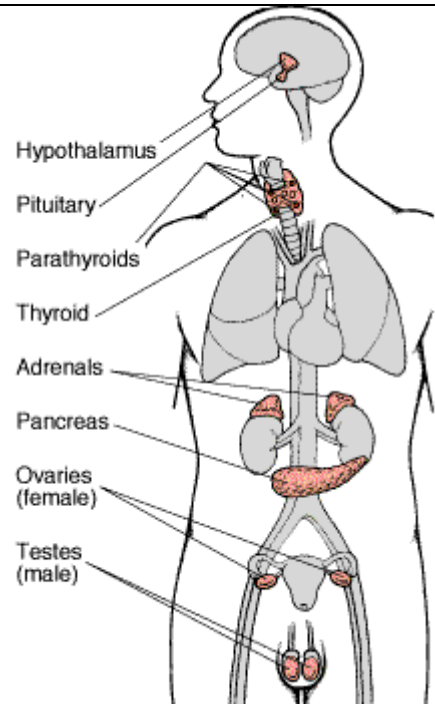


# The Endocrine System

## Notes

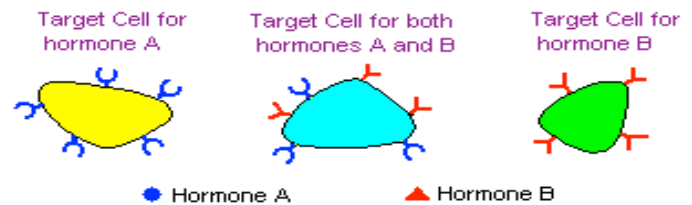
### I. Overview of the Endocrine System

- Made up of \_\_\_\_\_ that release \_\_\_\_\_ into the bloodstream
  - Hormones are \_\_\_\_\_ that control numerous body functions
- Allow for the maintenance of internal \_\_\_\_\_ or the internal environment in the body
- Allow for the regulation of growth and development of an organism



### II. Transport of Hormones

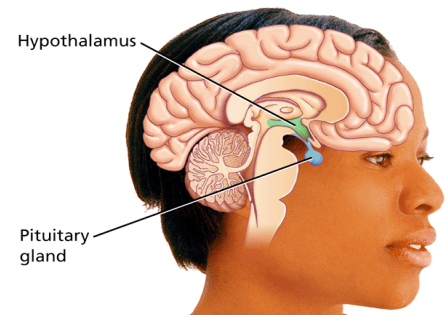
- Hormones are transported throughout the body by the bloodstream to **ALL** cells
- A given hormone usually affects only a limited number of cells called \_\_\_\_\_
- Only the \_\_\_\_\_ CELLS with the \_\_\_\_\_ for the hormone will be affected by that hormone
- Activities Controlled by Hormones
  - Activities of entire organs
  - Mood and Sleep
  - Growth and development
  - Reproduction
  - Sexual characteristics
  - Usage and storage of energy
  - Levels of fluid, salt & sugar in blood



### III. Endocrine Glands

A. \_\_\_\_\_

- **Function:** " \_\_\_\_\_ gland" that communicates with the hypothalamus to control many body activities
  - Link between \_\_\_\_\_ and endocrine systems
- **Location:** Tiny structure about the size of a grape at the base of the brain
  - Connected to the hypothalamus (part of the brain)
- **Hormones of the Pituitary:** produces & secretes \_\_\_\_\_ hormones that affects other glands and organs
- **Major Hormones**
  - Growth Hormone ( \_\_\_\_\_ )- growth hormone; helps fat be used for energy
  - Thyroid-stimulating Hormone ( \_\_\_\_\_ )- stimulates growth of the thyroid gland
  - Adrenocorticotrophic Hormone ( \_\_\_\_\_ )- stimulates growth of the adrenal gland
  - Follicle-stimulating Hormone ( \_\_\_\_\_ ) - growth of the ovarian follicles, production of estrogen in females; & production of sperm in males
  - Luteinizing Hormone ( \_\_\_\_\_ ) - stimulates ovulation and produces progesterone in females
  - \_\_\_\_\_ - released during childbirth; causes contraction of the uterus



▪ **Diseases of the Pituitary**

Gigantism	Dwarfism
<ul style="list-style-type: none"> <li>• Over-secretion of growth hormone prior to puberty</li> <li>• Excessive growth in long bones</li> <li>• Treatment: drug therapy to inhibit GH release</li> </ul>	<ul style="list-style-type: none"> <li>• Under-production of growth hormone during childhood</li> <li>• Long bone growth is decreased</li> <li>• Body is proportioned and intelligence is normal</li> <li>• Treatment: early diagnosis &amp; injections of GH for 5 or more yrs.</li> </ul>

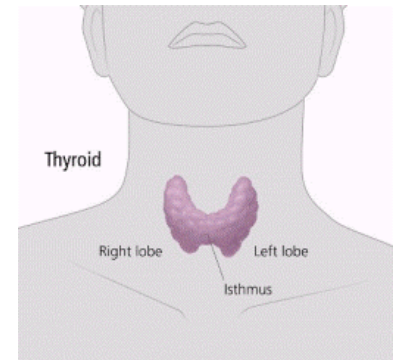
**B. Thyroid Gland**

▪ **Function:** regulates \_\_\_\_\_, growth and development, and blood \_\_\_\_\_ levels

▪ **Location:** Butterfly shaped mass found in \_\_\_\_\_ of the trachea; shaped like an \_\_\_\_\_

▪ **Hormones of the Thyroid Gland**

- Thyroxine - increases \_\_\_\_\_ rate; regulates growth and development
  - Requires \_\_\_\_\_ to be produced, which is found in foods and iodized salt
- Calcitonin - \_\_\_\_\_ blood \_\_\_\_\_ by accelerating storage in bones
  - 99% of calcium in the body is stored in bones, necessary for blood clotting, muscle contraction, and holding cells together

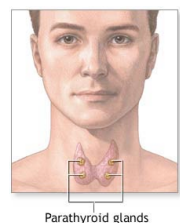


▪ **Diseases of the Thyroid Gland**

_____thyroidism	_____thyroidism (Myxedema)
<ul style="list-style-type: none"> <li>• Over-production of thyroxine increases metabolism</li> <li>• Causes weight-_____, increased appetite, fatigue, high blood pressure, nervousness, irregular menstrual periods in women.</li> <li>• Treatment: anti-thyroid medication, surgical removal of thyroid.</li> </ul>	<ul style="list-style-type: none"> <li>◦ Under-production of thyroxine causes slow metabolism</li> <li>◦ Causes weight-_____ without trying, depression, fatigue, puffiness of face, hands and feet</li> <li>◦ Treatment: thyroid-replacement hormone drugs, like Levothyroxine</li> </ul>
Graves Disease	Cretinism
<ul style="list-style-type: none"> <li>• Severe form of hyperthyroidism</li> <li>• More common in women</li> <li>• Symptoms: strained and tense facial expression, nervous, irritability</li> <li>• _____ - enlarged swelling of thyroid in neck</li> </ul>	<ul style="list-style-type: none"> <li>◦ When hypothyroidism occurs since infancy or childhood, growth and development are not occur normally</li> <li>◦ Lack of mental/physical growth resulting in mental retardation and malformation</li> <li>◦ Sexual development and physical growth does not reach beyond 7-8 year old children</li> </ul>

**C. Parathyroid Glands**

- **Function:** raises blood calcium
- **Location:** \_\_\_\_\_ small glands behind the thyroid (size of grains of rice)
- **Hormone of the Parathyroid Gland**
  - Parathormone (PTH) - raises blood calcium (opposite effect of calcitonin from thyroid) to maintain proper levels of circulating calcium

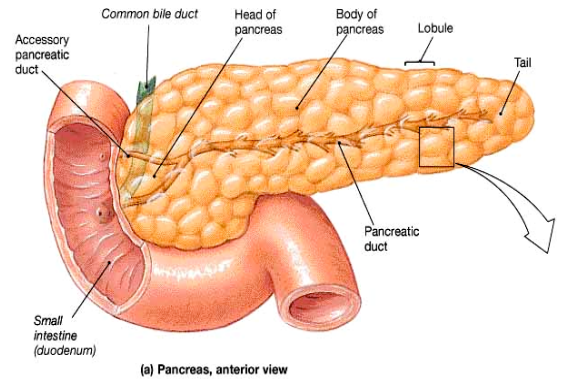


**D. Adrenal Glands**

- **Function:** Helps the body prepare for and \_\_\_\_\_
- **Location:** "\_\_\_\_\_" glands because found above each kidney
- **Hormones of the Adrenal Gland**
  - \_\_\_\_\_ (adrenaline) & Norepinephrine are released in emergency or stress situations to raise \_\_\_\_\_ levels and prepare the body for the "\_\_\_\_\_" response
  - Cortisol: "\_\_\_\_\_ hormone" that raises blood glucose by stimulating the breakdown of proteins
    - Too much suppresses \_\_\_\_\_

**E. Pancreas**

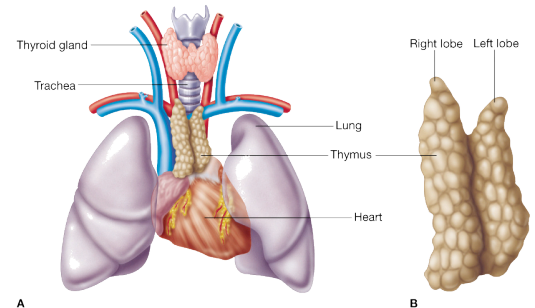
- **Function:** maintains \_\_\_\_\_ homeostasis (normal blood glucose levels) after eating
  - Also functions as an exocrine gland - secretes pancreatic juices that are carried to small intestines to aid in digestion) and
- **Location:** Fish-shaped organ behind stomach
- **Hormones of the Pancreas**
  - \_\_\_\_\_ - lowers blood glucose; promotes storage of glycogen in liver and muscles
  - \_\_\_\_\_ - raises blood glucose
- **Diseases of the Pancreas**
  - Diabetes Mellitus
    - Decreased secretion of insulin can affect metabolism of carbohydrates, proteins, fats
    - 2 types of D.M.



Type I (Insulin-dependent diabetes)	Type II (Noninsulin-dependent diabetes)
<ul style="list-style-type: none"> <li>• Juvenile onset</li> <li>• genetic and virus factors that destroy parts of the pancreas</li> <li>• requires insulin injections</li> </ul>	<ul style="list-style-type: none"> <li>• Adult onset</li> <li>• Most common in adults over 45</li> <li>• Risk factors: overweight or obese, heredity, certain ethnic groups</li> </ul>
<p><b>Symptoms:</b> fatigue, slow healing of skin infections and vision changes; poor circulation  <b>Long-term:</b> blindness, loss of limbs due to amputation, heart disease or even death</p>	

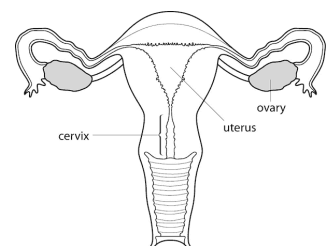
**F. Thymus**

- **Function:** Active in early life activating cells in the \_\_\_\_\_ system
  - Atrophies (stops functioning) during puberty
- **Location:** Mass of tissue found under the sternum
- **Hormone of the Thymus Gland**
  - \_\_\_\_\_ stimulates production of antibodies in early years



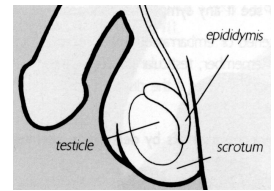
**G. Ovaries**

- **Function:** regulate menstruation and female sexual characteristics
- **Location:** Located behind pelvic cavity
- **Hormones of the Ovaries**
  - \_\_\_\_\_ - promotes growth and development of sex organs in female
  - \_\_\_\_\_ - maintains lining of the uterus



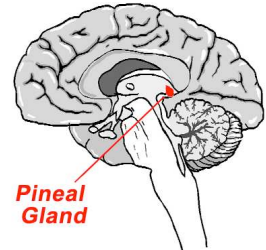
## H. Testes

- **Function:** stimulate sperm production and male sex characteristics
- **Location:** scrotal sac and suspended outside the body
- **Hormone of the Testes**
  - Testosterone - regulates sexual characteristics of male



## I. Pineal Gland

- **Function:** regulates \_\_\_\_\_ cycle
- **Location:** in the brain
- **Hormone of the Pineal Gland**
  - \_\_\_\_\_ - released at night to make you sleepy; not released during the day
    - Regulates the circadian rhythm (24-hour biological clock)



## III. Anabolic Steroids

- Synthetic form of testosterone used to treat some diseases
- Sometimes illegally abused by athletes to enhance performance and build muscle mass
- Negative side effects:
  - Both Sexes—balding, excess body hair, hostility, aggression, hallucinations, severe acne, kidney disease, high blood pressure and cholesterol, heart damage, liver dysfunction and cancer, stunted growth
  - Men—reduced testicular size, low sperm count, impotency, breast enlargement
  - Females—facial hair, breast reduction, deepening of voice, cessation of menstrual cycle

## IV. Endocrine System Maintains Homeostasis

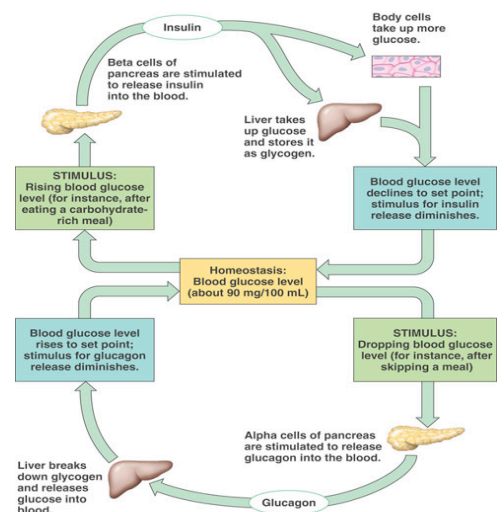
- \_\_\_\_\_ means "the maintenance of stable internal conditions in an organism".
- Homeostasis is maintained through a system called \_\_\_\_\_

### A. Negative Feedback Loop

- Through negative feedback, when the amount of a particular hormone in the blood reaches a certain level, the endocrine system sends signals that \_\_\_\_\_ the release of that hormone.
  - Sometimes a hormone with an opposing function may be released, if needed

### B. Pancreas & Negative Feedback

- Secretes insulin and glucagon to regulate the \_\_\_\_\_ (sugar) levels in the blood
- Steps to Negative Feedback Involving the Pancreas
  - STEP 1: The pancreas releases \_\_\_\_\_ when there is \_\_\_\_\_ sugar in the blood.
  - STEP 2: Insulin stimulates the liver to \_\_\_\_\_ sugar from the blood and store it as glycogen.
  - STEP 3: When there is not enough sugar in the blood, the pancreas releases \_\_\_\_\_.
  - STEP 4: Glucagon signals the liver to \_\_\_\_\_ glucose back into the blood



### C. Leptin & Negative Feedback

- Fat cells produce the hormone leptin when they are filled.
- Leptin is transported in the blood to the brain where it helps to \_\_\_\_\_ a person appetite.
- When the fat is used, the amount of \_\_\_\_\_, which causes the brain to start to feel \_\_\_\_\_ again

## Unit 8: Endocrine System