



Masters of Arts in Biology

December 1st, 2021

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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.



Masters of Arts in Biology

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.



Masters of Arts in Biology

Experiences



Over **180** M.A. in Biology awarded.

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Experiences

- Many colleagues have remained with Pfizer with advancement within your organization.
- Others have earned additional master's or PhD 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 'B' or better.
- Students must comply with Academic code and Title IX training (on-line)



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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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Auditing of Classes

- **Auditing.** is a student who is registered in a course without earning academic credit upon successful completion under the following conditions:
 - (1) the student must be properly registered for it;
 - (2) the student is entitled to all instruction in the course, including conferences; but will not receive criticism of papers, tests, and examinations.
- Auditing of courses is available only to Pfizer students who have graduated with the Brown/ Pfizer MA degree.
- All other Pfizer students are required to enroll in the course.



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Auditing of Classes

- Auditing of courses is limited to a total of 2 courses per Brown/ Pfizer MA graduate.
- To audit a BROWN course, the student must receive permission from the instructor prior to the start of the course.
 - The audited course shall be entered on the permanent record of any student electing this privilege.
 - The status of a course in which a student has registered may not be changed from audit to credit at any time.
- Auditing of a course will be at no cost to the student.



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Upcoming Courses

- Fall 2021: *Physiological Pharmacology*
 - » **Core course**
- Spring 2022: *Human Physiology*
- Fall 2022: *Cancer Biology*
- Spring 2023: *Molecular Genetics*
 - » **Core course**



BIOL2117: Human Physiology

John Stein

Brown University Dept. of Neuroscience

John_Stein@brown.edu

I apologize for not being able to be present at this intro meeting. If you have specific questions about this course that impacts your decision on whether or not you wish to take it please feel free to email me.

A number of key elements on the mode of instruction have yet to be determined due to potential impacts of social distancing. But whether we are live and in person (my personal preference) or virtual online I am prepared to make each method effective.

The following slides contain the learning outcomes, a tentative schedule based on week to week topics/exercises and logistics on means of assessment. Please note that the dates listed are only tentative. Much of this depends on method of instruction (online vs. in-person) and final scheduling.

Why take BIOL2117? What will I learn?

The goals of the course are to develop an understanding of the major organ systems in the body and how they work together in health and disease. We will start with selected aspects of molecular and cell biology and then build to an understanding of tissue, organ and organ system function covering nervous, endocrine, muscle, cardiovascular, respiratory, renal and gastrointestinal systems. As the semester progresses, we will study how different organ systems function together to maintain a stable internal environment. Along the way we will discuss human diseases and disorders that perturb this environment, which is interesting itself and also serves to help you understand normal physiology even better. Toward the end of the course we will cover topics of exercise, acid/base balance, metabolism that require integrating knowledge of multiple organ systems. We will also cover several clinical cases where your understanding of basic physiology will allow you to appreciate the corresponding symptoms and the possible side effects of treatment.

Many students appreciate how a course in Physiology allows you to tie knowledge of physics, chemistry, biochemistry and pharmacology to the larger topic of how our bodies work in both health and disease.

BIOL2117 Syllabus, Spring 2022 (Tentative)

| Week | Date (tentative) | Lecture Topic | Vander 12 th edition (black) 13 th edition (red) 14 th edition (TBA) |
|------|---------------------|---|---|
| 1 | 1/18 | Introduction, Homeostasis, Cell Physiology, Diffusion | (45-55) (46-57); Ch3 Section C (66-71); Ch4 (96-100); Protein (34-38) (68-72, 97-101, 34-39) |
| 2 | 1/21 | Transport and Osmosis, Cell Signaling | Ch4 (100-113) (101-114); Ch5 (118-131); Ch6 Section A (136-141) (120-135, 139-144) |
| 3 | 2/1 | Resting and Active Membrane Potential, AP Conduction, Synaptic Transmission | Nervous System Supplement (see webpage) Ch6 Section B&C (142-168) (145-172) |
| 4 | 2/8 | Nervous System Organization, Endocrine, Somatic Nervous System, Skeletal Muscle | (175-180) (179-184); (325-337...details on ACTH & TSH only!) (333-346); (251-263; 265-267; 274-277) (257-269; 272-274; 281-284) |
| | 2/15 | Exam 1 (Optional Hands-on Exercise) | |
| 5 | 2/22 | Cardiac I, Cardiac II | (354-375) (363-385) |
| 6 | 3/1 | Blood Flow I, Blood Flow II | (377-413) (387-422); CardioVis Program |
| 7 | 3/8 | Cardiovascular Function Curves, Respiratory I | (435-454) (447-468) |
| 8 | 3/15 | Respiratory II, Respiratory III | (454-468) (468-482) |
| | 3/22 | Exam 2 (Optional Hands-on Exercise) | |
| 9 | 3/29 | Renal I, Renal II | (476-488) (491-504); (490-505; 512-514) (506-522; 529-531) |
| 10 | 4/5 | Renal III, Acid/Base | (506-511) (524-528) |
| 11 | 4/12 | Sports Physiology, Gastrointestinal I | (267-273; 407-410; 464-465; 566-567) (274-280; 418-421; 478-479; 584-585) (517-547) (534-565) |
| 12 | 4/19 | GI II/Control of Feeding, Metabolism | |
| 13 | 4/26 | Diabetes, Clinical Correlations | (TBA) |
| | 5/4 | Final Exam | |

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

Means of Assessment

- Weekly online quizzes – 20%
- Exam 1 – 20%
- Exam 2 – 20%
- Exam 3 (Final Exam) – 20%
- Research Project on Integrative Physiology of Human Disease – 20%

The weekly online quizzes are open book/notes and designed to facilitate learning and prepare you for exams. With consistent effort you should score very well on these and be in a good position to do well on the closed book exams. Toward the last third of the course you will choose a disease/disorder topic not covered in class, find a research article or two that describes the biological underpinnings of causes, symptoms and side effects of treatments and prepare a short report on your research. The goal is to extend your newly gained knowledge of physiology to a novel topic and demonstrate understanding.

Online Office Hours

In addition to weekly lectures, I will hold weekly office hours to answer questions, review more difficult content and discuss research projects.

When?

Regular weekly time (to be determined)

Exam Review (2 days before each exam)

Hours will be posted on the course webpage.

Where?

Wherever you have internet access

Why?

(this is obvious)

How?

Webex...if things work the same was as this past spring.

Cancer Biology

Jennifer Sanders, Ph.D.

Patrycja Dubielecka-
Szczerba, Ph.D.

Course Overview

Goal: Provide an introduction to the cellular and molecular mechanisms underlying the development of human cancer

First half of course: Genetic and molecular basis of cellular transformation & characteristics of cancer cells.

Second half of course: Evolution of a tumor and the complex interactions that occur between cancer cells and other normal cells within the body.

Course Logistics

- Format: Mix of lecture and discussion of primary literature
- Grading: Discussion Participation, Short Paper, Midterm, Cumulative Final Exam
- Readings: Biology of Cancer by Robert Weinberg
Assigned review articles & primary literature

| TOPIC | FACULTY |
|---|--------------------|
| Characteristics of cancer cells | Sanders |
| Cancer Cell Signaling- Tyrosine Kinases | Sanders |
| Cancer Cell Signaling II- DNA damage/repair | Sanders |
| Epigenetics & Genome fluidity | Sanders |
| Cancer cell cycle & senescence | Dubielecka |
| Cancer Cell metabolism | Sanders |
| Midterm exam | |
| Cancer microenvironment I | Dubielecka |
| Cancer microenvironment II | Dubielecka |
| Invasion and metastasis | Dubielecka |
| Tumor immunology and immunotherapy I | Dubielecka |
| Tumor immunology and immunotherapy II | Dubielecka |
| Cancer stem cells | Dubielecka |
| Review | Sanders/Dubielecka |
| Final exam | Sanders/Dubielecka |

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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 ('B' 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

- **Gabby Gualtieri**
 - Gabrielle.Gualtieri@pfizer.com
 - Pfizer Global R&D; Groton Labs

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- **Good luck!!**