

FLORIDA ATLANTIC UNIVERSITY™

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Graduate Programs—NEW COURSE PROPOSAL

DEPARTMENT NAME: Basic Science COLLEGE OF: Charles E. Schmidt College of Biomedical Science

RECOMMENDED COURSE IDENTIFICATION:
 PREFIX PCB COURSE NUMBER 6848 LAB CODE (L or C) _____
 (TO OBTAIN A COURSE NUMBER, CONTACT ERUDOLPH@FAU.EDU)
 COMPLETE COURSE TITLE Adult Neurogenesis

EFFECTIVE DATE
 (first term course will be offered)
Summer 2011

CREDITS: **3**

TEXTBOOK INFORMATION:
 No textbook required. Journal articles provided by instructor

GRADING (SELECT ONLY ONE GRADING OPTION): REGULAR PASS/FAIL _____ SATISFACTORY/UNSATISFACTORY _____

COURSE DESCRIPTION, NO MORE THAN 3 LINES:
 In this course, we will go over the background of stem cells and neuroscience. Then we will cover the following aspects about neurogenesis: where neurogenesis happens in the brain, how it happens, why it happens, and, more importantly, how it might help the brain heal itself.

PREREQUISITES W/MINIMUM GRADE: *
 PSB 6037 Principles of Neuroscience or PSB 6345 Neuroscience I or equivalent

COREQUISITES:

OTHER REGISTRATION CONTROLS (MAJOR, COLLEGE, LEVEL):
 Graduate Students Only

PREREQUISITES, COREQUISITES & REGISTRATION CONTROLS SHOWN ABOVE WILL BE ENFORCED FOR ALL COURSE SECTIONS.
 * DEFAULT MINIMUM GRADE IS D-

MINIMUM QUALIFICATIONS NEEDED TO TEACH THIS COURSE:
Ph.D.

Other departments, colleges that might be affected by the new course must be consulted. List entities that have been consulted and attach written comments from each. Department of Biology.

Jianning Wei, Ph.D, jwei@fau.edu, tel: 297-0002
 Faculty Contact, Email, Complete Phone Number

SIGNATURES

SUPPORTING MATERIALS

Approved by: _____
 Department Chair: _____
 College Curriculum Chair: _____
 College Dean: _____
 UGPC Chair: _____
 Dean of the Graduate College: _____

Date: 3-16-10
3-16-10
3-16-10

Syllabus—must include all details as shown in the UGPC Guidelines.
 Written Consent—required from all departments affected.
 Go to: <http://graduate.fau.edu/gpc/> to download this form and guidelines to fill out the form.

Adult Neurogenesis
Course Number: PCB 6848

Prerequisites: Have background in basic neuroscience.

Co-requisites: not applicable

Instructor: Dr. Jenny Wei
Biomedical Science building, Room 210
Tel: 561-297-0002
Email: jwei@fau.edu
Office hours: 4-5pm, M, W, F.
M, W, F: 2:00-4:00pm, Room 130.

Textbook: No textbook required. Journal readings will be assigned.

Bibliography:

Book:

Gage, F., Kempermann, G., and Song, H., *Adult neurogenesis*. 2008: Cold Spring Harbor Laboratory Press.

Journal articles for reading:

1. Curtis, M., Kam, M., Nannmark, U., Anderson, M., Axell, M., Wikkelso, C., Holtas, S., van Roon-Mom, W., Bjork-Eriksson, T., and Nordborg, C. (2007) Human neuroblasts migrate to the olfactory bulb via a lateral ventricular extension. *Science*. 315, 1243-1249.
2. Doetsch, F., Garcia-Verdugo, J., and Alvarez-Buylla, A. (1997) Cellular composition and three-dimensional organization of the subventricular germinal zone in the adult mammalian brain. *Journal of Neuroscience*. 17, 5046-5061.
3. Ming, G. and Song, H. (2005) Adult neurogenesis in the mammalian central nervous system. *Annual Review of Neuroscience*. 28, 223-250.
4. Seri, B., Garcia-Verdugo, J., Collado-Morente, L., McEwen, B., and Alvarez-Buylla, A. (2004) Cell types, lineage, and architecture of the germinal zone in the adult dentate gyrus. *The Journal of comparative neurology*. 478, 359-378.
5. Seri, B., Garcia-Verdugo, J., McEwen, B., and Alvarez-Buylla, A. (2001) Astrocytes give rise to new neurons in the adult mammalian hippocampus. *Journal of Neuroscience*. 21, 7153-7160.

Journal articles for presentation:

1. Arvidsson, A., Collin, T., Kirik, D., Kokaia, Z., and Lindvall, O. (2002) Neuronal replacement from endogenous precursors in the adult brain after stroke. *Nature medicine*. 8, 963-970.
2. Cho, S., Benraiss, A., Chmielnicki, E., Samdani, A., Economides, A., and Goldman, S. (2007) Induction of neostriatal neurogenesis slows disease progression in a transgenic murine model of Huntington disease. *Journal of Clinical Investigation*. 117, 2889-2902.
3. Dimos, J., Rodolfa, K., Niakan, K., Weisenthal, L., Mitsumoto, H., Chung, W., Croft, G., Saphier, G., Leibel, R., and Golland, R. (2008) Induced pluripotent stem cells generated

- from patients with ALS can be differentiated into motor neurons. *Science*. 321, 1218-1221.
4. Holinger, G., Rizk, P., Muriel, M., Duyckaerts, C., Oertel, W., Caille, I., and Hirsch, E. (2004) Dopamine depletion impairs precursor cell proliferation in Parkinson disease. *Nature neuroscience*. 7, 726-735.
 5. Rochefort, C., Gheusi, G., Vincent, J., and Lledo, P. (2002) Enriched odor exposure increases the number of newborn neurons in the adult olfactory bulb and improves odor memory. *Journal of Neuroscience*. 22, 2679-2689.
 6. Santarelli, L., Saxe, M., Gross, C., Surget, A., Battaglia, F., Dulawa, S., Weisstaub, N., Lee, J., Duman, R., and Arancio, O. (2003) Requirement of hippocampal neurogenesis for the behavioral effects of antidepressants. *Science*. 301, 805-809.
 7. Van Kampen, J. and Eckman, C. (2006) Dopamine D3 receptor agonist delivery to a model of Parkinson's disease restores the nigrostriatal pathway and improves locomotor behavior. *Journal of Neuroscience*. 26, 7272-7280.
 8. van Praag, H., Christie, B., Sejnowski, T., and Gage, F. (1999) Running enhances neurogenesis, learning, and long-term potentiation in mice. *Proc Natl Acad Sci*. 96, 13427-13431.
 9. van Praag, H., Kempermann, G., and Gage, F. (1999) Running increases cell proliferation and neurogenesis in the adult mouse dentate gyrus. *Nat Neurosci*. 2, 266-70.

Course Description:

Can new neurons develop in the adult brain? For more than a century, It is firmly believed that our brain could not repair itself and that we were born with all the brain cells we would ever have. That belief has changed. Over the last 20 years, research has shown that neurogenesis, the creation of new brain cells, actually occurs in the adult human. This is an exciting finding since it opens the possibility to use these adult stem cells to treat neurological disease. To achieve, basic science research need to be done to better understand the process. In this course, we will go over the background of stem cells and neuroscience. Then we will cover the following aspects about neurogenesis: where neurogenesis happens in the brain, how it happens, why it happens, and, more importantly, how it might help with brain repair in neurodegenerative diseases.

Instructional Objectives:

After the course, the students should be able to:

1. Have a clear understanding that new neurons do continually develop in the adult brain and play an important role.
2. Understand the microenvironment that can support adult neurogenesis in the brain.
3. Be familiar with the experimental approaches that are used to investigate adult neurogenesis.
4. Appreciate the therapeutic potential of regulating neurogenesis to treat neurological diseases.

Schedule

Date Description

- | | |
|------|---|
| 6/22 | Introduction and background: stem cells |
| 6/24 | Background: neurons |
| 6/26 | Background: neural development |

- 6/29 Experimental approaches to detect adult neurogenesis (1)
- 7/1 Experimental approaches to detect adult neurogenesis (2)
- 7/3 Holiday/no class
- 7/6 Neurogenesis in the subventricular zone
- 7/8 Functional significance of neurogenesis in the subventricular zone (lecture/literature discussion)
- 7/10 Neurogenesis in the hippocampus
- 7/13 Functional significance of neurogenesis in the hippocampus (lecture/literature discussion)
- 7/15 Neural stem cell niche
- 7/17 Regulation of adult neurogenesis-activity and age (lecture/literature discussion)
- 7/20 Regulation of adult neurogenesis-neurotrophic factors and neurotransmitters (lecture/literature discussion)
- 7/22 Adult neurogenesis in neurological disorders (lecture/literature discussion) Stroke
- 7/24 Adult neurogenesis in neurological disorders (lecture/literature discussion) PD
- 7/27 Adult neurogenesis in neurological disorders (literature discussion/summary) HD
- 7/29 Application of iPSC in neurological disorders (literature discussion)
- 7/31 Exam
- 8/3 No class (take-home essay due)

Assessment Procedures:

- Class participation: 10%
- Literature discussion: 20%
- Take-home essay: 30%
- Final exam: 40%

Grading Criteria:

A (>90); B (80-89); C (60-79); D (<59)

Academic Honor Code:

Students at Florida Atlantic University are expected to maintain the highest ethical standards. Academic dishonesty is considered a serious breach of these ethical standards because it interferes with the University mission to provide a high quality education in which no student enjoys an unfair advantage over any other. Academic dishonesty is also destructive of the University community, which is grounded in a system of mutual trust and places high value on personal integrity and individual responsibility.

The FAU Honor Code requires a faculty member, student, or staff member to notify an instructor when there is reason to believe an academic irregularity is occurring in a course. The instructor must pursue any reasonable allegation, taking action where appropriate. The following constitute academic irregularities:

1. The use of notes, books or assistance from or to other students while taking an examination or working on other assignments, unless specifically authorized by the instructor, are defined as acts of cheating.
2. The presentation of words or ideas from any other source as one's own is an act defined as

plagiarism.

3. Other activities that interfere with the educational mission of the University.

For full details of the FAU Honor Code, see University Regulation 4.001 at www.fau.edu/regulations/chapter4/4.001_Honor_Code.pdf.

Students With Disabilities

In compliance with the American Disabilities Act (ADA), students who require special accommodations due to a disability to properly execute coursework must register with the Office for Students with Disabilities (OSD) – in Boca Raton, SU 133 (561-297-3880); in Davie, MOD 1 (954-236-1222); in Jupiter, SR 117 (561-799-8585); or at the Treasure Coast, CO 128 (772-873-3305) – and follow all OSD procedures.

Julie Sivigny

From: David Binninger [binninge@fau.edu]
Sent: Wednesday, March 17, 2010 11:47 AM
To: Julie Sivigny
Cc: Rodney Murphey
Subject: Fwd: Biomedical Science New Course Proposals

Good morning,

I circulated the syllabi for the new courses listed in your e-mail (see below) to the faculty who could make comments. I did not receive any responses that raised questions or noted a significant overlap with any of our graduate courses. Please let me know if you have any questions.

I hope this is helpful and good luck with the remainder of the process toward approval of the courses.

Regards,
David

David M. Binninger, Ph.D.
Associate Professor and Associate Chair
Department of Biological Science
and
Center for Molecular Biology and Biotechnology
Florida Atlantic University
777 Glades Road
Boca Raton, FL 33431 USA
Phone: (561) 297-3323
FAX: (561) 297-2749

Begin forwarded message:

From: Julie Sivigny <jsivigny@fau.edu>
Date: March 15, 2010 1:38:27 PM EDT
To: 'David Binninger' <binninge@fau.edu>
Subject: Biomedical Science New Course Proposals

Dear Dr. Binninger,
Thank you for your assistance with this process. We are submitting a total of 10 new course proposals and 2 changes. All syllabi were forwarded to Dr. Murphey but in multiple batches so if you are missing any please let me know and I'll send to you immediately.

Biomedical Science New Course Proposals:
Host Defense & Inflammation – Dr. Yoshimi Shibata
Molecular Neuropsychopharmacology – Drs. Igor and Tao
Macromolecules and Human Disease – Drs. Brew and Li
Adult Neurogenesis – Dr. Jianning Wei
Molecular Basis of Disease & Therapy – Dr. Caputi

3/17/2010

Tumor Immunology – Dr. Vijaya Iragavarapu
Molecular Genetics of the Cell – Dr. Kantorow
Molecular Basis of Human Cancer – Dr. Lu
Problem-based Immunology – Dr. Nouri-Shirazi
Fundamentals of General Pathology – Dr. Levitt

The integrated morphology courses will be processed as changes. We previously offered two 3-credit courses: Human Gross Anatomy – Trunk and Human Gross Anatomy – Extremities. We are changing these to 4-credit courses with the titles *Integrated Morphology I and II* taught by Drs. Willis Paull, Rainald Shmidt-Kastner and Deborah Cunningham.

The graduate college submission deadline is Wednesday March 17th at noon. I apologize for the lateness of some of these requests and appreciate your effort to assist us.

Please let me know if I can provide any additional information.
Thank you.
Julie

Julie A. Sivigny
Academic Program Specialist
Charles E. Schmidt College of Biomedical Science
Florida Atlantic University
(561) 297-2216

From: David Binninger [<mailto:binninge@fau.edu>]
Sent: Monday, March 15, 2010 11:16 AM
To: Julie Sivigny
Cc: Rodney Murphey; Jay Lyons
Subject: Fwd: Biomedical Science New Course Proposal - Macromolecules & Human Disease

Good morning Julie,

I forwarded the syllabi for the new courses to the appropriate faculty last week. It's my opinion that there will not be any issues or conflicts. So far, I have had only one response and that was that there were no concerns. Please confirm the full list of new courses and when you need a statement from me.

I hope this is helpful and please let me know if you have any questions.

Regards,
David

David M. Binninger, Ph.D.
Associate Professor and Associate Chair
Department of Biological Science
and
Center for Molecular Biology and Biotechnology
Florida Atlantic University
777 Glades Road
Boca Raton, FL 33431 USA
Phone: (561) 297-3323
FAX: (561) 297-2749