



## NTP 670 Neural stem cells

**Credits:** 3.0

**Canvas Course URL**

**Course Designations and Attributes ([guide.wisc.edu](http://guide.wisc.edu))**

Breadth – Biological Sci Counts toward the Natural Sci req

Level – Advanced

L&S Credit – Counts as Liberal Arts and Science credit in L&S

Grad 50% - Counts toward 50% graduate coursework requirement

**Meeting Time and Location**

Tuesdays and Thursdays from 1:30-2:45pm in HSLC room 1248

**Instructional Mode**

All face-to-face

**Specify how Credit Hours are met by the Course**

This class meets for two 75-minute class periods each week over the fall semester and carries the expectation that students will work on course learning activities (reading, writing, studying, etc.) for 3 hours out of the classroom for every class period. The syllabus includes more information about meeting times and expectations for student work.

### INSTRUCTORS AND TEACHING ASSISTANTS

**Director: Darcie L. Moore, Ph.D. ([darcie.moore@wisc.edu](mailto:darcie.moore@wisc.edu))**

**Co-Director: Xinyu Zhao, Ph.D. ([xinyu.zhao@wisc.edu](mailto:xinyu.zhao@wisc.edu))**

*Office hours are available by request.*

### OFFICIAL COURSE DESCRIPTION

#### Course Description

Among the topics that will be included in the course are: neural stem cells in embryonic development, adulthood and aging, neural stem cells derived from reprogramming or directed differentiation, neural stem cells in both central and peripheral nervous systems, regulation of neural stem cells, transplantation of embryonic and adult neural stem cells to the developing and adult CNS for experimental and therapeutic purposes, and the use of neural stem cells for disease modeling and drug development, as well as state-of-art methods, including gene editing for studying neural stem cells. The goal of this course is to introduce the concept, updated research, and therapeutic potentials of neural stem cells to graduate students and advanced senior undergraduate students.

#### Requisites

Biological sciences graduate student, or for undergraduates with senior standing that have taken basic Biochemistry, Biology, Genetics and Chemistry.

## LEARNING OUTCOMES

### Course Learning Outcomes

Students will:

- Understand how neural stem cells function during development and in the adult, and the regulation of these processes
- Understand how neural stem cells can be obtained from reprogramming and can be differentiated into different types of cells, and methods and concerns for their use in modeling disease
- Retrieve, evaluate, and interpret literature related to their scientific question
- Participate and discuss strengths and weaknesses of literature
- Identify, formulate and solve problems using appropriate information and approaches
- Propose original research and develop ability to write Specific Aims page
- Communicate effectively through written reports, oral presentations, and discussion

## SCHEDULE

<u>Tuesday</u>	<u>Thursday</u>	<u>Lecturer</u>
	<b>Sept 6</b> Introduction, Terminology, Group and paper assignments	D. Moore
<b>Sept 11</b> NSCs in Embryonic Development I	<b>Sept 13</b> Paper	X. Zhao
<b>Sept 18</b> NSCs in Embryonic Development II: Retina	<b>Sept 20</b> Paper	T. Gomez
<b>Sept 25</b> NSCs in Embryonic Development III	<b>Sept 27</b> Paper	Z. Huang
<b>Oct 2</b> NSCs in Embryonic Development IV	<b>Oct 4</b> Paper	A. Bhattacharyya
<b>Oct 9</b> NSCs in Adult I	<b>Oct 11</b> Paper	D. Moore
<b>Oct 16</b> NSCs in Adult II	<b>Oct 18</b> Paper	D. Moore
<b>Oct 23</b> NSCs in Adult III	<b>Oct 25</b> NSCs in Adult IV	D. Moore
<b>Oct 30</b> Paper	<b>Nov 1</b> Paper – <b>Submit outlines</b>	D. Moore
<b>Nov 6</b> <b><u>NO CLASS – SFN</u></b>	<b>Nov 8</b> NSCs from reprogramming	A. Bhattacharyya
<b>Nov 13</b> Paper	<b>Nov 15</b> NSC disease modeling and therapies I	A. Bhattacharyya (paper) X. Zhao (lecture)
<b>Nov 20</b> Paper	<b>Nov 24</b> <b><u>THANKSGIVING RECESS</u></b>	X. Zhao
<b>Nov 27</b> NSC disease modeling and therapies II	<b>Nov 29</b> Paper	M. Emborg
<b>Dec 4</b> NSC disease modeling and therapies III	<b>Dec 6</b> Paper	X. Zhao
<b>Dec 11</b> <b>Proposal Presentations</b>	<b>Exam date</b> <b>Proposal Presentations</b>	X. Zhao D. Moore

## GRADING AND ASSIGNMENTS

- **Weekly questions** – Each week, students will be given 2 questions to answer on Tuesday following the faculty lecture. Students will upload their answers to Canvas for grading by that Sunday night before midnight. Late assignments will have 20% taken off for each day it is late.

- **Paper presentations** - Each week, one of the classes will be devoted to presenting and discussing a paper related to the scientific topic for that week. Two students will be assigned each paper – one will present and defend the paper, and the other will moderate the questions and identify limitations. This may be changed based on enrollment. Participation in this process is crucial, and will be graded.
- **Group project and presentation** – Students are put into groups during the first class, and they are given a scientific question. Each group will create a Specific Aims page outlining experiments that could be performed to address that particular question. An outline will be submitted as a midterm. At the end of the course, as part of their final grade, students will submit the final Specific Aims page, and make a presentation including background and discussing how the proposed experiments will address their assigned scientific question.

**Participation** – 20%

**Paper Presentation** – 20%

**Group project** – 30%

**Weekly questions (12)** – 30%

Grades will be given using the traditional A, AB, B, etc. grading system

## **ACADEMIC INTEGRITY**

By enrolling in this course, each student assumes the responsibilities of an active participant in UW-Madison's community of scholars in which everyone's academic work and behavior are held to the highest academic integrity standards. Academic misconduct compromises the integrity of the university. Cheating, fabrication, plagiarism, unauthorized collaboration, and helping others commit these acts are examples of academic misconduct, which can result in disciplinary action. This includes but is not limited to failure on the assignment/course, disciplinary probation, or suspension. Substantial or repeated cases of misconduct will be forwarded to the Office of Student Conduct & Community Standards for additional review.

## **ACCOMMODATIONS FOR STUDENTS WITH DISABILITIES**

**McBurney Disability Resource Center syllabus statement:** "The University of Wisconsin-Madison supports the right of all enrolled students to a full and equal educational opportunity. The Americans with Disabilities Act (ADA), Wisconsin State Statute (36.12), and UW-Madison policy (Faculty Document 1071) require that students with disabilities be reasonably accommodated in instruction and campus life. Reasonable accommodations for students with disabilities is a shared faculty and student responsibility. Students are expected to inform me of their need for instructional accommodations by the end of the third week of the semester, or as soon as possible after a disability has been incurred or recognized. I will work either directly with you or in coordination with the McBurney Center to identify and provide reasonable instructional accommodations. Disability information, including instructional accommodations as part of a student's educational record, is confidential and protected under FERPA."

## **DIVERSITY & INCLUSION**

**Institutional statement on diversity:** "Diversity is a source of strength, creativity, and innovation for UW-Madison. We value the contributions of each person and respect the profound ways their identity, culture, background, experience, status, abilities, and opinion enrich the university community. We commit ourselves to the pursuit of excellence in teaching, research, outreach, and diversity as inextricably linked goals."

The University of Wisconsin-Madison fulfills its public mission by creating a welcoming and inclusive community for people from every background – people who as students, faculty, and staff serve Wisconsin and the world."