

# ANBI 116

## Evolution of SEX

Winter 2017/18



**INSTRUCTOR:** Pascal Gagneux (Assoc. Professor, Departments of Pathology and Anthropology)

**GOAL:** The course will explore the evolution of sexual reproduction. Human reproduction, like that of all other mammals is strictly sexual. This requires the existence of two sexes and precludes the persistence of successful genetic combinations across generations. This course will consider the evolutionary advantages and costs of sex. We will discuss the genetics of sex-determination, molecular recognition between gametes, fetal tolerance during pregnancy, primate mating systems, social and cultural aspects of sex and latest developments in assisted reproductive technologies.

**FORMAT:** 80 minute LECTURE

**READING:** One BROAD REVIEW OR BOOK CHAPTER PER SESSION, POSTED ON THE WEBSITE AS DOWNLOADABLE PDFS IN ADVANCE

**DAY:** TUESDAY and THURSDAY

**TIME:** 3:30 to 4:50 PM

**LOCATION:** TM 102

(Thurgood Marshall College, Room 102. It is near SSRB and Solis Hall)

**Office hours:** SSB 299, TBA

**EXAMS:** A) Midterm, multiple choice, 1 hour on February 15, multiple choice

B) Final: two hours, simple sentence replies to questions, March 20

**GRADES:** Grades will be based on student participation, Midterm and Final exam performances.

**WEB PAGE:** <https://pgagneux.wixsite.com/anbi116>

**JANUARY 9:** What is sex?

Exchange of molecules of heredity

**JANUARY 11:** Culture and sex

Third party involvement, arranged marriages, bride price, dowry, menstrual taboos, and other imposed rules.

**READING:** Diamond, Milton. (2004) Sexual Behavior in pre Contact Hawai'i: A sexological Ethnography. *Revista Española del Pacífico*.

**JANUARY 16:** Why two sexes? Or are there more?

Heterogamy: small and motile or large and sessile, sex determination in mammals

**READING:** Colegrave, Nick (2012). The Evolutionary Success of Sex. *EMBO Reports*

**JANUARY 18:** Mating systems across primates

How primates go about mating, from induced ovulation in lemurs to silver backs in gorillas, consortship in chimpanzee, and G-G rubbing in bonobos

**READING:** Gagneux, P (2015) Primate Groups and Their Correlates° International Encyclopedia of the Social & Behavioral Sciences, 2nd edition, Vol 18. Oxford: Elsevier

**JANUARY 23:** Sexual Dimorphism, Sex Ratio

Development, anatomy, endocrinology, physiology, immune system and central nervous system

**READING:** Mukherjee S. (2016) Why Sex is Mostly Binary but Gender Is a Spectrum. *Nautilus*.

**JANUARY 25: Sexual Selection, Finding a mate**

Easier said than done

READING: Steinsalz et al. (2015) This Gender Mystery Starts Nine Months Before Birth. The ratio of boys to girls at conception has been misunderstood for centuries. *Nautilus*

**JANUARY 30: Social pairing versus reproductive pairing**

Genetic quality versus resource provisioning

READING: Wilson et al. (2017) Humans as a model species for sexual selection research. *Proc R. Soc B*.

**FEBRUARY 2: The risk of sex: loss of winning combinations, threat of violence/exploitation, threat of infection**

Sex is costly

READING: Lehtonen et al. (2011). The Many costs of Sex. *Trends in Ecology and Evolution*.

**FEBRUARY 6: Sex and conflict**

Pairs within larger groups, how is this possible? Sexual jealousy as major reason for murder across societies?

READING: Crespi, B. and Semeniuk, C. (2004) Parent-offspring conflict in the evolution of vertebrate reproductive mode. *The American Naturalist*.

**FEBRUARY 8: Sex versus reproduction**

Uncoupling of sexual behavior and reproduction, recruiting sex for other purposes.

READING: Morin et al. (2014) The Separation of Sexual Activity and Reproduction in Human Social Evolution. L. Zhang and C.A. Ducusy (eds.), *Advances in Fetal and Neonatal Physiology*, 159 *Advances in Experimental Medicine and Biology* 814, Springer, New York

**FEBRUARY 13: Sex in art, religion and other business**

From earliest symbolic and figurative art to Kajuraho, Rembrandt, Japanese Ukiyo-e, pop art and the virtual world

READING: Miller, G. F. (2001) Aesthetic fitness: How sexual selection shaped artistic virtuosity as a fitness indicator and aesthetic preferences as mate choice criteria. *Bulletin of Psychology and the Arts* 2(1), 20-25. Special issue on Evolution, creativity, and aesthetics.

**FEBRUARY 15: MIDTERM (one hour)**

**FEBRUARY 20: Genital mutilation – too close for comfort**

The need for modifying, identity, covenant, control

READING: Lane, S.D., Rubinstein, R.A. (1996) Judging the Other, Responding to Traditional Female Genital Surgeries. *Hastings Center Report*.

**FEBRUARY 22: Sexual violence, Sex and Power**

The troubling association between sex, violence and power

READING: Smutts, B. (1992) Male Aggression against Women. *Human Nature*

**FEBRUARY 27: Sex trade, Contraception and Paternity Testing**

Big business, big social fall-outs

READING: Zimmerman C, Kiss L (2017) Human trafficking and exploitation: A global health concern. *PLoS Med* 14(11)

**MARCH 1: Reproductive disease**

Evolution acts mostly on differential reproduction. What are reproductive diseases?

READING: Inhorn, M.C. and Patrizio, P. (2015) Infertility around the globe: new thinking on gender, reproductive technologies and global movements in the 21st century. *Human Reproduction Update*.

**MARCH 6: Biology and identity, sex and gender**

Bodies and minds, hormones and surgeries, social norms and change

READING: Fausto-Sterling, A. (2005) The Bare Bones of Sex: Part 1—Sex and Gender. *Journal of Women in Culture and Society*

**MARCH 8: IVF/ART assisted reproductive technologies**

Is infertility a disease? Will there be evolutionary consequences from over-application of ART?

READING: Kamphuis *et al.* (2014). Are we overusing IVF? *British Medical Journal*.

**MARCH 13: The paradox of human post-reproductive Lifespan**

Grandmothers, grandfathers and the transmission of culture

READING: Coxworth *et al.* (2015) Grandmothering life histories and human pair bonding. *Proc. Nat. Acad. Sci USA*.

**MARCH 15: Recap and Sum Up**

**MARCH 20: FINAL EXAM**