

To know the brain is equivalent to ascertaining the material course of thought and will, to discovering the intimate history of life in its perpetual duel with external forces; a history summarized, and in a way engraved, in the defensive neuronal coordinations of the reflex, of instinct and of the association of ideas.

Santiago Ramon y Cajal, Recollections of My Life

NEUROSCIENCE 320: NEUROANATOMY



"Living Brain" by the National Ballet and Nova Dance College in Amsterdam;
choreographer Ernst Meisner; photographed by Bill Tanaka

Spring, 2013
Mark Bradford

Neuroanatomy is the fundamental discipline in neuroscience from the level of microscopic single neurons to that of macroscopic systems spanning the entire brain. There can be no hope of understanding the many levels of brain function if we do not have a detailed knowledge of brain geography at multiple scales.

Antonio Damasio, Descartes' Error

Course Objectives

The major objectives of this course are to develop an understanding of how to think about the organization of the nervous system and to think about it. The complexity of the nervous system is so great that we will be confronted with a myriad of facts, but we will strive foremost to build a framework on which to hang these facts—one that will serve us both in this course and in the future. We will approach our study of the nervous system from a structural perspective. However, structure and function are inseparable, and very often we will find ourselves discussing function. We will encounter examples of remarkable orderliness, exacting precision and exquisite beauty. Although the body of knowledge concerning the organization of the nervous system is vast, our level of understanding in many cases remains primitive. Thus, we may well find ourselves simultaneously fascinated and unsatisfied.

As you know, the vocabulary used in neuroanatomy does not consist primarily of household words—it is more like a foreign language. If you work consistently to increase your vocabulary early in the course, we will be able to converse fluently long before the course is over. Above, all, do not allow yourself to get behind or all may be lost!

Books

Required: Nolte, The Human Brain: An Introduction to its Functional Anatomy, 6th ed., Mosby, 2008

Recommended: Diamond, Scheibel and Elston, The Human Brain Coloring Book, Barnes and Noble, 1985

Other Materials

We will be using colors in lecture to help keep track of certain structures and pathways. I will bring some colored pencils to class each time for borrowing, but you will find it useful to purchase a set of colored pencils with at least 8 colors.

The “Human Brain Animations” videodisc that we use in class is available for study outside of class in Science Center A261 during working hours and at the Digital Anatomist website <http://www9.biostr.washington.edu/da.html> (where you will need QuickTime to view the animations). In addition, online brain atlases that include human material can be found at <https://www.msu.edu/~brains/index.html> and <http://brainmaps.org>.

Examinations and Other Assignments

There will be four examinations (including the final), a medium length paper requiring library research, and a group presentation of solutions to neurological patient problems. The schedule for these events and the approximate proportion of your grade determined by each are as follows:

Exam I	Feb 26	(15%)
Exam II	Mar 19	(20%)
Exam III	Apr 16	(15%)
Neurological Problems	April 23/25	(5%)
Paper	May 6	(20%)
Final Exam	May 16	(25%)

There will be a Q and A session approximately two days before each exam; the time and place will be announced in class and on Blackboard.

Contact Information

My office is Science Center A136. I can be contacted by phone at x58031 and by email at mark.braford@oberlin.edu. I will respond to both procedural and substantive questions on email provided that relatively short answers are required. My office hours are Mon 11-12, Tues 11-12, Wed 4-5 and by appointment. To make an appointment, please email.

Tutorial Help

If you find that you are having difficulty with the material in the course or that you need some insights about how to study the material, please see me immediately. It is not advisable to wait until a low score on an exam has confirmed your perception of having difficulty with the material. I am prepared to help any student and can provide some individual tutorial assistance. For more extended help, I can arrange for a student tutor. Forms for requesting a student tutor are available from Ms. Lynda Lee (Peters Hall 118) and require my signature.

Students with Disabilities

If you have a specific physical, psychiatric or learning disability that requires accommodations (such as a note taker or a special testing situation), please let me know immediately so that your learning needs can be appropriately met. You will need to provide documentation of your disability to the Office of Disability Services (Peters Hall G-27/28; x55588) from which I will receive the confirming paperwork.

SPRING 2013: CLASS SCHEDULE, READING ASSIGNMENTS AND COLORING SUGGESTIONS

Nolte = textbook; CB=coloring book

FEB	5	Course Organization; Elements of the Nervous System; Basic Neuroanatomical Concepts	Nolte Ch 1, Ch 24 pp 628-634 only; CB, 1-1 through 1-6, 2-1, 2-3, 2-6
	7	Embryonic Development	Nolte Ch 2; CB, 3-2 through 3-8
	12	Embryonic Development; CSF; Ventricular System and Meninges	Nolte Ch 3 (skim), 4, 5, 6 pp 140- 146 only
	14	Principles of Organization of the Spinal Cord and Brainstem	Nolte Ch 12 esp. pp 295-299; CB, 7-1, 6-3, 6-4
	19	Principles of Organization of the Spinal Cord and Brainstem	
	21	Morphology and Pathways of the Spinal Cord and Brainstem	Nolte, Ch 10, Ch 3 pp 68-78 review; CB, 4-1, 4-2, 4-4 through 4-7, 4-9, 4-13
	26	Exam I (covers material through Feb 19)	
	28	Morphology and Pathways of the Spinal Cord and Brainstem	Nolte, Ch 11, 15; CB, 5-1 through 5-10
MAR	5	Principles of Organization of the Forebrain	
	7	Morphology and Pathways of the Forebrain	Nolte, Ch 2 pp 44-48 review; CB, 3-9, 3-10 Nolte, Ch 25; CB, 5-44, 5-35 through 5-40
	12	Organization of the Thalamus and Isocortex	Nolte, Ch 16
	14	Organization of the Thalamus and Isocortex	Nolte, Ch 22 pp 541-558 only
	19	Exam II (covers material through Mar 14)	
	21	The Periodic Table of the Brain; Descending Somatic Motor Pathways	TBA; Nolte, Ch 18; CB, 4-3, 4-9, 4-10 through 4-12

SPRING BREAK

- APR 2 Descending Somatic Motor Pathways; Basal Ganglia
 4 Basal Ganglia; Cerebellum
 9 Autonomic Nervous System and Hypothalamus
 11 Limbic Structures: Amygdala and Hippocampus
 16 **Exam III** (covers material through Apr 11)
 18 Class Workshop: Solving Neurological Problems
 23 Class Workshop: Presenting Solutions to Neurological Problems
 25 Class Workshop: Presenting Solutions to Neurological Problems
 30 Auditory Systems and Vestibular Systems
 MAY 1 Visual Systems
 6 **Term papers due no later than Monday at 5:00 pm**
 7 Anatomical Substrates for Higher Functions
 9 Anatomical Substrates for Higher Functions
 16 **Final Exam** (Thursday, 2:00-4:00 pm)
- Nolte, Ch 19; CB, 5-24, 5-25, 5-23 (subthalamus)
 Nolte, Ch 20; CB, 5-13 through 5-15, 4-7, 4-8
- Nolte, Ch 10 pp 252-258 review; Ch 23 pp 580-594;
 CB, 8-1 through 8-4, 5-20 through 5-22
 Nolte, Ch 23 pp 594-605; Ch 24 pp 619-627;
 CB 5-26 through 5-28
- Nolte, Ch 6, 12, 15, 25
- Nolte, Ch 14; CB, 6-17 through 6-20
 Nolte, Ch 17; CB, 6-6 through 6-8
- Nolte, Ch 22, pp 558-576; CB, 5-33