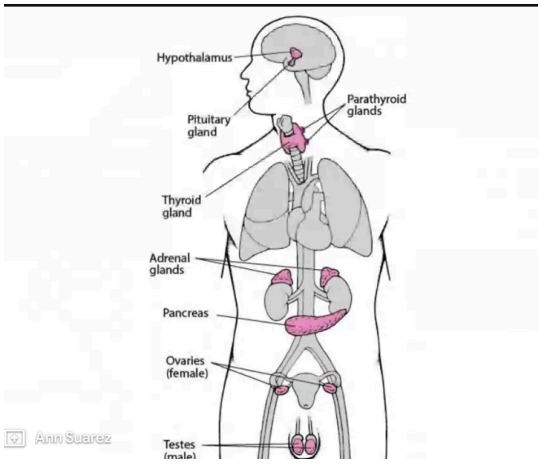
ENDOCRINE DISORDERS

Endocrine System

➢ A complex network of ductless glands and organs that release hormones directly into the bloodstream to regulate essential bodily functions.

ANATOMY



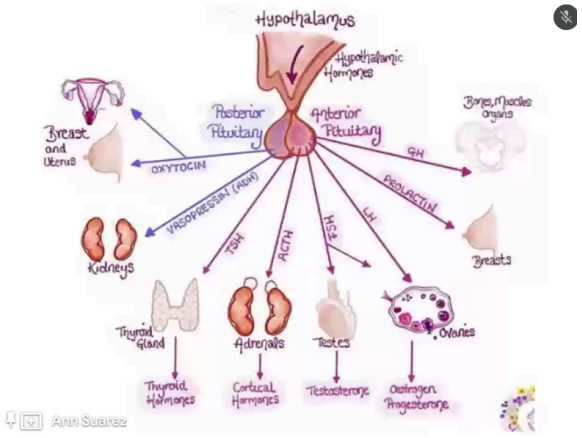
PARTS OF THE ENDOCRINE SYSTEM

1. **Hypothalamus**
   - It sits below the thalamus and above the pituitary gland.
   - Produces releasing and inhibitingg hormones that tell the pituitary gland to start or stop releasing its hormones.
2. **Pituitary Gland**
   - (master gland of endocrine system located below the hypothalamus).
   - Releases growth hormones, ACTH, FSH, etc.
3. **Thyroid gland**
   - Releases or secretes thyroid hormones.
   - **T3 (Triiodothyronine)** - Comprises 10% of thyroid output, but is the "active" hormone, with ~80% of it produced by converting T4 in the liver/kidneys.
   - **T4 (Thyroxine)** - Comprises 90% of thyroid output, known as the "inactive" or prohormone.
   - T3 and T4 are more on metabolism and production of heat.
4. **Parathyroid Glands**
   - Located behind your thyroid gland.
   - Responsible for maintaining and regulating the levels of Calcium and phosphorus.
5. **Adrenal Glands**
   - Located at the top of the kidneys.
   - Produces hormones such as Cortisol, aldosterone, and epinephrine.
   - Primarily involved in the stress response and help regulate the body's blood pressure.
6. **Pancreas**
   - It functions in both the endocrine and exocrine systems.
   - Produces insulin and glucagon.
7. **Ovaries**
   - Produce sex hormones.

- Estrogen and progesterone.

8. **Testes**
   - Testosteron.

HORMONES RELEASED



POSTERIOR PITUITARY GLAND

- Stores and releases hormones produced by the hypothalamus.

1. ***Oxytocin***
   - ➢ Uterus - for uterine contractions.
   - ➢ Breasts - for releasing of milk for breastfeeding.

2. ***Vasopressin (ADH)***
   - ➢ Antidiuretic Hormone (ADH) acts on the kidneys.
   - ➢ The primary function of ADH is to regulate water balance by promoting water reabsorption.
   - ➢ To prevent fluid loss.

ANTERIOR PITUITARY GLAND

- Releases more hormones than the posterior pituitary gland.

1. ***TSH (Thyroid Stimulating Hormone)***
   - ➢ A hormone that regulates the activity of the thyroid gland.
   - ➢ Releases the T3 and T4.

2. ***ACTH (Adrenocorticotropic Hormone)***
   - ➢ Stimulates our adrenal glands to release cortisol or other hormones.
   - ➢ Primarily involved in stress response.

3. ***FSH (Follicle - Stimulating Hormone)***
   - ➢ It acts on two glands the testes and ovaries.
   - ➢ Stimulates the testes to produce testosterone.
   - ➢ FSH and LH stimulate the ovaries to produce estrogen and progesterone.

4. ***Prolactin***
   - ➢ Acts on the breasts.
   - ➢ Stimulates the production of milk.

5. ***GH (Growth Hormone)***
   - Acts on our bones, muscles, and organs.
   - It is important, especially during childhood.

FUNCTIONS OF THE ENDOCRINE SYSTEM

- Regulation of metabolism
- Growth and development
- Reproduction
- Homeostasis
- Response to stress

DIAGNOSTIC TESTS

1. *STIMULATION TEST*

- used to assess the ability of endocrine glands to respond to a stimulus, often evaluating gland hypoactivity
- Ex. ACTH stimulation test

2. *SUPPRESSION TEST*
   - used to evaluate hyperactive glands by determining whether hormonal produce decreases when a suppressive agent is administer
   - Ex. Dexamethasone suppression test

3. *RADIOACTIVE IODINE UPTAKE (RAIU)*
   - Evaluates thyroid gland function by measuring iodine uptake from the bloodstream. (main organ thyroid gland)

4. *T3 and T4 UPTAKE TST*
   - Measures T3 and T4 in the blood to assess thyroid function. (blood specimen)
   - *T3:* 80-200 ng/dL
   - *T4:* 4.5-11.5 mcg/dL

5. *TSH TEST*
   - Measures TSH levels to evaluate the pituitary control over the thyroid gland (blood specimen)
   - *TSH:* 0.4-4.3 ulU/mL

6. *THYROID SCAN*
   - Uses radioactive isotopes to produce images of the thyroid gland to detect nodules, tumors, or functional abnormalities.

7. *HbA1C*
   - measures the average blood blood glucose levels over 2-3 months by assessing glucose.
   - *Non- diabetic:* 4-5.6%
   - *Diabetic:* <7%

8. *24-HOUR URINE COLLECTION*
   - measures hormones or metabolic levels excreted in urine over 24 hours to assess endocrine gland function.
   - Ex. Catecholamines:<20mcg/day (epinephrine), mcg/24hrs