



Masters of Arts in Biology

January 10th, 2019

Elizabeth O. Harrington, Ph.D.

*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

- *“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.”*



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.

Masters of Arts in Biology

Experiences

- Many colleagues have remained with Pfizer with advancement within your organization.
- Others have earned additional master's or PhD degrees.



Masters of Arts in Biology

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 2018: *Advanced Biochemistry*
 - **Core course**
- Spring 2019: *Biotechnology and Global Health*
- Fall 2019: *Molecular Targets of Drug Discovery*
- Spring 2020: *Biology of the Eukaryotic Cell*
 - **Core course**



Questions?

Biotechnology & Global Health

Toni-Marie Achilli, PhD

Lecturer in MPPB

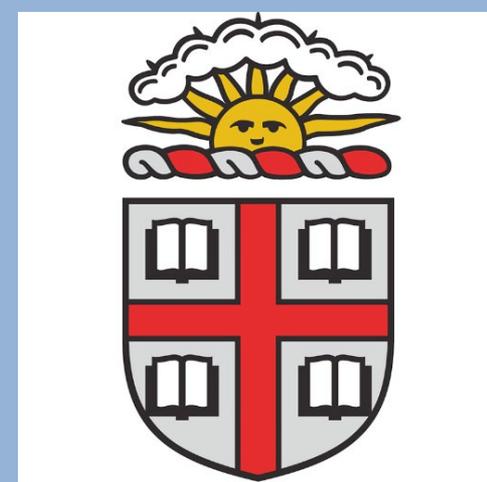
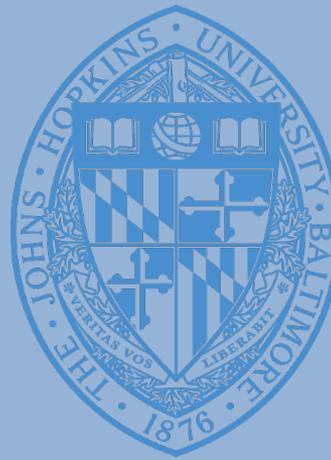
Spring 2019



About Me

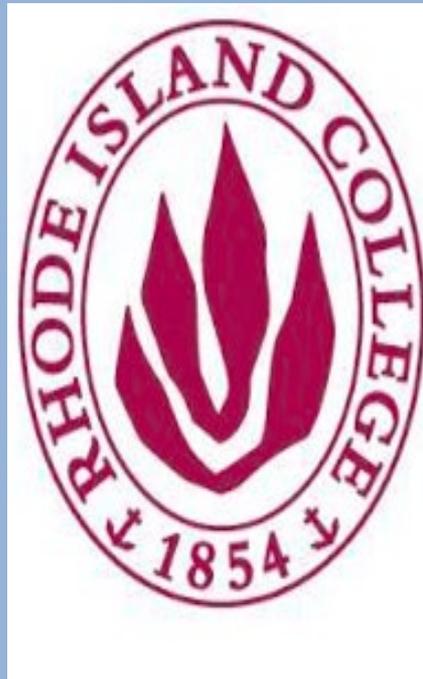
Email

Toni-Marie_Achilli@brown.edu



Office Hours

By Appointment



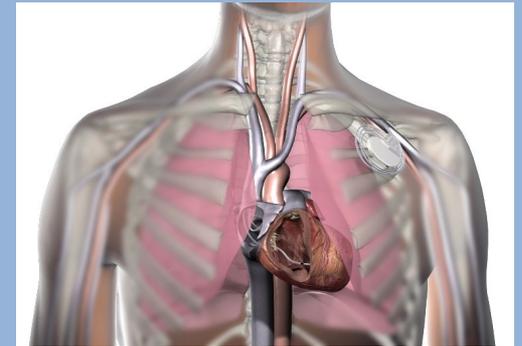
What is Biotechnology?



**Genetic
Modification**



**Pharmaceutical
Sciences**

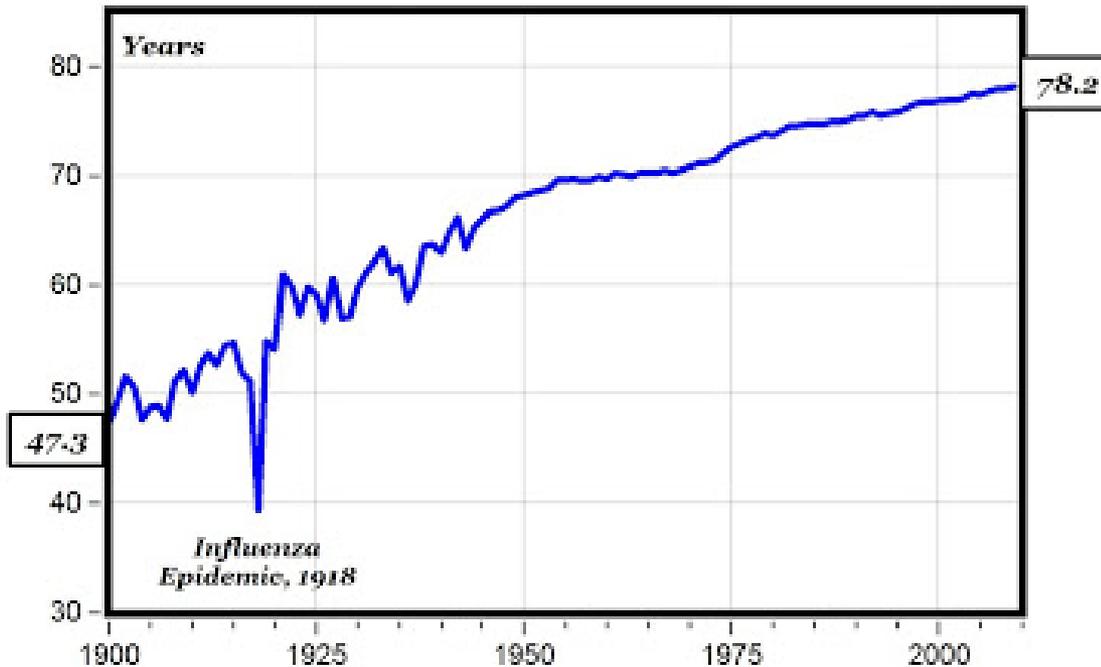


**Substitutive
Medicine**

**Our focus...Biotechnology in
Medicine and Global Health!**

Impact of Biotechnology

U.S. Life Expectancy at Birth 1900 to 2009

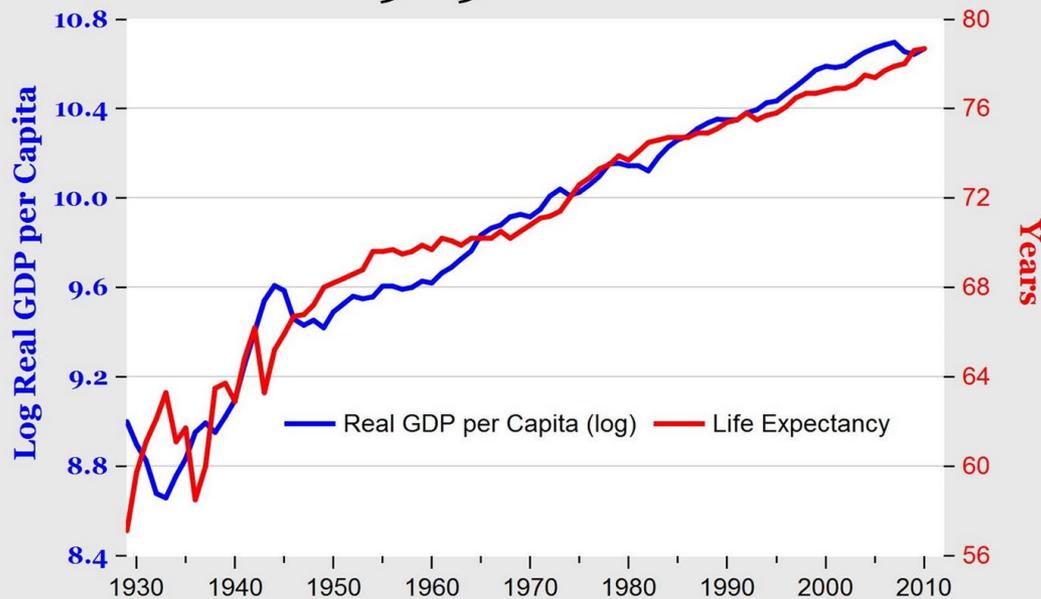


Year	Life Expectancy
1900	47 years
1950	68 years
2000	77 years
2010	78 years

People are living much longer!!

Cost of Biotechnology

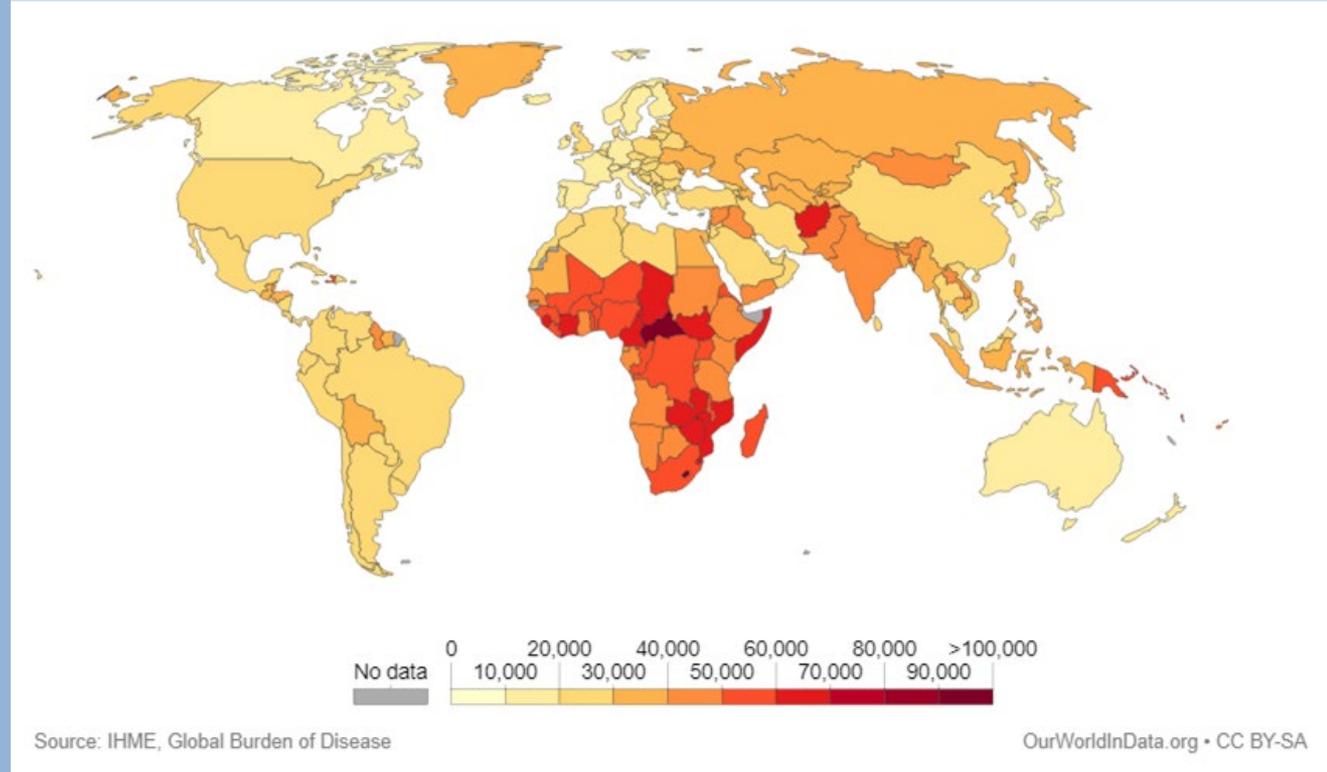
U.S. Life Expectancy vs. Real GDP per Capita (log) 1929 to 2010



Year	Percent of US GDP
1900	2 %
1950	6 %
2000	15%
2010	17%

Burden of Disease Across the World

- **Developed**
 - Higher standard of living
 - Diverse economy
- **Developing**
 - Lower per capita income
 - Lower Human Development Index (HDI)



DALYs (Disability-Adjusted Life Years) loss rate from all causes, 2016

Age-standardized DALY (Disability-Adjusted Life Year) loss rates per 100,000 individuals from all causes. DALYs are used to measure total burden of disease - both from years of life lost and years lived with a disability. One DALY equals one lost year of healthy life.

Burden of Disease Across the World

FIGURE 1 Under-five mortality declined in all regions between 1990 and 2012

Under-five mortality rate, by Millennium Development Goal region, 1990 and 2012 (deaths per 1,000 live births)

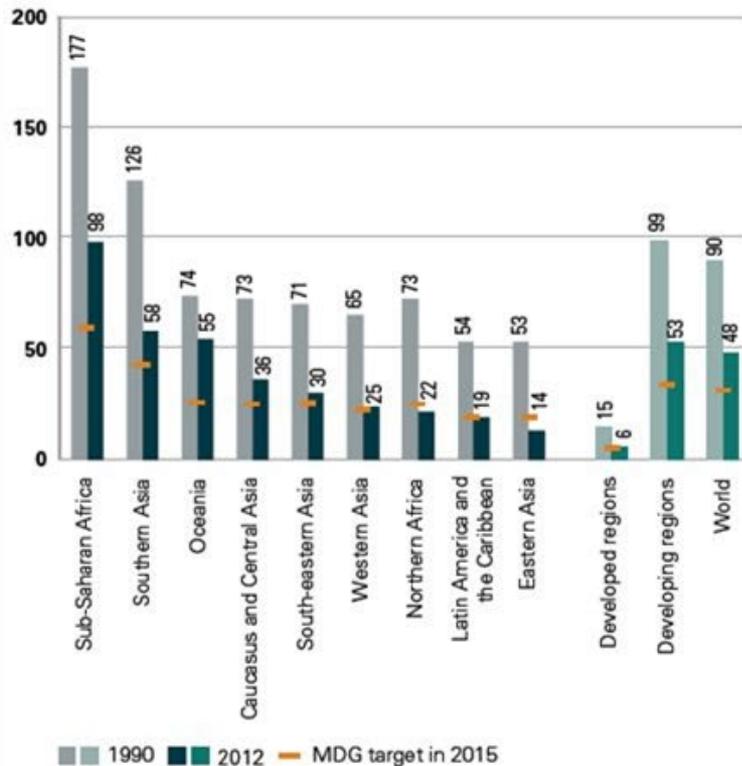
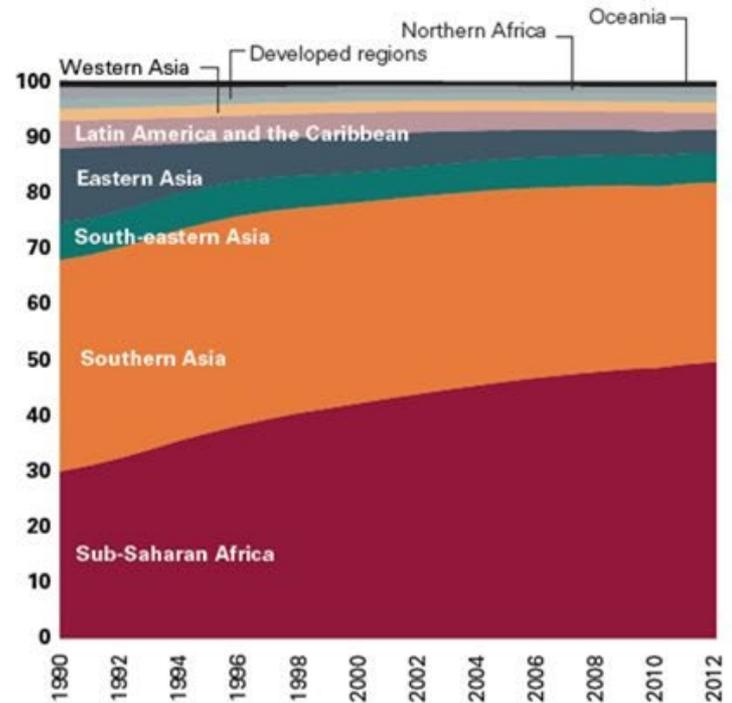


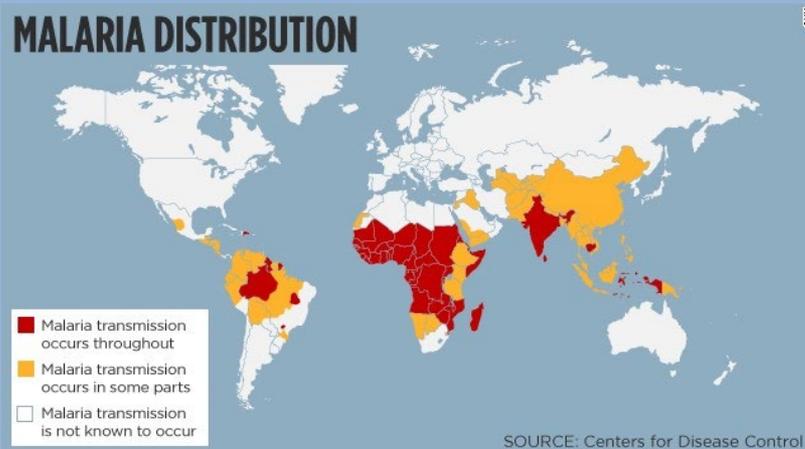
FIGURE 2 Nearly half the world's under-five deaths were concentrated in Sub-Saharan Africa in 2012

Share of global under-five deaths by Millennium Development Goal region, 1990–2012 (percent)



Case studies

Each case study will examine how disease affects different parts of the world differently, often due to the accessibility of technologies available to diagnose and treat those disease



Adults and children estimated to be living with HIV | 2014



Total: 36.9 million [34.3 million - 41.4 million]

Impact on Policy

To reduce health inequalities among underserved populations locally and worldwide through education, research, service and development of partnerships.



Course Objectives

- Use knowledge built in biology curriculums to explore the epidemiology and pathophysiology of predominant health conditions
- Evaluate challenges to diagnosing and treating disease in both the developed and developing world
- Gain an appreciation for the scope and interdisciplinary nature of global health initiatives

Lecture Topics

24-Jan	1. Course introduction 2. Technology Assessment and Health Data
31-Jan	1. The Cost of Health Care 2. Case study: Barrier 3
7-Feb	1. Leading Causes of Mortality 2. Case study: Antibiotic Resistance
14-Feb	Case Study: Immune System and Vaccines
21-Feb	Case Study: Cardiovascular Disease and Biotechnologies
28-Feb	1. Exam 1 2. Group Project Discussion

Lecture Topics

7-Mar	Case Study: Malaria
14-Mar	1. Obesity Gene in the Samoan Population 2. News Article Presentations
21-Mar	1. Case Study: Cancer 2. News Article Presentations
28-Mar	Spring Recess (No Class)
4-Apr	Case Study: Accucirc
11-Apr	Case study: HIV Drug resistance
18-Apr	1. Exam 2, 2. Group Project Discussion
25-Apr	Oral Debates



**Stephen McGarvey,
PhD, MPH**



Ian Michelow, MD



Rami Kantor, MD



David Tomlinson, MD

**Experts in the
field will join us
for guest lectures!**

Grading and Evaluation

Percentage of Grade	
10%	Attendance and in-class participation from readings
15%	News article assignment
25%	Exam 1
25%	Exam 2
25%	Semester Project (written and oral presentation)

Molecular Targets of Drug Discovery—Fall 2019

Diana M. Horrigan, Ph.D.

Lecturer, Brown University

**Molecular Pharmacology, Physiology &
Biotechnology Department**

Diana_Horrigan@brown.edu

Diana Horrigan



- Assumption College, BA in Biology, 2001
- Brown University, Ph.D. in Biomedical Sciences (Molecular Pharmacology & Physiology), 2006
- Began teaching at Brown in 2011
- Other Appointments:
 - Bryant University, Adjunct Clinical Asst. Prof. (Physician's Asst. Program), 2016-present
 - Assumption College, Visiting Asst. Prof., 2009-2011
 - Bridgewater State University, Visiting Asst. Prof. & Adjunct Lecturer, 2006-2008

Courses I currently teach at Brown:

- Molecular Pharmacology & Physiology (Fall)
- Molecular Pharmacology & Physiology
Professional Development Seminar (Fall)
- Cell Physiology and Biophysics (Spring)
- **Molecular Targets of Drug Discovery
(Spring)**

Molecular Targets of Drug Discovery

Fall 2019

Brown/Pfizer MA Program

Drug Discovery Pipeline

BJP JP Hughes et al.

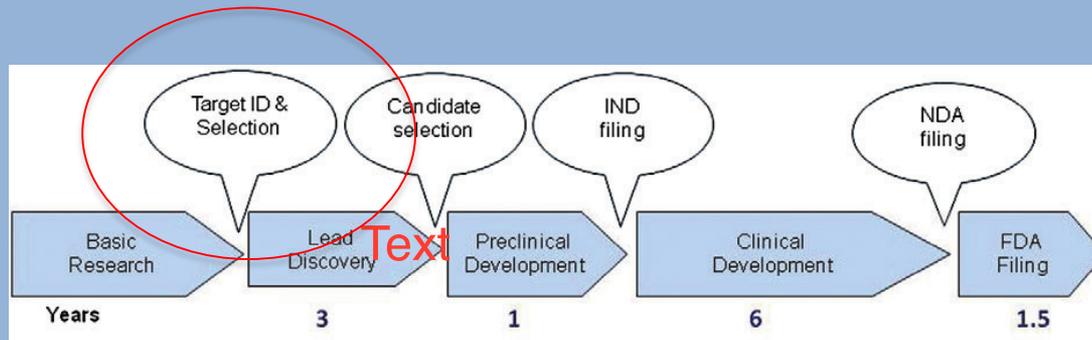


Figure 1

My Goals for Students:

1. I will provide a broad overview of the process of drug discovery and development from target identification & selection through clinical development, with the *main focus* on target identification & selection.
2. We will engage in discussion of current topics related to drug discovery and target identification & selection. I hope we can have stimulating class discussions of current topics.

Class Format

- Weekly lecture/presentation of a particular drug target (or class of targets) as they relate to disease.
- Weekly student-led discussion of a related topic relevant to that week's lecture topic. Preparation for the discussion will be done prior to class via the course website.

Class Assessments

- Group presentations on potential new drug targets
- Homework assignments
- In-class assessments (e.g. tests/quizzes)
- Class participation
- Final project (TBD)

➤ *This is subject to change and/or modification*

Masters of Arts in Biology

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

- **Heather Chen**
 - Pfizer Global R&D; Groton Labs

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- **Good luck!!**