

ZOO4926 - Stem Cell Biology

Special Topics in Zoology ZOO4926 Class Number 17507

Stem Cell Biology

Location: **Bartram Hall, Biology Department rm 211**

Days: **Mondays, Wednesdays, Fridays Period 8 – 3.00pm – 3.50pm**

Instructors: Dr Malcolm Maden, email malcmaden@ufl.edu, rm 326 Bartram Hall

Dr Edward Scott, email escott@ufl.edu

Course description

The course will cover all aspects of stem cells primarily from a biological viewpoint – what are they, where do they come from during development, why are they there, where are they found, how are they regulated, what happens if they become mis-regulated, what is their role in the normal organism, what is their role in regeneration and not just considering them in mammals, but across the Metazoa. We will, towards the end of the course, examine how and why stem cells are used for medical treatments and how they have been exploited for commercial gain. In each week there will be two lectures (Monday and Wednesday) on these subjects and in the third session each week (Friday) students will make presentations about a scientific publication they have read on the subject of the week or they will present information that has been featured that week in the popular and scientific news.

Lectures will be given by the instructors and guest speakers as detailed in the lecture schedule.

Course objectives

The objective of this course is to give students a thorough understanding of the basic biology of stem cells across the animal kingdom and in the different systems of the body so that their medical relevance and potential role can be better understood. To do this we will consider development, regeneration, aging, the systems of the body: brain, blood, gut, muscle, epidermis, heart, germ line, adipose tissue and cancer.

There is no textbook for the course as all the information is taken from recent scientific publications in the primary literature and will be posted on the canvas course site. Several excellent sources of information for this course are freely available on-line at NIH regenerative medicine (2006), the Harvard Stem Cell Institute Stembook (www.stembook.org [Links to an external site.](#)) and a recent 'Outlook' in Nature on 'Stem Cells' (Nature 597, 30th September 2021, S5-S26) describes their future potential in development and medicine.

Lecture Schedule

WEEK DATE TOPIC/LECTURER

SECTION 1 – THE BIOLOGY OF STEM CELLS

1	Mon Jan 9 th	Introduction I – MM
	Wed Jan 11 th	ES cells – ES
	Fri Jan 13 th	Presentations
2	Mon Jan 16 th	HOLIDAY
	Wed Jan 18 th	IPS cells
	Fri Jan 20 th	Presentations
3	Mon Jan 23 rd	Neural stem cells – BR
	Wed Jan 25 th	Neural stem cells – BR
	Fri Jan 27 th	Presentations
4	Mon Jan 30 th	Hydra and stem cells – CS
	Wed Feb 1 st	Planarians and stem cells – MM
	Fri Feb 3 rd	Presentations
5	Mon Feb 6 th	Stem cells and regeneration of teeth - GF
	Wed Feb 8 th	Limb regeneration in salamanders, are stem cells involved? – MM

	Fri Feb 10 th	Presentations
6	Mon Feb 13 th	Regeneration in mammals, liver - MM
	Wed Feb 15 th	EXAM 1 (in class)
	Fri Feb 17 th	Discussions/presentations

SECTION 2 – STEM CELLS IN MAMMALS

7	Mon Feb 20 th	Haematopoetic stem cells I – ES
	Wed Feb 22 nd	Haematopoetic stem cells II – ES
	Fri Feb 24 th	Discussions/presentations
8	Mon Feb 27 th	Epidermal stem cells - MM
	Wed March 1 st	Mesenchymal stem cells - ES
	Fri March 3 rd	Discussions/presentations
9	Mon March 6 th	Muscle stem cells – DK
	Wed March 8 th	Primary cilia in adult stem cells - DK
	Fri March 10 th	Discussions/presentations
10	Mon March 13 th	SPRING BREAK
	Wed March 15 th	SPRING BREAK

	Fri March 17 th	SPRING BREAK
11	Mon March 20 th	Adipose derived stem cells - KM
	Wed March 22 nd	Oocyte stem cells - MM
	Fri March 24 th	Discussions/presentations

SECTION 3 - MEDICINE AND STEM CELLS

12	Mon March 27 th	EXAM II (in class)
	Wed March 29 th	Organoids and humans - MM
	Fri March 31 st	Discussions/presentations
13	Mon April 3 rd	Cancer stem cells I - DO
	Wed April 5 th	Cancer stem cells II - DO
	Fri April 7 th	Discussions/presentations
14	Mon April 10 th	Breast cancer and stem cells - ES
	Wed April 12 th	Colon cancer and colitis - ES
	Fri April 14 th	Discussions/presentations
15	Mon April 17 th	Stem cell therapy for scoliosis - NM
	Wed April 19 th	Companies - ES

	Fri April 21 st	Discussions/presentations
16	Mon April 24 th	Group assignment
	Wed April 26 th	EXAM III (in class)
	Fri April 28 th	Reading day

MM = Dr Malcolm Maden (Biology) - malcmaden@ufl.edu

ES = Dr Edward Scott (Molecular Genetics & Microbiology) – edscott@ufl.edu

CS = Dr Christine Schnitzler (Whitney Laboratory)
– christine.schnitzler@whitney.ufl.edu

GF = Dr Gareth Fraser (Biology) - g.fraser@ufl.edu

BR = Dr Brent Reynolds (McKnight Brain Institute)
– brent.reynolds@neurosurgery.ufl.edu

DK = Dr Daniel Kopinke (Pharmacology & Therapeutics) [dkopinke @ufl.edu](mailto:dkopinke@ufl.edu)

NM = Dr Nadja Makki (Anatomy & Cell Biology) – nadja.makki@ufl.edu

KM = Dr Keith March (UF Center for Regenerative Medicine)
– Keith.March@medicine.ufl.edu

DO = Dr David Oppenheimer (Biology) – oppenhe@ufl.edu

Office hours

Office hours will take place weekly from 3.50 to 4.50 (after the scheduled lecture) on Wednesdays in Bartram rm326. If this timing is not suitable other times will be accommodated by arrangement.

Attendance and evaluation

Consistent and punctual attendance to all parts of the course is expected and required and a component of the marks is specifically laid aside for this. Excused absences require appropriate documentation. There will be 3 exams during the course which will

consist of short answer questions to be answered during a class period. The presentations and exercises will be graded and there will be an essay to be completed by the end of the semester. These three components will be scored as follows: SAQ exams 120 each, presentations 100, essay 100, attendance 20, total 600.

The final grade will follow the scheme of A = 100-90, B = 90-80, C = 80-70, D = 70-60.

Students Requiring Accommodations. Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the disability Resource Center by visiting <https://disability.ufl.edu/students/get-started/>. It is important for students to share their accommodation letter with their instructor and discuss their access needs, as early as possible in the semester.

Course Evaluation. Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at gatorevals.ua.ufl.edu/students/. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via ufl.bluera.com/ufl/. Summaries of course evaluation results are available to students at gatorevals.ua.ufl.edu/public-results/.

Class Demeanor. Students are expected to arrive to class on time and behave in a manner that is respectful to the instructor and to fellow students. Please avoid the use of cell phones and restrict eating to outside of the classroom. Opinions held by other students should be respected in discussion, and conversations that do not contribute to the discussion should be held at minimum, if at all. Consistent and punctual attendance to all parts of the course is expected and required and a component of the marks is specifically laid aside for this.

University Honesty Policy. UF students are bound by The Honor Pledge which states, "We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: "On my honor, I have neither given nor received unauthorized aid in doing this assignment." The Honor Code (<https://www.dso.ufl.edu/sccr/process/student-conducthonor-code/>) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.

COVID. In response to COVID-19, the following recommendations are in place to maintain your learning environment, to enhance the safety of our in-classroom interactions, and to further the health and safety of ourselves, our neighbors, and our loved ones.

If you are not vaccinated, get vaccinated. Vaccines are readily available and have been demonstrated to be safe and effective against the COVID-19 virus. Visit one.ufl.edu for screening / testing and vaccination opportunities.

If you are sick, stay home. Please call your primary care provider if you are ill and need immediate care or the UF Student Health Care Center at 352-392-1161 to be evaluated.

Course materials will be provided to you with an excused absence, and you will be given a reasonable amount of time to make up work.

Masks are optional at UF. However, masks are always acceptable for those who wish to wear them. The CDC recommends that those not fully vaccinated for COVID-19 continue to wear masks, particularly indoors; and even those who are fully vaccinated may choose to wear masks for a variety of reasons. Thank you for supporting your fellow Gators as they balance health, comfort, and other considerations in their decision to wear or not to wear a mask.

Attendance and make-ups

Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies that can be found in the online catalog at: <https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx> [Links to an external site.](#)

If you are experiencing COVID-19 symptoms ([click here for guidance from the CDC on symptoms of coronavirus](#) [Links to an external site.](#)), please use the UF Health screening system and follow the instructions on whether you are able to attend class. [Click here for UF Health guidance on what to do if you have been exposed to or are experiencing Covid-19 symptoms](#) [Links to an external site.](#) Course materials will be provided to you with an excused absence, and you will be given a reasonable amount of time to make up work. Refer to the above link for more information on the university's attendance policy.

Resources Available to Students

Health and Wellness

- *U Matter, We Care:* umatter@ufl.edu; 392-1575
- *Counseling and Wellness Center:* <http://www.counseling.ufl.edu/cwc/Default.aspx> [Links to an external site.](#); 392-1575
- *Sexual Assault Recovery Services (SARS):* Student Health Care Center; 392-1161
- *University Police Department:* <http://www.police.ufl.edu/> [Links to an external site.](#); 392-1111 (911 for emergencies)

Academic Resources

- *E-learning technical support:* Learningsupport@ufl.edu; <https://lss.at.ufl.edu/help.shtml> [Links to an external site.](#); 352-392-4357 (opt. 2)

- *Career Resource Center*: Reitz Union; <http://www.crc.ufl.edu/> [Links to an external site.](#); 392-1601
- Library Support: <http://cms.uflib.ufl.edu/ask>[Links to an external site.](#)
- Teaching Center: Broward Hall; 392-2010 or 392-6420
- Writing Studio: 302 Tigert Hall; <http://writing.ufl.edu/writing-studio/> [Links to an external site.](#); 846-1138

Procedure for Conflict Resolution

Any classroom issues, disagreements or grade disputes should be discussed first between the instructor and the student. If the problem cannot be resolved, please contact the Undergraduate Coordinator or the Department Chair. Be prepared to provide documentation of the problem, as well as all graded materials for the semester. Issues that cannot be resolved departmentally will be referred to the University Ombuds Office (<http://www.ombuds.ufl.edu> [Links to an external site.](#); 392-1308) or the Dean of Students Office (<http://www.dso.ufl.edu> [Links to an external site.](#); 392-1261). For further information refer to https://www.dso.ufl.edu/documents/UF_Complaints_policy.pdf [Links to an external site.](#) (for residential classes) or <http://www.distance.ufl.edu/student-complaintprocess> [Links to an external site.](#) (for online classes).