1. Course Information

Physiology 4640A: Organogenesis in Mammals
Fall Term 2017

This course examines the mechanisms underlying the development of selected organs and organ systems in mammals. Emphasis is on the molecular, biochemical and morphological maturation pathways that equip each system for its physiological role. Various experimental techniques/approaches relevant to Developmental Biology will be presented and discussed.

Lectures:
Tuesdays / 2:30-4:20 pm / FIMS & Nursing Building (FNB), room 2210

Requisites:
Suggested Prerequisite(s): Physiology 3120, 3130Y and Physiology 3140A.

Senate regulation regarding the student’s responsibility regarding requisites:
Unless you have either the requisites for this course or written special permission from your Dean to enroll in it, you may be removed from this course and it will be deleted from your record. This decision may not be appealed. You will receive no adjustment to your fees in the event that you are dropped from a course for failing to have the prerequisites.

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 Services for Students with Disabilities (SSD) at 661-2111 x 82147 for any specific question regarding an accommodation.

2. Instructor Information

<table>
<thead>
<tr>
<th>Instructors</th>
<th>Email</th>
<th>Office</th>
<th>Phone</th>
<th>Office Hours*</th>
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<tbody>
<tr>
<td>Dr. Chris Pin</td>
<td><a href="mailto:cpin@uwo.ca">cpin@uwo.ca</a></td>
<td>VRL A5-134</td>
<td>685-8500 Ext. 53073</td>
<td>After Lectures FNB 2210</td>
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<tr>
<td>(Course Coordinator)</td>
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<tr>
<td>Dr. Dean Betts</td>
<td><a href="mailto:dean.betts@schulich.uwo.ca">dean.betts@schulich.uwo.ca</a></td>
<td>DSB 2022 Ext. 83786</td>
<td>661-2111</td>
<td>After Lectures FNB 2210</td>
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<tr>
<td>Dr. Tom Drysdale</td>
<td><a href="mailto:tadrysda@uwo.ca">tadrysda@uwo.ca</a></td>
<td>VRL A5-138</td>
<td>685-8500 Ext. 55072</td>
<td>After Lectures FNB 2210</td>
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* or by appointment

OWL (powered by Sakai):
Students with OWL issues should contact the Computer Support Centre at 519 661-3800 or fill out the webform: https://servlet.uwo.ca/vistahelpdesk/controller.jsp (cut and paste this link)
3. Course Syllabus

Course Objectives:
The main objective of this course is to introduce students to the basic molecular, biochemical and morphological events that govern organ development. Additional objectives are to improve the ability of students to read, understand, and discuss primary scientific literature and to provide students with an opportunity to conceptually translate their knowledge in organogenesis to solve developmental problems/questions. The course material will include didactic lecturing, analysis of primary research journal articles and class discussions. **Students are expected to come prepared to work in groups and discuss, in class, the content of journal articles provided. This will require some independent work outside of the lectures.** The lectures will focus mainly on the factors that govern development of specific organs (see schedule) although many topics can be applied to the development of other organ systems.

Learning Outcomes:

*After completion of this course the student will be able to:*

- describe several fundamental mechanisms and pathways that govern tissue/organ development
- identify the various techniques/technologies utilized to study organogenesis and developmental biology and apply these techniques to address specific hypotheses
- identify research goals and hypotheses within a scientific publication
- create testable hypotheses and design experiments to test these hypotheses
- work in a small group to critically discuss primary research manuscripts

Method of Presentation

The material of the course will be presented in the form of didactic lectures, manuscript discussions, problem based learning exercises from the published scientific literature, and informal class discussions.

Methods of Evaluation

Students will be expected to:

- Actively participate in regular classroom discussions
- Prepare written assignments
- Apply the understanding of learned basic science to attempt to solve developmental problems
- Read assigned scientific papers *prior to* class
• Interact with other students in class to answer questions based on the primary literature
• Utilize current scientific literature in preparing assignments
• Write, in short answer essay format, mid-term and final examinations

**Physiology 4640A: Organogenesis in Mammals**

**Lecture Schedule**
Tuesdays 2:30-4:30 pm, FNB 2210 FIMS and Nursing Building (FNB)

<table>
<thead>
<tr>
<th>DATE</th>
<th>TOPIC (Instructor)</th>
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<tbody>
<tr>
<td>12 Sept.</td>
<td>Course Introduction (Pin); Principles of embryogenesis and organogenesis including gastrulation and germ layer formation (Drysdale)</td>
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<tr>
<td>19 Sept.</td>
<td>Limb development focusing on muscle differentiation (Pin)</td>
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<tr>
<td>26 Sept.</td>
<td>Transcription factors that govern development (Pin)</td>
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<tr>
<td>03 Oct.</td>
<td>Endoderm development into liver and pancreas (Pin)</td>
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<tr>
<td>10 Oct.</td>
<td>FALL READING WEEK</td>
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<td>17 Oct.</td>
<td>External factors affecting cell fate (Pin)*</td>
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<td>24 Oct.</td>
<td>Development of the heart (Drysdale)</td>
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<tr>
<td>31 Oct.</td>
<td>Development of the nervous system (Drysdale)</td>
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<td><strong>01 Nov.</strong></td>
<td><strong>Mid-term exam, 7-9 pm</strong> (based on first 6 lectures and student presentations)</td>
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<tr>
<td>07 Nov.</td>
<td>Organoids – organogenesis in a dish (Drysdale)*</td>
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<tr>
<td>14 Nov.</td>
<td>Germ cell development (Betts)</td>
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<tr>
<td>21 Nov.</td>
<td>Germ cell migration (Betts)</td>
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<tr>
<td>28 Nov.</td>
<td>Sex determination and gonad development (Betts)</td>
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<tr>
<td>05 Dec.</td>
<td>Epigenetic alterations and germline stem cells (Betts)*</td>
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Journal papers for lectures will be made available on WebCT at least one week before the lecture
* - in class assignments will involve group work and discussion based on the manuscript provided for the lecture
4. Course Materials

Textbook: None required

Suggested Textbooks:


Supplemental Information: Published journal articles will be provided for downloading from WebCT as required reading for lectures.

Students are encouraged to peruse the scientific literature and read review and/or primary research articles in developmental biology and organogenesis fields.

5. Evaluation:

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<th>Component</th>
<th>Date</th>
<th>% of Final Mark</th>
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<tr>
<td>Written Assignment</td>
<td>December 1st</td>
<td>15%</td>
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<tr>
<td>Mid-term exam</td>
<td>TBA</td>
<td>30%</td>
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<tr>
<td>In class Assignments</td>
<td>See schedule for dates</td>
<td>15%</td>
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<tr>
<td>Final exam</td>
<td>TBA (Dec 10 – 22, 2016)</td>
<td>40%</td>
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The mid-term (2 hours) and final exam (3 hours) will consist of short answer essay questions developed from lectures, assigned readings and other presented material. There will be a few practice exam questions provided before the midterm and final exams. In addition, Assignments 1 and 2 are designed to help prepare you for the mid-term and final exams. The final exam (3 h) will consider experimental ideas/approaches presented throughout the course, with the content focus being on the second half of the course.
6. Additional Information/Statements

Statement on Use of Electronic Devices
Electronic devices will not be allowed during tests and examinations.

Statement on Academic Offences
Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes an Scholastic Offence, at the following website: http://www.uwo.ca/univsec/handbook/

All assigned written work required in the course may be subject to submission for textual similarity review to the commercial plagiarism detection software under license to the University for the detection of plagiarism. 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 The University of Western Ontario and Turnitin.com (http://www.turnitin.com).

Absence from course commitments

A. Absence for medical illness:

Information about “Accommodation for Medical Illness – Undergraduates: POLICY ON ACCOMMODATION FOR MEDICAL ILLNESS - UNDERGRADUATE STUDENTS” can be found in the Academic Handbook at: http://www.uwo.ca/univsec/handbook/

Students must familiarize themselves with the Policy on Accommodation for Medical Illness: https://studentservices.uwo.ca/secure/index.cfm

Statement from the Dean's Office, Faculty of Science
If you are unable to meet a course requirement due to illness or other serious circumstances, you must provide valid medical or other supporting documentation to the Dean's office 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. In the event of a missed final exam, a "Recommendation of Special Examination" form must be obtained from the Dean's Office immediately. For further information please see: http://www.uwo.ca/sci/counselling/policies_faq.html

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.shs.uwo.ca/student/shs.policies.html
The Policy on Accommodation for Medical Illness is also available on the BMSUE secure site: www.uwo.ca/bmsc

Medical documentation for accommodation for medical illness of work worth less than 10% of the total course grade will be required. Such documentation must be submitted by the student directly to the appropriate Faculty Dean’s Office and not to the instructor. It will subsequently be the Dean’s Office that will determine if accommodation is warranted. The accommodation will be in the form of a make-up assignment, make-up quiz, or re-weighting.

B. Absence for non-medical reasons:

Appropriate documentation must be submitted by the student directly to the appropriate Faculty Dean’s Office and not to the instructor for non-medical absences from quizzes, assignments and the final exam is required. It will subsequently be the Dean’s Office that will determine if accommodation is warranted. The accommodation will be in the form of a make-up assignment, make-up quiz, make-up exam or re-weighting, which may involve written exams being replaced by oral exams.

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.

A Special Examination must be written at the University or an Affiliated University College no later than 30 days after the end of the examination period involved. To accommodate unusual circumstances, a date later than this may be arranged at the time permission is first given by the Dean of the Faculty. The Dean will consult with the instructor and Department Chair and, if a later date is arranged, will communicate this to Registrarial Services. If a student fails to write a scheduled Special Examination, permission to write another Special Examination will be granted only with the permission of the Dean in exceptional circumstances and with appropriate supporting documents. In such a case, the date of this Special Examination normally will be the scheduled date for the final exam the next time the course is offered.

Support Services:

Registrarial Services: http://www.registrar.uwo.ca

Academic Counselling (Science and Basic Medical Sciences): http://www.uwo.ca/sci/counselling/index.html

USC Student Support Services: http://westernusc.ca/services/

Student Development Services: http://www.sds.uwo.ca
Student Health Services:  [http://www.shs.uwo.ca/](http://www.shs.uwo.ca/)

Students that are in emotion/mental distress should refer to Mental Health@Western [http://www.uwo.ca/uwocom/mentalhealth/](http://www.uwo.ca/uwocom/mentalhealth/) for a complete list of option about how to obtain help.