Sex

- Why ‘worry’ about reproductive behaviors?
  - Sex/love: at the bases of many social interactions. At the bases 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 difference male/female behaviors are due at least in part to sex differences
  - What are the neural structures that are influences by sex differences? What psychological functions might be affected by sex differences? How>
  - Sexual orientation: How much psychology? How much is biology

- Some quiz questions:
  - Cataplexy can be explained by a damage to the orexinergic neurons. TRUE
  - The REM flip-flop involves: The vIFAG and SLD
  - A group of neuron responsible for month long rhythms (menstrual cycle) is a supradian clock

- Genetic Sex
  - Genetic factors:
    - Gametes = ova + sperms. 23 chromosomes each \( \rightarrow \) total of 23 pairs
    - 1 pair of sex chromosome
    - The X-rating: 3 X-only gametes but 50% XY
    - Genetic sex is determined by the male gametes
    - Named based on appearance
  - Y chromosome \( \rightarrow \) activate other chromosomes \( \rightarrow \) sex differences

- Gonads
  - Testes + ovaries: Produce sperm, ovum, and hormones
  - 1 gene on the Y chromosome will trigger tests developed (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 abounded in 2000, single genes are not reliable indicators of sex/gender

**Sex: internal genitalia**

- 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: 51.1% (US censes 96)

- Genetic disorder:
  - 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 Refeminization (Chart in book)
  - Male: XY \( \rightarrow \) primordial gonads develop into testes

**Sex**

- External sex organs
  - Primary sex characteristics (birth): gonads, internal genitalia, external genitalia
  - Secondary sex characteristics (puberty): facial hair, breasts...

**Sex: Puberty**

- Gonadotropin-releasing hormone and Gonadotropic hormones

- Note: in females, public and axillary hair depend on adrenal gland (kidney)
• CNS/PNS sex controllers?
  o Hypothalamus and amygdala: Sex and Emotion (next chapter)

**Sex: Hormonal Control**

• Hormones have activational and organizational effects. They also act on the nervous system → sexually dimorphic behaviors

• Hormonal cycles: Females
  o - Estrous cycle: last several days, only period of mating
  o Menstrual cycle: monthly growth/loss of lining of uterus. Mating at anytime
    ▪ Progesterone: lining of uterus, inhibits further ovum production. If there is no fertilization → decrease → loss of lining → menstruation
  o VIDEOS: Menstruation cycle; Eggs vs sperm pheromones
    ▪ Female is born with millions of eggs
    ▪ Males doesn’t have sex cells until puberty
    ▪ Pheromones test with twins:
      • One with artificial pheromones added got picked up more times at the bar (scent)
      • Two big problems with test:
        o Timing: more time past, people may be more drunk, etc...
        o Double blind would be better; sisters knew who was getting the hormone

• Male sexual behavior
  o Intromission → pelvic thrusting → ejaculation → refractory period
  o Coolidge effect: decrease of refractory period with the introduction of new females

• Females sexual behavior
  o Lordosis
  o 3 measures of sexual behaviors:
    ▪ Attractiveness: Change in male behavior
    ▪ Proceptivity, Receptivity: Change in female behavior

• Androgens (testosterone) have organizational effects on behavior

• Hormone test:
  o Activational effect of estradiol and progesterone in nonandrogenized animal
  o Evidence of defeminization: Estradiol + progesterone fails to facilitate female sexual behavior
  o Evidence of masculinization: testosterone facilitates male sexual behavior
  o Testosterone immediately after birth has behavioral defeminization and later, behavioral masculinization effects

**Pheromones**

• Sexual communications between individuals. VomeroNasal Organ
  o Animals:
    ▪ VNO: sensitive to urine (rat)
- Damage of VNO: poor discrimination between male and female (mice)
- Single neuron in accessory olfactory bulb can selectively respond to male or female scents (rodents)
- Humans:
  - T-shirt smell \(\rightarrow\) male/female discriminations in humans
  - In humans: sweat carries sexually dimorphic molecules

**Pheromones: Experimental evidences**

- **Lee-Boot effect**: Groups of co-housed female mice \(\rightarrow\) 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 exposed to new male (intact testes) \(\rightarrow\) failed pregnancy
- **Classroom seating effect**: Possibly anecdotal…

- **VIDEO FACTS**:
  - Sperm cannot survive in specific temperatures (which is why the organs are outside the body)