Human sexual behavior
- What makes sexual behaviors different between adult males and females?
- Hypothesis: activation effect of hormones during development
  - Females
    - Rats: hormones (estradiol and progesterone) control the behavior and the motivation
    - Primates: hormones do not control the behavior, but perhaps the motivation
  - Female motivation: initiation is highest when estradiol is high.
    - In primates: corresponds to period of high male selectivity
- Males
  - Key hormone: testosterone
  - Testosterone controls both the physiology (sperm production, erection) and motivation (initiation, overall interest).
  - GnRH blocker men > loose sperm / erection + loose sexual interest
  - GnRH blocker in monkeys > loss depends on rank (pervious experience. Low ranking have largest loss).
  - Testosterone: linked with aggression
    - Levels increase with psychological anticipation
    - Levels decrease with age

Sexual orientation
- Sexual orientation: gendered of preferred sexual partner
- There are more preferences: monogamy, polygamy, age,...
- Dependence on developmental vs genetic factors relating to orientation
  - In some cases, sexual orientation can be explained by prenatal exposure to androgens and genetic factors
- Genetic females
  - CAH (congenital adrenal hyperplasia): excess androgens prenatally
    - Mild physical effects - enlarged clitoris
    - Increased likelihood for homosexual preference
    - Increased likelihood for male behaviors (ex: what toys are used)
    - Sexually dimorphic behaviors
- Genetic males
  - Failure of androgenization: androgen insensitivity syndrome (AIS)
  - XY looking female
    - Internal testes produce testosterone (but there are no receptors)
    - Production of estrogens (small amounts) produce feminization
    - Normal female sex lives / behaviors
      - XY genes not sufficient for heterosexual behaviors. Lack of androgens likely to result in homosexual behaviors (but not necessary)
- Genetic factors
  - Twin studies: significantly more monozygotic (identical) twins are both homosexual when compared to fraternal twins
    - Genetic component for both male and female homosexual orientation
  - There are sexual dimorphisms in the brain, but they do not explain sexual orientation
- Brain differences
  - Men vs women: corpus callosum + few other areas (including hypothalamus)
  - Hetero vs homo sexual: inconclusive (or to the very least: indirect)
- Do animals show homosexual behaviors? Yes
- Homosexual behaviors vs. being homosexual
500-1500 species exhibit homosexual behaviors
- Homosexual behaviors for dominance
  - Chimps, bonobos
- Homosexual behavior for bonding

**Neural control for sexual behavior**
- **Males**
  - Medial preoptic area: evidence from recordings, stimulation and lesion studies
    - MPA
  - Sexually dimorphic nucleus of MPA: androgen-induces enlargement in males
    - SDN of MPA

![Neural Control Diagram]

- If spinal cord is inhibited, PGi is activated?
- Constant inhibition of PGi for no sexual behavior
- Serotonin related

- Mostly inhibitory pathway. Normal behavior: PGi needs to be constantly inhibited
- PAG (PeriAqueductal Gray) - midbrain, PAG: erection), nuclue
- ParaGigantoCellularis (medulla, PGi: ejaculation)
- SSRIs (antidepressants) decrease male sexual behaviors

**Male Sexual behavior**
- The amygdala receives sensory inputs, and inputs indicative of sexual behavior (info about stimuli and performance of sexual behavior)
- The amygdala sends its outposts to the MPA (emotional control of sexual behavior)

**Neural Control of Sexual Behavior**
- **Females**
  - Ventro medial nucleus of the hypothalamus: lesions and stimulation studies
  - Estradiol and progesterone (in rats) act in VMH

![Female Neural Control Diagram]
• Most excitatory pathway. Normal behavior: PGi needs to be exited
• PAG active in females sexual behavior (orgasms in scanner)
• As in males, sensory inputs converge in the amygdala, and the amygdala influences female sexual behavior (VMH)

**Neural control of bonding**
• 5-7% mammalian species are monogamous
• Prairie voles monogamous. Meadow voles are polygamous
• In voles: monogamy = high levels of oxytocin (females) and vasopressin (males)
• In human: oxytocin increases trust. involved in empathy

**Parenting behavior**
• Ex: rat milk production equiv: 2 gallons mill/day. Urine recycling and fluid exchange between mother and pups.
• Chemical signals from pup to mothers.
• Hormones and maternal behaviors
  • Rats: prolactin (maternal behavior), oxytocin (maternal bonding).
  • Humans: Postpartum Depression affects 13% of women
• Neural structures and parenting behaviors
  • MPA: lesion studies affect maternal but not sexual behaviors
  • MPA, oxytocin and prolactin also involved in paternal behaviors

**Practice quiz**
• Estradiol is an androgen: **FALSE**
  • Testosterone is!
• The vomeronasal organ is involved in vomiting: **FALSE**
  • Involved in pheromones
• The MPA is involved in
  • Male sexual behaviors
  • Maternal behaviors
  • Paternal behaviors
  • **ALL of the above**