

**MEDS 335**  
**Human Development:**  
**From Stem to Sternum**

**FALL 2017**

Mondays 12:00 PM to 1:50 PM

2 units

Location: WPH 206

<https://classes.usc.edu/term-20163/course/meds-335/>

**Instructors:**

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**Office Hours:**

Office hours will be scheduled by appointment. If you would like to meet in person, then please try to be available during the hour after class. You can also come to HSC (Segil) or to CHLA (Georgia) to meet in our office, if that is more convenient for you. We are available to meet by telephone or by Skype if you are unable to meet before/after class or at our off-campus offices.

**Course Description**

The transformation of a single cell, the fertilized egg, into a mature organism represents one of the most fascinating, complex, and mysterious processes in biology. This course will introduce you to some of the fundamental biological processes that go into the development of organisms, including gene regulation, control of organ size and growth, and the cell and molecular biology of developmental timing.

This course will consist of lectures and related student presentations. The course will start with a discussion of basic concepts of how the early embryo forms, how cells begin to specialize using cell-cell communication and extracellular signaling to alter gene expression and developmental fate, and how the basic axis and organ systems are determined. We will progress to discussing the origin of specific tissues as examples of complex development. Finally, we will discuss postnatal maturation, the role of the environment, and the exciting areas of stem cell biology and regenerative medicine in the context of maintenance and aging of the human body.

In past years, we have found that some of the students taking this course, were also taking the Human Cadaver course simultaneously, and that learning about the developmental origins and mechanisms of the different organ systems, heightened their appreciation of structure and function being studied in that course.

**Schedule:**

First day of classes:

Monday, August 21, 2017

Last day to add:

Friday, September 8, 2017

Last day to drop without a mark of "W" and receive a refund:

Friday, September 8, 2017

Last day to withdraw without a "W" on transcript or change pass/no pass to letter grade:

Friday, October 6, 2017

Last day to drop with a mark of "W":

Friday, November 10, 2017

End of session:

Wednesday, December 13, 2017

### Learning Objectives

Upon completion of this course, a student will have:

- a working knowledge of the origin of the major organ systems in the human body
- an understanding of the core concepts of developmental biology including developmental potential, cell determination and fate, morphogenesis and tissue movements, growth control and the cell division cycle, stem cells and regeneration, molecular and cellular evolution of development.

**Recommended Preparation:** One or both of the following:

Cell Biology (BISC220L, BISC221L);

Molecular Biology (BISC320L)

### Required Readings and Supplementary Materials

All required readings for the course will be from review articles and from primary research papers. Links to the articles will be posted on the class Blackboard site. You must be connected to the USC network to access these articles.

Textbook readings listed on the syllabus and Blackboard are strongly recommended. The Human Embryology and Developmental Biology can be accessed free through USC Digital Collections. There are additional textbooks from which we will recommend readings. They have their individual strengths and weaknesses. You do not have to read all three texts, but while they generally overlap, they do cover some different material. The textbook readings will broadly cover the basics of development in more detail than we will cover in class. Copies of the text are on reserve at Leavy Library.

*Developmental Biology by Scott Gilbert and Michael Barresi, 11th edition.*

*This is a great textbook, more concept driven and very well written.*

*Principles of Development- Fourth Edition by Lewis Wolpert and Cheryll Tickle*

*This is a very readable text.*

*Human Embryology and Developmental Biology – Fifth Edition by Bruce Carlson.*

*This textbook can be accessed through USC Digital Collection, so you do not have to purchase it. You can access the textbook by clicking the link below. It is somewhat dense, but oriented to human genetic defects and disease.*

<http://nml.usc.edu/more-info/?id=27226>

### Format of course:

This course is designed to provide you with a broad appreciation of developmental biology, with an emphasis on concepts of cellular and molecular development that underlie morphogenesis of organ systems. Since it is a 2 unit class, it will not be possible to be comprehensive of all the organ systems in the human body, but rather will move between organ systems to illustrate important concepts of embryonic development.

→ **Class structure:** each class will consist two ~50' periods, with 10' for discussion and a 5' break:

Part 1. An overview of development of the organ system *de jour*.

Part 2. Student presentations based on assigned papers. The goal is to provide students with a research perspective on the developmental problems associated with each week's lecture. This may be from a seminal paper, or a groundbreaking new insight in the field.

### Grading Breakdown

→ **Questions/Summaries - 30%** All students (except that week's presenters) are required to post two (annotated) questions each week, based on the readings that will be presented.

→ **Presentation: 30%** - Small groups (2-3 students, depending on enrollment) will present the research paper(s) each week in the second part of the class.

→ **Final Exam: 30%** - The final exam will consist of a 5-7 page (single spaced) mini-review, fully referenced and analytical. It can be an extension of the subject that you chose for your presentation.

→ Participation: 10% -

**Grading Scale:**

A	94-100
A-	90-93
B+	87-89
B	83-86
B-	80-82
C+	77-79
C	75-76
C-	74-70
D+	69-67
D	66-64
D-	63-60
F	59-0

**Statement for Students with Disabilities**

Any student requesting academic accommodations based on a disability is required to register with Disability Services and Programs (DSP) each semester. A letter of verification for approved accommodations can be obtained from DSP. Please be sure the letter is delivered to us as early in the semester as possible. DSP is located in STU 301 and is open 8:30 a.m.–5:00 p.m., Monday through Friday. Website and contact information for DSP:

[http://sait.usc.edu/academicsupport/centerprograms/dsp/home\\_index.html](http://sait.usc.edu/academicsupport/centerprograms/dsp/home_index.html), (213) 740-0776 (Phone), (213) 740-6948 (TDD only), (213) 740-8216 (FAX) [ability@usc.edu](mailto:ability@usc.edu).

**Statement on Academic Integrity**

USC seeks to maintain an optimal learning environment. General principles of academic honesty include the concept of respect for the intellectual property of others, the expectation that individual work will be submitted unless otherwise allowed by an instructor, and the obligations both to protect one's own academic work from misuse by others as well as to avoid using another's work as one's own. All students are expected to understand and abide by these principles. *SCampus*, the Student Guidebook, ([www.usc.edu/scampus](http://www.usc.edu/scampus) or <http://scampus.usc.edu>) contains the University Student Conduct Code (see University Governance, Section 11.00), while the recommended sanctions are located in Appendix A.

**Emergency Preparedness/Course Continuity in a Crisis**

In case of a declared emergency if travel to campus is not feasible, USC executive leadership will announce an electronic way for instructors to teach students in their residence halls or homes using a combination of Blackboard, teleconferencing, and other technologies.

**Note: This course will introduce you to some of the fundamental biological processes that go into the embryonic development of organisms, with an emphasis on the development of the human body. In this context, we will also discuss the cell and molecular origin of birth defects, and the role of the environment in influencing developmental events.**