



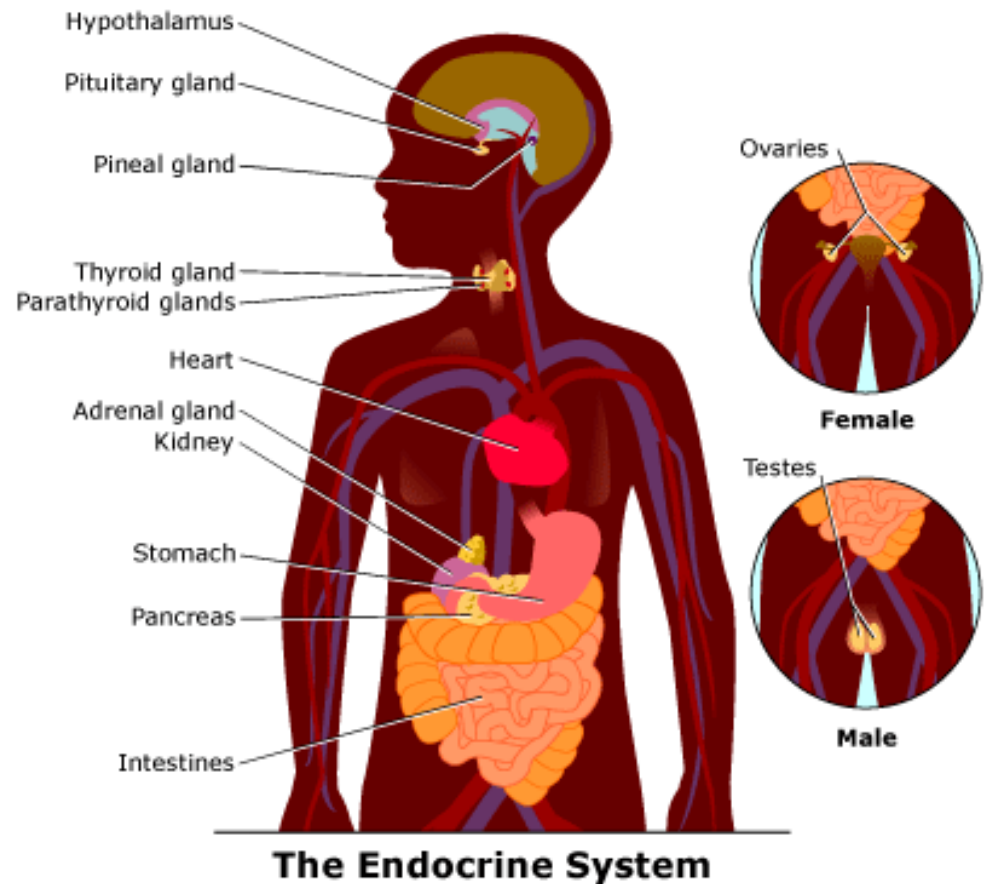
The Endocrine system

What is the endocrine system?

The endocrine system is made up of glands and the hormones they secrete. Although the endocrine glands are the primary hormone producers, the brain, heart, lungs, liver, skin, thymus, gastrointestinal mucosa, and placenta also produce and release hormones.

What is the endocrine system?

The primary endocrine glands are the pituitary (the master gland), pineal, thyroid, parathyroid, islets of Langerhans, adrenals, ovaries in the female and testes in the male.



The function of the endocrine system is the production and regulation of chemical substances called hormones.

Hormones...



A hormone is a chemical transmitter. It is released in small amounts from glands, and is transported in the bloodstream to target organs or other cells. Hormones are chemical messengers, transferring information and instructions from one set of cells to another.

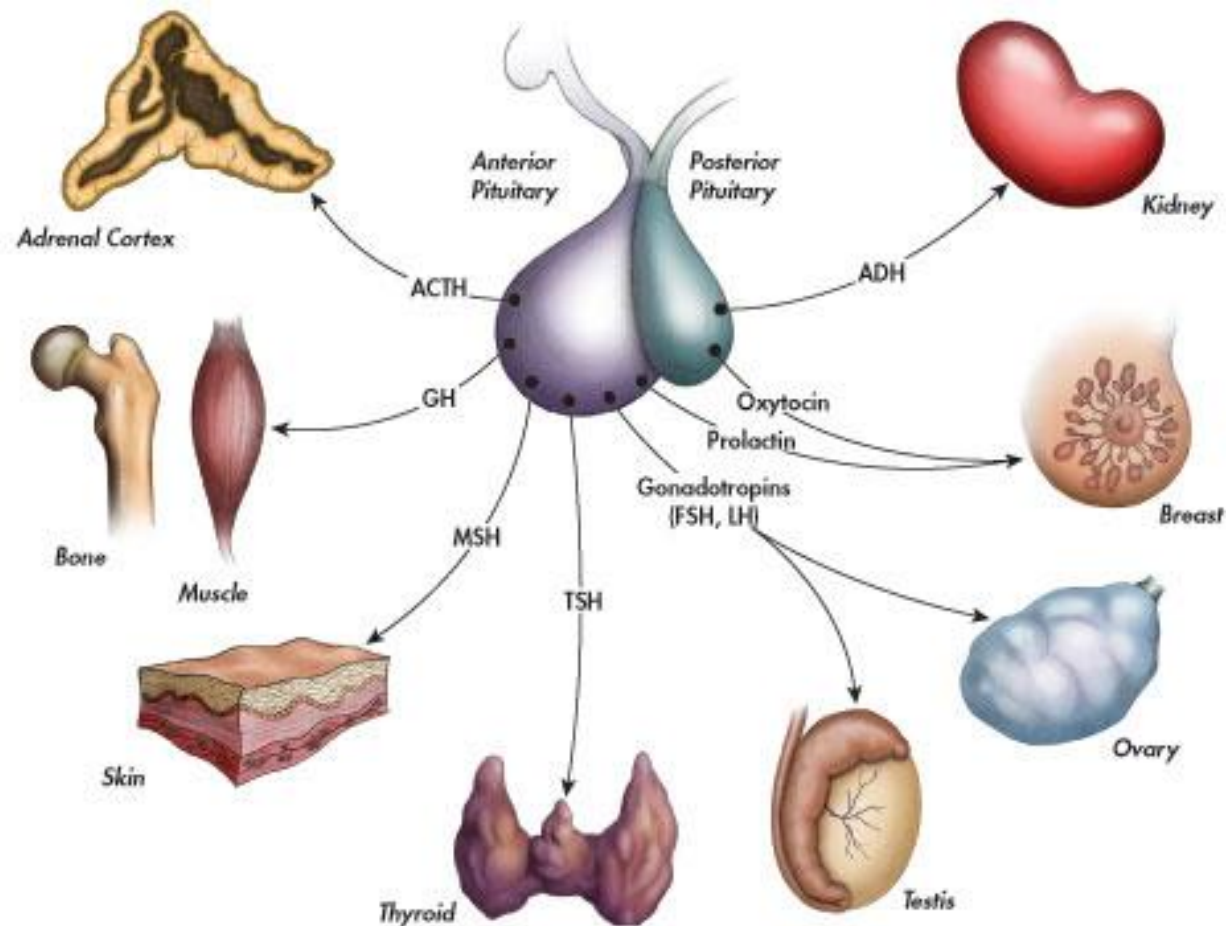
Hormones...

Hyposecretion or hypersecretion of any hormone can

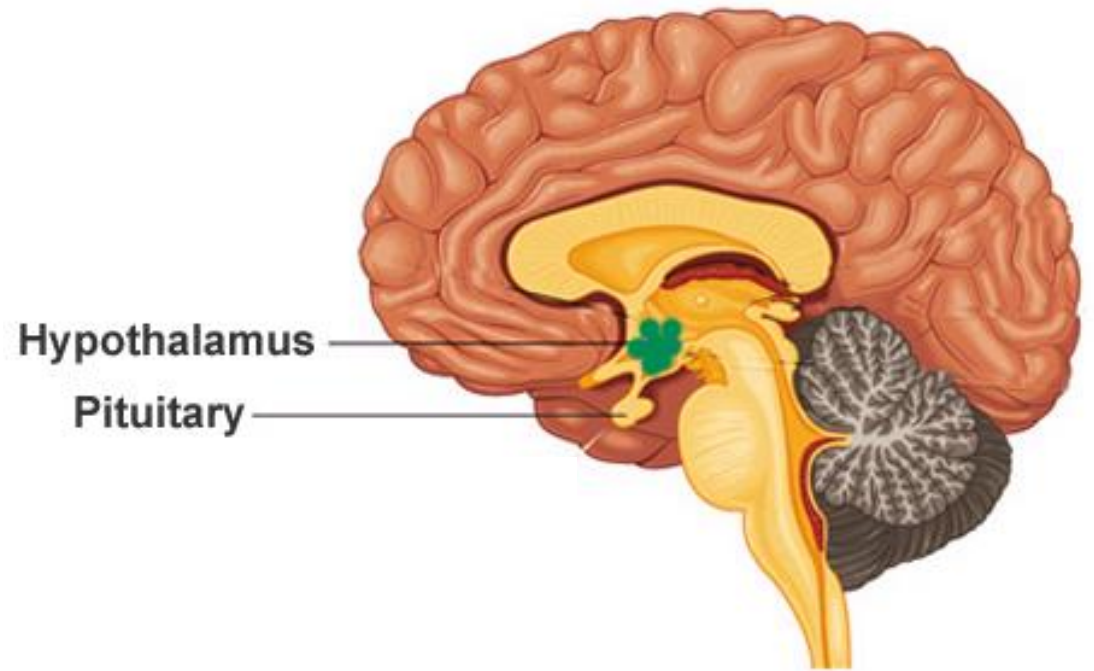
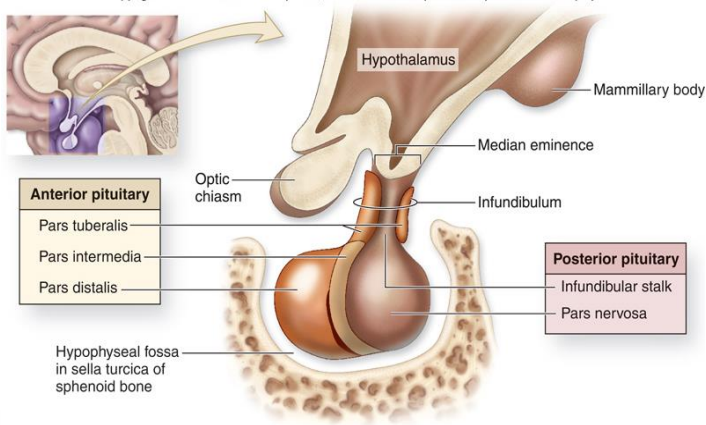
be harmful to the body.

Controlling the production of hormones can treat many hormonal disorders in the body.

Hormones regulate growth, development, mood, tissue function, metabolism, and sexual function.



Hormones...

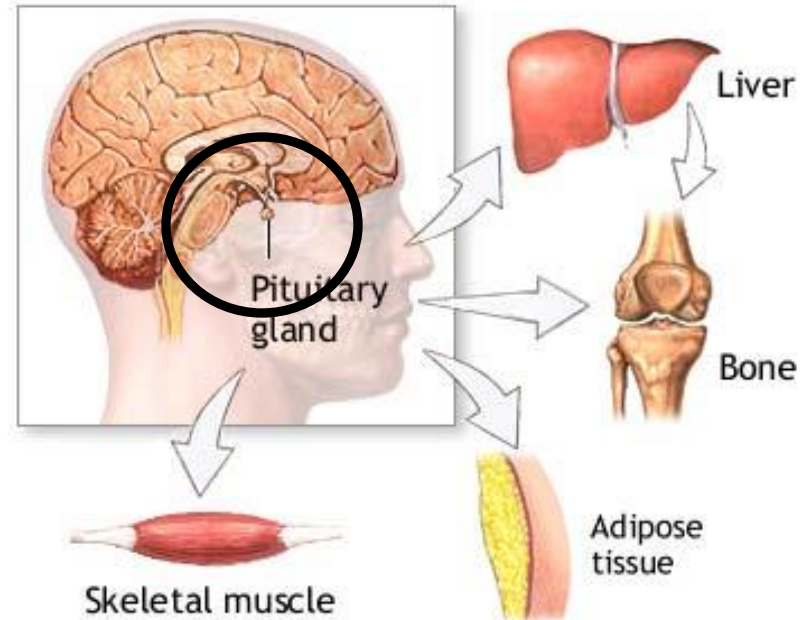


The pituitary gland has 2 lobes...

The endocrine system and nervous system work together to help maintain homeostasis... balance. The hypothalamus is a collection of specialized cells located in the brain, and is the primary link between the two systems. It produces chemicals that either stimulate or suppress hormone secretions of the pituitary gland.

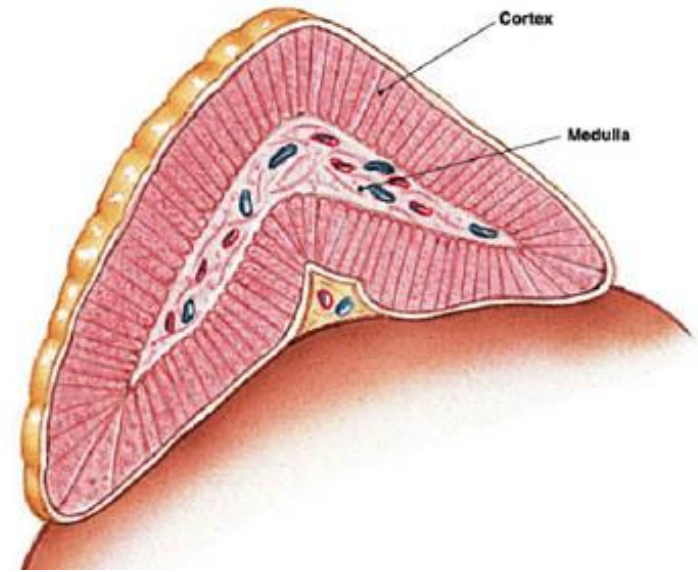
Secretions from the anterior pituitary gland...

Growth Hormone (GH): essential for the growth and development of bones, muscles, and other organs. It also enhances protein synthesis, decreases the use of glucose, and promotes fat destruction.

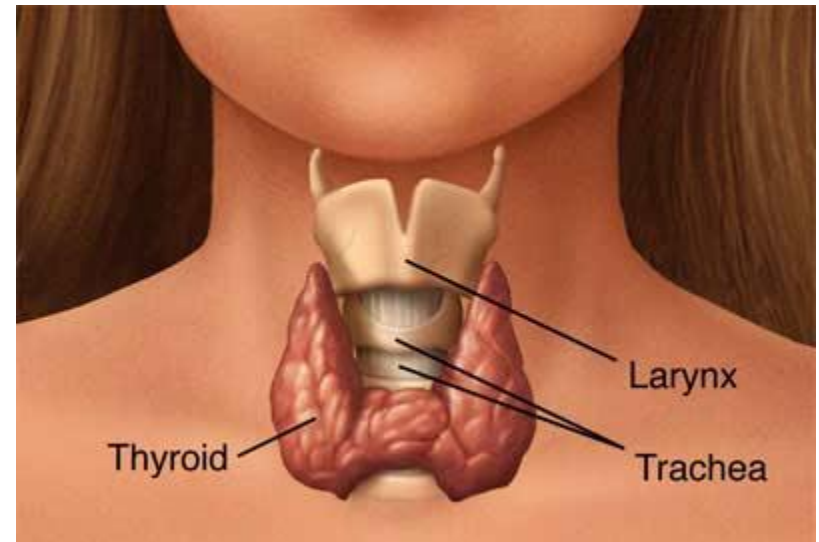


Secretions from the anterior pituitary gland...

Adrenocorticotropin (TRŌ pun) (ACTH): essential for the growth of the adrenal cortex.

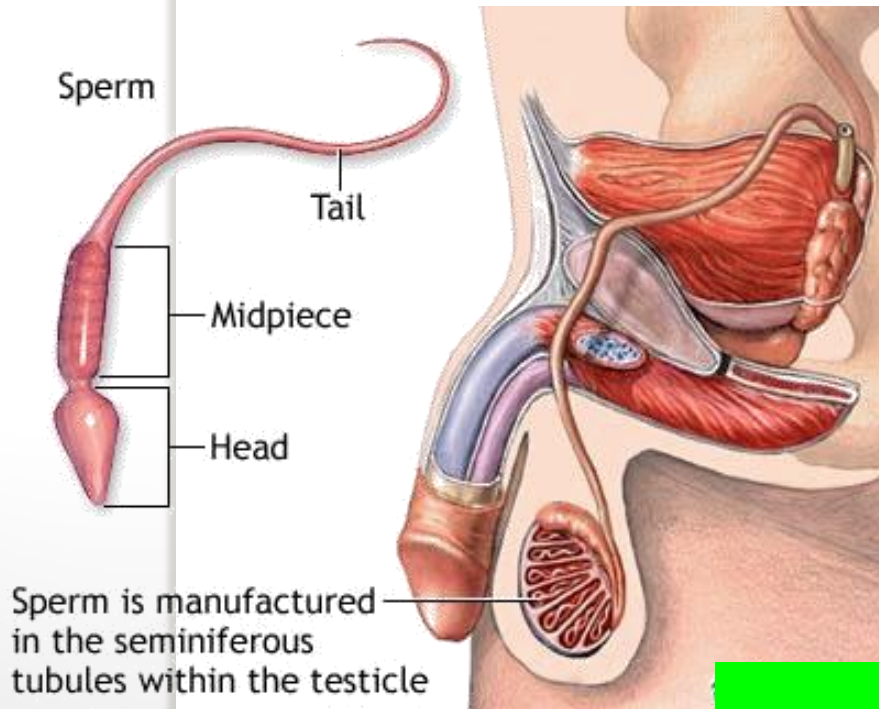


Thyroid-Stimulating Hormone (TSH): essential for the growth and development of the thyroid gland.

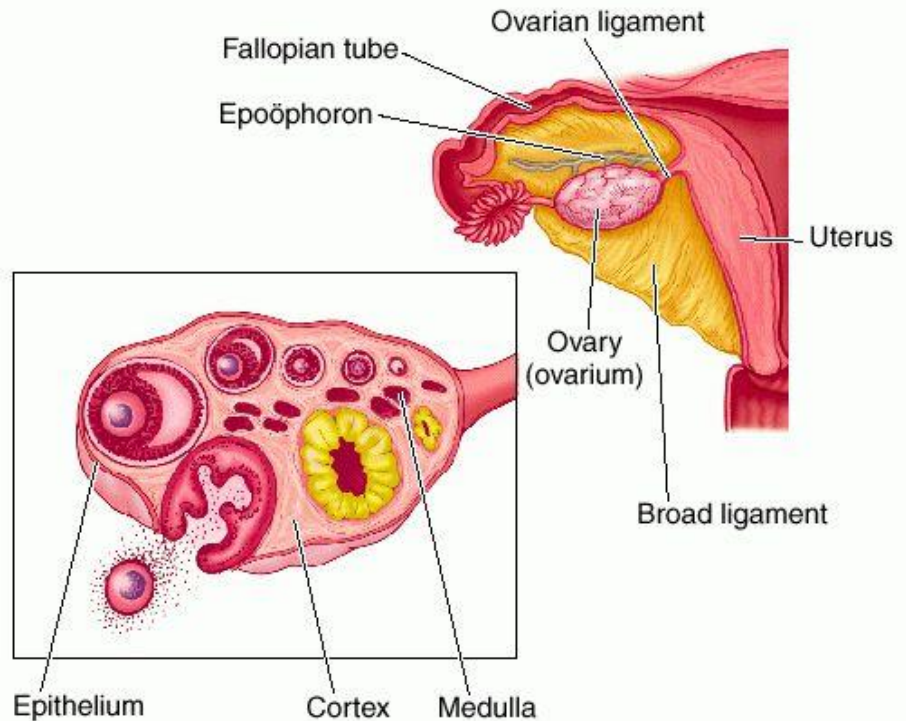


Secretions from the anterior pituitary gland...

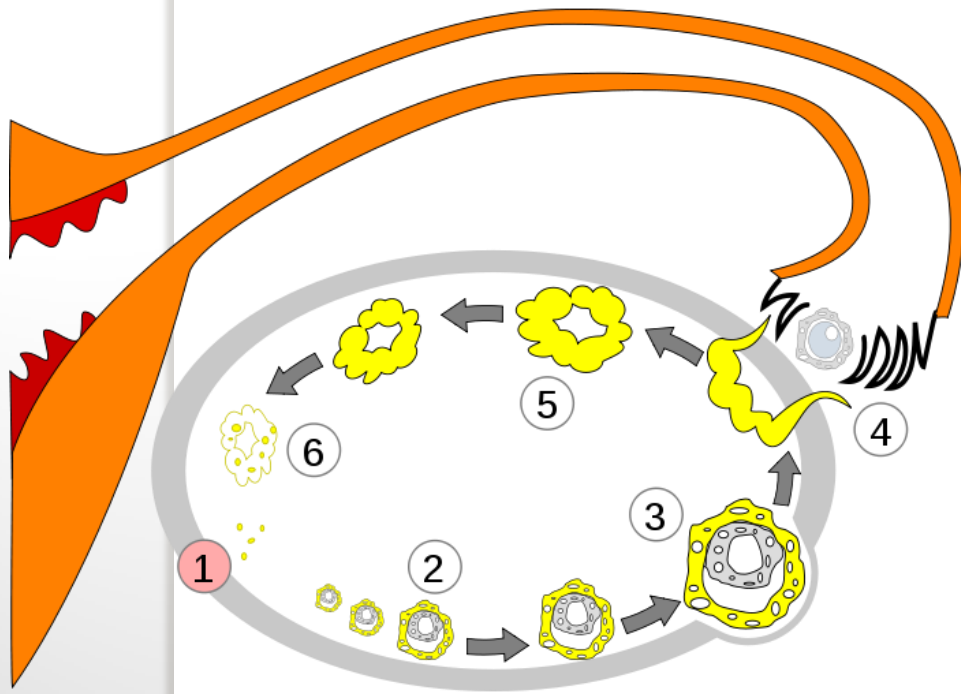
Follicle-Stimulating Hormone (FSH): is a gonadotropic hormone.



It stimulates the growth ovarian follicles in the female and the production of sperm in the male.



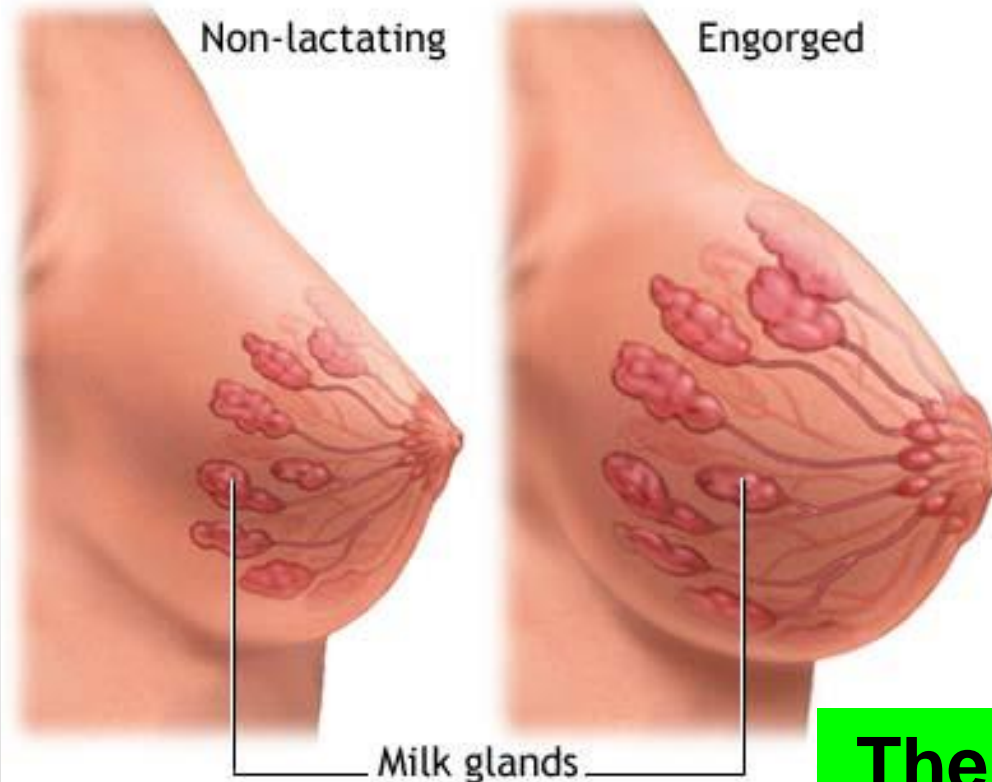
Secretions from the anterior pituitary gland...



The yellow corpus luteum remains after ovulation; it produces estrogen and progesterone.

Luteinizing Hormone (LH): is a gonadotropic hormone stimulating the development of corpus luteum in the female ovarian follicles and the production of testosterone in the male.

Secretions from the anterior pituitary gland...



Prolactin (PRL): stimulates the development and growth of the mammary glands and milk production during pregnancy.

The sucking motion of the baby stimulates prolactin secretion.

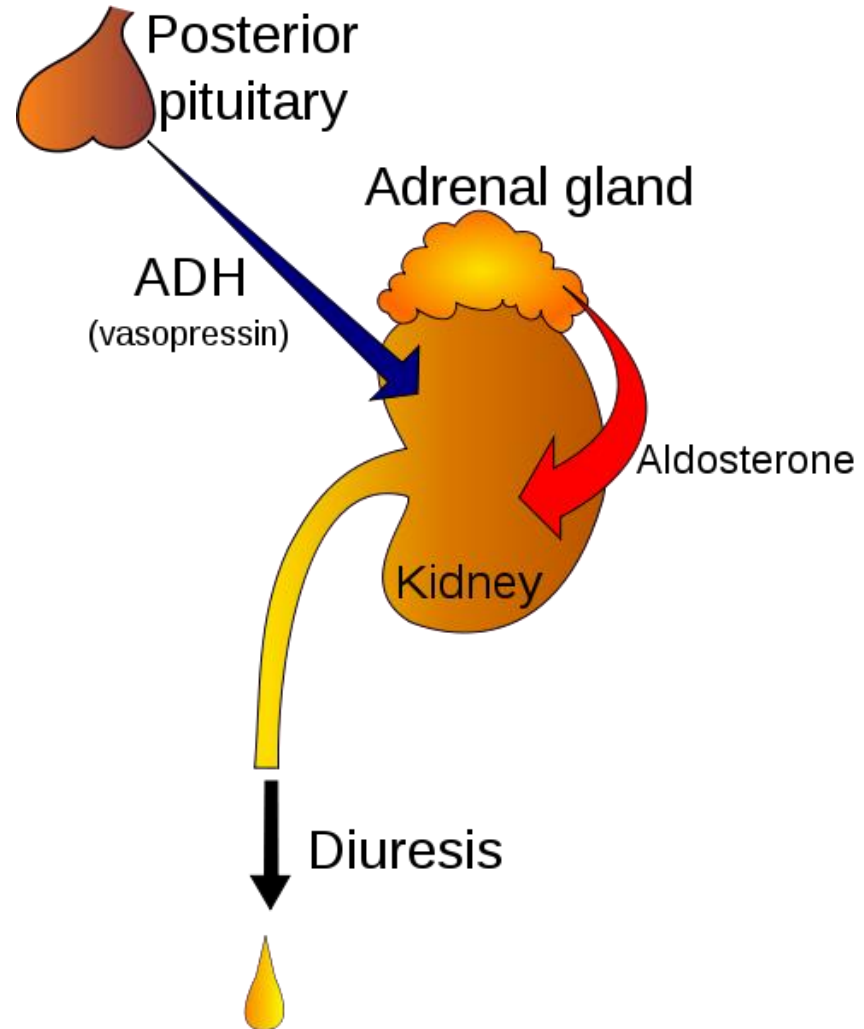
Secretions from the anterior pituitary gland...

Melanocyte-stimulating hormone (MSH): regulates skin pigmentation and promotes the deposit of melanine in the skin after exposure to sunlight



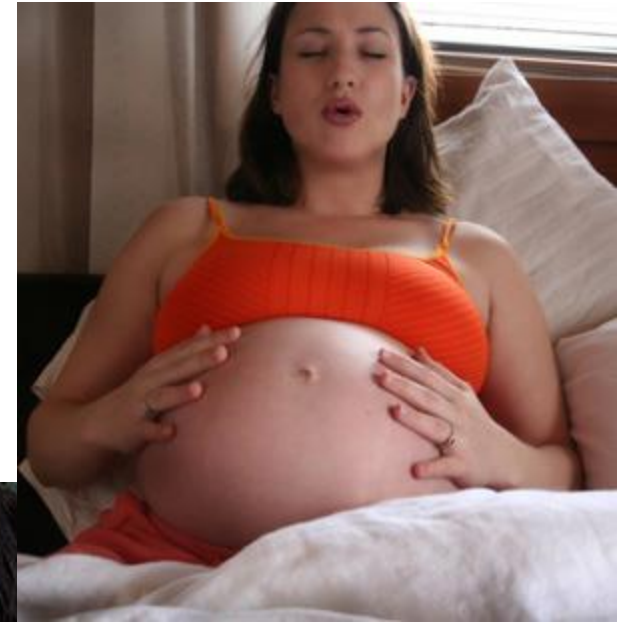
Secretions from the posterior lobe of the pituitary gland...

Antidiuretic Hormone (ADH): stimulates the reabsorption of water by the renal tubules. Hyposecretion of this hormone can result in diabetes insipidus.



Secretions from the posterior lobe of the pituitary gland...

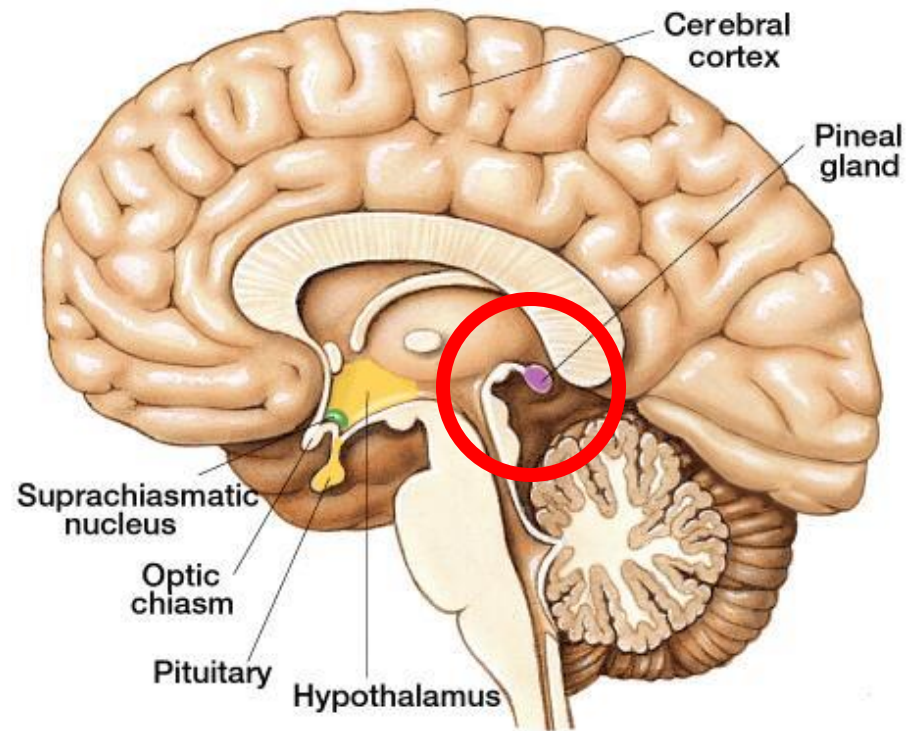
Oxytocin: stimulates the uterus to contract during labor, delivery, and parturition. A synthetic version of this hormone, used to induce labor, is called Pitocin. It also stimulates the mammary glands to release milk.



Secretions from the pineal gland...

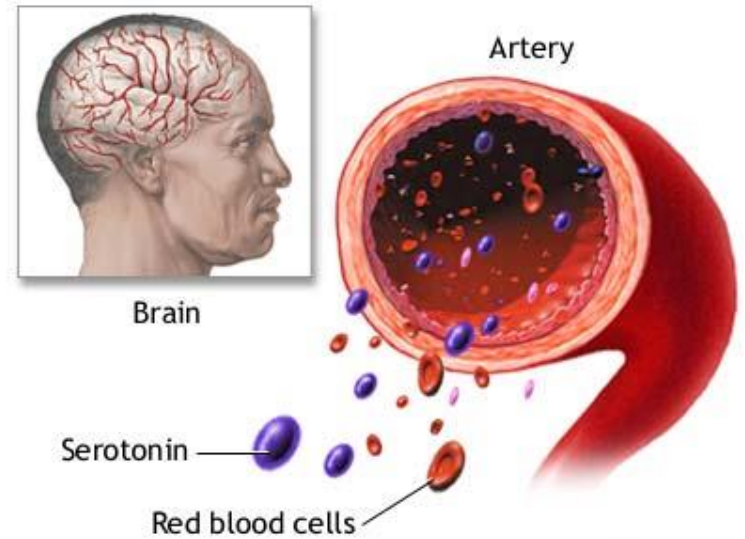
The pineal gland is pine-cone-shaped and only about 1 cm in diameter.

Melatonin: communicates information about environmental lighting to various parts of the body. Has some effect on sleep/awake cycles and other biological events connected to them, such as a lower production of gastric secretions at night.



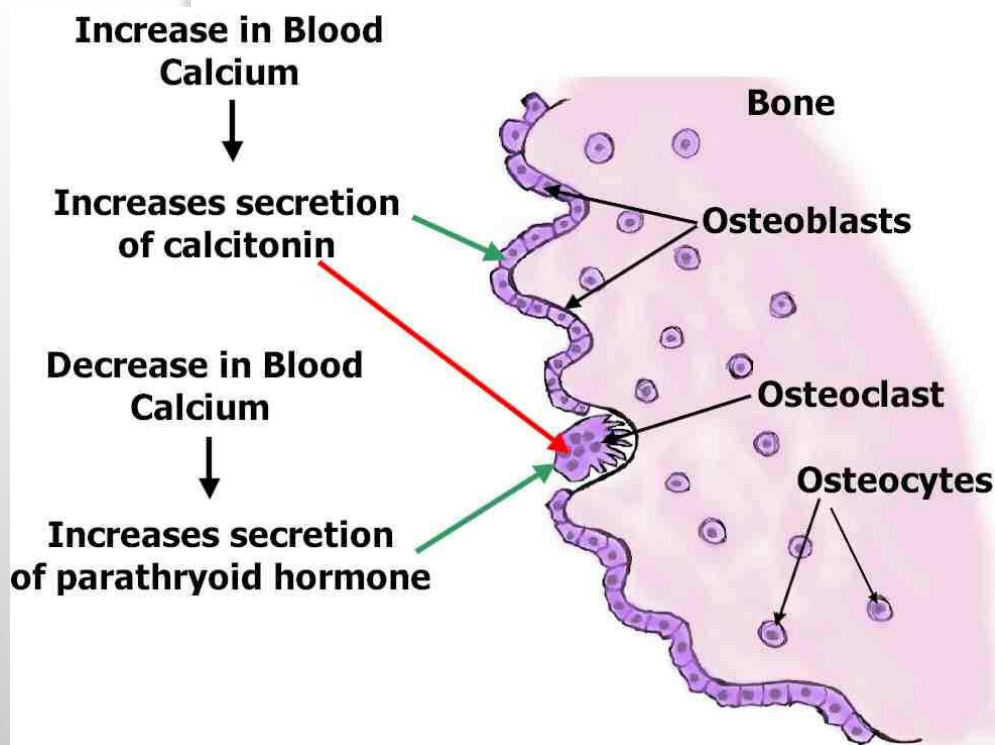
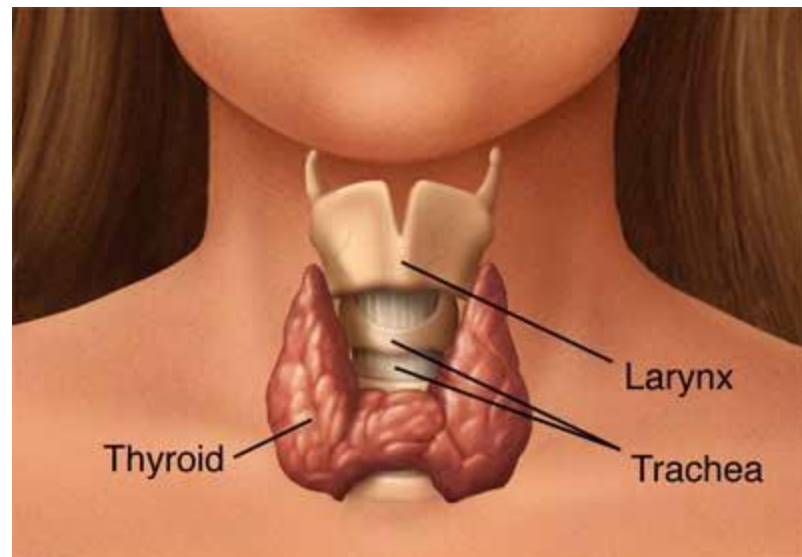
Secretions from the pineal gland...

Serotonin: a neurotransmitter that regulates intestinal movements and affects appetite, mood, sleep, anger, and metabolism.



Secretions of the thyroid gland...

The thyroid gland plays a vital role in metabolism and regulates the body's metabolic processes.



Calcitonin: influences bone and calcium metabolism; maintains a homeostasis of calcium in the blood plasma

Secretions of the thyroid gland...

Thyroxine (T4) and triiodothyronine (T3): essential to BMR – basal metabolic rate (the rate at which a person's body burns calories while at rest); influences physical/mental development and growth

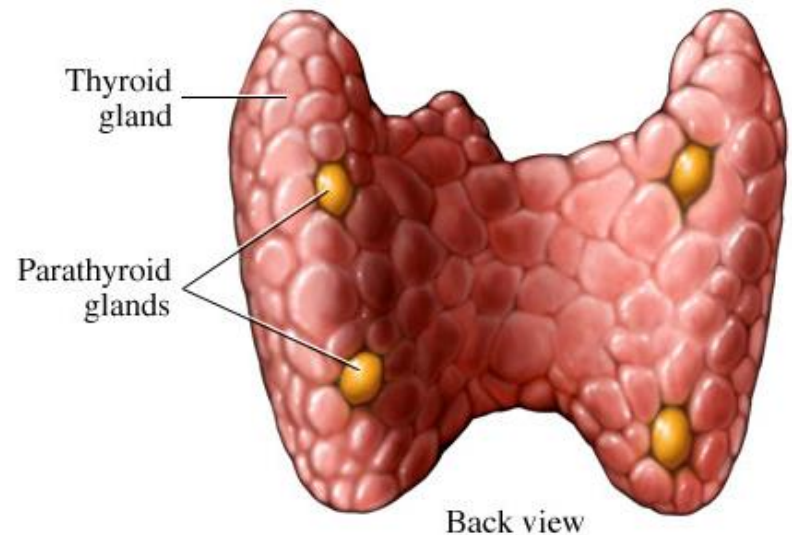
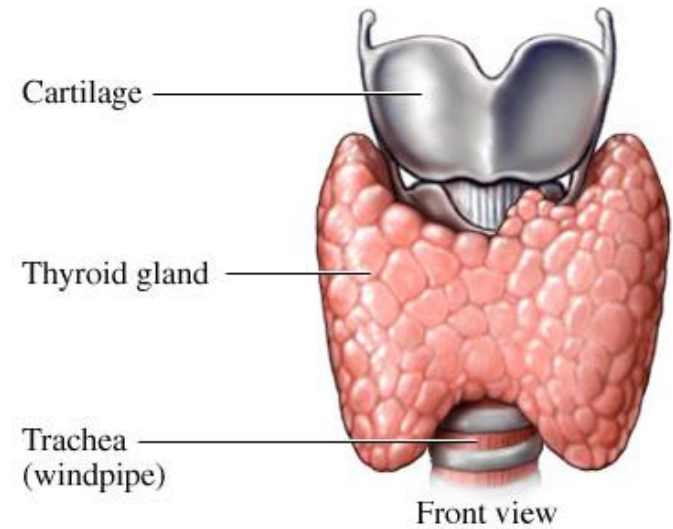


Hyposecretion of T3 and T4 = cretinism, myxedema, Hashimoto's disease

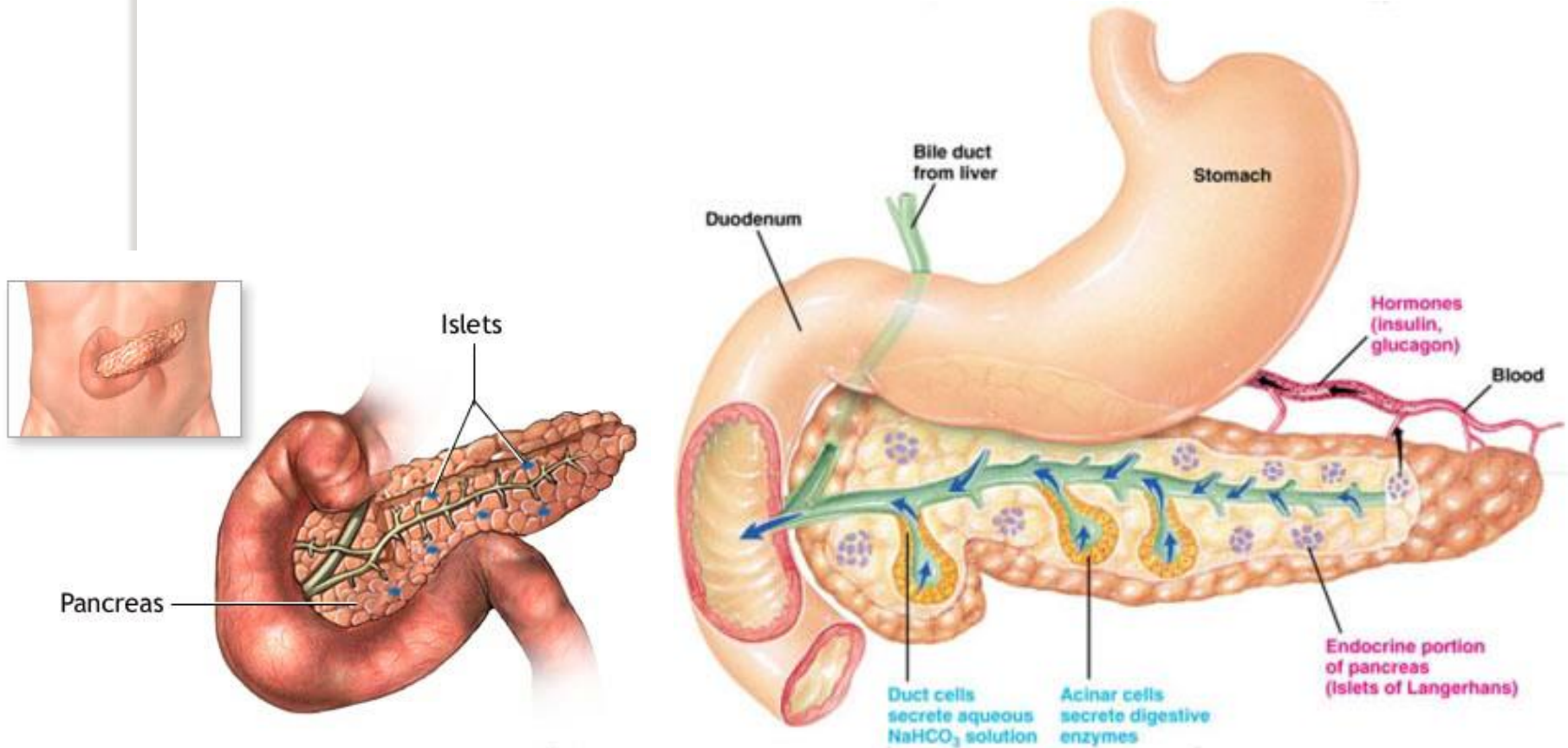
Hypersecretion of T3 and T4 = Grave's disease, goiter, Basedow's disease

Secretions of the parathyroid gland...

The two pairs of parathyroid glands are located on the dorsal or back side of the thyroid gland. They secrete parathyroid (PTH) which plays a role in the metabolism of phosphorus. Too little results in cramping; too much results in osteoporosis or kidney stones.



The islets of Langerhans...



The islets of Langerhans are small clusters of cells located in the pancreas.

Secretions from the islets of Langerhans...

Alpha cells facilitate the breakdown of glycogen to glucose. This elevates the blood sugar.

Delta cells suppress the release of glucagon and insulin.

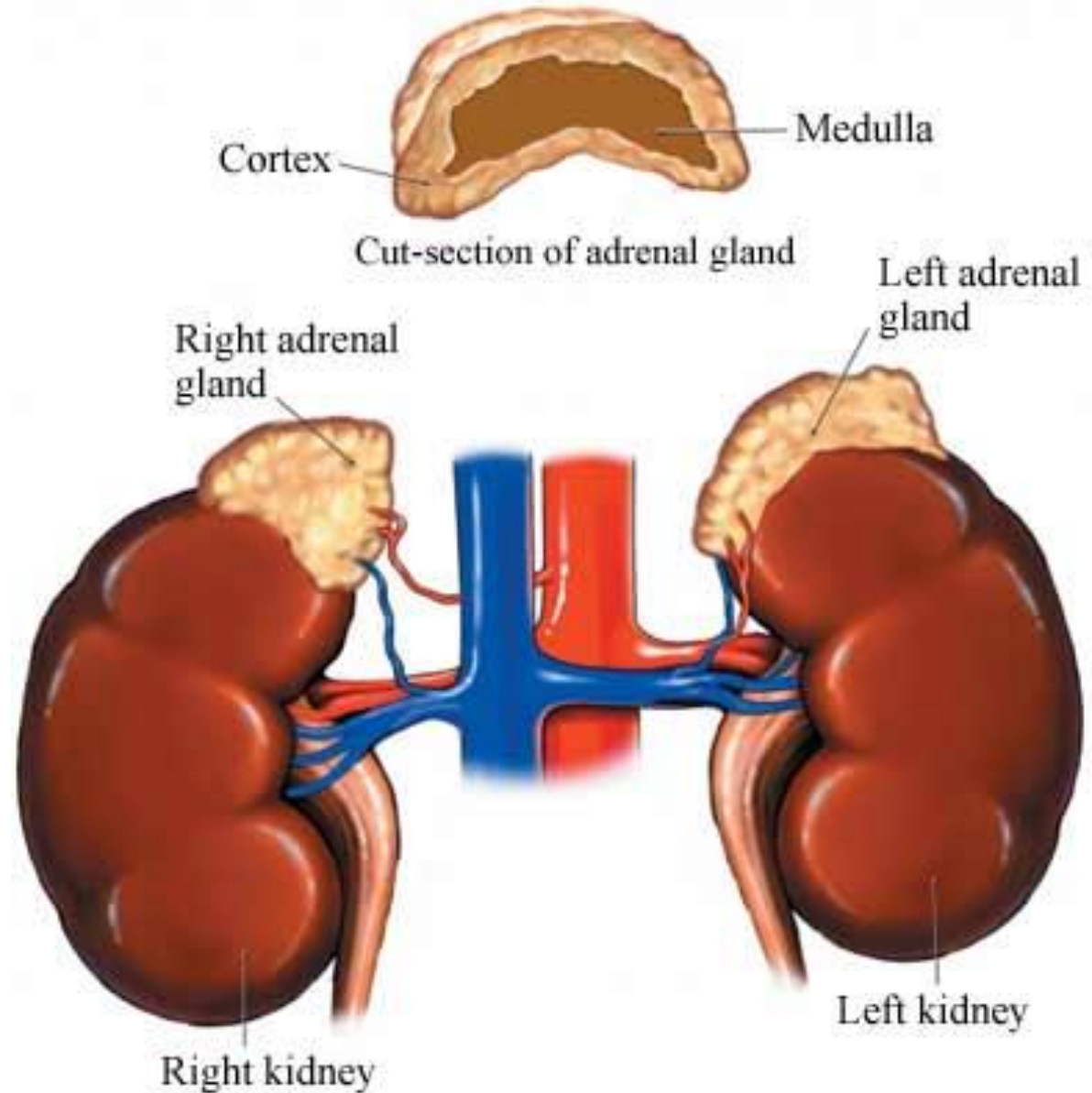
Beta cells secrete the hormone insulin, which is essential for the maintenance of normal blood sugar levels. Inadequate levels result in diabetes mellitus.

Your goal is to maintain normal blood glucose levels



The adrenal glands...

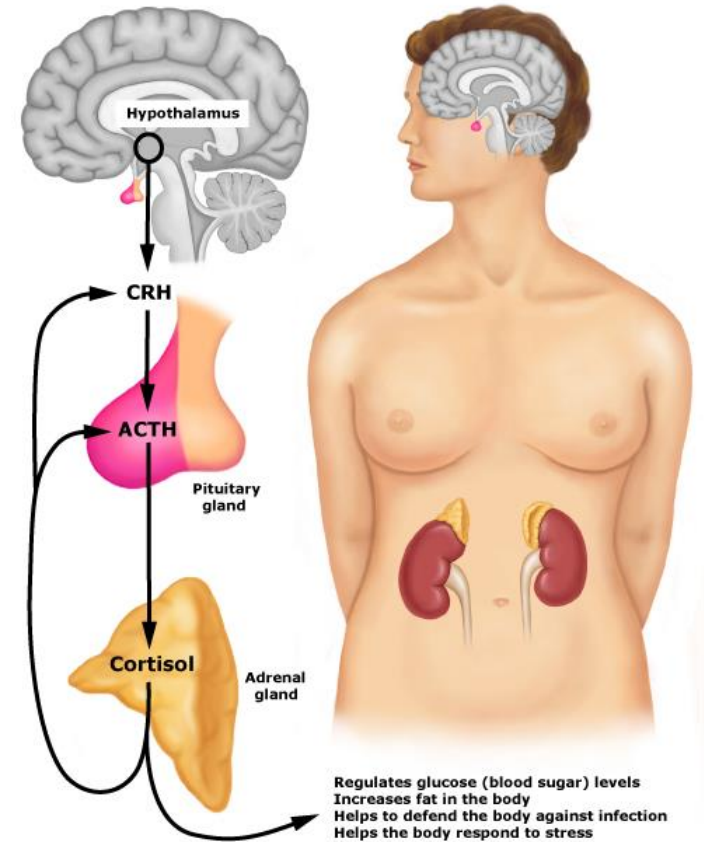
The triangular-shaped adrenal glands are located on the top of each kidney. The inside is called the medulla and the outside layer is called the cortex.



Secretions from the adrenal cortex...

Cortisol: regulates carbohydrate, protein, and fat metabolism; has an anti-inflammatory effect; helps the body cope during times of stress

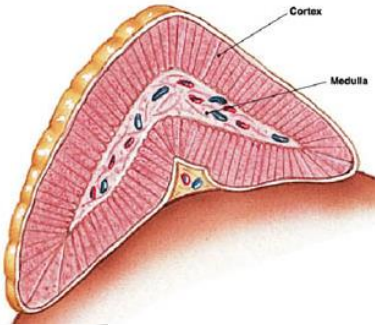
Hyposecretion results in Addison's disease; hypersecretion results in Cushing's disease



Corticosterone: like cortisol, it is a steroid; influences potassium and sodium metabolism

Secretions from the adrenal cortex...

Aldosterone: essential in regulating electrolyte and water balance by promoting sodium and chloride retention and potassium excretion.



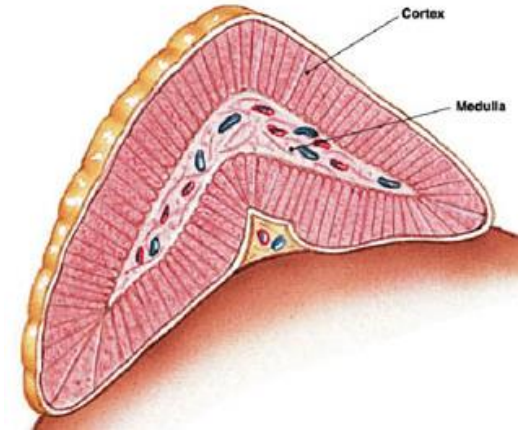
Androgens: several hormones including testosterone; they promote the development of secondary sex characteristics in the male.



Secretions from the adrenal medulla...



- Place the victim in shock position
- Keep the person warm and comfortable
- Turn the victim's head to one side if neck injury is not suspected



Dopamine is used to treat shock. It dilates the arteries, elevates systolic blood pressure, increases cardiac output, and increases urinary output.

Secretions from the adrenal medulla...



Epinephrine is also called adrenalin. It elevates systolic blood pressure, increases heart rate and cardiac output, speeds up the release of glucose from the liver... giving a spurt of energy, dilates the bronchial tubes and relaxes airways, and dilates the pupils to see more clearly. It is often used to counteract an allergic reaction.

Secretions from the adrenal medulla...



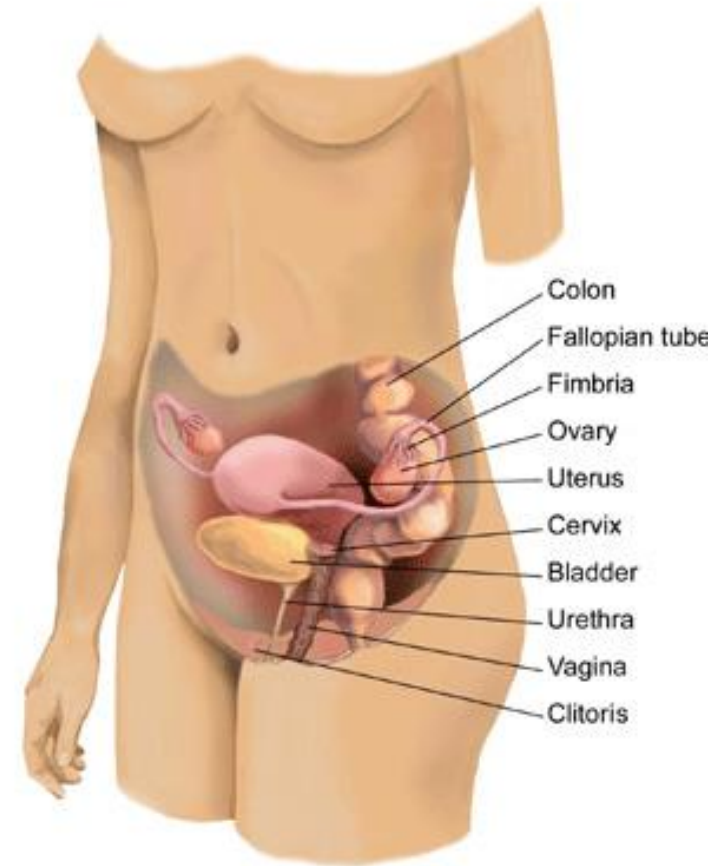
Norepinephrine, like epinephrine, is released when the body is under stress. It creates the underlying influence in the *fight or flight response*. As a drug, however, it actually triggers a drop in heart rate.

Secretions of the ovaries...

The ovaries produce several estrogen hormones and progesterone. These hormones prepare the uterus for pregnancy, promote the development of mammary glands, play a role in sex drive, and develop secondary sex characteristics in the female.

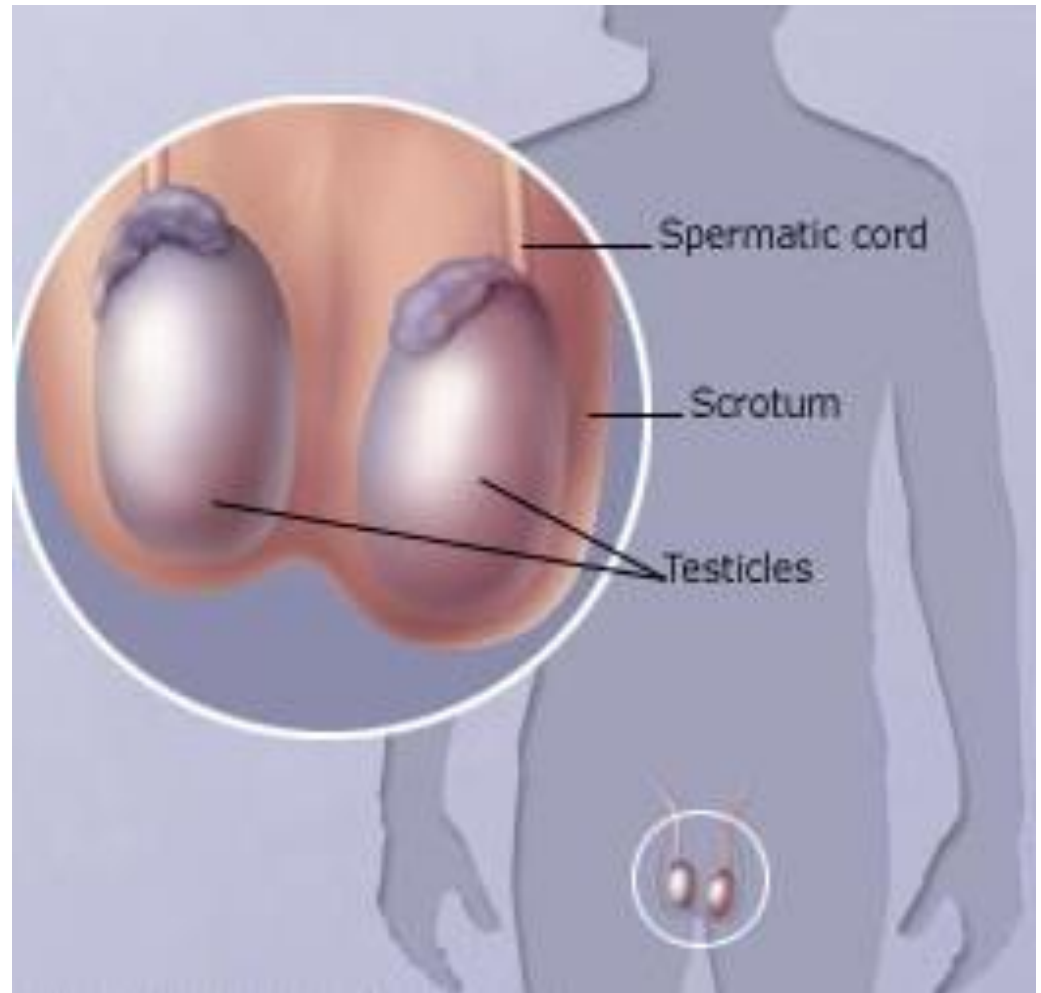
Estrogen is essential for the growth, development, and maintenance of female sex organs.

The Female Reproductive System



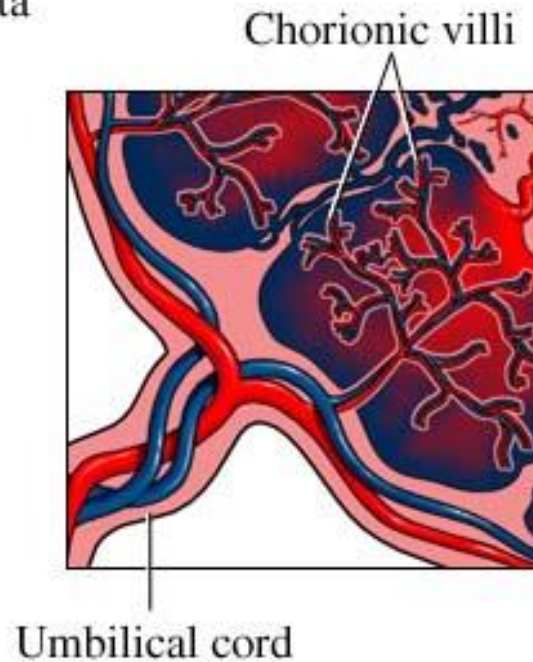
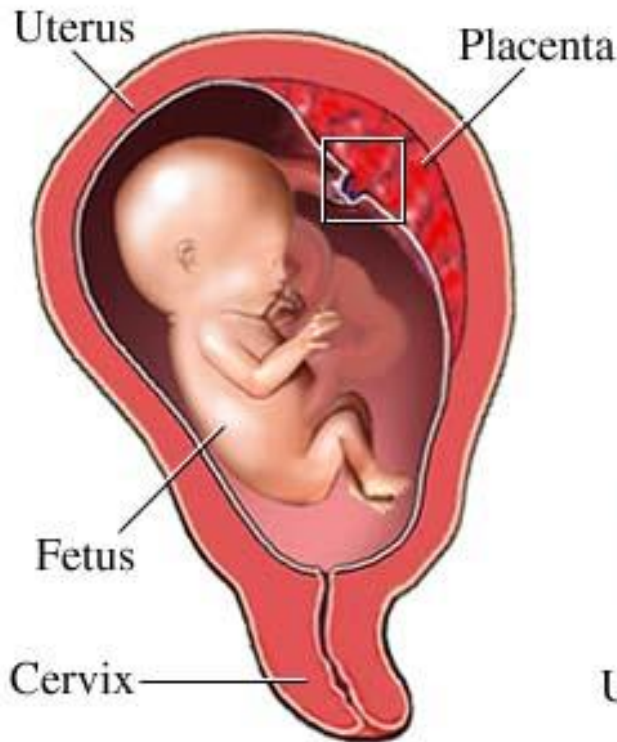
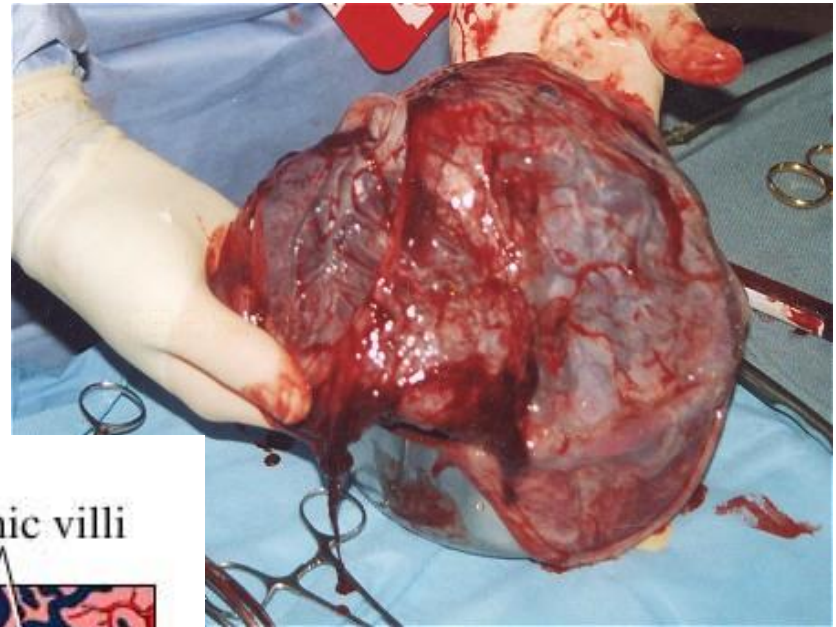
Secretions of the testes...

The testes produce the male sex hormone called testosterone. It is essential for normal growth and development of the male sex organs. Testosterone is responsible for the erection of the penis.



Secretions of the placenta...

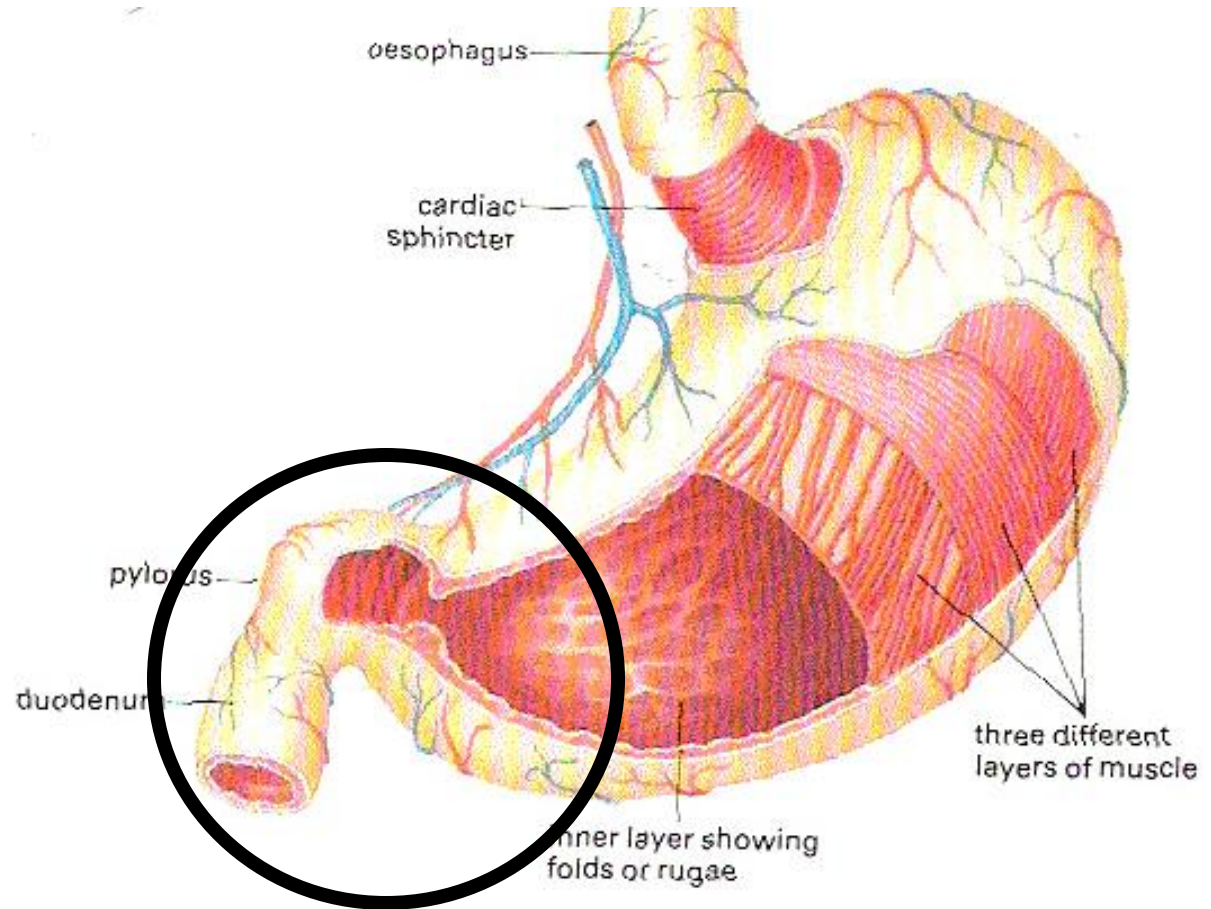
During pregnancy, the placenta serves as an endocrine gland.



It produces
chorionic
gonadotropin
hormone,
estrogen, and
progesterone.

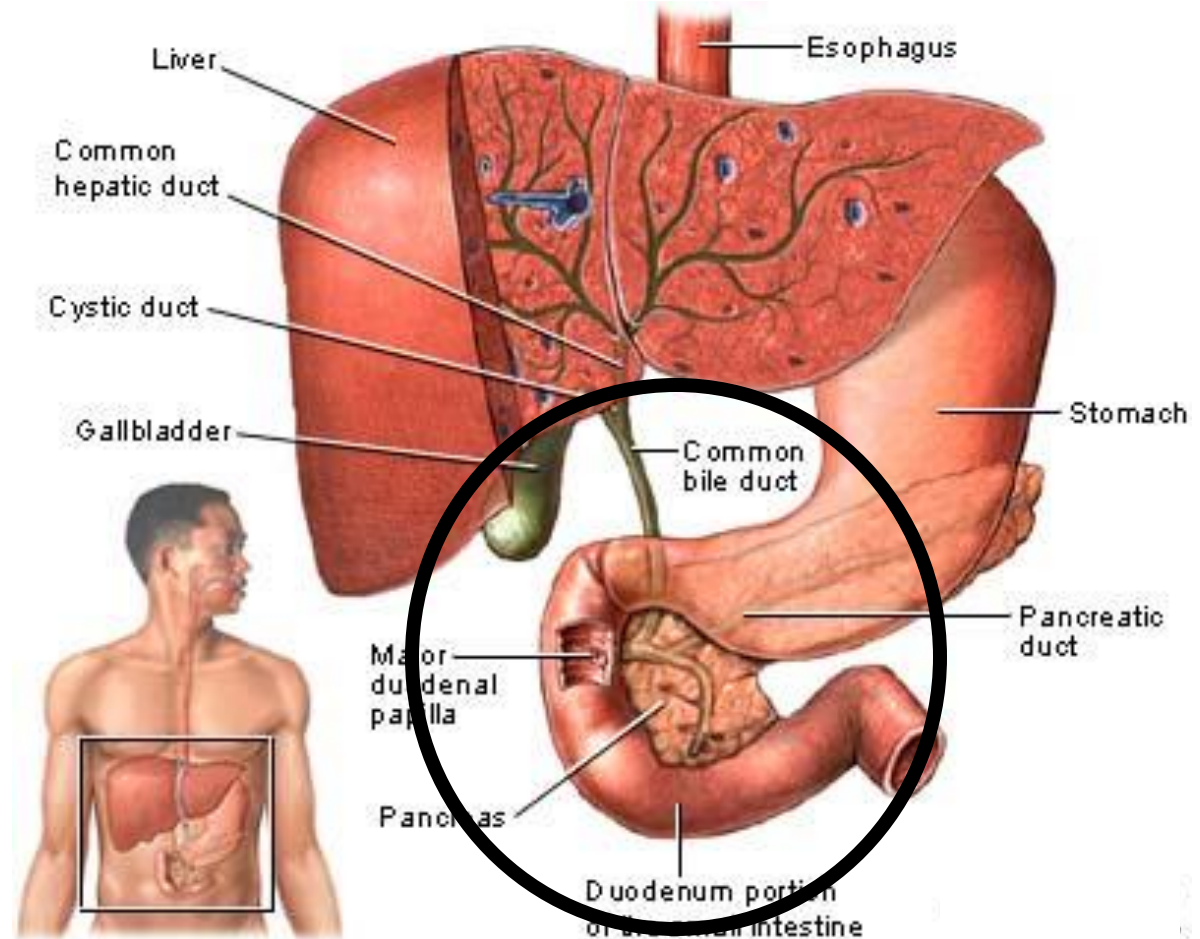
Secretions of the gastrointestinal mucosa...

The mucosa of the pyloric area of the stomach secretes the hormone gastrin, which stimulates the production of gastric acid for digestion.



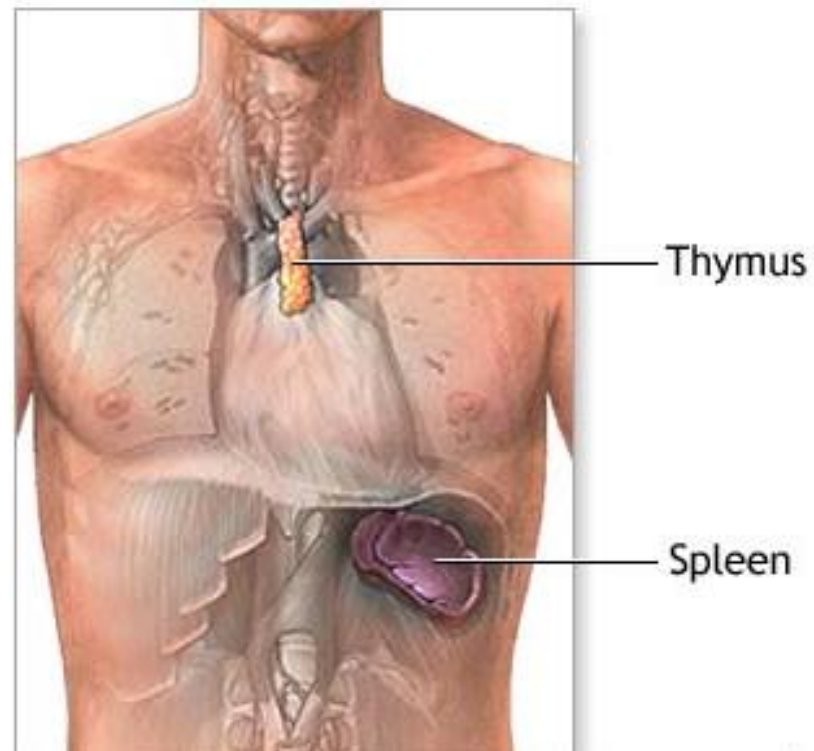
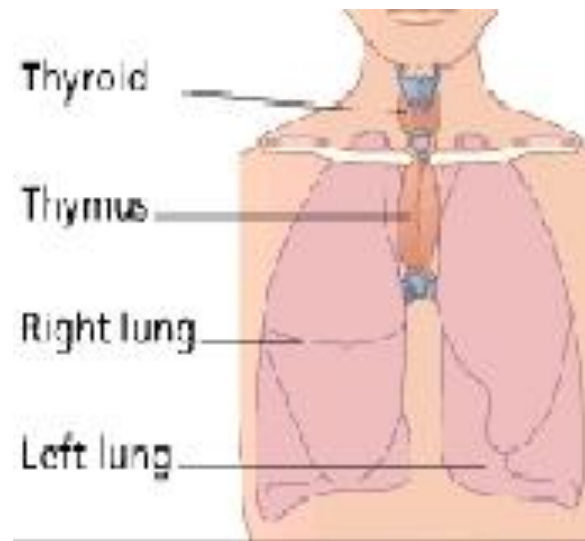
Secretions of the gastrointestinal mucosa...

The mucosa of the duodenum and jejunum secretes the hormone secretin, which stimulates pancreatic juice, bile, and intestinal secretion.



Secretions of the thymus...

The thymus gland has two lobes, and is part of the lymphatic system. It is a ductless gland, and secretes thymosin. This is necessary for the Thymus' normal production of T cells for the immune system.



THANK YOU