Schulich MEDICINE & DENTISTRY

Western Science

Bachelor of Medical Sciences (BMSc) Program

# Physiology and Pharmacology

## Physiology 4520b: Stem Cells and Regenerative Medicine

Course Syllabus for Winter 2023

THRIVE together

Western University is committed to a **thriving campus**; therefore, your health and wellness matter to us! The following link provides information about the resources available on and off campus to support students: https://www.uwo.ca/health/ Your course coordinator can also **guide you** to resources and/or services should you need them.

### 1. Technical Requirements:

Stable internet connection

Laptop or computer

### 2. Important Dates:

| Classes Begin | Classes End |
|---|---|
| Monday, January 9, 2023 | Monday, April 10, 2023 |

* March 7, 2023: Last day to drop a second-term half course without penalty

| Reading Week | Study day(s) | Exam Period |
|---|---|---|
| February 18–26 | April 11-12 | April 13-30 |

### 3. Contact Information

| Course Coordinator | Contact Information |
|---|---|
| **Dr. David Hess** | dhess@robarts.ca OR dhess3@uwo.ca |

| Instructor(s) or Teaching Assistant(s) | Contact Information |
|---|---|
| **Dr. Tyler Cooper** | **tcoope2@uwo.ca** |
| **Dr. John Diguglielmo** | **john.diguglielmo@schulich.uwo.ca** |
| **Xin Yue (Sharon) Xie** | **Xxie67@uwo.ca** |

## 4. Course Description and Design

**Delivery Mode:** in-person

Central concepts in regenerative medicine are explored, with a focus on the preclinical development of stem cell therapies. Emphasized are: fundamentals of tissue-specific (post-natal) stem cell isolation, expansion and functional characterization using xenotransplantation into immunodeficient mouse models and transgenic mouse models for the treatment of human hematopoietic disorders, ischemic vascular diseases, diabetes, and diseases of the gastrointestinal system and skin. The role of stem cells in the development of cancer will also be discussed.

### Timetabled Sessions

| Component | Date(s) | Time |
|---|---|---|
| Lecture | Tuesday | 2:30-4:30 PM |

- ☑ Asynchronous pre-work must be completed prior to sessions
- ☑ Attendance at sessions is required
- ☑ A recording will be provided of the sessions

All course material will be posted to OWL: http://owl.uwo.ca. Any changes will be indicated on the OWL site and discussed with the class.

If students need assistance, they can seek support on the OWL Help page. Alternatively, they can contact the Western Technology Services Helpdesk. They can be contacted by phone at 519-661-3800 or ext. 83800.

Google Chrome or Mozilla Firefox are the preferred browsers to optimally use OWL; update your browsers frequently. Students interested in evaluating their internet speed, please click here.

## 5. Learning Outcomes

Upon successful completion of this course, students will be able to:

- Understand fundamental concepts in stem cell biology and current laboratory techniques employed to study stem cell functions *in vitro* and *in vivo*.
- Discuss the promise and controversy over the use of different stem cell types and their potential for treating human disease.
- Understand the challenges surrounding the use of stem cell transplantation in the treatment of hematopoietic disorders, ischemic vascular disease, diabetes, and cancer.
- Understand the development of rational cell-based therapies from basic science, through clinical trials, to standard of care.
- Critically evaluate novel and emerging regenerative therapies for human disease.

## 6. Course Content and Schedule

| Week | Dates | Topic | Instructor |
|---|---|---|---|
| 1 | Jan 9–15 | Fundamental concepts in stem cell biology: A historical perspective | David Hess |
| 2 | Jan 16-22 | Hematopoietic stem cell biology and hematopoiesis | David Hess |
| 3 | Jan 23-29 | Development of transplantation strategies for hematopoietic diseases | David Hess |
| 4 | Jan 30–Feb 5 | Circulating progenitor cells that mediate blood vessel regeneration | David Hess |
| 5 | Feb 6-12 | Development of transplantation strategies for ischemic cardiovascular diseases | David Hess |
| 6 | Feb 13–18 | **In-class Mid-term Exam (35%)** | David Hess |
| 7 | Feb 19-26 | Reading Week | David Hess |
| 8 | Feb 27-Mar 5 | Roles of multipotent stromal cells in tissue repair and regeneration | David Hess |
| 9 | Mar 6-12 | Strategies for diabetes therapy: Islet replacement versus regeneration | David Hess |
| 10 | Mar 13–19 | Stem cells of the GI system: Generation of intestinal organoids | Tyler Cooper |
| 11 | Mar 20–26 | Clinical applications for GI stem cells: From cystic fibrosis to cancer | Tyler Cooper |
| 12 | Mar 27–Apr 2 | Multipotent skin progenitor cells in wound healing | John Diguglielmo |
| 13 | Apr 3-9 | Understanding the cancer stem cell hypothesis | John Diguglielmo |

## 7. Participation and Engagement

- ☑ Students are expected to participate and engage with content as much as possible
- ☑ Students can participate during in-class sessions or post comments on Owl after watching the recording
- ☑ Students can also participate by interacting in the forums with their peers and instructors

## 8. Evaluation

Below is the evaluation breakdown for the course. Any deviations will be communicated.

| Assessment | Format | Weighting | Due Date |
|---|---|---|---|
| Blog assignment / discussion forum | Written expert comment (200-300 words) on assigned blog topic | **Total = 15%**<br><br>Expert Comment:<br>Accuracy (3%)<br>Insightfulness (3%)<br>Responses (3%)<br><br>General discussion / participation (6% total, 2% per blog) | You are the expert for 1 out of 5 blog topics and a participant in the discussion on 3 additional blogs. Each blog runs concurrent with a 2-week module in the course |
| Midterm Exam | Written short- and long-answer questions (2 hour in-class exam) | **Total = 35%**<br><br>Short Answer: 4 questions worth 5 marks each<br><br>Long Answer: Choose 1 of 2 questions worth 15 marks each | Feb. 14th, 2023<br><br>Make-up Midterm: Feb. 17, 2023 |
| Final Exam | Written short- and long-answer questions (3 hour exam) | **Total = 50%**<br><br>Short Answer: 4 questions worth 5 marks each<br><br>Long Answer: Choose 2 of 4 questions worth 15 marks each | TBD - See posted final exam schedule |

- ☑ All assignments are due 11:55 pm EST unless otherwise specified0
- ☑ Rubrics will be used to evaluate assessments and will be posted with the instructions
- ☑ After an assessment is returned, students should wait 24 hours to digest feedback before contacting their evaluator; to ensure a timely response, reach out within 7 days
- ☑ Any grade appeals on assignments or midterms must be received within 3 weeks of the grade being posted.

Click here for a detailed and comprehensive set of policies and regulations concerning examinations and grading. The table below outlines the University-wide grade descriptors.

| | | |
|---|---|---|
| - | 90-100 | One could scarcely expect better from a student at this level |
| | 80-89 | Superior work which is clearly above average |
| | 70-79 | Good work, meeting all requirements, and eminently satisfactory |
| | 60-69 | Competent work, meeting requirements |
| | 50-59 | Fair work, minimally acceptable |
| | below 50 | Fail |

**Information about late or missed evaluations:**

- ☑ Late assessments without accommodation will be subject to a late penalty 15% / day
- ☑ Late assessments without accommodation [work less than 10%] will be reweighted to the final exam after receiving written permission (via email) from the course coordinator within 7 days of the assignment due date.
- ☑ One make-up mid-term exam will be offered.
- ☑ If the one scheduled makeup is missed with accommodations, then the weight of the missed mid-term will be transferred to the final exam.
- ☑ The final exam must be completed to pass the course. If a student is unable to complete the final exam and the scheduled make-up exam the student will receive an incomplete standing (see below) and will write the exam in the following year.

**INC (Incomplete Standing):** If a student has been approved by the Academic Counselling Office (in consultation with the instructor/department) to complete term work at a later date, an INC will be assigned. Students with INC will have their course load in subsequent terms reduced to allow them to complete outstanding course work. Students may request permission from Academic Counselling to carry a full course load for the term the incomplete course work is scheduled.

**SPC** (**Special examination):** If a student has been approved by the Academic Counselling Office to write a Special Examination and the final exam is the only outstanding course component, an SPC will be assigned. If the class has a makeup exam, the student is expected to write the makeup exam. If the class doesn't have a makeup exam or the student misses the makeup exam for reasons approved by the Academic Counselling Office, the student will write the exam the next time the course is offered. Outstanding SPCs will reduce the course load for the term the exam is deferred as outlined in Types of Examinations policy.

## 9. Communication:

- ☑ Students should check the OWL site every 24–48 hours
- ☑ Students should email their instructor(s) and teaching assistant(s) using email
- ☑ Emails will be monitored daily; students will receive a response in 24–48 hours
- ☑ This course will use Owl for discussions
- ☑ Students should post all course-related queries on the discussion forum so that everyone can access the questions and responses

## 10. Office Hours:

- ☑ Office hours will be held in-person at a time set by the instructor and student (Please email the instructor or TA to make an appointment).
- ☑ Office hours will be held at the students request (Please email the instructor or TA to make an appointment).

## 11. Resources

- ☑ All resources will be posted in OWL

## 12. Professionalism & Privacy:

Western students are expected to follow the Student Code of Conduct. Additionally, the following expectations and professional conduct apply to this course:

- ☑ All course materials created by the instructor(s) are copyrighted and cannot be sold/shared (e.g., Must Knows Facebook group, Course Hero, Chegg, etc.)
- ☑ Recordings are not permitted (audio or video) without explicit permission
- ☑ Permitted recordings are not to be distributed
- ☑ Students will be expected to take an academic integrity pledge before some assessments

Western is committed to providing a learning and working environment that is free of harassment and discrimination. All **students**, staff, and faculty have a role in this commitment and have a responsibility to ensure and promote a safe and respectful learning and working environment. Relevant policies include Western's Non-Discrimination/Harassment Policy (M.A.P.P. 1.35) and Non-Discrimination/Harassment Policy – Administrative Procedures (M.A.P.P. 1.35).
Any **student,** staff, or faculty member who experiences or witnesses' behaviour that may be harassment or discrimination **must report the behaviour** to the Western's Human Rights Office. Harassment and discrimination can be human rights-based, which is also known as EDI-based, (sexism, racism, transphobia, homophobia, islamophobia, xenophobia, antisemitism, and ableism) or non-human rights-based (personal harassment or workplace harassment).

## 13. How to Be Successful in this Class:

Students enrolled in this class should understand the level of autonomy and self-discipline required to be successful.

1. Invest in a planner or application to keep track of your courses. Populate all your deadlines at the start of the term and schedule your time throughout the course.
2. Make it a daily habit to log onto OWL to ensure you have seen everything posted to help you succeed in this class.
3. Follow weekly checklists created on OWL or create your own to help you stay on track.
4. Take notes as you go through the lesson material. Keeping handwritten notes or even notes on a regular Word document will help you learn more effectively than just reading or watching the videos.
5. Connect with others. Try forming an online study group and try meeting on a weekly basis for study and peer support.
6. Do not be afraid to ask questions. If you are struggling with a topic, check the online discussion boards or contact your instructor(s) and or teaching assistant(s).
7. Reward yourself for successes. It seems easier to motivate ourselves knowing that there is something waiting for us at the end of the task.

## 14. Western Academic Policies and Statements

**Absence from Course Commitments**

A. Absence for medical illness:

Students must familiarize themselves with the Accommodation for Illness Policy.

A student seeking academic accommodation for any **work worth less than 10%** must contact the instructor or follow the appropriate Department or course specific instructions provided on the course outline. Instructors will use good judgment and ensure fair treatment for all students when considering these requests. You are not required to disclose details about your situation to your instructor; documentation is not required in this situation, and you should not send any pictures to your instructor.

If you are unable to meet a course requirement for any **work worth 10% or greater** due to illness or other serious circumstances, you must provide valid medical or other supporting documentation to the Academic Counseling as soon as possible and contact your instructor immediately. It is the student's responsibility to make alternative arrangements with their instructor once the accommodation has been approved and the instructor has been informed. Please note that the format of a make-up test, exam, or assignment is at the discretion of the course coordinator.

A student requiring academic accommodation due to illness should use the Student Medical Certificate when visiting an off-campus medical facility or request a Record's Release Form (located in the Dean's Office) for visits to Student Health Services. The form can be found at: http://www.uwo.ca/univsec/pdf/academic_policies/appeals/medicalform.pdf

B. Absence for non-medical reasons:

Student absences might also be approved for non-medical reasons such as religious holidays and compassionate situations. Please review the policy on Accommodation for Religious Holidays. All non-medical requests must be processed by Academic Counselling. Not all absences will be approved; pay attention to the academic calendar and final exam period when booking any trips.

C. Special Examinations

A Special Examination is any examination other than the regular examination, and it may be offered only with the permission of the Dean of the Faculty in which the student is registered, in consultation with the instructor and Department Chair. Permission to write a Special Examination may be given on the basis of compassionate or medical grounds with appropriate supporting documents. To provide an opportunity for students to recover from the circumstances resulting in a Special Examination, the University has implemented Special Examinations dates. These dates as well as other important information about examinations and academic standing can be found here.

**Academic Offenses**

Scholastic offences are taken seriously, and students are directed here to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence.

**Accessibility Statement**

Please contact the course instructor if you require material in an alternate format or if you require any other arrangements to make this course more accessible to you. You may also wish to contact Accessible Education (AE) at 661-2111 x 82147 for any specific question regarding an accommodation or review The policy on Accommodation for Students with Disabilities

**Correspondence Statement**

The centrally administered **e-mail account** provided to students will be considered the individual's official university e-mail address. It is the responsibility of the account holder to ensure that e-mail received from the University at his/her official university address is attended to in a timely manner. You can read about the privacy and security of the UWO email accounts here.

**Discovery Credit Statement**

Students are permitted to designate up to 1.0 Discovery Credit course (or equivalent) for pass/fail grading that can be counted toward the overall course credits required for their degree program. The details of this policy and the deadlines can be found here.

**Turnitin and other similarity review software**

All assignments will be subject to submission for textual similarity review to the commercial plagiarism detection software under license to the University for the detection of plagiarism. Students will be able to view their results before the final submission. All papers submitted for such checking will be included as source documents in the reference database for the purpose of detecting plagiarism of papers subsequently submitted to the system. Use of the service is subject to the licensing agreement, currently between Western University and Turnitin.com.

## 15. BMSUE Academic Policies and Statements

**Cell Phone and Electronic Device Policy (for in-person tests and exams)**

The Schulich School of Medicine & Dentistry is committed to ensuring that testing and evaluation are undertaken fairly across all our departments and programs. For all tests and exams, it is the policy of the School that any electronic devices, i.e., cell phones, tablets, cameras, or iPod are strictly prohibited. These devices MUST be left either at home or with the student's bag/jacket at the front of the room and MUST NOT be at the test/exam desk or in the individual's pocket. Any student found with one of these prohibited devices will receive a grade of zero on the test or exam. Non-programmable calculators are only allowed when indicated by the instructor. The program is not responsible for stolen/lost or broken devices.

**Copyright and Audio/Video Recording Statement**

Course material produced by faculty is copyrighted and to reproduce this material for any purposes other than your own educational use contravenes Canadian Copyright Laws. You must always ask permission to record another individual and you should never share or distribute recordings.

**Rounding of Marks Statement**

Across the Basic Medical Sciences Undergraduate Education programs, we strive to maintain high standards that reflect the effort that both students and faculty put into the teaching and learning experience during this course. All students will be treated equally and evaluated based only on their actual achievement. ***Final grades*** on this course, irrespective of the number of decimal places used in marking individual assignments and tests, will be calculated to one decimal place and rounded to the nearest integer, e.g., 74.4 becomes 74, and 74.5 becomes 75. Marks WILL NOT be bumped to the next grade or GPA, e.g., a 79 will NOT be bumped up to an 80, an 84 WILL NOT be bumped up to an 85, etc. The mark attained is the mark you achieved, and the mark assigned; requests for mark "bumping" will be denied.

## 16. Support Services

The following links provide information about support services at Western University.

Western is committed to reducing incidents of gender-based and sexual violence and providing compassionate support to anyone who has gone through these traumatic events. If you have experienced sexual or gender-based violence (either recently or in the past), you will find information about support services for survivors, including emergency contacts at https://www.uwo.ca/health/student_support/survivor_support/get-help.html.
To connect with a case manager or set up an appointment, please contact support@uwo.ca.

Academic Counselling (Science and Basic Medical Sciences)
Appeal Procedures
Registrarial Services
Student Development Services
Student Health Services