Term Information

Effective Term	Spring 2018

General Information

Course Bulletin Listing/Subject Area	Psychology
Fiscal Unit/Academic Org	Psychology - D0766
College/Academic Group	Arts and Sciences
Level/Career	Graduate, Undergraduate
Course Number/Catalog	5603
Course Title	Stem Cells and the Brain
Transcript Abbreviation	Brain Stem Cells
Course Description	This course will explore the biology, function and relevance of stem cells for brain and behavior from development through aging. Through lectures and primary research literature, we will discuss what it means to be a neural stem cell, how stem cells shape the brain and what the role of stem cells might be in brain disorders and mental health.
Semester Credit Hours/Units	Fixed: 3

Offering Information

Length Of Course	14 Week
Flexibly Scheduled Course	Never
Does any section of this course have a distance education component?	No
Grading Basis	Letter Grade
Repeatable	No
Course Components	Lecture
Grade Roster Component	Lecture
Credit Available by Exam	No
Admission Condition Course	No
Off Campus	Never
Campus of Offering	Columbus

Prerequisites and Exclusions

Prerequisites/Corequisites	Psych 3313 or graduate standing
Exclusions	
Electronically Enforced	Yes

Cross-Listings

Cross-Listings

Subject/CIP Code

Subject/CIP Code	42.0101
Subsidy Level	Doctoral Course
Intended Rank	Junior, Senior, Masters, Doctoral

Requirement/Elective Designation

The course is an elective (for this or other units) or is a service course for other units

Course Details

Course goals or learning objectives/outcomes

- 1. Understand what a stem cell is and how stem cells function in the brain.
- 2. Gain understanding of different classifications of stem cells, their unique properties and limitations.
- 3. Gain knowledge of how stem cells could be applied to brain disease/disorders.
- 4. Understand ethical challenges in research and therapeutic use of neural stem cells.
- 5. Be able to read, evaluate and present primary research literature in a cutting edge area of psychology/neuroscience.
- 6. Be able to engage in group discussions of empirical data constructively.

Content Topic List

- What is a stem cell?
- How is the brain built from stem cells?
- Regulation of brain development: environment, genetics and disorders
- Adult neural stem cells in the subventricular zone
- Adult neural stem cells in the hippocampus
- Regulation of adult neural stem cells by the environment
- Stem cells as therapy: neurodegenerative disease
- Stem cells as therapy: trauma, spinal injury
- Stem cells and society: medical ethics
- Neural stem cells and society: research ethics

Sought Concurrence

Yes

Attachments

- Psychology Major Learning Objectives October 2016.docx: Curriculum Map

  (Other Supporting Documentation. Owner: Paulsen,Alisa Marie)
- Concurrence_Form_Psych 5603-signed.pdf: Concurrence-Neuroscience

  (Concurrence. Owner: Paulsen,Alisa Marie)
- Concurrence-Physiology and Cell Biology.pdf: Concurrence-Physiology and Cell Biology

  (Concurrence. Owner: Paulsen,Alisa Marie)
- Psych 5603 Concurrence-EEOB.pdf: Concurrence-EEOB

  (Concurrence. Owner: Paulsen,Alisa Marie)
- Psych 5603-syllabus undergraduate-revised.docx: UG syllabus

  (Syllabus. Owner: Paulsen,Alisa Marie)
- Psych 5603-Readings.docx: Course Readings

  (Other Supporting Documentation. Owner: Paulsen,Alisa Marie)
- Brain stem cells syllabus - Graduate-revised 7-12-17.docx: Grad syllabus

  (Syllabus. Owner: Paulsen,Alisa Marie)

Comments

- See 7-11-17 e-mail to B Givens and A Paulsen. *(by Vankeerbergen,Bernadette Chantal on 07/11/2017 10:35 AM)*

Workflow Information

Status	User(s)	Date/Time	Step
Submitted	Paulsen,Alisa Marie	02/21/2017 01:19 PM	Submitted for Approval
Approved	Givens,Bennet Stuart	02/21/2017 04:52 PM	Unit Approval
Approved	Haddad,Deborah Moore	02/21/2017 05:30 PM	College Approval
Revision Requested	Vankeerbergen,Bernadette Chantal	03/27/2017 12:21 PM	ASCCAO Approval
Submitted	Paulsen,Alisa Marie	04/03/2017 09:35 AM	Submitted for Approval
Approved	Givens,Bennet Stuart	05/31/2017 04:55 PM	Unit Approval
Approved	Haddad,Deborah Moore	06/01/2017 10:54 AM	College Approval
Revision Requested	Vankeerbergen,Bernadette Chantal	07/11/2017 10:35 AM	ASCCAO Approval
Submitted	Paulsen,Alisa Marie	07/12/2017 11:53 AM	Submitted for Approval
Approved	Givens,Bennet Stuart	07/12/2017 01:06 PM	Unit Approval
Approved	Haddad,Deborah Moore	07/12/2017 04:10 PM	College Approval
Pending Approval	Nolen,Dawn Vankeerbergen,Bernadette Chantal Hanlin,Deborah Kay Jenkins,Mary Ellen Bigler	07/12/2017 04:10 PM	ASCCAO Approval

Psych 5603. Stem cells and the brain (Undergraduate-level)

Instructor: Elizabeth Kirby

Office: 55 Psychology

Phone 688-2766

Email: Kirby.224@osu.edu

Office hours: TBD

Meeting location and time: TBD

Lecture for 2.75 h/week

Description: Stems cells are an integral part of the brain from its embryonic beginnings through adulthood. However, what stems can do and how they can influence behavior varies depending on age, location, environment and disease. Stem cells hold great promise as therapies for many brain diseases but how do their changing characteristics in different places and at different ages affect their usefulness? This course will explore the biology, function and relevance of stem cells for brain and behavior from development through aging. Through lectures and primary research literature, we will discuss what it means to be a neural stem cell, how stem cells shape the brain and what the role of stem cells might be in brain disorders and mental health.

Learning objectives: In the course, you will learn the basics of stem cell biology and how it applies specifically to the brain. You will acquire the vocabulary and background needed to discuss primary literature in the neural stem cell field. You will read and/or present landmark papers in neural stem cell research and become able to identify key findings that shaped one of the most dynamic and cutting edge fields of neuroscience today through in depth discussions in class. You will also learn about the ethical challenges that face neural stem field, some of which are unique to stem cell biology and some of which apply across many fields of medical research.

Course materials: Instructor notes and primary research literature

Pre-requisites: Psych 3313

Grade basis:

50% Presentation of primary research article (1 per student)

> Students will select a primary research article from a list curated by the instructor. They will present this article in a journal club format and lead a discussion of the article's merits and shortcomings. Presentations will be 30-45 min with 10-15 min for discussion for undergraduates. Presentations will be graded on equal parts worth 10 points each: 1) presentation of article background, context or motivation; 2) presentation of experimental methods; 3) presentation of experimental data; 4) summary of major conclusions and 5) proposed questions to stimulate further discussion of the article's findings/relevance to stem cells or neuroscience

30% Attendance and participation

A major part of the class is participating in discussion and analysis of primary experimental literature. In addition, attendance is essential for lecture portions because there is no text book and material will be largely covered in class by the instructor. Students will receive full attendance credit for every class in which they attend (1/2 credit) and participate with a substantive comment (1/2 credit). Students may drop their lowest 4 attendance scores (for unexcused absences, for example).

20% Quizzes

There will be 13 short quizzes (15 min each) in weeks 2-9, focusing on the material from the previous week. Students may drop their lowest 2 quiz scores.

Scale: Letter grade, standard OSU scale

Attendance: Mandatory and part of grading basis. Students are allowed up to 2 dropped quiz scores and 4 dropped attendance scores to compensate for any unexcused absences. Make-up work for missed classes/quizzes beyond this will require a University-approved rationale with appropriate documentation (letter from the Department of Athletics, doctor's note).

Due dates: Students will begin presenting primary literature in the 3rd week of the course. Students will sign up for preferred presentation slots at the beginning of the course. Quizzes will happen at the start of Weeks 2-14 (13 total). Graduate student written proposals will be due by the last day of class.

Week 1: What is a stem cell?

-Defining stemness

-Defining potency (pluripotent versus totipotent versus multipotent)

-Where can we find stem cells?

-What are the differences between different kinds of stem cells (embryonic, neural, etc.)

-What are classical stem cell signaling cascades?

Homework: short readings on stem cells for background (< 1hr)

Week 2: How is the brain built?

-Phases of brain development and various stem cell populations involved

-Where do neural stem cells come from?

-What happens to stem cells as development proceeds?

-Conservation of mechanisms across species

Homework: readings on developmental neurobiology for background (1-2 hr)

Quiz: 15 min on previous week's topic

Week 3: Regulation of brain development: environment, genetics and disorders

-Role of the neurogenic niche in development

-How can neural stem cells be disrupted during development? What are the consequences for development of brain and behavior?

-How do neural stem cell dynamics (due to genes or environment) participate in developmental disorders such as autism, mental retardation, microcephaly, etc.

Student presentations: Primary articles relevant to the week's topic.

Homework: readings on environmental impact on neural development for background (1-2 hr); reading primary articles

Quiz: 15 min on previous week's topic

Week 4: **Adult neural stem cells in the subventricular zone**

-Review of adult neurogenesis and stem cells in the adult subventricular zone

-Role of SVZ stem cells in brain function and behavior

Student presentations: Primary articles relevant to the week's topic.

Homework: readings on adult SVZ neurogenesis for background (1-2 hr); reading primary articles

Quiz: 15 min on previous week's topic

Week 5: **Adult neural stem cells in the hippocampus**

-Review of adult neurogenesis and stem cells in the adult hippocampus

-Role of hippocampal stem cells in brain function

Student presentations: Primary articles relevant to the week's topic.

Homework: readings on adult hippocampal neurogenesis for background (1-2 hr); reading primary articles

Quiz: 15 min on previous week's topic

Week 6: Regulation of adult neural stem cells by the environment

-Role of the neurogenic niche, relevance to behavior and mental health

-How do adult neural stem cells respond to aging, disease, injury?

-How do adult neural stem cells respond to positive stimuli like exercise?

Student presentations: Primary articles relevant to the week's topic.

Homework: readings on environmental impact on neural stem cells for background (1-2 hr); reading primary articles

Quiz: 15 min on previous week's topic

Week 7: Stem cells as therapy: neurodegenerative disease

-Review of current and past approaches to using stem cells to treat nervous system degeneration (Alzheimer's, Parkinson's, ALS).

Student presentations: Primary article relevant to the week's topic.

Homework: reading primary articles

Quiz: 15 min on previous week's topic

Week 8: Stem cells as therapy: trauma, spinal injury

-Review of current and past approaches to using stem cells to treat nervous system trauma (spinal injury, TBI)

Student presentations: Primary articles relevant to the week's topic.

Homework: reading primary articles

Quiz: 15 min on previous week's topic

Week 9: Stem cells and society: medical ethics

-Stem cell clinics and their ethical challenges

-Balances between inherent risk and benefit for patients

-Discussion of several prominent uses of stem cell therapy for brain injury (and why they never came to fruition or were abandoned)

Student presentations: Primary articles relevant to the week's topic.

Homework: reading primary articles

Quiz: 15 min on previous week's topic

Week 10: Neural stem cells and society: research ethics

-Discussion of prominent example of research misconduct in the stem cell field and its implications for science and society

Student presentations: Primary articles relevant to the week's topic.

Homework: reading primary articles

Quiz: 15 min on previous week's topic

Week 11: Induced pluripotent stem cells

-Discussion of what iPSCs are, what they may be useful for, their limitations

-Discussion of applicability of iPSCs to the brain and neurodegeneration **specifically**

Student presentations: Primary articles relevant to the week's topic

Homework: reading primary articles

Quiz: 15 min on previous week's topic

Week 12: Stem cell interactions with other cell types in the niche

-Discussion of how neural stem cells communicate with other cells in their niche

-Control of differentiation, function and clinical application by healthy and diseased neighboring cells

Student presentations: Primary articles relevant to the week's topic

Homework: reading primary articles

Quiz: 15 min on previous week's topic

Week 13: Aging and stem cells

-Discussion of how aging affects stem cells in the brain

-How aging impacts clinical potential of stem cells in the brain

Student presentations: Primary articles relevant to the week's topic

Homework: reading primary articles

Quiz: 15 min on previous week's topic

Week 14: Neurogenesis in cortex of primate adult brain (controversy in the early 1990s)

-Discussion of a controversy centering on 2 research groups in the early 1990s about whether primates show adult neurogenesis in the cortex

-Discussion of evidence for both sides, final resolution, implications for stem cell research

Student presentations: Primary articles relevant to the week's topic

Homework: reading primary articles

Quiz: 15 min on previous week's topic

Academic misconduct statement: "It is the responsibility of the Committee on Academic Misconduct to investigate or establish procedures for the investigation of all reported cases of student academic misconduct. The term "academic misconduct" includes all forms of student academic misconduct wherever committed; illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations. Instructors shall report all instances of alleged academic misconduct to the committee (Faculty Rule 3335-5-487). For additional information, see the Code of Student Conduct at http://studentlife.osu.edu/csc/."

Disability statement: "Students with disabilities that have been certified by the Office of Student Life Disability Services will be appropriately accommodated and should inform the instructor as soon as possible of their needs. The Office of Student Life Disability Services is located in 098 Baker Hall. 113 W. 12th Ave.; telephone 292-3307, TDD 292-0901; http://www.ods.ohio-state.edu/."

Psych 5603. Stem cells and the brain (Graduate-level)

Instructor: Elizabeth Kirby

Office: 55 Psychology

Phone 688-2766

Email: Kirby.224@osu.edu

Office hours: TBD

Meeting location and time: TBD

Lecture for 2.75 h/week

Description: Stems cells are an integral part of the brain from its embryonic beginnings through adulthood. However, what stems can do and how they can influence behavior varies depending on age, location, environment and disease. Stem cells hold great promise as therapies for many brain diseases but how do their changing characteristics in different places and at different ages affect their usefulness? This course will explore the biology, function and relevance of stem cells for brain and behavior from development through aging. Through lectures and primary research literature, we will discuss what it means to be a neural stem cell, how stem cells shape the brain and what the role of stem cells might be in brain disorders and mental health.

Learning objectives: In the course, you will learn the basics of stem cell biology and how it applies specifically to the brain. You will acquire the vocabulary and background needed to discuss primary literature in the neural stem cell field. You will read and/or present landmark papers in neural stem cell research and become able to identify key findings that shaped one of the most dynamic and cutting edge fields of neuroscience today through in depth discussions in class. You will also learn about the ethical challenges that face neural stem field, some of which are unique to stem cell biology and some of which apply across many fields of medical research.

Course materials: Instructor notes and primary research literature

Pre-requisites: consent of instructor

Grade basis:

25% Presentation of primary research article

> Within the first 4 weeks of class, graduate students will select a recent empirical paper related to neural stem cells and the brain for approval by the instructor. They will present this article in a journal club format and lead a discussion of the article's merits and shortcomings. Graduate students will present for 45 min-1hr with 10-15 min for discussion.

25% Written proposal of followup experiment

Graduate students will create a follow-up experiment or additional control experiment related to the paper they presented (1-2 pages in length).

30% Attendance and participation

A major part of the class is participating in discussion and analysis of primary experimental literature. In addition, attendance is essential for lecture portions because there is no text book and material will be largely covered in class by the instructor.

20% Quizzes

There will be 13 short quizzes (15 min each) in weeks 2-9, focusing on the material from the previous week. Students may drop their lowest 2 quiz scores.

Scale: Letter grade, standard OSU scale

Attendance: Mandatory and part of grading basis. Students are allowed up to 2 dropped quiz scores and 4 dropped attendance scores to compensate for any unexcused absences. Make-up work for missed classes/quizzes beyond this will require a University-approved rationale with appropriate documentation (letter from the Department of Athletics, doctor's note).

Due dates: Students will begin presenting primary literature in the 3rd week of the course. Students will sign up for preferred presentation slots at the beginning of the course. Quizzes will happen at the start of Weeks 2-14 (13 total). Graduate student written proposals will be due by the last day of class. Graduate student written proposals will be due by the last day of class.

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-What are the differences between different kinds of stem cells (embryonic, neural, etc.)

-What are classical stem cell signaling cascades?

Homework: short readings on stem cells for background (< 1hr)

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-Where do neural stem cells come from?

-What happens to stem cells as development proceeds?

-Conservation of mechanisms across species

Homework: readings on developmental neurobiology for background (1-2 hr)

Quiz: 15 min on previous week's topic

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-Role of the neurogenic niche in development

-How can neural stem cells be disrupted during development? What are the consequences for development of brain and behavior?

-How do neural stem cell dynamics (due to genes or environment) participate in developmental disorders such as autism, mental retardation, microcephaly, etc.

Student presentations: Primary articles relevant to the week's topic.

Homework: readings on environmental impact on neural development for background (1-2 hr); reading primary articles

Quiz: 15 min on previous week's topic

Week 4: **Adult neural stem cells in the subventricular zone**

-Review of adult neurogenesis and stem cells in the adult subventricular zone

-Role of SVZ stem cells in brain function and behavior

Student presentations: Primary articles relevant to the week's topic.

Homework: readings on adult SVZ neurogenesis for background (1-2 hr); reading primary articles

Quiz: 15 min on previous week's topic

Week 5: **Adult neural stem cells in the hippocampus**

-Review of adult neurogenesis and stem cells in the adult hippocampus

-Role of hippocampal stem cells in brain function

Student presentations: Primary articles relevant to the week's topic.

Homework: readings on adult hippocampal neurogenesis for background (1-2 hr); reading primary articles

Quiz: 15 min on previous week's topic

Week 6: Regulation of adult neural stem cells by the environment

-Role of the neurogenic niche, relevance to behavior and mental health

-How do adult neural stem cells respond to aging, disease, injury?

-How do adult neural stem cells respond to positive stimuli like exercise?

Student presentations: Primary articles relevant to the week's topic.

Homework: readings on environmental impact on neural stem cells for background (1-2 hr); reading primary articles

Quiz: 15 min on previous week's topic

Week 7: Stem cells as therapy: neurodegenerative disease

-Review of current and past approaches to using stem cells to treat nervous system degeneration (Alzheimer's, Parkinson's, ALS).

Student presentations: Primary article relevant to the week's topic.

Homework: reading primary articles

Quiz: 15 min on previous week's topic

Week 8: Stem cells as therapy: trauma, spinal injury

-Review of current and past approaches to using stem cells to treat nervous system trauma (spinal injury, TBI)

Student presentations: Primary articles relevant to the week's topic.

Homework: reading primary articles

Quiz: 15 min on previous week's topic

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-Stem cell clinics and their ethical challenges

-Balances between inherent risk and benefit for patients

-Discussion of several prominent uses of stem cell therapy for brain injury (and why they never came to fruition or were abandoned)

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-Discussion of prominent example of research misconduct in the stem cell field and its implications for science and society

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Homework: reading primary articles

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Quiz: 15 min on previous week's topic

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The Ohio State University
College of the Arts and Sciences Concurrence Form

The purpose of this form is to provide a simple system of obtaining departmental reactions to course requests. **An e-mail may be substituted for this form.**

An academic unit initiating a request should complete Section A of this form and send a copy of the form, course request, and syllabus to each of the academic units that might have related interests in the course. Units should be allowed two weeks to respond to requests for concurrence.

Academic units receiving this form should respond to Section B and return the form to the initiating unit. Overlap of course content and other problems should be resolved by the academic units before this form and all other accompanying documentation may be forwarded to the Office of Academic Affairs.

A. Proposal to review

Psychology 5603	Stem Cells and the Brain
Initiating Academic Unit	Course Number / Course Title
New	10/13/16
Type of Proposal (New, Change, Withdrawal, or other)	Date request sent
Neuroscience	10/27/16
Academic Unit Asked to Review	Date response needed

B. Response from the Academic Unit reviewing

Response: include a reaction to the proposal, including a statement of support or non-support (continued on the back of this form or a separate sheet, if necessary).

Although there are minor overlaps with two extant courses in the Department of Neuroscience (e.g., NeuroSc 4050; Neurogenetics and NeuroSc 5790H; Developmental Neuroscience), we see no significant overlap or reason for this new course on Stem Cells and the Brain not to be taught in Psychology. We believe this course will be an excellent addition for OSU students to learn about brain development and function. We strongly support the proposal.

Signatures

	Name	Position	Unit	Date
1.		Professor and Chair	Neuroscience	10.17.2016
2.				
3.				

Revised 5/27/14

Subject: RE: Concurrence for Psych 5603 requested
Date: Monday, October 31, 2016 at 7:59:32 AM Eastern Daylight Time
From: Mohler, Peter
To: Paulsen, Alisa
CC: Givens, Bennet, Kirby, Liz, Fowler, Lorri (DHLRI)

Dear Alisa
While it appears that there might be minor overlap in the areas covered in 5603 and the topics taught in current offerings of the Department of Physiology & Cell Biology, we fully support the proposal for Psych 5603.
Best of luck with your new course- looks like a great new learning opportunity for the students at Ohio State.
All my best, Peter

Peter J. Mohler, Ph.D.
Director – Dorothy M. Davis Heart & Lung Research Institute
Chair, Department of Physiology & Cell Biology
Professor, Departments of Internal Medicine and Physiology & Cell Biology
William D. and Jacquelyn L. Wells Chair in Cardiovascular Research
The Ohio State University Wexner Medical Center
Peter.Mohler@osumc.edu
Phone: 614-247-8610

From: Paulsen, Alisa [mailto:paulsen.10@osu.edu]
Sent: Friday, October 28, 2016 2:39 PM
To: Mohler, Peter J.
Cc: Givens, Bennet; Kirby, Liz; Paulsen, Alisa
Subject: Concurrence for Psych 5603 requested

Dear Dr. Mohler,

The Department of Psychology is creating a new course titled Stem Cells and the Brain (Psychology 5603). The course will have Psychology 3313 (Introduction to Behavioral Neuroscience) as a prerequisite, and will be taught at an advanced undergraduate/graduate level. I have attached the undergraduate and graduate syllabi, and requesting the support of the Department of Physiology and Cell Biology for this course. You can respond via email or by returning the attached concurrence form to me by November 11th. Please let me know if you have any questions.

Thanks,
Alisa

Alisa Paulsen, Ph.D.
Director of Undergraduate Programs
Department of Psychology
15 Psychology Building, 1835 Neil Avenue, Columbus, OH 43210
614-292-5750 Office / 614-292-5136 Fax
paulsen.10@osu.edu
undergrad.psy.ohio-state.edu

Subject: RE: Concurrence for Psych 5603 requested
Date: Thursday, November 17, 2016 at 2:28:22 PM Eastern Standard Time
From: Marschall, Elizabeth
To: Paulsen, Alisa
CC: Givens, Bennet, Kirby, Liz

Alisa,

Yes, EEOB is fine with having Psychology develop and teach this course.

Sincerely,

Libby Marschall
Elizabeth Marschall
Professor and Chair
Department of Evolution, Ecology, and Organismal Biology
300 Aronoff Laboratory, 318 West 12th Avenue, Columbus, OH 43210-1293
(614) 292-8280
marschall.2@osu.edu
eeob.osu.edu

From: Paulsen, Alisa
Sent: Monday, November 14, 2016 9:39 AM
To: Marschall, Elizabeth
Cc: Givens, Bennet; Kirby, Liz
Subject: Re: Concurrence for Psych 5603 requested

Dear Dr. Marschall,

Please let me know if we can answer any questions about our proposed course, Psychology 5603: Stem Cells and the Brain. We are hoping to offer the course in AU17 and would like submit it this week, if possible. I've attached the information for your review.

Thank you,
Alisa

Alisa Paulsen, Ph.D.
Director of Undergraduate Programs
Department of Psychology
15 Psychology Building, 1835 Neil Avenue, Columbus, OH 43210
614-292-5750 Office / 614-292-5136 Fax
paulsen.10@osu.edu
undergrad.psy.ohio-state.edu

From: Alisa Paulsen <paulsen.10@osu.edu>
Date: Friday, October 28, 2016 at 2:42 PM
To: "Marschall, Elizabeth" <marschall.2@osu.edu>
Cc: "Givens, Bennet" <givens.7@osu.edu>, "Kirby, Liz" <kirby.224@osu.edu>, Alisa Paulsen <paulsen.10@osu.edu>
Subject: Concurrence for Psych 5603 requested

Dear Dr. Marschall,

The Department of Psychology is creating a new course titled Stem Cells and the Brain (Psychology 5603). The course will have Psychology 3313 (Introduction to Behavioral Neuroscience) as a prerequisite, and will be taught at an advanced undergraduate/graduate level. I have attached the undergraduate and graduate syllabi, and am requesting the support of the Department of EEOB for this course. You can respond via email or by returning the attached concurrence form to me by November 11th. Please let me know if you have any questions.

Thanks,
Alisa

Alisa Paulsen, Ph.D.
Director of Undergraduate Programs
Department of Psychology
15 Psychology Building, 1835 Neil Avenue, Columbus, OH 43210
614-292-5750 Office / 614-292-5136 Fax
paulsen.10@osu.edu
undergrad.psy.ohio-state.edu

Regulation of brain development: environment, genetics and disorders

Wichterle, H., I. Lieberam, J. A. Porter, and T. M. Jessell. "Directed Differentiation of Embryonic Stem Cells into Motor Neurons." *Cell* 110, no. 3 (2002): 385-397.

Kudoh, T., S. W. Wilson, and I. B. Dawid. "Distinct roles for Fgf, Wnt and retinoic acid in posteriorizing the neural ectoderm." Development 129, no. 18 (September 2002): 4335-46.

Grandbarbe, L., J. Bouissac, M. Rand, M. Hrabe de Angelis, S. Artavanis-Tsakonas, and E. D. Mohier. "Delta-Notch signaling controls the generation of neurons/glia from neural stem cells in a stepwise process." Development 130, no. 7 (April 2003): 1391-402.

Zou, Y., E. Stoeckli, H. Chen, and M. Tessier-Lavigne. "Squeezing axons out of the gray matter: a role for slit and semaphorin proteins from midline and ventral spinal cord." *Cell* 102, no. 3 (August 4, 2000): 363-75.

Chd8 mediates cortical neurogenesis via transcriptional regulation of cell cycle and Wnt signaling. Durak O, Gao F, Kaeser-Woo YJ, Rueda R, Martorell AJ, Nott A, Liu CY, Watson LA, Tsai LH. Nat Neurosci. 2016 Nov;19(11):1477-1488. doi: 10.1038/nn.4400. Epub 2016 Oct 3. PMID: 27694995

Adult neural stem cells in the subventricular zone

Doetsch, F., I. Caille, D. A. Lim, J. M. Garcia-Verdugo, and A. Alvarez-Buylla. "Subventricular Zone Astrocytes are Neural Stem Cells in the Adult Mammalian Brain." *Cell* 97, no. 6 (June 11, 1999): 703-16.

Sonic hedgehog controls stem cell behavior in the postnatal and adult brain.
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Other topics to be added as student interest warrants (weeks: 11-14)

Induced pluripotent stem cells

Takahashi, K., and S. Yamanaka. "Induction of Pluripotent Stem Cells from Mouse Embryonic and Adult Fibroblast Cultures by Defined Factors." *Cell* 126, no. 4 (2006): 663-76.

Kondo, T., M. Asai, et al. Modeling Alzheimer's Disease with iPSCs Reveals Stress Phenotypes Associated with Intracellular Aβ and Differential Drug Responsiveness. *Cell Stem Cell* 12, no. 4 (2013): 487–96.

Interactions with other cell types in the niche:

Song, H., C. F. Stevens, and F. H. Gage. "Astroglia Induce Neurogenesis from Adult Neural Stem Cells." *Nature* 417, no. 6884 (May 2, 2002): 39-44.

Microglia regulate hippocampal neurogenesis during chronic neurodegeneration. De Lucia C, Rinchon A, Olmos-Alonso A, Riecken K, Fehse B, Boche D, Perry VH, Gomez-Nicola D. Brain Behav Immun. 2016 Jul;55:179-90. doi: 10.1016/j.bbi.2015.11.001. Epub 2015 Nov 2. PMID: 26541819 Free PMC Article

Aging and stem cells:

In Vivo Amelioration of Age-Associated Hallmarks by Partial Reprogramming.
Ocampo A, Reddy P, Martinez-Redondo P, Platero-Luengo A, Hatanaka F, Hishida T, Li M, Lam D, Kurita M, Beyret E, Araoka T, Vazquez-Ferrer E, Donoso D, Roman JL, Xu J, Rodriguez Esteban C, Nuñez G, Nuñez Delicado E, Campistol JM, Guillen I, Guillen P, Izpisua Belmonte JC. Cell. 2016 Dec 15;167(7):1719-1733.e12. doi: 10.1016/j.cell.2016.11.052. PMID: 27984723

Division-coupled astrocytic differentiation and age-related depletion of neural stem cells in the adult hippocampus. Encinas JM, Michurina TV, Peunova N, Park JH, Tordo J, Peterson DA, Fishell G, Koulakov A, Enikolopov G. Cell Stem Cell. 2011 May 6;8(5):566-79. doi: 10.1016/j.stem.2011.03.010. PMID: 21549330 Free PMC Article

In vivo clonal analysis reveals self-renewing and multipotent adult neural stem cell characteristics. Bonaguidi MA, Wheeler MA, Shapiro JS, Stadel RP, Sun GJ, Ming GL, Song H. Cell. 2011 Jun 24;145(7):1142-55. doi: 10.1016/j.cell.2011.05.024. Epub 2011 Jun 16. PMID: 21664664 Free PMC Article

Neurogenesis in cortex of primate adult brain (controversy in the early 1990s)

Gould E, Reeves AJ, Graziano MS, Gross CG (1999) Neurogenesis in the neocortex of adult primates. Science 286: 548–552. doi: 10.1126/science.286.5439.548. pmid:10521353

Bernier PJ, Bedard A, Vinet J, Levesque M, Parent A (2002) Newly generated neurons in the amygdala and adjoining cortex of adult primates. Proc Natl Acad Sci U S A 99: 11464–11469. doi: 10.1073/pnas.172403999. pmid:12177450

Kornack DR, Rakic P (2001) Cell proliferation without neurogenesis in adult primate neocortex. Science 294: 2127–2130. doi: 10.1126/science.1065467. pmid:11739948

Psychology Major Learning Objectives

Program Objectives

Knowledge Base in Psychology

K1. Describe key concepts, principles, & overarching themes in psychology

K2. Develop working knowledge of psychology's content domains

K3. Describe applications of psychology

Scientific Inquiry & Critical Thinking

S1. Use scientific reasoning ti interpret psychological phenomena

S2. Demonstrate psychology information literacy

S3. Engage in innovative & integrative thinking & problem solving

S4. Interpret, design, & conduct basic psychological research

S5. Incorporate sociocultural factors in scientific inquiry

Ethical & Social Responsibility in a Diverse World

E1. Apply ethical standards to evaluate psychological science & practice

E2. Build & enhance personal relationships

E3. Adopt values that build community at local, national, & global levels

Communication

C1. Demonstrate effective writing for different purposes

C2. Exhibit effective presentation skills for different purposes

C3. interact effectively with others

Professional Development

P1. Apply psychological content & skills to career goals

P2. Exhibit self-efficacy & self-regulation

P3. Refine project-management skills

P4. Enhance teamwork capacity

P5. Develop meaningful professional direction for life after graduation

Learning Goal Levels

F – Foundational

A- Advanced

I. Data Analysis and Research Requirement																			
Course	**Area**	**K1**	**K2**	**K3**	**S1**	**S2**	**S3**	**S4**	**S5**	**E1**	**E2**	**E3**	**C1**	**C2**	**C3**	**P1**	**P2**	**P3**	**P4**	**P5**
2220(H) Data Analysis		F			F	F	F	F					F			F	F	F		
2300 Research Methods		F	F	F	F	F	F	F	F	F	F		F		F	F	F	F		

II. Core Requirements (1 from each area)																				
A. Brain and Behavior																				
Course	**Area**	**K1**	**K2**	**K3**	**S1**	**S2**	**S3**	**S4**	**S5**	**E1**	**E2**	**E3**	**C1**	**C2**	**C3**	**P1**	**P2**	**P3**	**P4**	**P5**
3313 Intro to Behavioral Neuroscience	BN	F	F		F	F				F										
3313H Intro to Behavioral Neuroscienc	BN	F	F		F	F	F	F		F	F		F	F	F				F	
3513 Intro to Cognitive Neuroscience	CO	F			F	A		F		F			F							
B. Cognitive Psychology																				
3302 Perception & Language	CO	A	A	A	A	A	F		F											
3310 Sensation & Perception	CO	A	A	F	A	F	F									F				F
3312 Memory & Cognition	CO	A	A	F	A	A	F	F	F	F			F	F	F					F
C. Clinical and Developmental Psychology																				
2367.02 Abnormal Psychology Analysis	CL	F	F	F	F		F						F		F			F		
3331 Abnormal Psychology	CL	F	F	A	A			A	A											
3335 Psychology of Adjustment	CL	F																		
3340 Lifespan Development	D	F	F	F	F	F						F	F							
3530 Theories of Personality	CL	A	A	A	A	F	F	F	A	F	A		F				F			
3550 Psychology of Childhood	D	F	F	F	F	F						F	F							
3551 Psychology of Adolescence	D	F		F	F	F		F						F					F	

D. Social Psychology																					
2367.01 Social Psychology	S	F	F,A	F,A	F	F,A	F,A	F		F		F	F,A	F	F	F	F,A	F	F	
3325 Intro to Social Psychology	S	F	F,A	F,A	F	F,A	F	F		F		F				F				
3375 Stereotyping and Prejudice	S	F	F	F,A	F	F	F	F	F	F	F	F,A			F	F,A				

III. Advanced Requirements																				
Course	**Area**	**K1**	**K2**	**K3**	**S1**	**S2**	**S3**	**S4**	**S5**	**E1**	**E2**	**E3**	**C1**	**C2**	**C3**	**P1**	**P2**	**P3**	**P4**	**P5**
Sequenced Advanced Courses																				
4305 Intro to Psychopharmacology	BN	A	A	A	A	A	A	A	A											
4475 The Self	S	A	A	A	A		A		A		A	A			A	A				A
4501 Advanced Behavioral Neuroscience	BN	A	A	A	A	A	A	A												
4510 Cognitive Psychology Laboratory	CO	A	A	A	A	A	A	A		A			A	A	F	F				
4518 Attitudes	S	F,A	F,A	F	F,A	F,A	F	F	F		F	F				F	F	F		
4520 Social Psychology Laboratory	S	A		F,A	F,A	F,A	A	F,A	F,A	F,A		A	A	A		F,A	F,A	A	A	A
4532 Clinical Psychology Science	CL	A	A	A	A		A	A		F,A						A				A
4540 Counseling Psychology	CL	F,A	F,A	F	F	F	F		F	F	F,A	F			F	F				
4630 Attitudes and Persuasion	S	F,A	F,A	F,A	F,A	F	F	F,A	F			F	F,A		F	F	F	F		
4644 Hormones and Behavior	BN	A	A	A	A	A	A	A												
5600 Psychobio. of Learning and Memory	BN	A	A	A	A	A			A	A	A									
5602 Behavioral Genetics	BN	A	A	A	A	F	F	A	A											
5606 High Level Vision	CO	A	A	F	A	F	A	A					A	A	F					
5614 Cognitive Neuroscience	CO	A	F	F	A	A	F	A	F	F			F	A	A			A	A	
5622 Development of Brain	BN	A	A	A	A	A	A	A	A					A	A					

and Behavior																				
5681 Development and Psychopathology	CL	A		A	A			F												
5684 Psychology of Delinquency	D	A	A	A	A	A	A	F	A	A	F	A	A	F	A	A	A	F	F	A
Advanced Courses																				
4309 Human Motor Control	CO	A	A	A	A	A	F	F					F			F				
4485 Psychology and the Law		F,A	F,A	F,A	F, A	F	F	F	F	F	F	F,A	F,A			F,A				
4505 History of Psychology		A	F,A	A	F	A			A	F										
4508(H) Judgment and Decision-Making	Q	F	F	A	F		F	F	F											
4511 Psychological Testing		F	F	F	A	F		A		F			F	F		F				
4515 Psychology of Emotion	S	A,F	A,F	A,F	A,F	A,F		A,F	A,F	F	F					F			F	
4521 Personnel Psychology		F,A		F,A	F,A	F,A	F, A	F,A	F, A	F	F,A	F,A	F,A	F,A	F,A	F,A	F	F,A	F	F,A
4522 Organizational Psychology		A,F	A,F	A,F	F	F	A,F	F	F	F,A			F	F	F	F,A	F	F		F
4531 Health Psychology	CL	A	A	A	A	F	F			A	F		F		F	F	F	F	F	A
4543 Psychology of Gender	CL	A	F	A	A	A	F	F	A		A	F	F	F	A	F	A	F	F	F
4545 Cross-Cultural Psychology	CL	F,A	F,A	A	A	F	F	F	F	F	F,A	F,A	F	F	F	F			F	
4552 Psychology of Adult Years	D	F		F	F	F														
4554 Language Development	D		A		A	A	A	F					A	A						
4555 Adolescent Sexuality	D	F		F	F	F		F					F	F					F	
4571 Psychology of Dev. Disabilities	I	F		F	F	F, A						F	F, A					F		
5601 Comparative Psychology		A	A		A	A														
5608 Introduction to Mathematical Models	Q	F			A			A										F		
5610 Emotion Regulation	CL	A	A	A	A	A	A	F	F	F			A		A	A				

5613H Biological Psychiatry	BN	A	A	A	A	A	A													
5615 Psychology of Language	CO				F	F	F	F	F	F			F							
5618 Computational Cog. Neuroscience	CO	A	A	A	F	F	F						F	A	F	F				
5621 Intro to Event-Related Potentials	CO	A	A	A	A	F	A	A		F	F	F	F	A	F	F			A	
5832 Lifespan Sociomoral Development	D	A	F		F	A							A							
5898 Seminar in Behavioral Neuroscience	BN	A	A	A	A	A	A	A	A					A	A					

IV. Elective Courses

Course	Area	K1	K2	K3	S1	S2	S3	S4	S5	E1	E2	E3	C1	C2	C3	P1	P2	P3	P4	P5
2301 Psychology of Extraordinary Beliefs	Q	F			A				F	F										
2303 Positive Psychology	CL	F		F	F	F	F	F		F	A	A	F		F	F	F			
2311 Psychology of Motivation	CO	A	A	F	F	F	F								F	F	F			
2333 Psychology of Human Sexuality	CL	A	F	F	F	F			F	F	A	A			F	F	F			
2350 Contemp. Developmental Psychology	D	F		F	F		F					F								
2376 Interpersonal Relationships	S	F,A		F,A	F	F		F	F		F				F	F		F	F	
2420 Psychology Applied to Sport		F		F,A	F,A	F			F	F	F				F	F			F	
2462 Psychology of Creativity							F,A				F	F		F	F	F,A				
3321(H) Quant. and Statistical Methods		F			A	F	F	F	F											
3371 Language and the Mind	CO	A	F		A	F		F	F		F		F	A	A	A	F	F	F	
3624 Primate Cognition		F	F		F	F				F										
4320 Psychological Science of Addiction		F	F	F			F													
4525 Psychology of Personal Security	S	A		F,A	F,A	F	F,A		F	F,A	F	F, A	F,A		F	F	F	F		
5425 Introduction to fMRI	CO	A		F,A	F,A	F	F,A			F,A	F	F,A	F,A		F	F	F	F		
5603 Stem Cells and the Brain	BN	A	A	A	A	A	A	A	A											
5612 Introduction to Cognitive Science	CO	A	A		F	F	F						F							
5620 Technology, Efficiency, and Happiness	CO	A	F	A	F	F	F	F				F	F	A		F				
5870 Neuroeconomics and Decision Neuroscience	D	F	F	A	A		F	F	F											
5891 Proseminar in Cognitive Science	CO	A	A	A	A	A	A	A		A			A	A	F					

Experiential Elective Courses																			
3191 Internship in Psychology		F		F		F					A	F, A	F		A	F, A	F, A		A	F, A
3193.01 Individual Studies in Psychology		A				A														
3193.02 Individual Studies: Teaching		A	F,A	F,A	F,A	A	A	F	F	F	A	F, A	A	A	A	F, A	F	F, A	A	A
4998 Undergraduate Research		A			F,A	A	F, A	F,A		F,A					A					
4999.01(H) Thesis Research I			A		A	A	A	A		A	A		A	A		A	A	A		A
4999.02(H) Thesis Research II			A		A	A	A	A		A	A		A	A		A	A	A		A
5700 Science Education Outreach	D		A	A	A	A		A	A			A		A	A	A	A		A	