Spring 2024

BIOL 115-002: Evolution of Sex

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Evolution and Biology of Sex
BIOL 115 2024

This course is featured as a general education course within the Department of Biological Sciences.

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Sex is often defined according to reproduction, whereby two individuals that are male and female, mate and have offspring. However, sex is achieved in a multitude of ways, many appearing rather bizarre to us humans. This course addresses many levels of organization of sex, including genetics, meiosis, different types of sex determination, and sexual behavior, as well as asexual reproduction, mating strategies, sexual organ morphologies and differences in the male and female nervous systems. Sex is clearly a complex phenomenon that requires an evolutionary perspective to truly understand what it is and does.

Some of the questions we will address are:
- What is sex? Who has sex? Why is it so pervasive?
- What are the original and current functions of sex?
- Why does sex still persist after roughly 1-2 billion years?
- What determines sex? Who can change sex?
- Are there differences between females and males?
- How is sex related to chromosomes or hormones?
- What is sexual selection?
- Why are sex organs so diverse?
- What's the difference between sex and gender? How is it possible to be transgendered?

This course will supply you with a basic evolutionary biological understanding of sex. We will try to answer the above questions, as well as understand what are the current open problems in the field, and where is the sex going.

Plan for the semester

During the first part of the course, we will tackle the cellular and subcellular aspects of sex. We will begin with a refresher of the biological concepts you need to know and remember in order to appreciate the current knowledge. We will then follow by looking at the evolutionary history of possible early forms of sex. This will lead into discussion of what exactly is sex, what are the functions of sex, why is sex maintained and so pervasive.

During the second part of the semester, we will enter organismal Biology by asking how the differences between females and males evolved. We will start by asking whether or why there are more than two sexes. Next, we will discuss the development of sexual characteristics and mating systems, and why sexual organs evolve so fast and sometimes seem so unusual.

At the end of this course, we will cover topics that do not necessarily fit anywhere else, but are nonetheless interesting active areas of research, for example: orgasms, transgender issues and the non-reproductive roles of sex.

While the first and second portions of the course may seem more in keeping with a traditional introductory Biology course, the last third will undoubtedly be more controversial, where we will discuss neurobiology, psychology and others. We will be open to all types of discussion.

Sex can be taboo, and it plays unique roles in our society. I expect that you come with an open mind and be always polite. If we ever talk about a subject that makes you uncomfortable, please let me know, we can talk about it separately or not, as you wish.

We will rely heavily on popular media. Much of the reading material, podcasts, videos, etc. are not up on the Canvas list because they have not happened yet! Every Tuesday I will add to the outside materials source for the next Tuesday. If you come across anything interesting and want to discuss it in class, please let me know!

Grading strategy:

Exams	100 each	300
Final paper	100	100
Random unannounced quizzes	10 each	100
Points possible		500

This is a self-driven endeavor and I am not here to make you do or learn anything. This is your own journey, you are in charge, and you will get out of it what you put into it. Participation is very important though, but it does not mean just attending classes, it means asking questions, giving your opinions and discussing ideas. I understand that some people are shy in a class setting (nothing wrong with that) if you do not want to speak up though, I fully expect you to email me or talk to me in private.

Structure of Classes

Each week will begin with a short conversation about the topic of the day or previous written assignment. I will then go over new material and we will split into groups and start a discussion of the new material.

Final Paper (20 points). Identify a specific topic discussed in the preceding few weeks. You may use the weekly assignment topics for inspiration but you may not choose a question that you have already examined. Follow the same guidelines for the assignments, but in this task your goal is to review a topic using various sources.

Format and mechanics:

1) Write at ~2 pages of single spaced text.

2) Reference all ideas and images that are not your own using a Bibliography (does not count towards page minimum) at the end of your paper. Your bibliography must contain at least 6 RELIABLE sources. Please be careful about web citations. Much of what is published on the web is unreliable. Renowned science magazines, newspapers, video sources (like TEDtalks) or audio (Podcasts (who hosts it?) are acceptable. It is up to you to assess the validity of all your sources!!! I will dig up any resource I don't immediately recognize to see if it is valid and will give points accordingly.

3) Internet references should be cited with an author, page title, a full URL, and the date accessed.

4) There is a 10% penalty per day of lateness.

5) If you would like, YOU MAY SHARE IT WITH ME BEFORE THE DEADLINE FOR FEEDBACK. In order to do that, share a Googledoc (with editorial privileges) with me entitled with your name and what paper number it is.

6) Turn the paper in using Canvas by the deadline (midnight that specific date).

7) Grading: Your grade will be primarily based on how well you meet the objectives stated above and how well you expressed an understanding of the concepts. Proper spelling and grammar matters. Plagiarism of any kind will not be tolerated; copy-paste is never allowed. All assignments are automatically run through TURNITIN.

The final paper can be on any subject of your choosing so long as it relates to the evolution of eukaryotic sex. The paper should be an original synthesis of existing literature.

Written work

Writing is the currency of communication, and intellectual credit is very important in our society. The Department of Biological Sciences affirms that acts of cheating, fabrication and plagiarism by students constitute a subversion of the goals of the University and are serious offenses to academic goals and objectives, as well as to the rights of fellow students. It is the intent of this policy to provide appropriate sanctions, to provide fair and realistic procedures for imposing those sanctions, to provide safeguards for any student suspected of cheating or plagiarism. I will enforce the University's Code of Student Conduct. All instances of cheating, fabrication and plagiarism will be reported to the Office of the Dean of Students.

The following academic sanctions are provided by this rule for offenses of cheating, fabrication or plagiarism. In case of misconduct, I will assign a grade of "F" or zero for the assignment, project, test, paper, examination or other work in which the cheating or plagiarism took place. Upon a second offence, I will assign a grade of "F" or "XF" for the entire course.

Requests for Academic Accommodations

You may need special arrangements to meet your academic obligations during the term because of disability, pregnancy, or religious preferences. Please write to me with any requests for academic

accommodation. I am super flexible.

On a personal note: I have a horrible memory. Please, if we decide something in person, say after class, send me an email or a message in discord to confirm it. If it is not on my schedule, it doesn't exist. I would hate to make a commitment and just forget about it, leaving you feeling rejected. I don't mind at all getting bugged regularly.

Jan 16 - Feb 6	Introduction, review of biological concepts, what is sex anyway.	
Jan 22	DROP/ADD DEADLINE	
Feb 8	Exam 1	
Feb 13 – Mar 5	Organismal biology of sex, sex organ diversity and evolution, mating system strategies.	
Mar 7	Exam 2	
Mar 12	SPRING BREAK	
Mar 14	SPRING BREAK	
Mar 19 – April 9		
Apr 11	Exam 3	
Apr 16 – Apr 25	Orgasms, transgender issues and the non-reproductive roles of sex.	
Apr 30	LAST DAY OF CLASS – Friday classes meet	