

Exam 3 study guide

CHAPTER 10:

- What are hormones? How do they differ from neurotransmitters? (think site of action and distance travelled from release site) Are they made by the brain, peripheral organs or both?
 - **Hormones:** travel through bloodstream so they effect the entire body
 - Hormone levels adapt and respond to environmental changes
 - Hormones are made by the brain AND peripheral organs
- What are the 3 main classes of hormones?
 - Protein Hormones
 - Peptides mostly made in the brain
 - Hard to get in and out of blood brain barrier
 - Amine Hormones
 - Neurotransmitters
 - Mostly made peripherally in body
 - Steroid Hormones
 - Can pass through blood-brain barrier because they're fatty
- How do the classic mechanisms of hormone action differ between protein hormones and steroid hormones (think where the receptors are located and what effects they lead to in the cell)
 - Protein Hormone Action
 - Protein hormone receptors embedded in the cell membrane bind to the hormone, activating a second-messenger system that affects various processes inside the target cell
 - Steroid Hormone Action
 - Steroid hormones diffuse passively in, binding to large receptors molecules in target cells. The steroid-receptor complex then binds to DNA, altering the expression of certain genes---a so-called genomic effect
 - Slower than protein hormone action
- Know how hormone release is stimulated, starting at the hypothalamus, pituitary, and ending at the peripheral endocrine gland (testis, ovary etc). Which site produces releasing hormones? Tropic hormones?
 - Anterior Pituitary
 - Neuroendocrine in the Hypothalamus makes releasing hormones
 - Releasing hormones are sent to the anterior pituitary glands
 - Hormone producing cells n the anterior pituitary respond by releasing or inhibiting the release of their own hormones (tropic hormones)
 - Tropic hormones travel through the bloodstream and regulate endocrine glands throughout the body

- What is the difference between how hormones are released from anterior and posterior pituitary. Which 2 hormones are released from the posterior pituitary?
 - Anterior Pituitary
 - Hypothalamic hormones act on pituitary → pituitary releases tropic hormones
 - Posterior Pituitary
 - Peptide hormones oxytocin and vasopressin are made in hypothalamus
 - Oxytocin and vasopressin neurons also project widely throughout brain and regulate behavior
 - Neuroendocrine cell bodies in hypothalamus produce Oxytocin and Vasopressin
 - Axons from these neurons pass through pituitary stalk
 - Terminate on capillaries of posterior pituitary; during action potential oxytocin or vasopressin are released from terminal directly into bloodstream

- Know basics of sex determination: sex chromosomes, SRY gene, gonadal differentiation.
 - Sex Chromosomes
 - If sperm carries an X the baby will be female
 - If sperm carries a Y the baby will be male
 - SRY genes
 - Sex-determining Region of the Y chromosome
 - Without SRY gene gonads become ovaries
 - Gonadal Differentiation
 - 6 weeks after conception gonads are undifferentiated
 - testis-determining factor protein develops gonads into tests

- Know which sex is the 'default' and which results from action of SRY gene.
 - SRY Gene present
 - Testis-determining factor protein
 - Gonads develop into tests
 - Without SRY Gene
 - Gonads become ovaries

- What are organizational and activational effects of hormones? How are they different and when in life do they occur? Which type of effect has a sensitive or critical period?
 - Organization Effects of Hormones
 - Hormonal effects on the differentiation and development of the sex organs, brain and behavior in early development
 - Permanent
 - Sensitive period
 - Activational
 - Effect of a hormone that occurs in the fully developed organism, beginning at time of puberty
 - Feminization for females

- Females organization is Not hormone-dependent but there are activation effects
 - Masculinization and Defeminization for males
 - Males are complicated and have a combination of organizational and activational
- What does the story of David Reimer (also known as Brenda and Bruce) tell us about the role of hormones in shaping the development of the brain and gender identity?
 - Was born a male but was castrated and was raised a girl
 - The brain and body were in mismatch of the sex causing gender identification issues
 - Ambiguous genitalia as child because an androgen (DHT) is necessary for external characteristic development
 - Often raised as girls
- Which hormone is responsible for sexual interest and behavior in males? Females? Is this an organizational or activational effect? Does more of this hormone lead to more sexual behavior?
 - Females
 - Testosterone activates sexual behavior (Activational Effect)
 - Males
 - Testosterone activates sexual behavior (Activational Effect)
 - For both sexes, testosterone levels influence sexual interest and behavior
 - Adult androgens are “permissive” to sexual behavior
 - More does not equal better
 - Individual differences still apply
 - Organizational effects, other genes and experiences, etc.
- What is the role of the peptide hormones, oxytocin and vasopressin in social bonding and monogamy? What is the role of the reward system?
 - Peptide Hormones
 - Activate the reward system (ventral tegmental area)
 - Leads to dopamine release in presence of that special someone
 - Both ventral tegmental area and nucleus accumbens show greater activation to partner than unfamiliar if oxytocin given first
 - Oxytocin
 - In females, promotes social monogamy
 - Vasopressin
 - In males, promotes social monogamy
- What do females with congenital adrenal hyperplasia (CAH) tell us about the role of androgens to produce sex differences in the brain and behavior?
 - Adrenal dysfunction leads to under-production of cortisol and over-production of sex steroids