NROD60H3 **Current Topics in Neuroscience**
Fall 2005

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Office Hours: Mon: 15:00 – 16:30
Or by appointment

Lecture: Mon 10:00 -12:00 BV 260

Textbook: There is no assigned textbook for this course. Course readings will be assigned weekly. Copies of readings which are not available on line will be placed in the library for short-term loan.

Course Description:

The aim of this course is to conduct an intensive examination of selected topics in neuroscience. The primary emphasis will be on learning and memory and associated plastic changes observed in the brain.

Human interest in memory dates back to the time of Aristotle and our fascination with this topic remains undiminished. Powerful modern technologies have allowed us to search extensively for the biological basis of memory and have resulted in an explosion of research in the field. There are many levels at which one can study memory and as a consequence, memory research has become truly interdisciplinary. It is clear that an integrative approach will continue to play a key role in progress in this field. Although the answers to many questions remain elusive, we are closer than ever to a good understanding of the physical, chemical, cellular and circuit changes that underlie various forms of learning and memory. In this course we will examine selected current research on learning and memory at the molecular, cellular and cognitive levels.

Students with diverse learning styles and needs are welcome in this course. In particular, if you have a disability/health consideration that may require accommodations, please feel free to approach me and/or the AccessAbility Services Office as soon as possible. Tina Doyle, the UTSC AccessAbility Manager 416 287-7560 is available by appointment to assess specific needs, provide referrals and arrange appropriate accommodations. The sooner you let us now about your needs, the quicker we can assist you in achieving your learning goals in this course.

Grading Scheme

10% Class Participation
20% Oral Presentation
30% Response Papers
10% Proposal Due Oct 17
30% Literature Review

Class Participation:

A weekly mark out of 3 will be assigned for participation. This mark will be based on active participation in the class discussions.

Oral Presentation:

Each student will give an oral presentation based on a topic chosen from the assigned readings, but focusing on one or more current research papers. Your ability to lead discussions during the question period will also contribute to your presentation mark.

Short Reports:

Students will be required to submit 5 response papers over the term with each paper valued at 6% of your final mark. You may submit up to 8 response papers during the term, but only your best 5 will be counted. Response papers should be a maximum of 2 pages, double spaced with no cover page and due no later than the start of the class. In addition this course will take advantage of Turnitin. All papers should be submitted to Turnitin prior to the class. Details of this program follow. NO LATE RESPONSE PAPERS WILL BE ACCEPTED.

The two main purposes of the response papers are to encourage you to 1) read the work in depth in advance of the class and (2) think about it. A good response paper will demonstrate that you have read and thought about the readings for the week. Your response paper should not be a summary of the readings, but rather the emphasis of the paper should be on some thought, idea, or criticism you have with respect to the material you read. You should identify some issue, and discuss that issue in light of the readings and/or the current research in the field. For example, you may choose to examine a problem with the assigned reading that could have been better addressed, try and extend the research based on current findings (what would be the next step), comment on how the paper integrates the findings with current developments in theories on the topic, or comment on the interpretation of the data analysis and statisical outcomes. Your goal is to clearly state your issue, and then express your thoughts on this issue. Try to stay focused on one or two issues and cover these in depth, rather than trying to cover too many issues briefly.

Proposal and Literature Review:

A review paper on a topic covered during class will be due Dec 5, 2005. A proposal will be required on Oct 17, which should include a detailed outline of the topic you will be focussing on and include a complete list of references. Each student will be required to meet with me individually on this date to discuss their progress. Your proposal will be contribute 10% to your final grade.

The final paper will be no longer than 12 pages excluding the abstract, cover page, and reference pages. You are encouraged to be as concise as possible in this final paper while adequately covering the topic. APA format is required. Late papers will be accepted but docked 10% per day unless a medical note is provided. Please use only the medical note form available from UTSC online. Final papers are due at the start of class on Dec 5. You are required to bring a paper copy to class and also submit a copy through Turnitin.

Turnitin:

First, some background information on this program. Turnitin.com is a tool that assists in detecting textual similarities between compared works i.e.: it is an electronic resource that assists in the detection and deterrence of plagiarism.

Students agree that by taking this course all required papers may be subject to submission for textual similarity review to Turnitin.com for the detection of plagiarism. All submitted papers will be included as source documents in the Turnitin.com reference database solely for the purpose of detecting plagiarism of such papers. The terms that apply to the University's use of the Turnitin.com service are described on the Turnitin.com web site.

As indicated on the turnitin home page, all work submitted to Turnitin is checked against three databases of content:

- A current and archived copy of the publicly accessible Internet (more than 4.5 billion pages updated at a rate of 30-40 million pages per day);
- Millions of published works (from ABI/Inform, Periodical Abstracts, Business Dateline, ProQuest, the Gutenberg Collection of literary classics, and tens of thousands of electronic books);
- Millions of student papers submitted to Turnitin since 1996.

Students will submit all written reports to the turnitin.com site (www.turnitin.com). Detailed instructions on setting up your account can be found on this page. You must set up your own account and will need the following information: Course name, NROD60; Class ID #, 1336351; Class Enrolment Password, topics. You should set up your account in the folder called ACCOUNT SET-UP

http://www.utoronto.ca/ota/04-12-06%20Turnitin%20revised.pdf

Tentative Course Outline

Date	Topic
Sept 12	Introduction
Sept 19	LTP and LTD Response Paper 1 Due
Sept 26	Emotional Learning and Memory in the Amygdala Response Paper 2 Due
Oct 3	The Hippocampus, Neocortex and Memory Response Paper 3 Due
Oct 10	Thanksgiving University Closed
Oct 17	Proposals Due, Scheduled Individual appointments to be arranged in advance
Oct 24	Sleep-Dependent Learning and Memory Consolidation Response Paper 4 Due
Oct 31	Memory and Addiction Response Paper 5 Due
Nov 7	Neural Plasticity Response Paper 6 Due
Nov 14	Classes Cancelled
Nov 21	Synaptic Plasticity Response Paper 7 Due
Nov 28	Memory in Aging and AD Response Paper 8 Due
Dec 5	Molecular Basis of AD Final Paper Due

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Fall 2005 Readings

Unless otherwise indicated, all articles are available on-line

Sept 19

LTP and LTD: An Embarrassment of Riches
Malenka and Bear
Neuron Vol 44, 5-21

Unique changes in synaptic morphology following tetanization under pharmacological blockade
Weeks, Ivanco, LeBoutillier, Marrone, Racine & Petit
Synapse 2003 Jan 47(1): 77-86

Sept 26

Molecular Mechanisms Underlying Emotional Learning and Memory in the Lateral Amygdala
Rodrigues, Schafe and LeDoux
Neuron Vol 44, 75-91

Remembering one year later: role of the amygdala and the medial temporal lobe memory system in retrieving emotional memories.
Dolcos, LaBar and Cabeza
Proc Natl Acad Sci U S A. 2005 Feb 15;102(7):2626-31. Epub 2005 Feb 9.

Oct 3

Hippocampus: Cognitive Processes and Neural Representations that Underlie Declarative Memory
Eichenbaum
Neuron Vol 44, 109-120

New Circuits for Old Memories: The Role of the Neocortex in Consolidation
Wiltgen, Brown, Talton and Silva
Neuron Vol 44, 101-108

The Involvment of the Anterior Cingulate Cortex in Remote Contextual Fear Memory
Frankland, Bontempi, Talton, Kaczmarek, Silva
Science 2004 May 7:304, 829-30

Oct 17

Proposal Due. Individual appointments scheduled throughout the day.

Oct 24

Sleep-dependent Learning and Memory Consolidation
Walker and Stickgold

Neuron Vol 44, 121-133

Memory Consolidation in Sleep: Dream or Reality
Vertes
Neuron Vol 44, 135-148

A Failure of Sleep-dependent Procedural Learning in Chronic, Medicated Schizophrenia
Manoch, Cain, Vangel, Khurana, Goff and Stickgold
Biol Psychiatry 2004 Dec 15:56(12) 951-6

Oct 31

Memory and Addiction: Shared Neural Circuitry and Molecular Mechanisms
Kelley
Neuron 44, 161-179

Alterations in the Morphology of Dendrites and Dendritic Spines in the Nucleus Accumbens and Prefrontal Cortex Following Repeated Treatment with Amphetamine or Cocaine
Robinson and Kolb
Eur J Neurosci 1999 May 11(5):1598-604

Nov 7

The Mutable Brain
Holloway
Scientific American Sept 2003, 78-85

Anatomical Plasticity (Chapt 13) *in Brain Damage, Brain Repair*
Fawcett. Rosser, and Dunnett, 2000, 171-195
Short-term library

Nov 21

Morphological Plasticity of the Synapse: Interactions of Structure and Function in *Synaptic Plasticity and Transsynaptic Signaling*
Marrone, LeBoutillier, and Petit, 2005, 495-517
Short-term library

Reduction in Size of Perforated Postsynaptic Densities in Hippocampal Axospinous Synapses and Age-Related Spatial Learning Impairments
Nicholson, Yoshida, Berry, Gallagher and Geinisman
J Neurosci 2004 Sep 1 24(35):7 7648-53

Nov 28

Memory and Executive Function in Aging and AD: Multiple Factors that Cause Decline and Reserve Factors that Compensate
Buckner

Neuron Vol 44, 195-208

Dietary Factors and AD
Luchsinger and Mayeux
The Lancet Neurology Vol 3, Oct 2004 579-587

Midlife Dietary Intake of Antioxidants and Risk of Laate-Life Incident Dementia: the Honolulu-Asia Study
Laurin, Masaki, Foley, White and Launer
Am J Epidemiol 2004 Oct 1 160(7):959-67

Dec 5

Deciphering the Molecular Basis of Memory Failure in Alzheimer's Disease
Walsh & Selkoe
Neuron Vol 44, 181-193