

FLORIDA ATLANTIC UNIVERSITY™

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 CATALOG _____

Graduate Programs—NEW COURSE PROPOSAL¹

DEPARTMENT: DEPT. OF BIOLOGICAL SCIENCES

COLLEGE: CHARLES E. SCHMIDT COLLEGE OF SCIENCE

RECOMMENDED COURSE IDENTIFICATION:

PREFIX BSC COURSE NUMBER 5029 LAB CODE (L or C) C

(TO OBTAIN A COURSE NUMBER, CONTACT MJENNING@FAU.EDU)

COMPLETE COURSE TITLE: MOLECULAR GENETICS OF AGING

EFFECTIVE DATE

(first term course will be offered)

 SUMMER 2014

CREDITS²: 3

TEXTBOOK INFORMATION:

RESEARCH PAPERS AND REVIEW ARTICLES, MADE AVAILABLE BY FACULTY IN THE CONTENT FOLDER ON BLACKBOARD

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

COURSE DESCRIPTION, NO MORE THAN THREE LINES:

AN IN-DEPTH EXAMINATION OF CURRENT THEORIES OF AGING, MOLECULAR PATHWAYS MODULATING AGING, AND MAJOR DISCOVERIES ABOUT AGING IN MAMMALS AND IN DIFFERENT MODEL ORGANISMS, INCLUDING YEAST, C. ELEGANS, DROSOPHILA AND MOUSE.

PREREQUISITES*: UNDERGRADUATE DEGREE WITH COMPLETED COURSES IN AND/OR RELATED TO BIOLOGY, GENETICS, BIOCHEMISTRY AND/OR MOLECULAR BIOLOGY.

COREQUISITES*:

REGISTRATION CONTROLS (MAJOR, COLLEGE, LEVEL)*:

* PREREQUISITES, COREQUISITES AND REGISTRATION CONTROLS WILL BE ENFORCED FOR ALL COURSE SECTIONS.

MINIMUM QUALIFICATIONS NEEDED TO TEACH THIS COURSE: GRADUATE LEVEL DEGREE IN RELATED FIELD

Faculty contact, email and complete phone number:
 Dr. Kailiang Jia; kjia@fau.edu; 561-799-8054

Please consult and list departments that might be affected by the new course and attach comments.³

Approved by:

Department Chair: 

College Curriculum Chair: _____

College Dean: _____

UGPC Chair: _____

Graduate College Dean: _____

UFS President: _____

Provost: _____

Date:

 04.01.14

1. Syllabus must be attached; see guidelines for requirements:
www.fau.edu/provost/files/course_syllabus.2011.pdf

2. Review Provost Memorandum: Definition of a Credit Hour
www.fau.edu/provost/files/Definition_Credit_Hour_Memo_2012.pdf

3. Consent from affected departments (attach if necessary)

Email this form and syllabus to UGPC@fau.edu one week before the University Graduate Programs Committee meeting so that materials may be viewed on the UGPC website prior to the meeting.

Molecular Genetics of Aging

Summer 2 Semester, 2014

Course information

Course Title: Molecular Genetics of Aging
Course Number: BSC 5029-001 (3 credits)
Course Date: May 12, 2014 – June 23, 2014, Tuesday and Thursday, 11:00am –12:20pm
Course Location: Boca Campus, Sanson Life Science Building, Rm. 119
Instructor: Kailiang Jia, M.D., Ph.D.
Assistant Professor
Department of Biological Sciences
Sanson Life Science Building, Rm. 261
Email: kjia@fau.edu, Phone: (561) 297-0512
Office hours: Tuesday and Thursday, 1:00pm – 4:00pm or by appointment

Course description

This course is open to graduate and upper level undergraduate students. In this course students will learn current theories of aging, molecular pathways modulating aging, major discoveries of aging in different model organisms including yeast, *C. elegans*, *Drosophila* and mouse, and in mammalian system. Additionally, students will learn how to read and criticize research articles.

Pre-requisite

Background knowledge in molecular biology and genetics. Undergraduate degree with completed courses in and/or related to biology, genetics, chemistry, and/or molecular biology.

Course objectives/student learning outcomes

Students are expected to: gain current knowledge and research methods of aging and learn how to design experiments to address aging-related scientific questions.

Instructional methods

Lectures, paper discussions and student presentations

Required texts/reading

Research papers and review articles, available in the Content folder on Blackboard.

Supplementary/recommended reading

Molecular Biology of Aging (2008). Edited by Leonard P. Guarente, Linda Partridge and Douglas C. Wallace. Cold Spring Harbor Laboratory Press. Cold Spring Harbor, New York

Course topical outline (subject to change depending on course needs)

Please note that weeks progress more quickly during summer (multiple weeks condensed into 1)

- Week 1** (1) Course overview
 (2) Theories of aging

Assigned reading: An integrated theory of ageing in the nematode *Caenorhabditis elegans*

- Week 2** (1) Longevity pathways in *C. elegans*

Assigned reading: The Plasticity of Aging: Insights from Long-Lived Mutants

- (2) Dietary restriction in *C. elegans* – 1

Assigned reading: The genetics of caloric restriction in *Caenorhabditis elegans*

- Week 3** (1) Dietary restriction in *C. elegans* – 2

Assigned reading: PHA-4/Foxa mediates diet-restriction induced longevity of *C. elegans*

- (2) Dietary restriction in *C. elegans* – 3

Assigned reading: Pyruvate imbalance mediates metabolic reprogramming and mimics lifespan extension by dietary restriction in *Caenorhabditis elegans*

- Week 4** (1) Dietary restriction in yeast

Assigned reading: Regulation of Yeast Replicative Life Span by TOR and Sch9 in Response to Nutrients

- (2) Dietary restriction in fly

Assigned reading: Regulation of Lifespan in *Drosophila* by Modulation of Genes in the TOR Signaling Pathway

- Week 5** (1) Dietary restriction in mouse

Assigned reading: (1). Life-Span Extension in Mice by Prewaning Food Restriction and by Methionine Restriction in Middle Age. (2). Rapamycin fed late in life extends lifespan in genetically heterogeneous mice

- (2) Dietary Restriction in mammals

Assigned reading: Caloric Restriction Delays Disease Onset and Mortality in Rhesus Monkeys

- Week 6** (1) Mitochondria activity and aging - *C. elegans* (1)

Assigned reading: Mitochondrial Electron Transport Is a Key Determinant of Life Span in *Caenorhabditis elegans*.

- (2) Mitochondria activity and aging – *C. elegans* (2)

Assigned reading: (1). A mutation in succinate dehydrogenase cytochrome b causes oxidative stress and ageing in nematodes (2). Extension of Life-Span with Superoxide Dismutase/Catalase Mimetics

Week 7 (1) Mitochondria activity and aging – fly

Assigned reading: High-quality life extension by the enzyme peptide methionine sulfoxide reductase

(2) Mitochondria activity and aging – mouse

Assigned reading: Mitochondrial DNA Mutations, Oxidative Stress, and Apoptosis in Mammalian Aging

Week 8 (1) class review

(2) **Mid-term Exam (May 30, 2014)**

Week 9 **Memorial Day, - NO SCHOOL - May 26, 2014**

Week 10 (1) Discovery of the role of IGF signaling pathway in aging

Assigned reading: (1) Interacting genes in nematode dauer larva formation (2). A *C.elegans* mutant that lives twice as long as wild type (3) *daf-2*, an Insulin Receptor-Like Gene That Regulates Longevity and Diapause in *Caenorhabditis elegans*

(2) Target genes of IGF signaling in *C. elegans*

Assigned reading: (1). *daf-16* integrates developmental and environmental inputs to mediate aging in the nematode *Caenorhabditis elegans*. (2). DAF-16 Target Genes That Control *C. elegans* Life-Span and Metabolism

Week 11 (1) IGF signaling in fly

Assigned reading: Extension of Life-Span by Loss of CHICO, a *Drosophila* Insulin Receptor Substrate Protein

(2) IGF signaling in mouse

Assigned reading: Extended Longevity in Mice Lacking the Insulin Receptor in Adipose Tissue

Week 12 (1) NAD-dependent deacetylase (SIRT) in yeast

Assigned reading: Requirement of NAD and SIR2 for Life-Span Extension by Calorie Restriction in *Saccharomyces cerevisiae*

(2) SIRT in *C. elegans*

Assigned reading: Increased dosage of a sir-2 gene extends lifespan in *Caenorhabditis elegans*

Week 13 (1) SIRT in fly

Assigned reading: Sir2 mediates longevity in the fly through a pathway related to calorie restriction

(2) SIRT in mouse

Assigned reading: The sirtuin SIRT6 regulates lifespan in male mice

Week 14 (1) Autophagy and aging

Assigned reading: Longevity pathways converge on autophagy genes to regulate life span in *Caenorhabditis elegans*

(2) Telomere and aging

Assigned reading: Long lifespan in worms with long telomeric DNA

Week 15 (1) Aging research in humans

Assigned reading: Positional Cloning of the Werner's Syndrome Gene

(2) class review

Week 16 (1) An inter-disciplinary theory of aging

(2) **Final Exam (June 20, 2014)**

Week 17 **Final Exam Week (no class)**

Assessment

Two written exams (all)	60%
Discussion participation (all)	15%
Paper presentation (graduate)	15%
Paper review (undergraduate)	15%
Attendance (all)	10%

Assignment of Grades

Percentage	Grade
93 – 100%	A
90 – 92%	A ⁻
87 – 89%	B ⁺
83 – 86%	B
80 – 82%	B ⁻
77 – 79%	C ⁺
73 – 76%	C
70 – 72%	C ⁻
67 – 69%	D ⁺
63 – 66%	D
60 – 62%	D ⁻
59% or less	F

Policy on absences, makeup tests, late work, and incompletes

Absences for which a medical or court excuse is provided (professional letterhead required) will be recorded but not figured in the attendance grade. Likewise, one absence for which advance notice is given by phone or in person will not be figured in the attendance grade. Any significant tardy or early departure from class will be figured as one absence. Three absences will result in grade F. Students will not be penalized for absences due to participation in University-approved activities, including athletic or scholastics teams, musical and theatrical performances, and debate activities. These students will be allowed to make up missed work without any reduction in the student's final course grade.

Also, note that grades of Incomplete ("I") are reserved for students who are passing a course but have not completed all the required work because of exceptional circumstances. A grade of "I" will only be given under certain conditions and in accordance with the academic policies and regulations put forward in FAU's University Catalog. The student must show exceptional circumstances why requirements cannot be met. A request for an incomplete grade has to be made in writing with supporting documentation, where appropriate.

If a student cannot attend an exam or hand in a homework project on time due to circumstances beyond their control then the instructor may assign appropriate make-up work.

Classroom etiquette policy

University policy on the use of electronic devices states: "In order to enhance and maintain a productive atmosphere for education, personal communication devices, such as cellular telephones and pagers, are to be disabled in class sessions."

Disability policy statement

In compliance with the Americans with Disabilities Act (ADA), students who require special accommodation 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.

Religious Accommodations

Students who wish to be excused from course work, class activities or examinations must notify the instructor in advance of their intention to participate in religious observation and request an excused absence.

Honor Code policy statement

Students at Florida Atlantic University are expected to maintain the highest ethical standards. Academic dishonesty, including cheating and plagiarism, 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. Harsh penalties are associated with academic dishonesty. For more information, see University Regulation 4.001 at http://www.fau.edu/ctl/4.001_Code_of_Academic_Integrity.pdf



Charles E. Schmidt College of Science
Department of Biological Sciences
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Boca Raton, FL 33431
tel: 561.297-3320
fax: 561.297-2749

TO: University Graduate Programs Committee (UGPC)
FROM: Rodney Murphey, Ph.D.
Professor and Chair
Department of Biological Sciences
DATE: February 19, 2014
RE: New Course Proposal Consent

To Whom It May Concern:

This note constitutes acknowledgement and consent of the Department of Biological Sciences for the creation of a new course within the department: **BSC 5029 – Molecular Genetics of Aging**.

Best Regards,

A handwritten signature in blue ink, appearing to read 'R. Murphey', is written over a light blue grid background.

Rodney Murphey, Ph.D.
Chairman, Department of Biological Sciences
Director, Life Science Initiative on the MacArthur Campus