

**NRO B60H3F**  
**FALL, 2001**  
**NEUROSCIENCE I: CELL ANATOMY AND PHYSIOLOGY**

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**Professor:** Dr. Gwen O. Ivy

**Office:** S569

**Office Hours:** Tuesday: 5-6 p.m.; Thursday: 6-7 p.m.; or by appointment  
Wednesday 12-1 p.m.

**Phone:** 287-7438

**Textbook:** Neuroscience by D. Purves, et al (eds). Second Edition, 2001  
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. S128  
R 3-5 p.m. S128

**Labs:** P0001 T 2-4 p.m. S227 TA: Mani Vessal  
P0002 W 7-9 p.m. S227 Mani Vessal  
P0003 F 10-12 noon S227 Janelle LeBoutillier

***Course Description***

Neuroscience is about 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 behaviour, thoughts and emotions 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 may 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). The labs may also include discussion of scientific articles to be handed out at appropriate times. Gloves will be provided in the labs at a cost of .25¢ per pair.

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 behaviors, emotions, and ultimately, we hope, cognition.

### ***Grading***

20% Midterm Exam I: Multiple Choice, Short Answer  
Week of October 8, 2001  
(material covered to date from text chapters 1, 2 and 3)

15% Lab Quizzes: Each week in lab, beginning the third week of classes, you will be asked to answer questions or identify structures on a sheep brain, as directed by your T.A. This 15% component of your grade will be averaged among all quizzes given. An absence counts as a 0% unless a doctor's note, etc., is presented to your T.A.

25% Midterm Exam II: Multiple choice, Short Answer  
Week of November 5, 2001.  
(Material covered since first midterm from text).

15% Lab Exam Practical      Week of November 19, 2001 Rooms S240/242/248/250  
5-7 p.m. (Tentative)  
Comprehensive examination of material covered in laboratory.

25% Final Exam              Multiple choice, short answers  
3 hours during Final Exam Period, TBA by Registrar, Dec. 10-21.  
[Material from text (not from Labs) covered since Midterm Exam II]

## **Itinerary - NRO B60H3F**

T	Sept. 11	<u>Introduction</u> to course; no labs this week.
R	Sept. 13	Chapter 1: The Organization of the Nervous System (Pp 1-15)
T	Sept. 18	Chapter 1 (cont'd.) (pp 15-26 briefly; pp 26-29)
R	Sept. 20	Chapter 1 (cont'd.) (pp 33, 38-39, 32 + 477)
T	Sept. 25	Chapter 2 Electrical Signals of Nerve Cells (pp 42-51)
R	Sept. 27	Chapter 2 (cont'd.) (pp 51 -56)
T	Oct. 2	Chapter 3: Voltage-Dependent Membrane Permeability (pp 57-65)
R	Oct. 4	Chapter 3 (cont'd.) (pp 65-76)

### ***Week of Mid term I (20% of grade)***

T	Oct. 9	Chapter 4: Channels and Transporters (pp 77-84)
R	Oct. 11	Chapter 4 (cont'd.) (pp 85-97)
T	Oct. 16	Chapter 4 (cont'd.) (pp 90, 92-93)
R	Oct. 18	Chapter 5: Synaptic Transmission (pp 99-106)
T	Oct. 23	Chapter 5 (cont'd.) (pp 106-110)
R	Oct. 25	Chapter 5 (cont'd.) (pp 111-115)
T	Oct. 30	Chapter 6: Neurotransmitters (pp 117-123)
R	Nov. 02	Chapter 6 (cont'd.) (pp 123-135)

***Week of Midterm II (25% of grade)***

T	Nov. 06	Chapter 6 (cont'd.) (pp 135-140)
R	Nov. 8	Chapter 7: Neurotransmitter Receptors and Their Effects (pp 141-150)
T	Nov. 13	Chapter 7 (cont'd.) (pp 150-159)
R	Nov. 15	Chapter 7 (cont'd.) (pp 156-163)

***Week of Laboratory Practical Exam (15% of grade)***

T	Nov. 20	Chapter 8: Intracellular Signal Transduction (pp 165-172)
R	Nov. 22	Chapter 8 (cont'd.) (pp 172-181)

***Week of Lab Exam 2 (15% of grade)***

T	Nov. 27	Chapter 8 (cont'd.) (pp 181-185)
R	Nov. 29	Review for Final Exam
M	Dec. 3	<b><i>Last Day of Classes</i></b>
	Dec. 10- 21	<b><i>Final Exam Period, date TBA 25% of grade</i></b>