120.627 Stem Cells and the Biology of Aging and Disease (3 credits)
Third term (January 21 – March 13, 2020)

Class Times: Mondays & Wednesdays, 10:30 – 11:50 am

Classroom: Room W2030 in the Bloomberg School of Public Health

Course Director: Daniela Drummond-Barbosa, Ph.D.
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Teaching Assistant: Ana Caroline Gandara, Ph.D.
Room W3104-2
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Course Description: This course is intended to expose students to cutting-edge topics in stem cell biology through a combination of lectures and discussions based on primary literature. Topics include basic stem cell biology in invertebrate and vertebrate systems, including germline, neural, and Leydig stem cells; the regulation of stem cells by physiology and aging; the connection between stem cells, telomerase, and cancer; and ethical issues pertaining to potential therapeutic applications of stem cells.

Course Learning Objectives: After successfully completing this course, a student will be able to explain some of the basic cellular and molecular mechanisms that ensure self-renewal of stem cells; compare and contrast the regulation and function of stem cells in different systems; explain how physiology and aging impacts stem cell behavior and function; discuss how telomerase function is relevant to stem cells and cancers; and raise some of the ethical issues in stem cell research and its therapeutic applications.

Pre-Requisites: This course is aimed at master or doctoral students, and postdoctoral fellows that have successfully completed a course in biochemistry, molecular biology, or cell biology at undergraduate or graduate level.

Readings: Students will be expected to read one or two recent reviews and/or primary literature papers assigned prior to each lecture or discussion. Papers will be provided on the CoursePlus website, and should be read by students prior to class.

Course Format: This course is based on lectures and paper discussions. Students should attend all lectures and be prepared to participate during the paper discussions.

Course Grading: Evaluation will be based on midterm (50% of grade) and final (50% of grade) exams. Final exam will only cover material from post-midterm classes.

<table>
<thead>
<tr>
<th>Course grading scale:</th>
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<tbody>
<tr>
<td>90-100</td>
<td>Outstanding</td>
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<tr>
<td>80-89</td>
<td>Very good</td>
</tr>
<tr>
<td>70-79</td>
<td>Acceptable</td>
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Course Schedule:

Session 1 – Wednesday, January 22
Course introduction (Daniela Drummond-Barbosa)

Session 2 – Monday, January 27
Germline stem cells in the mammalian testis (Bill Wright)

Session 3 – Wednesday, January 29
Paper discussion on mammalian germline stem cells led by students (Ana Gandara)

Session 4 – Monday, February 3
Telomerase, stem cells, and cancer (Alan Meeker)

Session 5 – Wednesday, February 5
Paper discussion on telomerase, stem cells and cancer led by students (Alan Meeker)

Session 6 – Monday, February 10
Leydig stem cells in the mammalian testis (Barry Zirkin)

Session 7 – Wednesday, February 12
Paper discussion on Leydig stem cells led by students (Barry Zirkin)

Session 8 – Monday, February 17
Mid-term written examination (in class, closed-book) – 50% of grade

Session 9 – Wednesday, February 19
Neural stem cells (Christa Habela)

Session 10 – Monday, February 24
Paper discussion on neural stem cells led by students (Christa Habela)

Session 11 – Wednesday, February 26
Drosophila as a model for stem cell research (Daniela Drummond-Barbosa)

Session 12 – Monday, March 2
Impact of whole-body physiology and systemic factors on stem cells (Daniela Drummond-Barbosa)

Session 13 – Wednesday, March 4
Paper discussion on stem cells and physiology led by students (Daniela Drummond-Barbosa)

Session 14 – Monday, March 9
Ethical issues in stem cell research (Bill Wright)

Session 15 – Wednesday, March 11
Final written examination (in class, closed-book) – 50% of grade