

Faculty of Health Kinesiology and Health Science

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

Term: Winter 2024

Prerequisite / Co-requisite: HH/KINE 2011 3.00 or SC/BIOL1000 3.00

Course Instructor

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Time and Location

Lectures MW 11:30-1:00
Monday: Rm. CC 106
Wednesday: Rm. SC 222

Organization of Course

- The class time is Mon/Wed from 11:30 – 1:00 am.
- Lecture material will be posted on eClass, and students are responsible for viewing lectures during class time.
- Tests will be in person

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. This course will also cover ethical questions arising from stem cell use, laws and regulations and public misconceptions.

Topics Covered

- 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
- Laws and Regulations
- Ethical Considerations

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

Resources

Lectures

Online: PubMed, SciHub.

Evaluation

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

Test 1:	20%
Test 2:	21%
Test 3:	19%
Presentation 1	15%
Presentation 2	15%
Participation:	10%
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)

Missed Tests: Students with a documented reason for missing course test 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 Director. Further extensions or accommodation will require students to submit a formal petition to the Faculty.

ACADEMIC HONESTY AND INTEGRITY

In this course, we strive to maintain academic integrity to the highest extent possible. Please familiarize yourself with the meaning of academic integrity by completing SPARK's [Academic Integrity module](#) at the beginning of the course. Breaches of academic integrity range from cheating (i.e., the improper crediting of another's work, the representation of another's ideas as your own, etc.) to aiding and abetting (helping someone else to cheat). All breaches in this course will be reported to the appropriate university authorities, and can be punishable according to the [Senate Policy on Academic Honesty](#).

To promote academic integrity in this course, students will be normally required to submit their written assignments to Turnitin (via the course Moodle) for a review of textual similarity and the detection of possible plagiarism. In so doing, students will allow their material to be included as source documents in the Turnitin.com reference database, where they will be used only for the purpose of detecting plagiarism. The terms that apply to the University's use of the Turnitin service are described on the Turnitin.com website.

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

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