Lectures: Mondays 5-6:30PM, Pavilion VIII Room 108.

Office Hours: by appointment.

Instructor:
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Phone: 301.346.4009

Course Description:

This course is a study of the biological mechanisms as well as therapeutic implications of the mammalian phenomenon known as Adult Neurogenesis— the birth of new and functional neurons in the adult central nervous system. Students will be exposed to some of the quintessential scientific manuscripts that led to the discovery of Adult Neurogenesis (including Joseph Altman's work), that have shaped the field over the past 15 years (including Fred Gage’s work) analyzing both their impact as well as scientific method; other reading material will include the latest scientific review papers that present to-date summaries of the literature surrounding the major avenues of therapeutic application— various diseases, disorders and cases of damage. Guest-speakers will include faculty members of the Departments of Neuroscience and Psychology actively conducting research in the field of neurogenesis (including Brian Wiltgen and Jonathan Kipnis) as well as physician specialists in several of the relevant diseases and disorders. Students will be notified of and encouraged to attend relevant lectures on and off grounds as well as read newly published papers in Adult Neurogenesis to supplement their coursework. Grading will be conducted on a credit/no-credit basis and assessments will be made based on class participation (20%), weekly reading quizzes (20%), an oral presentation (30%) and a final three-page paper (30%).

Class Expectations:

Prerequisite: this course is designed for first and second-year students involved in biological research.

Students will be expected to have completed the weekly reading assignments, which will include one review paper and one journal article. Both documents must be printed and brought to class one week prior to discussion; students who do not bring them will be asked to leave class in order to print them before returning. Given the non-graded nature of the course and the students' limited scientific backgrounds and foundations, focus should be placed primarily on main concepts— the introduction and discussion/conclusion— when completing the assigned reading. Students will be expected to actively participate in class and engage the presenter with thoughtful questions. Students that fulfill these guidelines will
receive full credit in class participation. Quizzes will take place at the beginning of each class and emphasize completion and very basic comprehension of the week’s reading.

The student responsible for the week’s oral presentation will be expected to demonstrate a comprehensive understanding the paper, including methods and results. The presenter is encouraged to seek out the instructor outside of class for clarification while preparing, and is expected to have done any necessary supplementary research to fully understand the experiments conducted. The student should present the data in the form of “chalk-talk” style drawings. The presentation should last thirty minutes with a ten-minute question and answer period. Presentations will be graded based on the Persuasive Speech Rubric attached (adopted from Neuroscience Undergraduate Program criteria for persuasive speech).

The final paper will dismiss Adult Neurogenesis as a viable therapeutic strategy for any one of the potential clinical illnesses discussed. Papers should be three pages maximum using proper citation of only primary source materials. Papers will be graded based on sound clarity of argument and language and use of compelling evidence. Papers must be submitted on last day of class, April 30th.

In the case of excused class absence, students will be expected to write a one-page analysis of that week’s readings, in place of taking the weekly reading quiz, and submit it at or before the following class. Unexcused absences will receive a zero for the week’s quiz and participation grades. Students may make up a maximum of three classes.

Grading:
Credit/No Credit
The minimum grade for credit is 70%

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<th>Component</th>
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<tr>
<td>Class Participation</td>
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<tr>
<td>Weekly Quizzes</td>
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<td>Oral Presentation</td>
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<td>Final Paper</td>
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Schedule:

The default format for class structure will be: short quiz (5 min); discussion of review paper (45 min); oral presentation (30 min); Q&A (10 min). In the case of a guest speaker, formal discussion of the review paper will be omitted, and students will be encouraged rather to direct their questions and discussion toward the speaker.

Week 1: Introductions, Course Overview and the Basics of Adult Neurogenesis
Assignment: write one-page, double-spaced addressing: your research experience; why you’ve decided to take this course; and what you hope to get out of this course. Be prepared to speak briefly about each of these things during introductions.

Week 2: The discovery of Adult Neurogenesis
Review Paper:

Journal Article:

Week 3: Current survey of Adult Neurogenesis
Review Paper:

Journal Article:
TBD: most recent ground-breaking *Nature/Science* paper.

Week 4: Implications in Learning and Memory
Review Paper:

Journal Article:

*Guest Lecture: Professor Brian Wiltgen, Department of Psychology, UVA.*

Week 5: Implications in Alzheimer Disease
Review Paper:

Journal Article:

*Possible Guest Lecture: Dr. Steven Dekosky, School of Medicine, UVA.*

Week 6: Implications in Parkinson Disease
Review Paper:

Journal Article:

SPRING BREAK

Week 7: Implications in Down Syndrome
Review Paper:
Journal Article:

Week 8: Implications in Schizophrenia
Review Paper:

Journal Article:

Week 9: Implications in Major Depressive Disorder
Review Paper:
Petrik D, Eisch A (2011): The neurogenesis hypothesis of affective and anxiety disorders: are we mistaking the scaffolding for the building? *Neuropsychopharmacology.*

Journal Article:

**Guest Lecture:** Professor Jonathan Kipnis, Department of Neuroscience, *UVA.*

Week 10: Implications in Post-Traumatic Stress Disorder
Review Paper:

Journal Article:

Week 11: Implications in Traumatic Brain Injury
Review Paper:

Journal Article:

Week 12: Implications in Stroke
Review Paper:

Journal Article:

Week 13: Implications in Seizures and Epilepsy
Review Paper:

Journal Article:

Week 14: FINAL PAPERS DUE