BIOL 659 - Topics in Evolutionary Biology: Antimicrobial Resistance

Overview

Description: This seminar will explore how evolutionary principles may be applied to the control of antimicrobial resistance (AMR) through analysis and discussion of primary literature. Topics will include the history of AMR and its control; molecular evolution tools for monitoring AMR; the origin and spread of resistance genes, including the interactions of human-associated, agricultural and natural microbial communities; population genetic and game theoretic models of AMR; empirical evaluation of temporal, spatial and biochemical resistance-proofing strategies; lessons from parallel systems (e.g. Bt resistance); the role of ecological interactions within microbial communities; phage therapy; and review of current public policy prescriptions. The seminar will also provide practice and training in scientific presentation, writing and critique (i.e. peer review).

Meeting time and place: Tues/Thur 2:00-3:15pm in Wilson 133

Instructor: Todd Vision, Assoc. Prof., Dept. of Biology, Genome Sciences 3155, tjv@unc.edu, 919.962.4479, office hours Mon 2-4pm or by appt.

Eligibility: For undergraduates, Biol 201 or equivalent and permission of the instructor. Preferably one or more advanced courses in evolution. Can count as BIOL elective credit in the major if combined with other 600-level courses for a total of three credit hours. May be repeated for credit; may be repeated in the same term for different topics; 12 total credits. 6 total completions.

Credit hours: 2

Class format

The majority of classes will consist of a student paper presentation followed by class discussion. Most of the remainder will be discussions with guest presenters. Student presenters may use slides or handouts in their presentations. Presentations will typically be 15-20 minutes, and cover the major elements of the introduction, methods, results, and discussion, with special attention to figures, tables and statistical analyses. Following each presentation, the paper will be critiqued as a group. In order to have a successful discussion, everyone is expected to have read and be prepared to discuss the paper. All students (presenters and non-presenters) should bring at least one question or discussion point.

Assignments and Final Exam

The oral presentation will count as assignments. Two additional assignments are designed to provide some practice with a core professional skill of scientists, reviewing papers for journals. Peer review requires skills not just in reading with a critical eye, but also judgment in prioritizing concerns, and having the ability to provide actionable suggestions for improvement of a paper. These same skills, turned on one’s own work, can also help ensure that your own articles fare well in peer review. Students will choose two papers in consultation with Dr. Vision on which to write two 500-1,000 word reviews. The final exam will be a 3,000-6000 word review on a topic chosen by the student in consultation with Dr. Vision.
Grading
Final grades will be on the A-F scale for undergraduate, H-F for graduates. The point breakdown will be as follows.
• Reviews - 15 each
• Oral presentations - 30 combined
• Final paper - 25
• Class participation – 15
Rubrics will be provided for each of the assignments.

Readings
All readings and other class materials will be made available as links or downloads from Sakai.

Attendance and preparation
Attendance and full participation are critical for a class of this nature. Please inform Dr. Vision about unavoidable absences. Repeated unexcused absences will count against class participation. Readings need to be completed before the assigned class, and failure to do so will count against class participation.

Key dates
Sep 21 - Review 1 paper selected
Sep 26 - Review 1 due
Oct 26 - Review 2 paper selected
Oct 31 - Review 2 due
Nov 30 – Draft abstract and bibliography of final paper due
Dec 14, 12pm - Final paper due

Notes
Students are expected to know and abide by the UNC Honor Code. This syllabus is subject to change.