A501, Techniques in Reproductive Diversity
Spring, 2014
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Background and Objectives

When you think about it, you can't help but marvel at all the ways in which humans act like other animals…. and the degree to which other animals exhibit properties we used to associate exclusively with humans. So the more we look, the more we see, and I hope you will find pleasure and challenge in thinking about "Common Themes in Reproductive Diversity (CTRD)."

The title of the course is the same as that of the training grant supported by the National Institute of Child Health and Human Development (NICHD). The goal of the training grant is to advance understanding of reproductive mechanisms and behavior in light of evolution (http://www.indiana.edu/~reprodiv/what.php). The goal of this course is to introduce students to methods that will help make that advancement possible.

The course faculty are affiliated with the Center for the Integrative Study of Animal Behavior (CISAB) and conduct research in reproduction and development, sex and sex differences, maternal effects, immune function, cognitive aspects of mate choice, nutritional state and human conception, sexual behavior, molecular developmental genetics, genomics, and more.
http://www.indiana.edu/~reprodiv/faculty.php

Not surprisingly it is you – the students - who will make the greatest progress towards new insights, and we hope that this class will play a role in that. We want you to have access to the newest technology and ideas, so you can make great strides. Thus this course is aimed at PhD students working in fields related to reproduction. Please help us see even more parallels and contrasts when comparing humans, model organisms, and non-traditional organisms.

As you move through the class, please take every opportunity to consider how you might transfer the techniques you learn to your organism or question of choice, and how your field can contribute to other people's projects and to a general understanding of reproduction and development.

Format

- Class will meet 2 times per week, Tuesdays, 1:30-2:30 and Thursdays 1:30-4:30 with exceptions: 12:30 on 1/23 and 1/30, because of job seminar, see also Feb 11-13, where the long class is on Feb 11, and the shorter class on Feb 13.
- Some labs will run over or require that you come in at other times, You will need to be flexible and commit to coming in for extra time if you are to get full benefit.
- The default location is CISAB, but please stay alert, as the venue will change often.
- On Tuesdays rotating faculty will introduce topics and the principles behind their methods. On Thursdays you will do the lab or fieldwork.
- There is no textbook; you may need to make a software purchase during the semester.

- There will be a required proposal to be turned in at the end of the semester and involve a written document and a class presentation during the last week of classes.

Theme

We will have a very loose theme for the class, which is the response organisms exhibit to stressors in the environment (cold, food shortage, crowding, toxins, anthropogenic and other forms of environmental change, etc.). Stress may be acute or chronic and can influence reproduction, immune status, development, cognitive function, cellular metabolism, and more.

If you are interested in how socially challenged mothers affect the sexual development of their offspring or the impact of an urban environment on bird populations, or the effect of population density on the mental health of zoo animals or humans, then you are interested in stress.

Having a theme is a challenge in a class like this, but the goal is not only to pursue a range of techniques, but also to use our own creativity to see how the techniques might inform understanding of a particular area of research.

Sex differences are inherently fascinating and we are all curious about the mechanisms that rise to sex differences developmentally and among adults, and also how selection leads to their evolution. Where possible we will consider sex differences in response to stress.

We will learn methods while posing questions such as these: Does restraint (handling) influence adreno-corticoid output in circulation and does the output vary by sex? In humans, do the sexes differ in sexual desire? What is the relationship between sex, stress, and gender? How might stress influence receptor abundance in blood? How do humans rate attractiveness and do the sexes differ? How do you test for pregnancy in other cultures?

Caveat: I don't want to engage in false advertising. We will touch on these subjects, but time is short, so please don't expect depth that we won't be able to deliver.

Expectations of you

- To participate fully, be prepared, be present, have fun. Inform me if you must be away, but the expectation is that you will be fully engaged every week
- To complete assignments as made by the various faculty participants. The faculty are free to design homework, analytical problem, whatever. Some probably will and some may not.
- To join a small group in order to prepare a collaborative research proposal, which you will turn in to me and present during the last week of classes.
- The proposal should employ at least two of the techniques you will learn this semester, ideally more, and attempt to connect the proposal to our theme.

You may choose the question. I recommend that you choose 1-3 collaborators and prepare a proposal that is 4-5 pages of text plus 1 page of references and 3 figures. Two collaborators may be ideal. I am already looking forward to your presentations.**TECHNIQUES IN REPRODUCTIVE DIVERSITY**

Spring 2014 (as of 1/9/2014)

Jan 14-16: No class

Jan 21-23: Working with wild animals – measuring response to stressors, with blood, feces and feathers– Ellen Ketterson, Adam Fudicker, Rachel Hanauer, Mikus Abolins-Abols, Sam Slowinski -Tuesday, CISAB; Thursday, Kent Farm

Jan 28-30: Introduction, DNA and hormone extractions- preparing Kent Farm samples for next week's analyses" -Rose Stewart, Rachel Hanauer, Mikus Abolins-Abols- Tuesday, CISAB; Thursday, CISAB lab, JH 348

Feb 4-6: Using EIA and molecular sexing to characterize adrenal responsiveness to restraint - Rose Stewart, Rachel Hanauer, Mikus Abolins-Abols- - Tuesday **AND** Thursday, CISAB lab, JH348

Feb 11-13: Using quantitative PCR to assess transcript abundance for target genes, GR and MR – Kim Rosvall Tuesday CISAB lab JH348 (long class); Thursday, CISAB (shorter class)

Feb 18-20: Using functional genomics to measure stress-induced changes in gene expression – Matt Hahn, Biology, Tuesday CISAB, Thursday (TBD)

Feb 25-27: Stress in the city, Michael Romero, Tufts University (TBD)

Mar 4-6: Studying stress and human sexual behavior and sexual psychophysiology - Justin Garcia, Tierney Lorenz, Kinsey Institute, Morrison Hall, 3rd floor

Mar 11-13: Employing neuroanatomical techniques to study sex differences– Dale Sengelaub and Cara Wellman, PBS, Tuesday, CISAB; Thursday, Sengelaub and Wellman labs, PBS building, PYA408

Mar 25-27: Studying signaling proteins during development of sexually selected traits – John Foley, Tuesday CISAB, Thursday John Foley lab, Medical Sciences, Jordan Hall

April 1-3: Methods for studying human mate search and choice – Peter Todd, Rob Bowers, Psychological and Brain Sciences, Cog. Sci, Adaptive behavior and cognition lab HK330

April 8-10: Labeling socially relevant peptides, enzymes and receptors in songbirds – Jim Goodson, Biology, Tuesday CISAB, Thursday Goodson Lab, JHA007

April 15-17: Assessing immune function - Greg Demas, Biology, Tuesday, CISAB; Thursday, Demas lab, JH267

April 22-24: Biomarkers of Women's Reproductive Functioning –Virginia Vitzthum, Anthropology, Kinsey Institute (TBD)

April 29-31: Overview, retrospective and proposal presentations – Ellen Ketterson, CISAB