

**Psychology W3435**  
***Neurobiology of Reproductive Behavior***  
**Spring 2009**

Professor Frances A. Champagne  
[fac2105@columbia.edu](mailto:fac2105@columbia.edu)

PSYC W3435 Neurobiology of Reproductive Behavior (seminar)  
 4 pts F Champagne W 10:10-12:00PM Room 405 Schermerhorn Hall

**INSTRUCTOR PERMISSION REQUIRED PRIOR TO REGISTRATION**

**Please be advised that if you do not obtain permission to register from the instructor prior to registering you will not be permitted to take this course. Requests for permission should be made by email and it is recommended that you make this request in advance of the registration period.**

Reproduction encompasses a broad range of behaviors in the life cycle of an organism from mate selection and copulation to parental care. These seminars will examine various aspects of reproduction across species and the neural mechanisms that regulate these behaviors and allow an organism to adapt to environmental change.

Textbook: Nelson, R.J. (2005) An Introduction to Behavioral Endocrinology. (3<sup>rd</sup> edition) Sinauer Associates Inc., Sunderland MA.

**Weekly syllabus**

Week 1                      **Course Introduction, Selection of Seminar Topics**

Week 2                      **Overview of Hormones and Endocrinology**  
 Nelson Chapters 1-2

**Sexual Differentiation**  
 Nelson Chapters 3&4

Wilson CA, Davies DC. (2007) The control of sexual differentiation of the reproductive system and brain. *Reproduction*. 133(2):331-59

Week 3                      **Mate Selection**  
 Brennan PA, Kendrick KM. (2006) Mammalian social odours: attraction and individual recognition. *Philos Trans R Soc Lond B Biol Sci*. 361(1476):2061-78.

Yamazaki K, Beauchamp GK. (2007) Genetic basis for MHC-dependent mate choice. *Adv Genet*. 59:129-45.

Fisher HE, Aron A, Brown LL. (2006) Romantic love: a mammalian brain system for mate choice. *Philos Trans R Soc Lond B Biol Sci*. 361(1476):2173-86.

Week 4**Sexual Orientation**

Rahman Q. (2007) The neurodevelopment of human sexual orientation. *Neurosci Biobehav Rev.* 29(7):1057-66.

Roselli CE, Resko JA, Stormshak F. (2002) Hormonal Influences on Sexual Partner Preference in Rams *Archives of Sexual Behavior.* 31(1): 43–49

Bocklandt S, Vilain E. (2007) Sex differences in brain and behavior: hormones versus genes. *Adv Genet.* 59:245-66.

Week 5**Male Sexual Behavior**

Nelson Chapter 5

Crews D. (2005) Evolution of neuroendocrine mechanisms that regulate sexual behavior. *Trends Endocrinol Metab.* 16(8):354-61.

Week 6**Female Sexual Behavior**

Nelson, Chapter 6

Dixson A. (2001) The evolution of neuroendocrine mechanisms regulating sexual behaviour in female primates. *Reprod Fertil Dev.* 13(7-8):599-607.

Week 7**Pregnancy and Lactation**

Brunton PJ, Russell JA. (2008) The expectant brain: adapting for motherhood. *Nat Rev Neurosci.* 9(1):11-25.

De Weerth C, Buitelaar JK. (2005) Physiological stress reactivity in human pregnancy—a review. *Neuroscience & Biobehavioral Reviews.* (2):295-312

Lonstein J. (2007) Regulation of anxiety during the postpartum period. *Frontiers in Neuroendocrinology*, 28: 115-141

Theodosis DT, Poulain DA. (2001) Maternity leads to morphological synaptic plasticity in the oxytocin system *Progress in Brain Research*, 133: 49-58

Week 8

MIDTERM EXAM

Week 9

SPRING BREAK

Week 10**Maternal Behavior**

Nelson, Chapter 7

Lévy F, Keller M, Poindron P. (2004) Olfactory regulation of maternal behavior in mammals. *Horm Behav.* 46(3):284-302.

Week 11**Paternal Behavior**

Wynne-Edwards KE. (2001) Hormonal changes in mammalian fathers. *Horm Behav.* 40(2):139-45.

Wang Z, Aragona BJ. (2004) Neurochemical regulation of pair bonding in male prairie voles. *Physiol Behav.* 83(2):319-28.

Schradin C, Anzenberger G. (1999) Prolactin, the Hormone of Paternity. *News Physiol Sci.* 14:223-231.

### Week 12

#### **Reproductive Behavior Across Generations**

Benoit D, Parker KC.(1994) Stability and transmission of attachment across three generations. *Child Dev.* 65(5):1444-56.

Champagne FA. (2008) Epigenetic mechanisms and the transgenerational effects of maternal care. *Front Neuroendocrinol.* 29(3):386-97.

Anway MD, Skinner MK. (2006) Epigenetic transgenerational actions of endocrine disruptors. *Endocrinology.* 147(6 Suppl):S43-9.

### Week 13

#### **Stress and reproductive behavior**

Nelson Chapter 11

Wasser SK, Barach DP. (1983) Reproductive Suppression Among Female Mammals: Implications for Biomedicine and Sexual Selection Theory *The Quarterly Review of Biology.* 58(4):513-538.

Wingfield JC, Sapolsky RM. (2003) Reproduction and resistance to stress: when and how. *J Neuroendocrinol.* 15(8):711-24.

### Week 14

#### **Environment and Reproduction**

Bhatt R. (2000) Environmental influence on reproductive health. *International Journal of Gynecology & Obstetrics.* 70(1): 69-75.

Andrews MW, Rosenblum LA. (1991) Attachment in Monkey Infants Raised in Variable- and Low-Demand Environments. *Child Development.* 62(4): 686-693.

Klein SL, Nelson RJ. (1999) Influence of social factors on immune function and reproduction. *Rev Reprod.* 4(3):168-78.

### Week 15

#### **Aging and Reproduction**

Hijazi RA, Cunningham GR. (2005) Andropause: is androgen replacement therapy indicated for the aging male? *Annu Rev Med.* 56:117-37.

Chakraborty TR, Gore AC. (2004) Aging-related changes in ovarian hormones, their receptors, and neuroendocrine function. *Exp Biol Med (Maywood).* 229(10):977-87.

Spencer RP. (2002) Cessation of reproduction: an analytic view of menopause. *Med Hypotheses.* 59(4):406-10.

## Course requirements

Each week, students will attend a two-hour seminar. Class time will be devoted to the presentation and discussion of book chapters and journal articles. The reading is intended to provide background knowledge on the relevant topics, to cover current research on those topics, and to serve as a stimulus for discussion. Students will be selected to conduct presentations in class each week.

The students take a written midterm exam with essay questions covering the material in the textbook, the papers and the class discussions. During the second half of the semester, the students write a term paper. The 10 page paper should take the form of a critical review paper that addresses a specific question related to the topics of the seminar.

Grading is allocated as follows:

Midterm exam	20%
Term paper	30%
Participation and Presentations	50%