

CSAT 6048 Biology of Aging

CSAT 6050 Aging and Longevity Mechanisms (module 1)
CSAT 6049 Molecular and Cellular Mechanisms of Aging (module 2)

Spring 2021

CLASS DAYS and TIME: Mondays and Wednesdays 10:00 AM - 11:50 AM

CSAT 6048 Biology of Aging January 13 to May 17, 2021

CSAT 6050 Aging and Longevity Mechanisms January 13 to March 22, 2021

CSAT 6049 Molecular and Cellular Mechanisms of Aging March 24 to May 17, 2021

CLASSROOM: online

COURSE FACULTY: Course Director: Dr. Pamela Larsen larsenp@uthscsa.edu, Course Co-Directors: Drs. James Nelson nelsonj@uthscsa.edu (CSAT 6050) and Qitao Ran ran@uthscsa.edu (CSAT-6049)

OFFICE HOURS: Ad hoc - please schedule by email. We are happy to meet with you and individual scheduling allows us to be efficient with your time and ours (no waiting or missed drop-ins).

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READ THIS DOCUMENT CAREFULLY - YOU ARE RESPONSIBLE FOR ITS CONTENTS.

COURSE DESCRIPTION AND OBJECTIVES

Biology of Aging is the core course of the Biology of Aging Track. The course consists of two parts: "Aging and Longevity Mechanisms" and "Molecular and Cellular Mechanisms of Aging". The purpose of this course is to provide students with the most up-to-date information on our understanding of the aging process. This advanced interdisciplinary graduate course provides experimental understanding of the interrelated areas of aging and age-related diseases. Faculty from several departments with broad expertise in Geroscience (the study of biological aging) will cover the molecular, cellular and physiological biology of aging, human aging and model systems used for aging studies, age-related changes in organs and tissues, and age-related diseases.

Pre-requisites – None

Semester credit hours – 4 credit hours awarded for successful completion of the course

By the end of this course, each student should be able to:

- Describe fundamental aging processes that occur at the molecular, cellular, and physiological levels.
- Critically read and interpret published biology of aging research.
- Demonstrate skill in experimental design and analysis, including pros and cons of use of animal model systems to gain knowledge and issues particular to aging research.
- Develop hypotheses and design experimental approaches to test the emerging hypotheses.

COURSE ORGANIZATION

This course is composed of two parts. Part 1 is Aging and Longevity Mechanisms. Part 2 is Molecular and Cellular Mechanisms of Aging. The course structure for both parts is same. Each half will focus on 4 topics that will provide the student with generalizable concepts about knowledge and research on aging and age-related diseases. Each topic will be the subject of study for four sequential class sessions.

The first session on a topic, held on a Wednesday, will be in an interactive lecture format and there will be assigned foundation reading comprised of research publications, reviews or book chapters. The 2nd session, held on the following Monday, will focus on an impactful research publication related to the topic. This publication, termed “springboard paper”, will be the foundation for the remaining 3 sessions of the topic.

In preparation for the 2nd session, each student will complete homework for an assigned springboard research paper. Students will be expected to have read and understood the paper and be prepared to discuss it. The approach will be similar to the paper discussions in the IBMS 5000 course. The homework will be a series of questions to guide critical review of the springboard paper. The independent study homework (i.e. answers to specific questions about the paper) will have a deadline for electronic submission via Canvas.

In addition, and different from the IBMS 5000 course, students will be expected to come to the 2nd session with one or more significant questions springing to mind from reading the paper. These questions should be experimentally answerable and serve as the basis for developing a mini-proposal, which will be presented in the 3rd session on the following Wednesday. Science often advances from novel findings and unexpected outcomes that “spring” from reading the literature. Students are expected to come to the 2nd session prepared to discuss their ideas and work with the faculty and their peers to begin to formulate a testable hypothesis which they will then develop into a proposal.

At the third session, termed “Initial Aims” on the schedule, students will present their proposal orally, using a powerpoint format. Using the presentation template provided, each student will present his or her hypothesis and how to experimentally test it. Then the faculty will moderate a student discussion and selection of one specific aim, or some variation thereof. The goal of this 3rd session is for each student to get feedback from faculty and peers that will enable them to refine their proposal. This powerpoint proposal have a deadline for electronic submission via Canvas (usually by 10 pm on the night before the 3rd session).

During the 4th and last session, termed “Developed Aim” on the schedule, each student will orally present their refined proposal. The Developed Aim will have a deadline for electronic submission via Canvas (usually by 10 pm on the night before the 4th session). At the Developed Aim class session of a topic, students will each present their hypothesis, aim and key experiments. The faculty and students will critically evaluate the students’ work.

Materials – PDFs of research publications, reviews or book chapters.

Computer Access – Computer to access university email and Canvas course management webpage.

Reading Assignments – To be provided via Canvas and/or email as PDFs of research publications, reviews or book chapters.

ATTENDANCE

Attendance at each class session for the entire class period is required. Deduction of 20 points will occur for any unexcused absence, as determined by the course directors, for initial aims or developed aims class sessions. Partial absence will lead to a deduction of 5-15 points for that class session.

TEXTBOOKS

Required or Recommended: None

GRADING POLICIES AND EXAMINATION PROCEDURES

For each topic, three items will be graded: written springboard paper critic, initial Aims and Developed Aim. The templates for the paper critic and the aims presentations will be provided on Canvas. Discussion for the springboard paper and feedback to classmates' presentations will be incorporated into the score for initial aims and developed aim class sessions. The quality of the hypothesis and aim(s) will be scored by faculty. Note, incorporation of feedback provided by others into the developed aim will be necessary to obtain the highest possible score.

On time submission of springboard paper critic, initial aims and developed aim assignments is required. Late submission will result in 5 points deduction for each occurrence. Unexcused absence, as determined by the course directors, for initial aims or developed aims class sessions will result in deduction of 20 points from the score for that class session. Partial unexcused absence will lead to a deduction of 5-15 points for that class session, as determined by the course directors.

Grading System

For graded items, the student's individual score from a possible 100 points will be displayed on Canvas. For calculation of the final course score, the weighting of the graded items will be: 10% written springboard paper critics, 30% initial aims sessions and 60% developed aim sessions. Equal weight will be given to each of the eight topics. The conversion of the final score to a letter grade will be:

- A for 90 to 100 points
- B for 80 to 89.9 points
- C for 70 to 79.9 points
- D for 60 to 69.9 points
- F for 59.9 or less points

The final letter grade for the course may be based on a curve.

REQUESTS FOR ACCOMODATIONS FOR DISABILITIES

In accordance with policy 4.2.3, **Request for Accommodation Under the ADA and the ADA Amendments Act of 2008 (ADAAA)**, any student requesting accommodation must submit the appropriate request for accommodation under the American with Disabilities Act (ADA, form 100). to his/her appropriate Associate Dean of their School and a copy to the ADA Coordinator. Additional information may be obtained at <http://uthscsa.edu/eo/request.asp>.

ACADEMIC INTEGRITY AND PROFESSIONALISM

Any student who commits an act of academic dishonesty is subject to discipline as prescribed by the UT System Rules and Regulations of the Board of Regents. Academic dishonesty includes, but is not limited to, cheating, plagiarism, collusion, the submission for credit of any work or materials that are attributable in whole or in part to another person, taking an exam for another person, signing attendance sheets for another student, and any act designed to give unfair advantage to a student or the attempt to commit such an act. Additional information may be obtained at

TITLE IX AT UTHSCSA

Title IX Defined:

Title of the Education Amendments of 1972 is a federal law that prohibits sex discrimination in education. It reads “no person in the United States shall, on the basis of sex, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any education program or activity receiving Federal financial assistance.”

University of Texas Health Science Center San Antonio’s Commitment:

University of Texas Health Science Center San Antonio (UTHSCSA) is committed to maintaining a learning environment that is free from discriminatory conduct based on gender. As required by Title IX, UTHSCSA does not discriminate on the basis of sex in its education programs and activities, and it encourages any student, faculty, or staff member who thinks that he or she has been subjected to sex discrimination, sexual harassment (including sexual violence) or sexual misconduct to immediately report the incident to the Title IX Director.

In an emergency, victims of sexual abuse should call 911. For non-emergencies, they may contact UPD at 210-567-2800. Additional information may be obtained at <http://students.uthscsa.edu/titleix/>

EMAIL POLICY

Email to your livemail.uthscsa.edu account will be the official means of communications regarding changes to items such as the schedule, a room number, an error in the materials, etc. Please maintain sufficient space in your mail box to receive any such notices. Course faculty will not attempt other means to provide you with a notice if they receive a course notice because “an exceeded email limit”.

USE OF RECORDING DEVICES

Recording during class sessions is not allowed, unless prior approval is obtained by the instructors or approval is agreed upon in compliance with ADA (see above under accommodations).

ELECTRONIC DEVICES

Use of laptops or tablets is allowed during class for Biology of Aging course content only. Please do not engage in use of social media, play games, surf the web or shop during class. This reduces your learning during class and may reduce that of other students as well. Furthermore, use of cell phones or smartphones for conversations or texting during lecture or lab is strictly prohibited. You need to silence your phones or turn them off during lecture and lab sessions. Any student in violation of this policy maybe excused from the learning environment and marked absent for the day, if disruption of learning occurs.

CSAT 6048 Biology of Aging Spring 2021 Schedule

MODULE 1: *Aging and Longevity Mechanisms (CSAT 6050, 2 semester credit hours)*, Mondays and Wednesdays 10:00 – 11:50 AM from January 13 to March 22, 2021 Course Director: Dr. James Nelson

Date	Day	Room	Activity	Topic	Topic Instructors
Jan 13	Wed		Class Orientation		Drs. Larsen, Nelson, Ran
<i>Jan 18</i>	<i>Mon</i>		<i>MLK Holiday</i>		
Jan 20	Wed		Lecture	Human Aging and Frailty	Drs. Sara Espinoza, Monica Serra, James Nelson and Pamela Larsen
Jan 25	Mon		Springboard Paper		
Jan 27	Wed		Initial Aims		
Feb 1	Mon		Developed Aim		
Feb 3	Wed		Lecture	Elucidation of Mechanisms of Aging	Drs. Randy Strong, James Nelson and Pamela Larsen
Feb 8	Mon		Springboard Paper		
Feb 10	Wed		Initial Aims		
Feb 15	Mon		Developed Aim		
Feb 17	Wed		Lecture	Cellular Senescence and Stem Cells in Aging	Drs. Erzse Kokovay, Peter Hornsby, Marcel Daadi and James Nelson
Feb 22	Mon		Springboard Paper		
Feb 24	Wed		Initial Aims		
March 1	Mon		Developed Aim		
March 3	Wed		Lecture	Neurobiology of Aging	Drs. Veronica Galvan, Naomi Sayre and James Nelson
<i>Mar 8 & 10</i>			<i>Spring Break</i>		
March 15	Mon		Springboard Paper		
March 17	Wed		Initial Aims		
March 22	Mon		Developed Aim		

MODULE 2: *Molecular and Cellular Mechanisms of Aging (CSAT 6049, 2 semester credit hours)*, Mondays and Wednesdays 10:00 – 11:50 AM from March 24 to May 17, 2021 Course Director: Dr. Qitao Ran

Date	Day	Room	Activity	Topic	Topic Instructors
March 24	Wed		Lecture	Oxidative Stress and Mitochondrial dysfunction and Proteostasis	Drs. Qitao Ran and Karl Rodriguez
March 29	Mon		Springboard Paper		
March 31	Wed		Initial Aims		
April 5	Mon		Developed Aim	Inflammaging	Drs. Ellen Kraig and Ann Griffith
April 7	Wed		Lecture		
April 12	Mon		Springboard Paper		
April 14	Wed		Initial Aims		
April 19	Mon		Developed Aim	DNA Damage and Repair	Drs. Paul Hasty and Alex Bishop
April 21	Wed		Lecture		
April 26	Mon		Springboard Paper		
April 28	Wed		Initial Aims		
May 3	Mon		Developed Aim	Nutrient Sensing and Signaling in Aging	Drs. Adam Salmon and TBD
May 5	Wed		Lecture		
May 10	Mon		Springboard Paper		
May 12	Wed		Initial Aims		
May 17	Mon		Developed Aim		