Masters of Arts in Biology

January 14th, 2015

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Associate Dean, Office of Graduate & Postdoctoral Studies
Division of Biology & Medicine
Masters of Arts in Biology

• Established in 1993 via contractual agreement.

• Accredited by Connecticut Department of Education.

• Course offering is a section of an existing Brown University course.
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• “The quality of student performance required is at least as rigorous as for the Master of Arts degree within any Graduate Program in the Division.

• The difference is the Pfizer students obtain breadth in Biology in more than one graduate area by not imposing strict requirements for specific courses.”

• http://www.brown.edu/about/administration/biomed/graduate-postdoctoral-studies/brownpfizer-master-arts-program
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Objectives

• Provide graduate instruction within the biological sciences for Pfizer colleagues and contractors who wish to extend their knowledge in discrete areas relating to their employment and/or interests.

• Provide a broad-based and rigorous Master of Arts training in biological sciences.
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Experiences

Over 170 M.A. in Biology awarded.
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Experiences

Some have gone on to higher degrees....
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Overview

• Open to Pfizer contractors and colleagues.

• Only one prerequisite required:
  • *A Bachelors degree in any field.*

• All courses held on-site at Pfizer-Groton campus and available via WebEx for offsite employees.
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Overview

- Pfizer employees and contractors register as Special Students via a Registration Form;
  - Standard Brown tuition fees apply.

- Students apply to Graduate School for the M.A. program after successful completion of two courses.

- Pfizer reimburses colleagues only who pass with grade of a ‘C’ or better.
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Program Requirements

• 8 graduate courses:
  • 2 of 8 courses in “core” subjects
    • cell biology,
    • biochemistry,
    • genetics,
    • pharmacology;
  • 6 of 8 courses with grade of ‘B’ or better.

• Passing final paper or proposal “culminating experience” on topic approved by Assoc Dean, Graduate & Postdoctoral Studies.
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Program Requirements: Culminating Experience

• As a culminating experience for the Master of Arts in Biology Program, there are two options:
  • an NIH style research proposal based on an original hypothesis or
  • a final paper which, based on the course work taken by the student, represents an original in-depth analysis and literature review of a problem in modern biology.
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Program Requirements: Culminating Experience

• **Research proposal** (written as though you were preparing a NIH RO1 application) will include:
  • project summary/abstract,
  • specific aims,
  • research strategy,
  • literature cited.

• **Final paper** (10-15 pgs, excluding figures and references) will include:
  • introduction,
  • discussion,
  • conclusion,
  • literature cited.
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Program Requirements: Culminating Experience

• Topics must be discussed with, and approved by the Associate Dean for Graduate and Postdoctoral Studies.

• The final project may be undertaken following completion of 7 courses, but must be completed no later than one semester following completion of the 8th course.
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Program Requirements:
Culminating Experience

• Both projects are designed to demonstrate the student's ability to master and integrate the knowledge gained in the prior course work and to apply that knowledge to a specific problem in modern biology.
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Program Requirements

• No courses can be transferred from another institution.

• Must be actively employed as a colleague or contractor at Pfizer.

• Pfizer M.A. students may take courses toward the degree on Brown University campus with permission of instructor and Assoc. Dean of Graduate and Postdoctoral Studies.
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Program Requirements

• Once accepted by the Graduate School, the students are expected to enroll in courses continuously each semester;
  • with the exception of the summer term.
  • If not, a request for a Leave of Absence (LOA) must be submitted one month prior to the start of the term via the Graduate School to avoid billing.
  • Only one LOA is permissible during the course of study.
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Application Requirements

• Successful completion of two Brown University graduate courses (B or better).

• Undergraduate transcript with date of degree.

• Letter of recommendation from Supervisor at Pfizer.

• 1-2 pg. Colleague Statement

• No GRE requirement!
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Upcoming Courses

- Fall 2013: Virology
- Spring 2014: Cell Biology
  - Core course
- Fall 2014: Histology
- Spring 2015: Human Physiology
- Fall 2015: Physiological Pharmacology
  - Core course
- Spring 2016: Developmental Biology
- Fall 2016: Cancer Biology
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Previous Courses

• Advanced Biochemistry,
• Advanced Microbiology,
• Cancer Biology,
• Cell Biology,
• Developmental Biology,
• Drug Delivery,
• Human Physiology,
• Introduction to Epidemiologic Research Methods
Questions?
<table>
<thead>
<tr>
<th>Date</th>
<th>Lecture Topic</th>
<th>Vander 12\textsuperscript{th} edition</th>
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<tr>
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<td>2</td>
<td>1/27</td>
<td>Transport and Osmosis, Cell Signaling</td>
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<td>Resting and Active Membrane Potential, AP Conduction, Synaptic Transmission</td>
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<td>4</td>
<td>2/10</td>
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<td>2/17</td>
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<td>6</td>
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<td>Cardiac I, Cardiac II</td>
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<td>7</td>
<td>3/3</td>
<td>Blood Flow I, Blood Flow II</td>
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<td>8</td>
<td>3/10</td>
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<td>Renal I, Renal II</td>
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<td>Renal III, Acid/Base</td>
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<td>4/14</td>
<td>Sports Physiology, Gastrointestinal I</td>
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<td>4/21</td>
<td>GI II/Control of Feeding, Metabolism</td>
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<td>4/28</td>
<td>Diabetes, Special Topic</td>
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<td>16</td>
<td>5/5</td>
<td>Final Exam</td>
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Note: The schedule is tentative.
What do I assume for prior knowledge?

- Introductory Biology
- Basic chemistry
- Basic physics (Ohms Law... $V = IR$)

Chapter 2 of the text has review of basic chemistry that is pertinent to physiology
BIOL2117
Canvas webpage

• Syllabus
• Updated readings
• Exam Results
• Lecture Slides
• Additional Material
• Discussion Group
Online Office Hours

**When?**
Regular weekly time (to be determined)
Exam Review (Sunday before Tue exam)
Hours will be posted on the myCourses webpage.

**Where?**
Wherever you have internet access

**Why?**
(this is obvious)

**How?**
Adobe Connect?...log onto the following address
Grades

- Midterm 1  30%
- Midterm 2  30%
- Final Exam  40%
- Final Grade  100%
Who is the instructor?

• John Stein is a Lecturer in the Division of Biology & Medicine and Neuroscience
• Teaches BIOL0140C ‘Communicating Science: Animating Science’ and BIOL0800 ‘Principles of Physiology’.
• He co-teaches NEUR0010 ‘The Brain: An Introduction to Neuroscience’.
Course Description

• Presents drugs in the context of the diseases they treat.

• A group of the most commonly prescribed drugs is discussed in terms of their fundamental modes of action and clinical importance.

• *Previous course work or knowledge of physiology helpful but not required.*

• *The course fulfills a core course requirement.*
Course Objectives

• To become familiar with the *basic principles* related to the use of drugs for treating human disorders.

• To understand the *mechanism of action* of therapeutically useful drugs.

• To appreciate the *limitations* of drug therapy and the possibilities for *future drug development*.
Topics Covered

1) Basic principles of drug/cellular target interactions, such as drug/receptor interactions
Topics Covered

• 2) How can drugs be *administered*, and how are they *distributed, metabolized* and *excreted*?

• 3) What are the stages involved in *drug development* from preclinical studies to human marketing?

• 4) *Cardiovascular pharmacology*: Angina, Arrhythmias, Congestive Heart Failure, Cholesterol Control

• 5) *Central Nervous System*: Transmitters and Disorders: Alzheimer’s, Parkinson’s, Depression, Schizophrenia, Epilepsy, Drug Addiction
Topics Covered

• 6) Endocrine Pharmacology: Diabetes and Osteoporosis
• 7) Chemotherapy: Basic principles for attacking unwanted cells or organisms (Anticancer, Antiviral, Antimicrobial)
• 8) Inflammatory Pharmacology: Immunosuppressive Drugs, Peptic Ulcer Disease, Asthma
• 9) Where appropriate, special attention will be given to areas and drugs that are targeted by Pfizer
Course Details

• Ideal student background: Biology and Chemistry.


• There will be weekly 20 minute quizzes worth 75% of the course grade, and a term paper worth 25%.
Here’s Hoping You Are Better Prepared For The Quiz Questions Than This Group!
Questions?
Richard Freiman, PhD
Associate Professor
Research interests: mechanisms of transcription regulation, mammalian development

Kristi A. Wharton, PhD
Professor
Research interests: mechanisms of cell fate specification, intercellular signaling (BMP signaling), neurodegeneration (ALS)
Development is a circular process

“The development of multicellular organisms from a single cell - the fertilized egg - is a brilliant triumph of evolution.”

Lewis Wolpert
How is an organism constructed?

Development is a process, characterized by progressive change (like orgami), starting from a single cell giving rise to a multi-cellular complex organism.

How is the overall pattern of the body plan laid out, i.e., head to tail, back to front, left and right?

Process of pattern formation
How do different types of cells become specified?

How are cells organized together to form a functional organ?
Do cells have multiple potentials?
Which cells, and what controls their fate?

What controls the ability of some tissues to regenerate?
What regulates growth?
Other topics

- Remarkable conservation of process during evolution
- Development of various organ systems: heart and vasculature, limb, muscle/skeletal, sensory organs, etc
- Environmental influence on development – toxicants, nutrition
- Developmental plasticity
- Birth defects and cancer
COURSE GOALS
1. To familiarize students with the subject matter of developmental biology, including basic concepts and experimental analyses. Developmental biology is a broad, highly interdisciplinary field and we will not attempt a comprehensive survey of all its aspects. Representative topics have been selected to illustrate fundamental concepts.
2. To encourage students to place the "facts" that they learn into an appropriate operational and theoretical framework.
3. To enable students to learn the limitations and transient nature of "facts" - that is, to understand the design and context of experiments which lead to the establishment of something as a fact - and to develop an ability to evaluate such experiments in a rigorous, critical fashion.

COURSE PREREQUISITES:
Introductory course in biology and, at least one course in genetics, cell and molecular biology, and/or biochemistry

COURSE MATERIALS:
Text: Scott F. Gilbert, Developmental biology 10th ed (Sinauer, 2013)
Lecture slides and additional readings: posted on Canvas site

COURSE ASSESSMENTS:
Quizzes: Weekly quizzes to help students assess their comprehension
Exams: Three exams
Questions?
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How to get started???

1. Register for course offering via the Brown website:
   
   http://www.brown.edu/pfizer

2. Educational Assistance:
   
   – **Colleagues:** Apply for via HR source. Following the successful completion of the course (‘C’ or better), you will be reimbursed by Pfizer to pay off your loan.
   
   – **Contractors:** None available, but Ledge Light credit union has individual educational loan options.
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How to get started????

3. Mail tuition check to:

Brown University Cashier's Office
164 Angell Street
Box 1911
Providence, RI 02912
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Pfizer Contact

- **Frances Clark**
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• Good luck!!