Biochemistry of Embryogenesis (BIO 4364)-2017

Lectures: Tuesday and Thursday 12:30 - 1:50 PM; BIOSC342.

Instructor: Gianfranco Bellipanni, Ph.D. – bellipa4@temple.edu

Office Hours: Biology Life Sciences Building, Room 427B
   - By appointment (Phone: 215-204-9578, or email)
   - TBD 12-1pm

Prerequisite:
   Although Bio 2203 Genetics is the only prerequisite, students without any background in molecular biology or biochemistry may find Bio 4364 difficult.

Description:
   Biochemistry of embryogenesis is a course designed to impart a broad understanding of the molecular mechanisms underlying animal development. The course involves the study of molecular pathways involved in embryonic development—including Wnt, Shh, BMPs, FGF and Delta/Notch signaling. In the second part of the course we will focus on the role of this signaling pathways during, early embryo development and differentiation of organs, tissues, and cells—in a number of model systems among of invertebrate and vertebrate organisms. This course will introduce students to aspects of biochemistry like multi proteins complex involved in specific gene transcription and the developmental processes.

Material

Grading:
   At the end of term your Final Grade will be based as follows:

   20% Quizzes: The quizzes will help you keep up with the readings and manage your time wisely. Quiz dates are listed in the schedule at the end of this document.

   20% Mid-term exam: There will be three exams during the term.

   20% case study presentation: by the end of the semester there will be one case study, students independently will explore a topic elated to the course and present their findings.

   20% Final Exam: It is not cumulative. Exams may include short answer, essay, and multiple-choice questions.
There will be NO MAKE-UP TESTS OR QUIZZES throughout the course. Missed quizzes will count as your lowest score quizzes. If have a documented medical or family emergency, a make-up exam may be given PROVIDED YOU CONTACT YOUR INSTRUCTOR BEFORE THE EXAM OR AS SOON AS POSSIBLE AFTER THE EMERGENCY. Complaints about grading will not be considered later than 2 weeks after the test is returned.

Final grades will be rounded to the nearest whole number.
A range = 92% or above
A- range = 90 - 91%
B+ range = 87% - 89%
B range = 83% - 86%
B- range = 80% - 82%
C+ range = 76% - 79%
C range = 65%-75%
C- range = 60% - 64%
D+ range = 55% - 59%
D range = 50% - 54%
D- range = 45%- 49%
F range = 44% or below

Blackboard:
Course announcements, assignments, and grades will be posted online using BlackBoard. When available, PowerPoint presentations will be posted shortly before or after each lecture. Updates to this syllabus will be posted; please check periodically. If you have not used BlackBoard previously, ask a fellow student to spend a few minutes helping you.

You will also receive important course announcements via your Temple email account. If you do not use your Temple email account, you need to activate it. If you have forgotten your password, you need to go to Computing Services and have them assign you a new password. It is strongly recommended that you check your e-mail regularly. I may send messages—sometimes with attachments—to the class using this medium. You should also feel free to email me if you have any questions or problems (please include your full name in all email messages regarding Bio 3265)—I check e-mails daily. But please, feel free to call if you prefer a more personal communication. I am also available during the office hours listed above. If you don’t find me in our office, please check for me in the lab (BL 422). If you would like to meet with me at another time, please don’t hesitate to e-mail or to call, and I can schedule a time to meet.

Attendance:
Lecture attendance and punctuality is expected and your presence is MANDATORY when quizzes or exams are scheduled. If you miss a class meeting for any reason, you will be held responsible for all material covered and announcements made in your absence. To get credit for an in-class quiz you must attend the scheduled class. Quizzes will be administered at the beginning of the class. If you are late in the class you will miss
the quiz. Tardiness is counted as zero. Avoid entering the lectures late. If you are late, enter as quietly as possible.

**Academic Rights and Responsibilities:**

Freedom to teach and freedom to learn are inseparable facets of academic freedom. The University has adopted a policy on Student and Faculty Academic Rights and Responsibilities (Policy # 03.70.02) which can be accessed through the following link:

http://policies.temple.edu/getdoc.asp?policy_no=03.70.02

**Academic dishonesty:** The University has a policy on Student and Faculty and Academic Rights and Responsibilities (Policy #03.70.02), which can be accessed through the following link:

http://policies.temple.edu/getdoc.asp?policy_no=03.70.02

This includes Temple University's rules on plagiarism and cheating and general academic dishonesty. Temple rules prohibit:

1. Academic dishonesty and impropriety, including plagiarism and academic cheating.
2. Interfering or attempting to interfere with or disrupting the conduct of classes or any other normal or regular activities of the University.

**Students with disabilities:** Any student who needs accommodation because of a disability should contact Dr. Bellipanni privately to discuss the specific situation as soon as possible. The Office of Disability Resources and Services (215-204-1280) in Ritter Annex 100 can coordinate reasonable accommodations for students with documented disabilities.

**Academic freedom:** The University has a policy on Student and Faculty and Academic Rights and Responsibilities (Policy #03.70.02). Follow the link http://policies.temple.edu/getdoc.asp?policy_no=03.70.02.

**Changes to this syllabus:** The information contained in this syllabus, other than the grade and missed-exam policies, may be subject to change with reasonable advance notice, as deemed necessary and appropriate by the instructor.
Tentative class schedule and subjects

26 lectures-day, 23 lectures, 1 day mid term exam and 2 days for case study presentation

1. Lectures 1-2: Intro-What is biochemistry?
2. Lectures 2-3: Intro-What is embryology?
   a. Mechanisms of developmental organization
   b. Specifying identity
   c. Differential gene expression
   d. Cell to cell communication
3. Lectures 4-9: Biochemistry of signaling pathways
   a. Wnt/ Beta-catenin complex
   b. TGF-beta/nodal
   c. Delta-Notch
   d. Fgf
   e. Bmp
   f. Shh
4. Lectures 10-12: Embryogenesis-Stem cells biochemistry
   Stem cells: Nanog/Oct4/Sox2/Esrrb/Kfl4
5. Lectures 13-16: Biochemistry of early invertebrate Embryogenesis
   Drosophila egg patterning and development
   Dorso-ventral patterning in frog and fish
7. Lectures 21-23: Embryogenesis
   Specification of the Spinal cord neurons