

Genetic Correlates of Behavior, Winter 2008
Psychology 251-001

CRN:

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Office Hours: Mon & Wed.4-5, by appointment

Course description: We will cover how genetic backgrounds influence behavior and how the environment can determine the effects of genes on behavior. The course will first review basic principles in genetics and select topics in molecular genetics. Examples of gene-behavior relationships discussed in the first half of the course will be relatively straight-forward and generally will not reflect the complexity that is more commonly observed. The second half of the course will cover more typical (and more complex) relationships between genes and behavior. Although an in depth knowledge of molecular biology is not required for success in this course, each class will build on the previous one. A strong background in molecular biology is not required for this course, but you will need to keep up with the course material.

When: Tuesday and Thursday 2:10-4:00 PM

Where: Wellman 111, except Feb 4th and 6th (meet in Science Lab Building 2060)

Grading:

- 1) Midterm Exam (30%)
- 2) Class participation (40%)
- 3) Term Paper (30%)

Classes: Concepts that are covered later in the course depend on your understanding topics covered earlier in the course. A few minutes will be set aside at the beginning of each class for you to ask questions about the previous lecture. At the end of each class “glossary” slides will provide definitions of terms that will be used in the next class. Spending a few minutes learning these terms before the next class will help you with the jargon used to describe examples. I also encourage you to send me questions by email before class. Assigned readings in the first half of the course will complement the material covered in lecture.

Powerpoint presentations and papers for discussion will be posted online. Attend class to make sure you don't miss any last minute additions (and to ask questions of course!). The second half of the course will focus on recent papers examining the relationships between genes and behavior.

Course Website: The course website can be accessed through SmartSite. The website will contain readings, lecture slides, and practice exam questions.

Mid-term Exam: The mid-term will be a mix of multiple choice and short answer questions. The goal of the mid-term is to make sure that you understand basic concepts in genetics, molecular biology, and behavior so that you will be able to read and understand the papers covered in the second half of the course. Some sample questions will be posted on the course website before the exam. If you don't have a firm grasp of the material in the first half of the course, it will be hard for you to appreciate the papers in the second part of the course.

Discussions: The second half of the course will consist of discussions of research articles from the primary literature. Students should come to class with at least three questions for discussion. For most papers, I will give a short orientation to the paper before it is assigned. These orientations will consist of mostly technical information so that you can understand what is happening in each paper.

Term Paper: The paper is a critical review that examines the role of genetic factors in behavior. Ideally the paper will cover how both the environment and genetic factors can affect a given behavior. Remember that many environmental effects on behavior are mediated by changes in gene expression! Good review papers start with a hypothesis that is evaluated by discussing relevant research papers. Some good examples of recent reviews include:

Bale, T. L. 2006. Stress sensitivity and the development of affective disorders. *Horm. Behav.* 50, 529-533.

Diorio, J. & Meaney, M. J. 2007. Maternal programming of defensive responses through sustained effects on gene expression. *J. Psychiatry Neurosci.* 32, 275-284.

You are **required** to keep a copy of your paper and it is a good idea to save any notes/rough drafts in case questions arise about the integrity of your work. For example, notes could help verify that your work is your own and not plagiarized.

The approximate length should be roughly 2000 words (around 8 double-spaced pages). Please note this does not include the cover page or references.

References

The references should include original papers from peer reviewed journals, also known as primary references. You should include at least 10 relevant papers (only 2 of which can be review papers or chapters) in your reference section. References must explicitly support a piece of information discussed in your paper, and must be cited in the text at the point that the evidence is discussed. I encourage you to talk with me about topics and resources for finding material for your paper.

Presentations

You will need to give a short presentation to the class based on your paper. Presentations should include some background on the research question and should be aimed for a general audience. Presentations should be about 15-20 min long.

TENTATIVE CLASS SCHEDULE

Introduction to Behavioral Genetics

1. Mon, Jan 7th - Introduction to class and behavioral geneticsx
2. Wed. Jan 9th - Introduction to genetics (Trut paper)
3. Mon. Jan. 14th - Molecular genetics (McGuffin paper)
4. Wed. Jan 16th – PCR and Gene regulation
5. Mon. Jan 21st - Measuring gene expression
6. Wed. Jan 23rd - Manipulating gene expression (Nelson paper)
7. Mon. Jan. 28th - Mutations and behavior (Hungs and Minot paper)
8. Wed. Jan. 30th - Epigenetics (Robinson paper)
9. Mon. Feb 4th - Genbank Lab, **meet in Science Lab Building 2060**
10. Wed. Feb 6th - Catch-up and review **meet in Science Lab Building 2060**
11. Mon. Feb 11th – Mid-term Exam

Complexity in Behavioral Genetics

12. Wed. Feb 13th – Molecular mechanisms of biological rhythms (Benzer paper)
13. Mon. Feb. 18th – No class Presidents' Day
14. Wed. Feb 20th – Mouse models of autism (Crawley and Brodtkin papers)
15. Mon. Feb 25th– Molecular mechanisms of autism in humans (NRN papers)
16. Wed. Feb 27th – Microarrays and behavior (Gammie paper)
17. Mon. Mar. 3rd - Epigenetics and behavior (Meaney papers)
18. Wed. Mar 5th- Gene-environment interactions and mental disorders (Caspi papers)
19. Mon. Mar 10th – Student presentations
20. Wed. Mar 12th – Student presentations
21. Mon. Mar 17th – Ethics of behavioral genetics