

Developmental Psychobiology
Dr. Robert Smith
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2003 DK
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Hours by appointment

<u>Date</u>	<u>Topic</u>	<u>Assignment</u>
Jan 24	An overview of neural and behavioral development; Induction and organization of neural tissue	Chaps 1,2
Jan 31	Cell birth, migration and differentiation	Chaps 3,4
Feb 7	Patterning of connections; cell survival and death	Chaps 5,6,7
Feb 14	Synaptogenesis	Chaps 9, 10
Feb 21	Prenatal regulatory and risk factors: hormones and teratogens	Readings
Feb 28	The emergence of behavior; maternal/fetal interactions	Chap 10, readings
Mar 7	Midterm examination	
Mar 14	No class – spring break	
Mar 21	Behavior capabilities at birth; early environment effects	Chap 10, readings
Mar 28	Behavioral development	Chap 10, readings
April 4	Childhood stages and sequences	Chap 10, readings
Apr 11	Late cortical and behavioral development: still a sensitive period	Readings
Apr 18	Childhood neurobehavioral disorders	Readings
Apr 25	Presentations	
May 2	Presentations	
May 9, 5:00PM	Grant proposal deadline	

Final exam: Tuesday, May 16, in this room, at our regular meeting time.

Text: Sanes, Reh, and Harris. Development of the Nervous System, 2nd ed. Supplements will be announced in class and/or provided through lecture.

Course goals: To insure that you understand the major current data, theories, and research foci concerning the factors governing neural, and hence behavioral, development from conception to adulthood. To enable you to see the "holes" in our current understanding of the processes of development, and to be able to propose meaningful research to answer the still-unanswered questions.

Course requirements:

Graduate credit: 2 essay exams, each 30%.

One grant proposal - 30% (see attached), due at the last class. As with real grant proposals, late proposals get a "0", no matter what the reason. The grant proposal is due no later than 5PM on April 28.

A ten-minute oral defense of your proposal, 10%.

Undergraduate credit: Only the exams are required (50% each).

Registration information. Last day to add - Feb. 7th. Last day to drop - Feb. 24th

Disability accommodations. If you are a student with a disability and you need academic accommodations, please see me *and* contact the Disability Resource Center (DRC) at 703-993-2474. All

academic accommodations must be arranged through that office.

Honor code. This is a graduate course, to help prepare you for a collaborative world. The proposal must be substantially your own idea, but you are free to bounce ideas off of classmates or anyone else. You are encouraged to form study groups to *learn* the material, but your work during actual exams must be your own.

Grant proposal

A grant proposal is like no other paper you are likely to write. For this course, we will adhere to the format for NIH small grant proposals. You can find forms and instructions for NIH grants at <http://grants1.nih.gov/grants/funding/phs398/phs398.html> Your proposal must include (page limits are for single-spaced, standard margins, font at least 10 point):

A half-page abstract

A. Specific aims - concise summary of exactly what you propose to do (1 p. limit)

B. Background literature - a focused literature review, not to exceed three pages (single spaced)

C. Methods - a detailed summary of the methods you chose, including why you chose them, what you are going to do, and how you are going to do it. Include a data analysis plan. Note any problems you might have and how you will deal with them. Don't forget what your subjects are and how you will obtain them. Not to exceed 12 pages.

D. Literature cited. Complete references for your proposal.

A partial budget. I don't want dollar amounts, but I want a listing of equipment needed (if any), and estimates of personnel time and supplies involved for the whole project.

To get funded, a proposal must be more than just clear. It must be clear to the reader that the problem you have chosen is important, that the literature you reviewed supports the need, that the methods will accomplish your goals, that you know enough to actually do the work, that you know the resources needed, and that you can analyze and interpret the data.

Within the first four weeks of the semester you should decide on a general area for your proposal. Come in and talk to me and we will narrow it down. Then you will do a focused literature search and we will meet again. After that you are free to meet with me as needed.

Some themes of the course

Genes control patterns of development. We are learning more about families of genes and how even minor perturbations in their expression or mechanisms of action can produce serious developmental defects.

Sequential development. Each stage builds on what has come earlier, at neural, behavioral, and cognitive levels.

Activity-dependent growth. Development of a neural connection, a brain area, a behavioral capability are partly dependent upon stimulation. Changing patterns of stimulation can change patterns of growth.

Commonality of processes. Similar or identical *processes* appear to underlie body growth and brain development; formation of neural connections and memory. In several instances the same *process* may be used for different purposes. A corollary of this is that a manipulation [e.g. drug] intended to alter one outcome may affect processes altering others.

Plasticity. The developing CNS is highly modifiable by chemicals, circulatory insufficiency, trauma, environmental stimulation, etc. Each of these can change processes and/or patterns of neural activity.

Prevention/intervention. We are learning more about risk factors for many disorders, and current research suggests that real interventions [predicated on early assessment of a problem] are on the horizon.