Ch 45.3 Notes

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Vocab

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Adrenal Gland: A small gland located on top of the kidneys that secretes hormones such as adrenaline, cortisol, and aldosterone, which play important roles in regulating the body's response to stress, metabolism, and electrolyte balance.

Parathyroid Glands: Four small glands located in the neck that secrete parathyroid hormone (PTH), which helps regulate calcium and phosphorus levels in the blood.

Parathyroid Hormone (PTH): A hormone secreted by the parathyroid glands that regulates calcium and phosphorus levels in the blood by increasing the amount of calcium released from bones, reducing calcium excretion in the kidneys, and increasing calcium absorption in the intestines.

Calcitonin: A hormone secreted by the thyroid gland that helps regulate calcium levels in the blood by inhibiting the release of calcium from bones and increasing the excretion of calcium by the kidneys.

Norepinephrine: A neurotransmitter and hormone produced by the adrenal glands that plays a role in the "fight or flight" response by increasing heart rate, blood pressure, and respiration.

Glucocorticoids: A group of steroid hormones, including cortisol, produced by the adrenal glands that help regulate glucose metabolism, suppress inflammation, and modulate the immune response.

Mineralocorticoids: A group of steroid hormones, including aldosterone, produced by the adrenal glands that help regulate electrolyte balance and blood pressure by promoting the retention of sodium and the excretion of potassium.

Androgens: A group of steroid hormones, including testosterone, produced by the gonads and adrenal glands that promote the development and maintenance of male characteristics.

Testosterone: A steroid hormone produced primarily by the testes that promotes the development and maintenance of male secondary sex characteristics, such as facial hair, deepening of the voice, and muscle mass.

Estrogens: A group of steroid hormones, including estradiol, produced primarily by the ovaries that promote the development and maintenance of female secondary sex characteristics.

Estradiol: The most common and biologically active form of estrogen, produced primarily by the ovaries that promotes the development and maintenance of female secondary sex characteristics.

Progesterone: A steroid hormone produced primarily by the ovaries that plays a key role in the menstrual cycle and pregnancy by preparing the uterus for implantation and supporting fetal development.

Melatonin: A hormone produced by the pineal gland in response to darkness that helps regulate the sleep-wake cycle and circadian rhythm.

Pineal Gland: A small gland located in the brain that secretes melatonin and plays a role in regulating the sleep-wake cycle and circadian rhythm.

Melanocyte Stimulating Hormone (MSH): A hormone produced by the pituitary gland that regulates the production of melanin, the pigment that gives color to skin, hair, and eyes.

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Notes

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Endocrine glands respond to diverse stimuli in regulating homeostasis, development, and behavior

Parathyroid glands

* Calcium regulation
* Levels too low= release Parathyroid hormone
  + Increases calcium level
  + Acts on bones/kidney/intestines
    - Mineral matrix in bone to break down
    - Stimulates kidney to reabsorb calcium
    - Promotes production of vitamin D= stimulates intestine to absorb calcium
  + Negative feedback.
  + Calcium levels high= inhibit PTH release

Calcium levels too high= THYROID releases calcitonin

* Inhibit bone breakdown, secrete calcium into filtrate (kidney)

Adrenal hormones: response to stress

Overactive in Advanced Honors Biology students

Adrenal glands on top of kidneys

* Cortex (outside part)
  + True endocrine cells
* Medulla (inside part)
  + From neural tissue (neuroendocrine)

Adrenal Medulla

Fight or flight

* Catecholamines and neurotransmitters
  + Epinephrine
  + Norepinephrine
* What do these hormones do
  + Increase glycogen breakdown to glucose (why?)
  + Increase heart rate and stroke volume
  + Dilate bronchioles
  + Dilate BVs to heart, lungs, muscle and constrict BVs to digestive/skin

Adrenal Cortex

Activates under stressful conditions

* Low blood sugar, decreased volume/pressure, shock
* Hypothalamus causes AP to release adrenocorticotropic hormone (ACTH) 🡪 causes adrenal cortex to release **corticosteroids**

Corticosteroids (2 kinds)

* Glucocorticoids (example= cortisol)
  + Make more glucose available
    - Increase glucose synthesis
    - Breakdown muscle for fuel
* Mineralocorticoids (example= aldosterone)
  + Maintain salt/water balance

Sex hormones

Affect growth, development, reproductive cycles and sexual behavior (some produced by adrenal glands, but higher levels from gonads)

* FSH and LH from adrenal gland controls gonadal sex hormone synthesis
* GnRH from hypothalamus controls SECRETION of gonadal sex hormones

Gonads produce three main steroid hormones (all produced in everyone but in different quantities)

* Androgens
  + Testosterone main one= development of male reproductive structures and secondary sexual characteristics
* Estrogens
  + Estradiol main one= maintenance of female reproductive system and secondary sexual characteristics
* Progesterone = uterus lining/prep

Hormones and Biological Rhythms

Pineal gland

* Near center of brain
* Produces melatonin
  + Regulates functions related to light (when you are sleepy)
  + Secreted at night
  + Amount released depends on length of the night
* Regulated by hypothalamus

Summary

