

Drug Addiction

NROD66H3

(Friday 10:00-12:00 pm; AA206)

Instructor: Suzanne Erb

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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 literature review, and corresponding annotated bibliography on a specific research question. These 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.

SUMMARY OF COURSE COMPONENTS AND EVALUATION

	<u>Percent of final grade</u>
Class participation	8
Test	8
Quizzes	12 (3 X 4% each)
Seminar	30
Annotated Bibliography	12
Literature Review	30

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

SCHEDULE OF LECTURES/ SEMINARS

**Assigned readings for each week are included in the next section of the syllabus*

- Week 1**
Sept 14 **INTRODUCTION AND OVERVIEW**
- Week 2**
Sept 21 **LECTURE**
The reinstatement procedure: A model of relapse that encompasses the cycle of addiction
- Week 3**
Sept 28 **LECTURE (Hour 1)**
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**
Oct 5 **TEST (Hour 1)**
The test will cover lecture material and readings for Weeks 1-3
- GROUP MEETINGS FOR SEMINARS (Hour 2)**
- Week 5**
Oct 12 **LIBRARY WORKSHOP**
- Week 6**
Oct 19 **INDIVIDUAL MEETINGS FOR LITERATURE REVIEWS/
GROUP MEETINGS FOR SEMINARS**
- Week 7**
Oct 26 **STUDENT SEMINAR**
Patterns of drug self-administration associated with the development of dependence: Animal studies
- (QUIZ – 5 Multiple Choice questions, at start of class)**
- Week 8**
Nov 2 **STUDENT SEMINAR**
The “incubation” phenomenon: Relationship between abstinence and drug craving
- (QUIZ – 5 Multiple Choice questions, at start of class)**

- Week 9**
Nov 9 **STUDENT SEMINAR**
Role of the amygdala in the incubation of drug craving
- (QUIZ – 5 Multiple Choice questions, at start of class)*
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- Week 10**
Nov 16 **STUDENT SEMINAR**
Studies on the relationship between stress and smoking
- (QUIZ – 5 Multiple Choice questions, at start of class)*
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- Week 11**
Nov 23 **STUDENT SEMINAR**
Studies of cue- and stress-induced cocaine craving: Neural correlates in human subjects
- (QUIZ – 5 Multiple Choice questions, at start of class)*
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- Week 12**
Nov 30 **STUDENT SEMINAR**
Individual differences in vulnerability to the motivational effects of cocaine
- (QUIZ – 5 Multiple Choice questions, at start of class)*

ASSIGNED READINGS

*All assigned readings can be found by searching the pubmed data base:
<http://www.ncbi.nlm.nih.gov/pubmed>*

Week 2

Sept 21

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

Sept 28

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 26

Beckmann, JS, Gipson, CD, Marusich, JA, Bardo, MT (2012) Escalation of cocaine intake with extended access in rats: dysregulated addiction or regulated acquisition? *Psychopharmacology*, 222:257-267.

Lenoir, M, Guillem, K, Koob, GF, Ahmed, SH (2011) Drug specificity in extended access cocaine and heroin self-administration. *Addiction Biology*, E-pub (ahead of print).

Week 8

Nov 2

Chauvet, C, Goldberg, SR, Jaber, M, Solinas, M (2012) Effects of environmental enrichment on the incubation of cocaine craving. *Neuropharmacology*, 63: 635-641.

Grimm, JW, Hope, BT, Wise, RA, Shaham, Y (2001) Incubation of cocaine craving after withdrawal. *Nature*, 412: 141-142.

Lu, L, Grimm, JW, Dempsey, J, Shaham, Y (2004) Cocaine seeking over extended withdrawal periods in rats: different time courses of responding induced by cocaine cues versus cocaine priming over the first 6 months. *Psychopharmacology*, 176: 101-108.

Week 9

Nov 9

Li, Y-Q, Li, F-Q, Wang, X-Y, Wu, P, Zhao, M, Xu, C-M, Shaham, Y, Lu, L (2008) Central amygdala extracellular signal-regulated kinase signaling pathway is critical to incubation of opiate craving. *The Journal of Neuroscience*, 28: 13248-13257.

Lu, L, Uejima, JL, Gray, SM, Bossert, JM, Shaham, Y (2006) Systemic and central amygdala injections of the mGluR2/3 agonist LY379268 attenuate the expression of incubation of cocaine craving. *Biological Psychiatry*, 61: 591-598.

Week 10

Nov 16

McKee, SA, Sinha, R, Weinberger, AH, Sofuoglu, M, Harrison, ELR, Laery, M, Wanzer, J (2010) Stress decreases the ability to resist smoking and potentiates smoking intensity and reward. *Psychopharmacology*, 25: 490-502.

Sinha, R, Garcia, M, Paliwal, P, Kreek, MJ, Rounsaville, BJ (2006) Stress-induced cocaine craving and hypothalamic-pituitary-adrenal responses are predictive of cocaine relapse outcomes. *Archives of General Psychiatry*, 63: 324-331.

Week 11

Nov 23

Fox, HC, Seo, D, Tuit, K, Hansen, J, Kimmerling, A, Morgan, PT, Sinha, R (2012) Guanfacine effects on stress, drug craving and prefrontal activation in cocaine dependent individuals: preliminary findings. *Psychopharmacology*, 26: 958-972.

Potenza, MN, Hong, KA, Lacadie, CM, Fulbright, RK, Tuit, KL, Sinha, R (2012) Neural correlates of stress-induced and cue-induced drug craving: Influences of sex and cocaine dependence. *American Journal of Psychiatry*, 169: 406-414.

Week 12

Nov 30

Belin, D, Berson, N, Balado, E, Piazza P-V, Deroche-Gamonet, V (2011) High-novelty-preference rats are predisposed to compulsive cocaine self-administration. *Neuropsychopharmacology*, 36: 569-579.

Saunders, BT, Robinson, TE (2011) Individual variation in the motivational properties of cocaine. *Neuropsychopharmacology*, 36: 1668-1676.

DESCRIPTION OF COURSE COMPONENTS

CLASS PARTICIPATION

8% 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 *quality of participation*; students' contributions should reflect a good level of familiarity with and comprehension of assigned readings.

TEST

8% of final grade

The test will comprise a series of short answer questions based on the assigned readings and lecture material in Weeks 1-3.

QUIZZES

**12% of final grade
(3 quizzes X 4% per quiz)**

Quizzes, each consisting of 5 multiple choice questions, will be given in the first 20 min of class before each "Student Seminar". Students who are presenting in a given week will not write the quiz for that week. The best 3 of 5 grades (each worth 5%) will be used toward the final grade. *There will be no make-ups for missed quizzes.*

SEMINAR

30% of final grade

Scheduling

Each student will participate in leading a seminar on one of the 6 topics scheduled between Weeks 7 and 12 (Nov 2 to 30) of the course. Two to four students will participate in each of the seminars. During class on Week 2 (Sept 21), students will be asked to submit a first, second, and third choice for which seminar they wish to participate in. Students wishing to be assigned to the same seminar group should submit one request under both/all names. By Week 3 (Sept 28), seminar assignments will be posted on the intranet.

Content

Each group assigned to a particular seminar topic will be responsible for providing a presentation based on the assigned readings (listed above), and leading a class discussion. Each group will be given 90 min for their presentation (including discussion time). As a group, students may choose to give a series of relatively independent presentations (i.e., they may divide the time equally between/among members), or they may choose to prepare a more integrated presentation. Either way, the seminar should be organized as a group, with an emphasis on the themes/concepts/questions that relate the individual papers. That is, the seminar as a whole should reflect a cohesive conceptual framework. In addition, an effort should be made to relate the material back to the main theme of the course, "The cycle of addiction". That is, an effort

should be made to identify how the material is relevant to informing our understanding of the various phases of the addiction cycle (drug use, withdrawal, and relapse).

ANNOTATED BIBLIOGRAPHY

12% of final grade

Students will write an annotated bibliography based on a selection of 5 key papers from the *primary literature*. The majority of papers (at least 3) must have been published within the past 5 years. This bibliography will form the basis of a literature review on a specific research question arising from the student's seminar topic (see "Literature Review" below). All 5 papers must be **other than those included as assigned readings for the student's seminar topic**. Briefly, a citation of each paper must be provided (in APA style), followed by a concise summary of the paper that includes a brief assessment of its value or relevance to the central thesis of the paper. Each summary must be between 150-200 words (approximately one double-spaced page, including citation). The papers, and corresponding summaries, must be presented in alphabetical order.

A description of what an annotated bibliography is and how it is written can be found at the following link: <http://www.writing.utoronto.ca/advice/specific-types-of-writing/annotated-bibliography>. In addition, students will be guided through the process of writing an annotated bibliography during a library workshop scheduled for Oct 12. **Annotated bibliographies are due at the start of class, Nov 16.**

LITERATURE REVIEW

30% of final grade

Students will write a literature review, based on a specific question arising from their seminar topic, and agreed upon in consultation with Prof Erb (approval of topics will be made during individual meetings with students in class on Oct 19). The series of 5 papers included in the student's annotated bibliography, *in addition to at least 5 additional papers from the primary literature (with at least 3 of these published in the past 5 years)*, must be reviewed in the paper, and included in the reference list. Additional papers (from the primary literature or reviews), as well as the assigned readings for the student's seminar topic, may also be included in the review and cited in the reference list.

In terms of format, the literature review must be 8-10 double-spaced, type-written pages (12 point font, 0.75-1.0 in margins). All formatting must be according to APA style.

The first paragraph of the review must explicitly state the central thesis and organizing structure of the paper. The paper should be organized with a series of subtitles that allow a systematic and cohesive discussion of the central thesis. Evaluation will focus on the student's ability to critically analyze, synthesize, and evaluate the literature.

A description of what a literature review is, and how it is written, can be found at the following link: <http://www.writing.utoronto.ca/advice/specific-types-of-writing/literature-review>. In

addition, students will be guided through the process of writing a literature review during a library workshop scheduled for Oct 12.

Literature reviews are due 4:30 pm, Dec 7.

SUMMARY OF IMPORTANT DATES

Sept 21	Submission of seminar request forms
Oct 19	Approval of literature review topics
Oct 5	Test
Oct 26, Nov 2, 9, 16, 23 30	Quizzes (best 3 of 5)
Nov 16	Annotated Bibliography due
Dec 7	Literature review due