Sex

Why worry about reproductive behavior?

- Sex/love: at the bases of many social interactions. At the base of Art production (literature, painting…)
- Sexual Behavior (sex) vs. Sexual Experience (emotion): Two different (interacting) neural systems. Consequences: Physical and psychological
- Sexually dimorphic behaviors: some differences between male/female behaviors are due to least in part to sex differences
- What are the neural structures that are influenced by sex differences? What psychological functions might be affected by sex differences? How?
- (Sexual Orientation: How much is ‘psychology’? How much is ‘biology’?)

Genetic Sex 9.1

- Genetic Factors
  - Gametes = ova + sperms. 23 chromosomes each > total of 23 pairs
  - 1 pair of sex chromosomes
  - The X rating!: ¾ X gametes but 50% XY
  - Genetic sex is determined by the male gametes

Sex

- Y chromosome > activate other chromosomes > sex differences
- Gonads
  - Testes + ovaries: Produce sperm, ovum and hormones
  - 1 gene on the Y chromosome will trigger testes development (SRY gene)
  - Gonads are physically differentiated 6 weeks after conception, functionally differentiated after 3 months gestation
  - After gonad development: Organizational vs Activational hormonal effects
- SRY testing: ‘gender’ verification
  - Was abandoned in 2000, single genes are not reliable indicators of sex/gene

Internal Genitalia 9.2

- Internal sex organs
  - Mullerian and Wolffian systems
    - Male gonads (testes) produce
      - Anti-mullerian peptide hormones (defeminizing)
      - Pro-Wolffian steroid hormones called androgens such as testosterone or dihydrotestosterone (masculinizing)
      - Males: 48.9%, Females: %1.1% (US census 1996)
- Genetic Disorders (in terms of the genitals)
  - Androgen insensitivity syndrome (XY: look female but no female internal organs)
Persistent Mullerian duct syndrome (XY: look male but internally both male and female)
○ Turner syndrome: X0 (look female internally and externally, but no gonads)

Masculinization and Defeminization 9.4

External Sex Organs 9.3
● Primary Sex characteristics (birth): gonads, internal genitalia, external genitalia
● Secondary Sex characteristics: (puberty, facial hair, breasts)

Puberty
● FSH: Follicle stimulating Hormone
● Luteinizing Hormone
● Note: in females, pubic and axillary hair depend on adrenal gland (kidney)

CNS/PNS sex controllers?
● Hypothalamus and amygdala: Sex and emotions

Hormonal Control 9.6
● Hormones have activational and organizational effects. They also act on the nervous system > sexually dimorphic behaviors
● Hormonal cycles: females
  ○ Estrous (rodents) cycle: last several days, only period of mating
  ○ Menstrual (human + some primates) cycle: monthly growth/loss of lining of uterus. Mating at any time
● Progesterone: lining of uterus, inhibits further ovum production. If there is no fertilization > decrease > loss of lining > menstruation
● Male sexual behavior
  ○ Intromission > pelvic thrusting > ejaculation > refractory period
  ○ Coolidge effect: decrease of refractory period with the introduction of new females
● Female Sexual Behavior
  ○ Lordosis
  ○ 3 measures of sexual behaviors:
    ■ Attractiveness: change in male behavior
    ■ Proceptivity, receptivity: change in female behavior (active vs passive)

9.7
● Androgens (testosterone) have organizational effects on behavior
● Testosterone immediately after birth has behavioral defeminization and later, behavioral masculinization effects.

Sex control/Communication: Pheromones 9.8
● Sexual communications between individuals. VomeroNasal Organ
● Animals
  ○ VNO: sensitive to urine (rat)
- Damage of VNO: poor discrimination between male and female (mice)
- Single neurons in accessory olfactory bulb can selectively respond to male or female scents (rodents)

- Humans
  - T-shirt smell > male/female discriminations in humans
  - Human sweat carries sexually dimorphic molecules

Pheromones: experimental evidence
- Lee-boot effect: groups of co-housed female mice > stop of estrous cycle
- Whitten effect: synchronization of estrous cycle, if male odor present
- Vendenbergh effect: early onset of female puberty upon exposure to male pheromones
- Bruce effect: female mouse inseminated and exposed to new male (intact testse) > failed pregnancy
- Classroom Seating effect: Possibly anecdotal