Special Topics in Zoology ZOO4926

Stem Cell Biology Class Number 21283

Location: Bartram Hall (Biology Department) rm 211

Days: Mondays, Wednesdays, Fridays Period 6 – 12.50pm – 1.40pm

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

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 the 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.

The course is divided into three sections: 1) The Biology of Stem Cells in which we examine stem cells and their role in invertebrates such as Hydra and Planarians and in lower vertebrates such as salamanders; 2) Stem Cells in Mammals in which we examine the presence and role of stem cells in many mammalian organs; 3) Medicine and Stem Cells in which we look at cancer and the role that stem cells play in regeneration and their potential in regenerative medicine. We also examine how stem cells have been exploited for commercial gain. At the end of each section there will be an exam consisting of short answer questions.

In each week there will be one or two lectures on these subjects and in the third session of 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 instructor 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).

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, taking place at the end of each of the sections of 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 - Bartram Hall rm 211,

Time - 12.50 – 1.40pm

WEEK	DATE	TOPIC/LECTURER
		SECTION 1 – THE BIOLOGY OF STEM CELLS
1	Mon Jan 6th	Introduction – MM
	Wed Jan 8th	Embryology - MM
	Fri Jan 10th	Discussions/presentations
2	Mon Jan 13th	ES cells – ES
	Wed Jan 15th	IPS cells – ES
	Fri Jan 17th	Discussions/presentations
3	Mon Jan 20th	HOLIDAY
	Wed Jan 22nd	Hydra – CS
	Fri Jan 24th	Discussions/presentations
4	Mon Jan 27th	Planarians – MM
	Wed Jan 29th	Limb regeneration in salamanders - MM
	Fri Jan 31st	Discussions/presentations
5	Mon Feb 3rd	Regeneration of teeth - GF
	Wed Feb 5th	**EXAM I**
	Fri Feb 7th	Discussions/presentations
		SECTION 2 – STEM CELLS IN MAMMALS
6	Mon Feb 10th	Neural stem cells – BR
	Wed Feb 12th	Neural stem cells – BR
	Fri Feb 14th	Discussions/presentations
7	Mon Feb 17th	Epidermal stem cells – MM
	Wed Feb 19th	Mesenchymal stem cells – ES
	Fri Feb 21st	Discussions/presentations
8	Mon Feb 24th	Hematopoietic stem cells – ES
	Wed Feb 26th	Hematopoietic stem cells – ES
	Fri Feb 28th	Discussions/presentations
9	SPRING BREAK	
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	SPRING BREAK	
10	Mon March 9th	Cardiac stem cells - ES
	Wed March 11th	Colon stem cells - ES
	Fri March 13th	Discussions/presentations
11	Mon March 16th	Oocyte stem cells - MM
	Wed March 18th	**EXAM II**
	Fri March 20th	Discussions/presentations
		MEDICINE AND STEM CELLS
12	Mon March 23rd	Adipose derived stem cells - KM
	Wed March 25th	Cancer and stem cells - DO
	Fri March 27th	Discussions/presentations
13	Mon March 30th	Cancer and stem cells - DO
	Wed April 1st	Stem cells and regeneration in mammals - MM

	Fri April 3rd	Discussions/presentations
14	Mon April 6th	Stem cells and regeneration in mammals - MM
	Wed April 8th	Organoids - MM
	Fri April 10th	Discussions/presentations
15	Mon April 13th	Companies - ES
	Wed April 15th	Group assignment
	Fri April 17th	Discussions/presentations
16	Mon April 20th	Group assignment
	Wed April 22nd	**EXAM III**
	Fri April 24th	Reading day

LECTURERS

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

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

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