

## **Faculty of Health Kinesiology and Health Science**

**Course:** HH/KINE 4515 3.0 M Stem Cells and Therapeutic Applications

**Term:** Winter 2019

**Prerequisite / Co-requisite:** None

### **Course Instructor**

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### **Time and Location**

Lectures                      MW 11:30-1:00

### **Expanded Course Description**

This course examines specific stem cell populations and the molecular regulation governing their capacity for proliferation, differentiation, self-renewal and cell fate with emphasis on adipogenic and muscle stem cells. Other topics include normal and traumatic regeneration/repair, role of stem cells in cancer development and current therapeutic strategies being utilized for muscle myopathies.

### **Organization of the Course**

- 1) Two assigned power point presentations, each will be presented.
- 2) One presentation subject will be general and the other a primary scientific paper.
- 3) For the general topic a review paper might be provided, but it is not necessary that the group rely on one paper. If not references must be provided.
- 4) Duration of presentations are about 25 minutes, questions might be interjected and following the presentation.
- 5) The power point presentation will be submitted on the day of the talk.
- 6) A Summary also must be distributed to all members of the class on the day of the presentation
- 7) The summary will be on a single page (diagram or flowchart etc on back of page is recommended)
- 8) Summary for a general topic should include:
  - The reference and authors
  - Any important references
  - Current state of knowledge in the area
  - Importance of the topic to stem cells
  - Shortcomings

- Future directions
- 9) Presentation grades based on:
  - Organization
  - Clarity
  - Completeness
  - Ability to teach the class
  - Main points of the paper
  - Quality of the presentation summary handout
  - Ability to answer questions
  - Ability to critically analyze paper
  - remember only 25 minute time limit

## TOPICS

- Developmental Origin of Stem cells
- Embryonic Stem (ES) cells
- Maintenance of Pluripotency
- Adult Stem cells
- Cancer Stem cells
- Stem Cell Micro Environment (Niche)
- Induced Pluripotent Stem cells (iPCs)
- Somatic Nuclear Cell Transplant (SNCT)
- Adipose Stem Cells
  - Lineage Determination
  - Brown adipose tissue therapy
  - Adipose Derived Stem Cells
- Muscle Stem Cells
  - Satellite Cells
  - Satellite Cells & Aging
  - Satellite Cells and Exercise
  - Satellite Cell Niche
  - Therapy
  - Other Myogenic Stem cells
- Regenerative Medicine

## Course Learning Objectives

### (1) ***Brief statement of the purpose:***

The purpose of this course is to assist students in developing a critical overview of the biology of stem cells importantly as impacts the homeostasis of adipose and muscle physiology. Students will be able to understand how stem cells impact on physiology, how they are derived and identify fundamental principles of their use in muscular disease, obesity and other diseases. Students will be able to describe how to apply cutting edge stem cell knowledge and research to various health care problems.

## **(2) Brief list of specific learning objectives of the course**

- critically examine the science of stem cells as it applies to adipose and muscle biology
- be able to describe the range of impacts for stem cell research on society
- understand recent approaches in stem cell research
- develop their ability to discuss and write about the biology of stem cells

### **Evaluation**

The final grade for the course will be based on the following items weighted as indicated:

Seminar #1:	15%
Seminar #2:	15%
Participation:	10%
Test 1:	20%
Test 2:	21%
Test 3:	19%
Total	100%

### **Grading, Assignment Submission,**

#### **Lateness Penalties and Missed Tests**

**Grading:** The grading scheme for the course conforms to the 9-point grading system used in undergraduate programs at York (e.g., A+ = 9, A = 8, B+ = 7, C+ = 5, etc.). Assignments and tests\* will bear either a letter grade designation or a corresponding number grade (e.g. A+ = 90 to 100, A = 80 to 90, B+ = 75 to 79, etc.)

(For a full description of York grading system see the York University Undergraduate Calendar - [http://calendars.registrar.yorku.ca/pdfs/ug2004cal/calug04\\_5\\_acadinfo.pdf](http://calendars.registrar.yorku.ca/pdfs/ug2004cal/calug04_5_acadinfo.pdf))

**Missed Tests:** Students with a documented reason for missing course exam or seminar, such as illness, compassionate grounds, etc., which is confirmed by supporting documentation (e.g., doctor's letter) may request accommodation from the Course Instructor. Further extensions or accommodation will require students to submit a formal petition to the Faculty.

### **IMPORTANT COURSE INFORMATION FOR STUDENTS**

All students are expected to familiarize themselves with the following information, available on the Senate Committee on Curriculum & Academic Standards webpage (see Reports, Initiatives, Documents) - [http://www.yorku.ca/secretariat/senate\\_cte\\_main\\_pages/ccas.htm](http://www.yorku.ca/secretariat/senate_cte_main_pages/ccas.htm)

- York's Academic Honesty Policy and Procedures/Academic Integrity Website
- Ethics Review Process for research involving human participants
- Course requirement accommodation for students with disabilities, including physical, medical, systemic, learning and psychiatric disabilities
- Student Conduct Standards
- Religious Observance Accommodation