

NRO B60H3F
FALL 2004
NEUROSCIENCE I: CELL ANATOMY AND PHYSIOLOGY

Professor: Dr. Gwen O. Ivy

Office: S569

Office Hours: Tuesday: 5-6 p.m.; Thursday: 5-6 p.m., Monday: 2-3 pm or by appointment.

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Textbook: *Neuroscience* by D. Purves et al (eds). Third Edition, 2004
(may be purchased in the bookstore).

Lab Text: *The Sheep Brain: A Photographic Series* by C.H. Vanderwolf and Richard K. Cooley (may be purchased in the bookstore).

Lectures: T 4-5 p.m. S309
R 3-5 p.m. S309

Labs:

PRA0001	T	2-4 p.m.	SW250
PRA0002	T	5-7 p.m.	SW250
PRA0003	W	7-9 p.m.	SW250
PRA0004	F	9-11 a.m.	SW250
PRA0005	F	11-1 p.m.	SW250
PRA0006	F	1-3 p.m.	SW250
PRA0007	T	10-12 a.m.	SW250

TA's: Dr. Janelle LeBoutillier is in charge of TA's in all of the labs. Any lab concerns should be directed to Dr. LeBoutillier at janelle@utsc.utoronto.ca or (416) 287-7430.

Course Description

Neuroscience is the scientific study of nervous systems. It includes study of the nature and functioning of the nervous system at all levels, from the molecules that make up individual nerve cells and the transfer of information from one nerve cell to another, to the complexities of how thoughts, emotions and behaviours are produced.

Neuroscience is at the interface between biology and psychology. It is unique in that it makes use of a variety of methods and investigations from a wide range of traditional disciplines. To understand the nervous system and how it works requires knowledge of anatomy, molecular biology, biochemistry, pathology, physiology, pharmacology, psychology and zoology.

Neuroscience I is a fairly sophisticated introduction to the field of neuroscience; a virtual springboard from which to enter all of the other Neuroscience courses in our program. As well, this course can provide a physiological foundation for many of our Psychology courses and interdigitates nicely with many of our biology courses. We will cover the gross as well as cellular structure and function of the nervous system in depth. In particular, we will study the cellular and molecular biology of nervous system components, including: neurons, glial cells, meninges, choroid plexus, blood brain barrier, ventricular and vascular systems. We will definitely focus on the major cell of the nervous system - the neuron!

We will explore neuronal physiology at the cell and molecular levels in order to better understand the complex mechanisms of intercellular communication in the nervous system, including electro-chemical transformations at the synapse, different types of receptor mechanisms and neuroregulation at the DNA level. Finally, we will briefly cover the development of the vertebrate nervous system.

The laboratory will cover gross and systems anatomy of the nervous system. We will dissect sheep brains and will examine a wide variety of nervous system structures in 3-D. The fine histology and function of several systems, as well as several neuroanatomical techniques will be discussed and/or demonstrated. Students should bring their own dissecting equipment. This usually consists of a small pair of scissors, tweezers, a scalpel and a "blunt dissection instrument" like a small metal or plastic rod (certain coffee stirrers may work, or nail files). Glasses and safety glasses are strongly recommended. Gloves will be provided in the labs at a cost of 25¢ per pair. Proper safety procedures, as detailed in your lab syllabus must be followed in the labs at all times. Non-compliance will result in a failing lab grade.

Altogether, this course lays the framework for understanding subsequent neuroscience courses. We will begin to understand how the activity of even small groups of neurons can lead to the activity of circuits specialized for all of our sensations, movements, specific goal directed behaviours, emotions, and ultimately, we hope, cognition.

Grading

- 20% Midterm Exam I: Multiple choice, short answer. 2 hours.
Week of October 4, 2004. TBA by the Registrar.
[Material covered to date from lectures & text chapters 1, 2 and 3 as far as covered in class.]
- 25% Midterm Exam II: Multiple choice, short answer. 2 hours.
Week of November 1, 2004. TBA by the Registrar.
[Material covered **SINCE** first midterm from lecture & text.]
- 30% Lab Exam: Labs begin next week and continue for 8 lab sessions (weeks 2-9 of this 13 week course). Your lab exam will be given on the 10th week and will consist of three parts:
- 1) Written portion based on lab lectures.
 - 2) Written portion based on atlas.
 - 3) "Practical bell-ringer" component.
- 25% Final Exam: Multiple choice, short answer. 3 hours.
During Final Exam Period TBA by Registrar (Dec. 9-21).
[Material from lectures & text (not from Labs) covered **SINCE** Midterm Exam II.]

Itinerary - NRO B60H3F

R	Sept. 9	<u>Introduction</u> to course (no labs this week).
T	Sept. 14	Chapter 1: <u>Studying the Nervous Systems of Humans and Other Animals.</u>
R	Sept. 16	Chapter 1 (cont'd.)
T	Sept. 21	Chapter 1 (cont'd.). Begin Chapter 2.
R	Sept. 23	Chapter 2: <u>Electrical Signals of Nerve Cells.</u>
T	Sept. 28	Chapter 2 (cont'd.)
R	Sept. 30	Chapter 3: <u>Voltage-Dependent Membrane Permeability.</u>
T	Oct. 5	Chapter 3 (cont'd.)

OCT 4th week of Midterm I (20% of grade) (TBA by the Registrar)

R	Oct. 7	Chapter 4: <u>Channels and Transporters.</u>
T	Oct. 12	Chapter 4 (cont'd.)
R	Oct. 14	Chapter 4 (cont'd.)
T	Oct. 19	Chapter 4 (cont'd.)
R	Oct. 21	Chapter 5: <u>Synaptic Transmission.</u>
T	Oct. 26	Chapter 5 (cont'd.)
R	Oct. 28	Chapter 5 (cont'd.)
T	Nov. 2	Chapter 6: <u>Neurotransmitters.</u>

November 3- last day to drop class without academic penalty.

November 8th week Midterm II (25% of grade)(TBA by Registrar)

R	Nov. 4	Chapter 6 (cont'd.)
T	Nov. 9	Chapter 6 (cont'd.)
R	Nov. 11	Chapter 6 (cont'd.)
T	Nov. 16	Chapter 7: <u>Neurotransmitter Receptors and Their Effects.</u>
R	Nov. 18	Chapter 7 (cont'd.)
T	Nov. 23	Chapter 7 (cont'd.)
R	Nov. 25	Chapter 7 (cont'd.)
T	Nov. 30	Review for Final Exam.
W	Dec. 1	<i>Last Day of Classes</i>
	Dec. 9-21	<i>Final Exam Period, date TBA 25% of grade</i>