Class 15: Sex (Part 2)

HUMAN SEXUAL BEHAVIOR

- What makes sexual behaviors different between adult males and females?
- Hypothesis: Activational effect of hormones (during development).

Females:
- Rats: Hormones (estradiol + progesterone) control the behavior (e.g.: lordosis) AND the motivation
- Primates: Hormones do not control the behavior, but perhaps the motivation.

Diagram (textbook figure 9.9)
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 in men \(\rightarrow\) loose sperm/erection + loose sexual interest.
  - GnRH blocker in monkeys \(\rightarrow\) Loss depends on rank (i.e. previous experience. Low ranking has largest loss)

Testosterone levels increase with psychological anticipation.
- Testosterone is involved in other male behaviors (Aggression)
- Testosterone levels decrease with age.

Sexual Orientation: Fig 9.10
- Other dimensions of sexual preferences: Monogamy, polygamy, age….
- Dependence on developmental (education) Vs genetic (physiology) factors?

Prenatal exposure to androgens and genetic factors

Genetic females:
Congenital Adrenal Hyperplasia: too much androgens prenatally.
- Mild physical effects (e.g. enlarged clitoris)
- Increased likelihood for homosexual preference
- Increased likelihood for male ‘behaviors’ (e.g. toys)
- Sexually dimorphic behaviors

**Genetic Males:**
Failure of androgenization: Androgen Insensitivity Syndrome.
- 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 sufficient for homosexual behaviors (not necessary)

**Genetic factors:**
- Twin studies: significantly more monozygotic (identical) twins are both homosexual when compared to fraternal twins.

**Brain differences:**
- Men Vs women: Corpus callosum + few other areas (including hypothalamus)
- Hetero Vs Homosexuals: Inconclusive (or to the very least: indirect).

Video about fingers having genetic differences. Fingers have correlation with the hormones that we produce. The size of the index finger and ring finger has to do with the production of testosterone levels in males.
- Do animals show homosexual behaviors?
- Homosexual behaviors vs. ‘being’ homosexual
  - 500-1500 species (like bonobo monkeys, giraffes, sharks, etc……)
  - Homosexual behavior for dominance
  - Homosexual behavior for bonding.

**Neural Control of Sexual Behavior** (Fig 9.11)
**Males:**

- Medial Preoptic Area: Evidence from recordings, stimulation and lesion studies
- Sexually Dimorphic Nucleus of MPA: androgen-induced enlargement in males

**Sensory inputs:**

- Spinal cord
- Vomeronasal Organ
- Medial Amygdala

**Erection and Ejaculation**

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

**Male Sexual Behavior:** Fig 9.12

- The amygdala receives sensory inputs, and inputs indicative of sexual behavior (information about stimuli and performance of sexual behavior).
- The amygdala sends its outputs to the MPA (‘Emotional’ control of sexual behavior)
Females:
- **Ventral** medial nucleus of the hypothalamus: lesions and stimulation studies.
- Estradiol and progesterone (in rats) act in VMH

**Sensory Inputs:**
- Spinal cord
- Vomeronasal organ
- Medial amygdala

VMH → (+) PAG/PGi → (+) Spinal Cord

- Mostly excitatory pathway. Normal behavior: PGi needs to be exited
- PAG active in female sexual behavior.

**Female Sexual Behavior:** fig 9.13

- As in males, sensory inputs converge in the amygdala and the amygdala controls female sexual behavior.
Neural Control of Bonding:

- 5-7% mammalian species are monogamous (possibly ‘serially monogamous’)
- Prairie voles monogamous, Meadow voles are polygamous.
- In voles: monogamy = high levels of oxytocin (females) and vasopressin (males).

Parenting Behavior: Fig 9.14

- Parturition: set of behavior at and immediately after giving birth (nesting, hiding, cleaning, nursing…)
  - Example: Rat milk production equiv. 2 Gallons milk/day. Urine recycling and fluid exchange between mother and pups. Chemical signals from pups 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.