

LAS 103D Section 1 – Course Schedule

Frontiers of the Discipline

Stem Cells and Cellular Engineering:

Biomedical Applications, Politics and Ethics

Monday, 4:10-5:00 PM - Room 115 Science II

INSTRUCTOR: Don Sakaguchi, room 505 Science II ext. 4-3112

OFFICE HOURS: by appointment (dssakagu@iastate.edu)

Reading Materials: Handouts, Reference books/readings, web-based resources

Grading: S/F, based on class participation

Date	Topic	Reading/Preparation
Jan. 13	Introduction, survey and discussion. Make sure Top Hat is operating correctly.	
Jan. 20	No class – University holiday	
Jan. 27	General introduction to stem cell biology	StemCellBasics.pdf
Feb. 3	Research in the Sakaguchi Lab – Stem Cells and Cellular Engineering	
Feb. 10	Tour of a stem cell research lab – The Sakaguchi Lab at ISU	
Feb. 17	Isolation and characterization of embryonic stem cells	StemCellBasics.pdf
Feb. 24	Isolation and characterization of adult (non-embryonic/somatic) stem cells	StemCellBasics.pdf
Mar. 2	Multipotent mesenchymal stem cells (MSCs)	StemCellBasics.pdf
Mar. 9	Dinner and a Movie: “Mapping Stem Cell Research-Terra Incognita”	Please note: This video is ~90 min. long
Mar. 16	No class - Spring break	
Mar. 23	Bioethical issues associated with the use of stem cells in biomedicine	
Mar.30	Bioethics - 2	Handout
Apr. 6	Political policies and how they impact and influence the use of stem cells in biomedicine in the US and abroad	
Apr. 13	Political policies – Part 2 Discussion of Controversial Topics	
Apr. 20	Discussion of Controversial Topics	
Apr. 27	Discussion of Controversial Topics Class evaluation & survey	
May 4	No class (finals week)	

Canvas will be used to post class materials. To access Canvas, go to the Iowa State Homepage (<http://www.iastate.edu>), and click on Sign Ons and select Canvas. To login, enter your NET ID (that part of your ISU e-mail address before @) and your password. Click on “LAS 103D – Stem Cells and Cellular Engineering, Spring 2020”.

Attendance, class participation and grading:

Students are expected to attend class and to participate in class discussions. Interactive discussion will make the class more interesting and greatly enhance the learning process. If you have a legitimate conflict (scheduled hospitalization, ISU-sponsored sports event, educational trip, etc.) **you must make arrangements prior to the class.**

Grading for this course is S/F. *The best way to receive an “F” for a grade is to not attend class, not submit your Weekly Current Affairs, and not participate in class discussions.*

Weekly Assignments:

Current Affairs – stem cells

Each week you are expected to submit a brief report of events relevant to stem cells - biology, bioengineering, biomedical, politics or ethics.

Assignment is due: each Sunday by 8:00 PM, the day before class.

Submit through Canvas (Assignments)

Please use the following format and provide the requested information in the **body of your submission**:

WEEKLY CURRENT AFFAIRS

Your name:

Title:

Brief description/synopsis/abstract (in your own words):

Significance:

Reference to the source of the information:

Each week the course instructor will select 3-4 of the Current Affairs submissions to share with the class. Be prepared to share this information with the rest of the class.

Here is an example:

Name: Sarah Student (**your name**)

Title: “3D microfibrinous scaffolds selectively promotes proliferation & glial differentiation of adult NSCs”

Abstract: Researchers in the US have developed a novel method to influence neural stem cell differentiation. There is considerable interest in biomaterials-based scaffolds because there is growing evidence that they can be used to influence stem cell differentiation. In this article, the investigators used a novel microfluidics approach to fabricate PCL microfibers with different diameters and topographies. They used these microfibrinous scaffolds to grow multipotent adult hippocampal progenitor cells. They found that the microfibers significantly enhanced cell proliferation compared to standard 2D planar surfaces that are often used to grow cells in a lab. Furthermore, they discovered a significant increase in astrocyte differentiation for cells growing on the microfibers.

Significance: This study has the potential to develop more advanced cell transplant strategies to treat a variety of disorders and injuries. The use of microfibrinous scaffolds may provide important biological and topographic cues that may serve to regulate cell survival and differentiation of transplanted cells. Generally speaking, this research can indirectly

help regenerative medicine.

Reference: Neural Cell News. "Interesting research hailing from [@IowaStateU](#) this week; 3D microfibrinous scaffolds selectively promotes proliferation & glial differentiation of adult NSCs: A platform to tune cellular behavior in neural." Neural Cell News, 2 Dec 2019. <<https://twitter.com/NeuralCell/status/1069362958369730560>>.

Macromolecular Bioscience, Volume 19, Issue 2 (available online, not yet assigned an issue).
3D Microfibrinous Scaffolds Selectively Promotes Proliferation and Glial Differentiation of Adult Neural Stem Cells: A Platform to Tune Cellular Behavior in Neural Tissue Engineering
Bhavika B. Patel, Farrokh Sharifi, Daniel P. Stroud, Reza Montazami, Nicole N. Hashemi, Donald S. Sakaguchi
First published: 27 November 2018
Print Feb 2019
<https://doi.org/10.1002/mabi.201800236>

Top Hat (www.tophat.com):

In class surveys and activities: This course will use the Top Hat (www.tophat.com) classroom response system during class. You will be able to submit answers to in-class questions/surveys using smartphones, tablets, laptops, or through text messaging. You can visit the Top Hat Overview (support.tophat.com/hc/en-us/articles/200019034-Top-Hat-Overview-Getting-Started) within the Top Hat Success Center which outlines how you can register for a Top Hat account, as well as provides a brief overview to get you up and running with the system. An email invitation to join your Top Hat space will be sent to you by your instructor, but if you don't receive it, you can still create your student account at tophat.com. I suspect that everyone in class has already been using Top Hat. As such, you should have already purchased a Top Hat license from the ISU Book Store or online in order to access any quizzes or questions your other instructors have implemented in the Top Hat system. Should you require assistance with Top Hat at any time please contact the IT Solution Center at 515-294-4000 or solution@iastate.edu.

LAS 103D - Spring 2020

Join Code: **584581**

STUDENT LEARNING OUTCOMES / COURSE GOALS:

Stem Cells and Cellular Engineering: Biomedical Applications, Politics and Ethics is developed around two central learning goals:

- Upon completion of this course students will achieve fundamental understanding of the characteristics of stem cells, their microenvironment, and their therapeutic potential based upon scientific research;
- Upon completion of this course students should be able to share an understanding of science as a human endeavor and the interactions between science and society, with a focus on ethics and policies related to stem cell research.

Additional Information

In our classes, we will practice the ISU Principles of Community. Our goals are to create a classroom environment that fosters learning, embraces diversity, demonstrates respect for others, and is free of discrimination.

ISU Principles of Community (<http://www.diversity.iastate.edu/principles-of-community>)

Respect: We seek to foster an open-minded understanding among individuals, organizations and groups. We support this understanding through outreach, increasing opportunities for collaboration, formal education programs and strategies for resolving disagreement.

Purpose: We are encouraged to be engaged in the university community. Thus, we strive to build a genuine community that promotes the advancement of knowledge, cooperation and leadership.

Cooperation: We recognize that the mission of the university is enhanced when we work together to achieve the goals of the university. Therefore, we value each member of the Iowa State University community for his or her insights and efforts, collective and individual, to enhance the quality of campus life.

Richness of Diversity: We recognize and cherish the richness of diversity in our university experience. Furthermore, we strive to increase the diversity of ideas, cultures and experiences throughout the university community.

Freedom from discrimination: We recognize that we must strive to overcome historical and divisive biases in our society. Therefore, we commit ourselves to create and maintain a community in which all students, staff, faculty and administrators can work together in an atmosphere free from discrimination, and to respond appropriately to all acts of discrimination.

Honest and respectful expression of ideas: We affirm the right to and the importance of a free exchange of ideas at Iowa State University within the bounds of courtesy, sensitivity and respect. We work together to promote awareness of various ideas through education and constructive strategies to consider and engage in honest disagreements.

Academic Dishonesty

The class will follow Iowa State University's policy on academic dishonesty. Anyone suspected of academic dishonesty will be reported to the Dean of Students Office.

Accessibility Statement

Iowa State University is committed to assuring that all educational activities are free from discrimination and harassment based on disability status. Students requesting accommodations for a documented disability are required to work directly with staff in Student Accessibility Services (SAS) to establish eligibility and learn about related processes before accommodations will be identified. After eligibility is established, SAS staff will create and issue a Notification Letter for each course listing approved reasonable accommodations. This document will be made available to the student and instructor either electronically or in hard-copy every semester. Students and instructors are encouraged to review contents of the Notification Letters as early in the semester as possible to identify a specific, timely plan to deliver/receive the indicated accommodations. Reasonable accommodations are not retroactive in nature and are not intended to be an unfair advantage. Additional information or assistance is available online at www.sas.dso.iastate.edu, by contacting SAS staff by email at accessibility@iastate.edu, or by

calling 515-294-7220. Student Accessibility Services is a unit in the Dean of Students Office located at 1076 Student Services Building.

Dead Week

This class follows the Iowa State University Dead Week policy as noted in section 10.6.4 of the Faculty Handbook.

Discrimination and Harassment

Iowa State University does not discriminate on the basis of race, color, age, ethnicity, religion, national origin, pregnancy, sexual orientation, gender identity, genetic information, sex, marital status, disability, or status as a U.S. Veteran. Inquiries regarding non-discrimination policies may be directed to Office of Equal Opportunity, 3410 Beardshear Hall, 515 Morrill Road, Ames, Iowa 50011, Tel. 515-294-7612, Hotline 515-294-1222, email eooffice@iastate.edu

Religious Accommodation

Iowa State University welcomes diversity of religious beliefs and practices, recognizing the contributions differing experiences and viewpoints can bring to the community. There may be times when an academic requirement conflicts with religious observances and practices. If that happens, students may request the reasonable accommodation for religious practices. In all cases, you must put your request in writing. The instructor will review the situation in an effort to provide a reasonable accommodation when possible to do so without fundamentally altering a course. For students, you should first discuss the conflict and your requested accommodation with your professor at the earliest possible time. You or your instructor may also seek assistance from the Dean of Students Office at 515-294-1020 or the Office of Equal Opportunity at 515-294-7612.

Contact Information

If you are experiencing, or have experienced, a problem with any of the above issues, email academicissues@iastate.edu