Endocrine System

Group of glands that produces regulatory chemicals (hormones)

**Hormones**
- Chemical messengers released directly into the bloodstream
- Regulate:
  * May have wide-spread effect or only affect certain tissues
  **...** cells with receptors that respond to specific hormones

**Two Main Categories of Hormones**

**Pituitary Gland**
- Gland found in the brain
- Master gland since it releases hormones that affect the working of other glands
- Pituitary gland is controlled by the hypothalamus

Anterior Pituitary secretes:
- Growth hormone (GH)
- Thyroid stimulating hormone (TSH)
- Adrenocorticotropic hormone (ACTH)
- Prolactin (PRL):
- Follicle Stimulating Hormone (FSH)
- Lutenizing Hormone (LH):
- Endorphins:

Posterior Pituitary secretes:
- Antidiuretic hormone (ADH):
- Oxytocin:

**Disorders of the Pituitary Gland**

**Gigantism:**

**Acromegaly:**
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Hypothalamus

- Secretes releasing hormones (stimulates the gland to do its job)
- Secretes inhibiting hormones (stops the release of hormones by a gland)
- Produces

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Pineal Gland

Located superior to the midbrain
- Produces and secretes:
  - melatonin:

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Thyroid Gland

Located in the neck surrounding the larynx
- Produces:
  - calcitonin: functions in calcium metabolism (takes calcium out of bloodstream to be deposited in bone tissue)
  - thyroxine (T4)
  - triiodothyroxine (T3)

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Disorders of the Thyroid Gland

Goiter:

- Hypothyroidism: underactivity of the thyroid gland
  - Infantile hypothyroidism:
    - myxedema:

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Hyperthyroidism:
- Graves disease:
  - Thyroid storm:

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Parathyroid

- Located in the posterior part of the thyroid
- Produces
  - Parathyroid hormone:
Disorders of the Parathyroid

- Tetany

Thymus Gland

Located _________ to the heart
- produces and secretes:
  - thymosin

Adrenal Glands

Located on top of both kidneys

Adrenal medulla: inner part of the kidney
- produces and secretes:
  - epinephrine
  - norepinephrine

Adrenal cortex: outer part of the kidney
- produces and secretes:
  - glucocorticoids
  - mineralocorticoids: regulates electrolyte balance
  - sex hormones: have little effect on the body

Disorders of the Adrenal Cortex

Hyposecretion of cortisol:
- Addison disease

Hypersecretion of cortisol:
- Cushing syndrome

Sex Glands (Gonads)

Ovaries: located in the pelvic area of the female
- produces and secretes:
  - estrogen: stimulates primary and secondary sex characteristics
  - progesterone: stimulates development of mammary glands and uterine lining in maintaining pregnancy

Testes: located outside of the body in the scrotum of the male
- produces and secretes:
  - testosterone: stimulates production of the sex organs and secondary sex characteristics
Pancreas
Islets of Langerhans: cells that assist in the endocrine function of the pancreas
- produces and secretes:
  - insulin: regulates the amount of glucose in the blood by controlling the rate at which it is stored in the liver
  - glucagon: regulates the amount of glucose in the blood by causing the liver to release stored glucose into the bloodstream

Disorders of the Pancreas
Hyperglycemia (Diabetes mellitus): excess glucose in the blood caused by an inability of the islet cells to produce enough insulin
Type 1 (juvenile diabetes): appears before the age of 30, caused by an autoimmune destruction of insulin producing cells
Type 2 (adult onset): caused by weight gain, controlled by diet and exercise
Gestational: occurs during pregnancy, mother cannot produce enough insulin for both mother and child

Gestational Diabetes
High blood glucose levels in mother
Brings extra glucose to baby
Causes baby to put on extra weight

Hypoglycemia
Malfunctions of the Pancreas
Low blood sugar symptoms include:
- Sweating
- Feeling tired
- Weakness
Other Hormone Producing Tissues

- Stomach and small intestine secrete hormones for digestion
- Kidneys secrete ________ to stimulate RBC production
- Atria secretes __________ to increase sodium excretion to lower blood pressure
- Placenta produces hormones during pregnancy

Prostaglandins

How Hormones Maintain Homeostasis

Feedback Mechanism
- Homeostatic mechanism that helps keep a variable close to a particular value or set point

Negative Feedback vs. Positive Feedback

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