. Students are strongly
encouraged to meet with Professor Erb during office hours (or by appointment) to obtain
guidance in the development of proposals.

Final proposals should follow the stylistic guidelines for the Journal of Neuroscience (more
information on this will be provided in class Sept 30) and include the following section headings
and corresponding content:

Title page

Abstract **(maximum 250 words or 1 double-spaced page)**

The abstract should provide a brief overview of your proposal, including brief statements of background/rationale, objectives and hypotheses, methods, and predicted results.

Introduction **(maximum 1000 words or 4 double-spaced pages)**

This section should provide a brief review and synthesis of the relevant literature, with the key objective of developing the rationale for the proposed experiment/s. The section should conclude with clear statements about your research objectives and hypotheses. A minimum of 10 articles from the *primary literature* must be included in your literature review; the majority of these articles (at least 6) must have been published in the last 5 years.

Methods **(maximum 750 words or 3 double-spaced pages)**

This section should be written in the future tense and include relevant subsections (e.g., subjects, drugs, apparatus, procedures, etc). It should include a *very clear description* of your research design, including the nature and number of experimental groups and how many subjects will be included in each group.

Results **(maximum 500 words or 2 double-spaced page)**

Your results section should provide a succinct description of what you anticipate your experimental findings to be (you are not required to discuss methods of statistical analysis, although you may chose to do so). *Do not* include graphs with hypothetical data; rather, describe in words the specific differences in the direction of the dependent measure(s) that you expect to observe between experimental groups.

References **(no restrictions but must be formatted according to the Journal of Neuroscience)**

Papers are due Thurs December 1 (last day of classes, UTSC), 4:30 pm, in Professor Erb's office. Late or electronic submissions will not be accepted.