"MICROBIAL PATHOGENESIS" SYLLABUS (SPRING QUARTER 2022)

Infectious diseases continue to be a leading cause of human morbidity and mortality worldwide as well as an important cause of economic loss and the "poverty trap" in developing countries. "Microbial Pathogenesis" focuses on the molecular mechanisms of host-pathogen interactions and pathogenesis of representative bacterial, fungal, and protozoan diseases. Topics include malaria, trypanosomiasis, toxoplasmosis, selected gram-negative and gram-positive bacterial infections, pathogenic mycobacteria, opportunistic mycoses, the evolution of pathogenicity and the impact of the host microbiota during microbial pathogenesis, and the development of antimicrobials and vaccines. The course is taught by Rockefeller and Cornell faculty and selected guest speakers. Each class includes a lecture followed by an in-depth discussion of assigned papers with the lecturer. If possible, the discussion can be continued at lunch with the speaker.

When: Fridays from 10:00 AM - 12:00 PM (March 4 – June 10, 2022)
Where: Carson Auditorium
Registrar: Kristen Cullen <cullenk@rockefeller.edu> (Dean's Office, Rockefeller University)

Course organizers:

Luciano Marraffini	marraffini@rockefeller.edu
Jeremy Rock	rock@rockefeller.edu

Rockefeller/Cornell Faculty Contacts:

Sean Brady	sbrady@mail.rockefeller.edu
Kirk Deitsch	kwd2001@med.cornell.edu
Vince Fischetti	vaf@rockefeller.edu

Outside lecturers:

Andrew Goodman	andrew.goodman@yale.edu
Eduardo Groisman	eduardo.groisman@yale.edu
Joseph Heitman	heitm001@duke.edu
Sebastian Lourido	lourido@wi.mit.edu
Jayne Raper	Jayne.Raper@nyumc.org
Joseph A. Sorg	jsorg@bio.tamu.edu
Sophie Helaine	Sophie_Helaine@hms.harvard.edu
Becky Lamason	rlamason@mit.edu

Credits: 2

Format: Each class includes a lecture (10:00 - 11:00 AM) followed by one or two (depending on the number of students) 20-minute presentations by students on a paper suggested by the speaker in which they outline follow-up experiments (a short break will separate the speaker and student lectures). If possible, lunch with the speaker follows in the Abby Aldrich Dining Room for a set of interested students (12:00 - 1:00 PM).

Background Reading: None

Class Preparation: Two papers will be assigned each week (one original research papers plus one review article) to accompany the lecture. One or two students will be assigned each

class to present follow-up experiments on one of the papers. These experiments will be critiqued by the rest of the class in a discussion moderated by the speaker. At the end of the course each student will write a 3-page proposal on a topic covered in the course but different than the one presented previously. More details will be available in the first lecture.

Evaluation: Credit will be based on class attendance, proposal and participation.

Schedule

March 4 ***Mycobacterium tuberculosis***
Jeremy Rock
The Rockefeller University

March 11 **Bacterial Persistence as a Mechanism of Pathogenesis**
Sophie Helaine
Harvard Medical School

March 18 ***Toxoplasma gondii***
Sebastian Lourido
MIT Department of Biology/Whitehead Institute

March 25 ***Plasmodium falciparum*** **(Malaria)**
Kirk W. Deitsch
Weill Medical College of Cornell University

April 1 **Impact of the host microbiota in bacterial pathogenesis**
Andrew Goodman
Yale University

April 8 **African trypanosomiasis (sleeping sickness)**
Jayne Raper
Hunter College of CUNY

April 15 **Gram-Positive bacterial pathogens**
Vince A. Fischetti
The Rockefeller University

April 22 **Antimicrobial drug discovery**
Sean Brady
The Rockefeller University

April 29 **No class**

May 6 **Mechanisms and barriers of horizontal gene transfer**
Luciano Marraffini
The Rockefeller University

May 13 ***Clostridium*** **pathogenesis**
Joseph Sorg
Texas A&M University

May 20 **Fungal pathogenesis: sexual reproduction in microbial pathogens**
Joseph Heitman
Duke University Medical Center

May 27 **Intracellular bacterial pathogens**
Becky Lamason
MIT

June 3 **No class**

June 10 **Evolution and regulation of bacterial pathogenesis**
Eduardo Groisman
Yale University