

Special Topics in Zoology      ZOO4926      Class Number 19623

Stem Cell Biology

Location: Computer Science/Engineering      CSE E119

Days: Mondays, Wednesdays, Fridays Period 7 – 1.55pm – 2.45pm

Instructors: Malcolm Maden, email [malcmaden@ufl.edu](mailto:malcmaden@ufl.edu), rm 326 Bartram Hall & 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 one or two lectures on these subjects and in the third session each week 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.

### **Course objectives**

The objectives 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. Two excellent sources of information for this course are freely available on-line at NIH regenerative medicine (2006) and the Harvard Stem Cell Institute Stembook ([www.stembook.org](http://www.stembook.org)).

### **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 which will follow the scheme of A = 100-90, B = 90-80, C = 80-70, D = 70-60.

Lecture Schedule,

Location - Computer Science/Engineering      CSE E119

Time - 1.55 – 2.45pm

<b>WEEK</b>	<b>DATE</b>	<b>TOPIC/LECTURER</b>
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**SECTION 1 – THE BIOLOGY OF STEM CELLS**

1	Mon Jan 11 <sup>th</sup>	Introduction – MM
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	Wed Jan 13 <sup>th</sup>	Embryology - MM
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	Fri Jan 15 <sup>th</sup>	Discussions/presentations
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2	Mon Jan 18 <sup>th</sup>	HOLIDAY
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	Wed Jan 20 <sup>th</sup>	ES cells – ES
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	Fri Jan 22 <sup>nd</sup>	Discussions/presentations
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3	Mon Jan 25 <sup>th</sup>	IPS cells – ES
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	Wed Jan 27 <sup>th</sup>	Organoids – what stem cells can do – MM
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	Fri Jan 29 <sup>th</sup>	Discussions/presentations
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4	Mon Feb 1 <sup>st</sup>	Hydra and stem cells – CS
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	Wed Feb 3 <sup>rd</sup>	Planarians and stem cells – MM
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	Fri Feb 5 <sup>th</sup>	Discussions/presentations
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5	Mon Feb 8 <sup>th</sup>	Limb regeneration in salamanders, are stem cells involved? - MM
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	Wed Feb 10 <sup>th</sup>	Stem cells and regeneration of teeth - GF
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	Fri Feb 12 <sup>th</sup>	<b>EXAM I (in class)</b>
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**SECTION 2 – STEM CELLS IN MAMMALS**

6	Mon Feb 15 <sup>th</sup>	Neural stem cells – BR
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	Wed Feb 17 <sup>th</sup>	Neural stem cells – BR
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	Fri Feb 19 <sup>th</sup>	Discussions/presentations
7	Mon Feb 22 <sup>nd</sup>	Epidermal stem cells – MM
	Wed Feb 24 <sup>th</sup>	Haematopoetic stem cells I – ES
	Fri Feb 26 <sup>th</sup>	Discussions/presentations
8	Mon March 1 <sup>st</sup>	Haematopoetic stem cells II – ES
	Wed March 3 <sup>rd</sup>	Mesenchymal stem cells - ES
	Fri March 5 <sup>th</sup>	Discussions/presentations
9	Mon March 8 <sup>th</sup>	Muscle stem cells – DK
	Wed March 10 <sup>th</sup>	Primary cilia in adult stem cells - DK
	Fri March 12 <sup>th</sup>	Discussions/presentations
10	Mon March 15 <sup>th</sup>	Oocyte stem cells - MM
	Wed March 17 <sup>th</sup>	Adipose derived stem cells - KM
	Fri March 19 <sup>th</sup>	<b>EXAM II (in class)</b>
		<b>SECTION 3 - MEDICINE AND STEM CELLS</b>
11	Mon March 22 <sup>nd</sup>	Stem cell therapy for scoliosis - NM
	Wed March 24 <sup>th</sup>	Cardiac stem cells and MI - MM
	Fri March 26 <sup>th</sup>	Discussions/presentations
12	Mon March 29 <sup>th</sup>	Cancer and stem cells - DO
	Wed March 31 <sup>st</sup>	Breast cancer and stem cells - ES
	Fri April 2 <sup>nd</sup>	Discussions/presentations

13	Mon April 5 <sup>th</sup>	Colon cancer and colitis - ES
	Wed April 7 <sup>th</sup>	Stem cells and regeneration in mammals - MM
	Fri April 9 <sup>th</sup>	Discussions/presentations
14	Mon April 12 <sup>th</sup>	Stem cells and regeneration in mammals - MM
	Wed April 14 <sup>th</sup>	Companies - ES
	Fri April 16 <sup>th</sup>	Discussions/presentations
15	Mon April 19 <sup>th</sup>	Group assignment
	Wed April 21st	<b>EXAM III (in class)</b>
	Fri April 23rd	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)