

# ZOO4926 - Stem Cell Biology

Special Topics in Zoology      ZOO4926      Class Number 17064

GMS6336

GMS6331

## Stem Cell Biology

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

Days: **Mondays, Wednesdays, Fridays**    Period 6 (12:50 PM - 1:40 PM)

Instructors:      Dr Malcolm Maden, email [malcmaden@ufl.edu](mailto:malcmaden@ufl.edu), rm 326 Bartram Hall  
                         Dr Edward Scott, email [escott@ufl.edu](mailto: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](http://www.stembook.org) [Links to an external site.](#)[Links to an external site.](#)) and a recent

'Outlook' in Nature on 'Stem Cells' (Nature 597, 30<sup>th</sup> September 2021, S5-S26) describes their future potential in development and medicine.

## Lecture Schedule

WEEK	DATE	TOPIC/LECTURER
<b>SECTION 1 – THE BIOLOGY OF STEM CELLS</b>		
1	Mon Jan 8th	Introduction I – MM
	Wed Jan 10th	ES cells – ES
	Fri Jan 12th	Presentations
2	Mon Jan 15th	HOLIDAY
	Wed Jan 17th	IPS cells - ES
	Fri Jan 19th	Presentations
3	Mon Jan 22nd	Neural stem cells – BR
	Wed Jan 24th	Neural stem cells – BR
	Fri Jan 26th	Presentations
4	Mon Jan 29th	Hydra and stem cells – CS
	Wed Jan 31st	Planarians and stem cells – MM
	Fri Feb 2 <sup>nd</sup>	Presentations
5	Mon Feb 5th	Stem cells and regeneration of teeth - GF

	Wed Feb 7th	Limb regeneration in salamanders, are stem cells involved? – MM
	Fri Feb 9th	Presentations
6	Mon Feb 12th	Regeneration in mammals, liver - MM
	Wed Feb 14th	<b>EXAM 1 (in class)</b>
	Fri Feb 16th	Discussions/presentations

## **SECTION 2 – STEM CELLS IN MAMMALS**

7	Mon Feb 19th	Haematopoetic stem cells I – ES
	Wed Feb 21st	Haematopoetic stem cells II – ES
	Fri Feb 23rd	Discussions/presentations
8	Mon Feb 26th	Epidermal stem cells - MM
	Wed Feb 28th	Mesenchymal stem cells - ES
	Fri March 1st	Discussions/presentations
9	Mon March 4th	Muscle stem cells – DK
	Wed March 6th	Primary cilia in adult stem cells - DK
	Fri March 8th	Discussions/presentations
10	Mon March 11th	SPRING BREAK

- |    |                |                                 |
|----|----------------|---------------------------------|
|    | Wed March 13th | SPRING BREAK                    |
|    | Fri March 15th | SPRING BREAK                    |
| 11 | Mon March 18th | Oocyte stem cells - MM          |
|    | Wed March 20th | Revision session                |
|    | Fri March 22nd | Adipose derived stem cells - KM |

### **SECTION 3 - MEDICINE AND STEM CELLS**

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|----|----------------|--------------------------------------|
| 12 | Mon March 25th | <b>EXAM II (in class)</b>            |
|    | Wed March 27th | Organoids and humans - MM            |
|    | Fri March 29th | Discussions/presentations            |
| 13 | Mon April 1st  | Cancer stem cells I - DO             |
|    | Wed April 3rd  | Cancer stem cells II - DO            |
|    | Fri April 5th  | Discussions/presentations            |
| 14 | Mon April 8th  | Breast cancer and stem cells - ES    |
|    | Wed April 10th | Colon cancer and colitis - ES        |
|    | Fri April 12th | Discussions/presentations            |
| 15 | Mon April 15th | Stem cell therapy for scoliosis - NM |

	Wed April 17th	Companies - ES
	Fri April 19th	Discussions/presentations
16	Mon April 22nd	Group assignment
	Wed April 24th	<b>EXAM III (in class)</b>
	Fri April 26th	Reading day

MM = Dr Malcolm Maden (Biology) - [malcmaden@ufl.edu](mailto:malcmaden@ufl.edu)

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

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

GF = Dr Gareth Fraser (Biology) - [g.fraser@ufl.edu](mailto:g.fraser@ufl.edu)

BR = Dr Brent Reynolds (McKnight Brain Institute)  
– [brent.reynolds@neurosurgery.ufl.edu](mailto: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](mailto:nadja.makki@ufl.edu)

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

DO = Dr David Oppenheimer (Biology) – [oppenhe@ufl.edu](mailto:oppenhe@ufl.edu)

### Office hours

Office hours will take place weekly from 1.45 to 2.45 (after the scheduled lecture) on Wednesdays in Bartram rm326. If this timing is not suitable other times will be readily 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.aa.ufl.edu/students/](https://gatorevals.aa.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/](https://ufl.bluera.com/ufl/). Summaries of course evaluation results are available to students at [gatorevals.aa.ufl.edu/public-results/](https://gatorevals.aa.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](https://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](mailto: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](mailto: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.](#)[Links to an external site.](#); 392-1308) or the Dean of Students Office (<http://www.dso.ufl.edu> [Links to an external site.](#)[Links to an external site.](#); 392-1261). For further information refer to [https://www.dso.ufl.edu/documents/UF\\_Complaints\\_policy.pdf](https://www.dso.ufl.edu/documents/UF_Complaints_policy.pdf) [Links to an external site.](#)[Links to an external site.](#)(for residential classes) or <http://www.distance.ufl.edu/student-complaintprocess> [Links to an external site.](#)[Links to an external site.](#)(for online classes).