

CHAPTER 18

WHATS ON THE TEST

20 Questions

Names of hormones and from where

Alcoholic blocks the affect (antidiuretic) (beer)

Function of the hypothalamus or thalamus

General action of the hormone

Functions of endocrine

Which organ has both endocrine and exocrine functions

Negative feedback- process used to control level of hormone

What hormones are released when stressed

Conditions cause high blood sugar. Kidney can't absorb

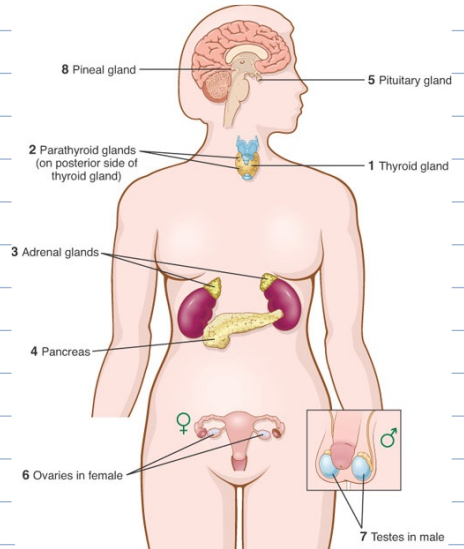
Peptide

Hormone causes increase of red blood cells

General adaptation syndrome

What happens when too much calcium is in the blood

Abbreviations of hormones



ENDOCRINE SYSTEM

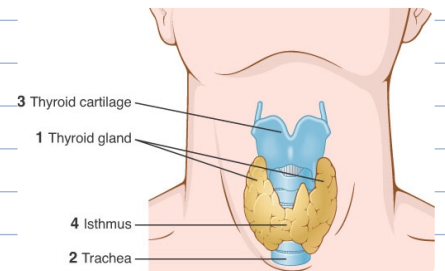
- Glands release hormones
- Hormones regulate the many and varied functions of an organism
- Hormones bind to receptors
- Receptors are recognition sites in the various target tissues on which hormones act

Endocrine Gland-secrete their hormones directly into the bloodstream

Exocrine Gland-sends chemical substances (tears, sweat, milk, saliva) via ducts to the outside of the body

THYROID FUNCTION

- There are two hormones
 - Thyroxine or Tetraiodothyronine (T4)
 - Triiodothyronine (T3)
- Thyroid hormones aid cells in their uptake of oxygen and regulate metabolic rate
- Calcitonin:simulates calcium to leave the blood and enter the bone

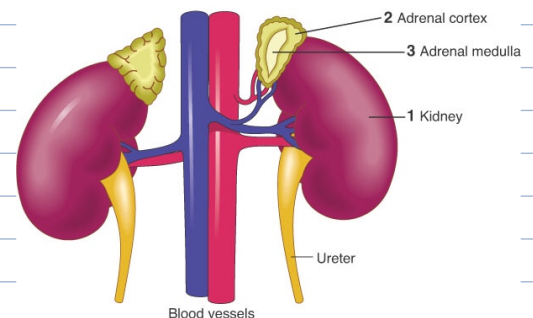


Parathyroid Hormone (PTH):causes calcium to mobilize from bones into the bloodstream

ADRENAL GLANDS

Has two parts:

- An outer portion, the adrenal cortex
 - secretes corticosteroids or steroids, chemical derived from cholesterol
- An inner portion, adrenal medulla
 - chemicals derived from amino acids



FUNCTION: ADRENAL CORTEX SECRETES

- Glucocorticoids: influence metabolism of sugars, fats, and proteins (cortisol) and are anti-inflammatory (cortisone). Influences-sugar

- Mineralocorticoids: regulate electrolytes
 - Aldosterone: reabsorption of sodium/excretion of potassium. Influences-salt
- Sex Hormones: androgens (testosterone) and estrogens influence secondary sex characteristics

FUNCTION: MEDULLA SECRETES

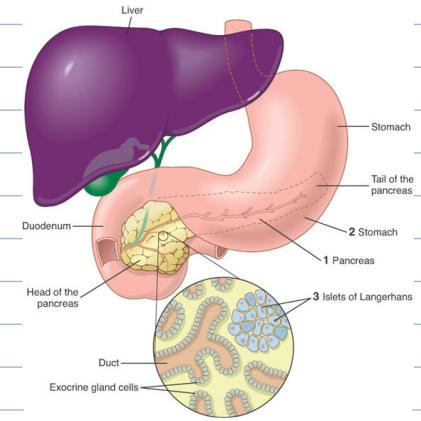
Two types of catecholamine hormones

- Epinephrine (adrenaline): increases heart rate and blood pressure, dilates bronchial tubes, and releases glucose from storage
- Norepinephrine (noradrenaline): constricts vessels to raise blood pressure
- Both are sympathomimetic agents

PANCREAS FUNCTION

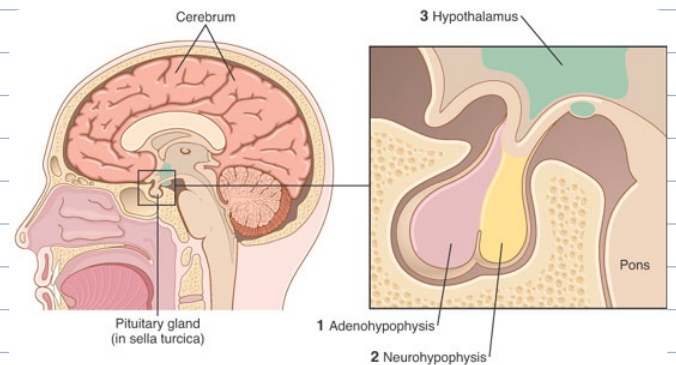
Endocrine Function

- Islets of Langerhans produce:
 - Insulin: promotes movement of glucose into cells and promotes storage as glycogen
 - Glucagon: promotes movement of glucose into the blood by breaking down glycogen stored in liver cells



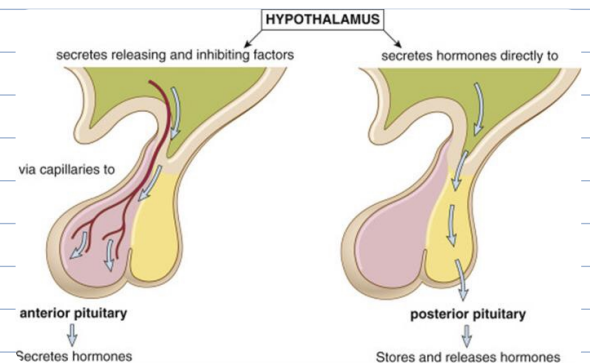
PITUITARY GLAND

- Pea-sized gland in the depression of skull (sella turcica) also called hypophysis
 - Anterior lobe (adenohypophysis)
 - Posterior lobe (neurohypophysis)
- Hypothalamus-controls secretions of the pituitary via releasing factors (hormones)



PITUITARY FUNCTION

- Anterior pituitary
 - growth hormone (GH) or somatotropin (STH)
 - Thyroid-stimulating hormone (TSH; thyrotropin)
 - Adrenocorticotrophic hormone (ACTH)
 - Gonadotropic hormones (FSH, LH)
 - Prolactin (PRL)
- Posterior pituitary: stores and releases hormones synthesized in the hypothalamus
 - Antidiuretic hormone (ADH; vasopressin)
 - Oxytocin (OT)



MALE

Testes

- Hormone: Testosterone
- maintains germ cell formation and secondary sexual characteristics

FEMALE

Ovaries

Hormones: Estrogen and Progesterone

Maintains menstrual cycle, release of ovum, secondary sexual characteristics, preparation of uterus for pregnancy

MAJOR ENDOCRINE GLANDS VOCABULARY

Adrenal Cortex-Outer section (cortex) of each adrenal gland; secretes cortisol, aldosterone, and sex hormones.

Adrenal Medulla-Inner section (medulla) of each adrenal gland; secretes epinephrine and norepinephrine.

Ovaries-Located in the lower abdomen of a female; responsible for egg production and estrogen and progesterone secretion.

Pancreas-Located behind the stomach. Islet (alpha and beta) cells (islets of Langerhans) secrete hormones from the pancreas. The pancreas also contains cells that are exocrine in function. They secrete enzymes, via a duct, into the small intestine to aid digestion.

Parathyroid Glands-Four small glands on the posterior of the thyroid gland. Some people may have three or five parathyroid glands.

Pituitary Gland (hypophysis)-Located at the base of the brain in the sella turcica; composed of an anterior lobe (adenohypophysis) and a posterior lobe (neurohypophysis). It weighs only 1/16 of an ounce and is a half-inch across.

Testes-Two glands enclosed in the scrotal sac of a male; responsible for sperm production and testosterone secretion.

Thyroid Gland-Located in the neck on either side of the trachea

HORMONES VOCABULARY

Adrenaline (epinephrine)-Secreted by the adrenal medulla; increases heart rate and blood pressure.

Adrenocorticotropic Hormone (ACTH)-Secreted by the anterior lobe of the pituitary gland; also called adrenocorticotropin. ACTH stimulates the adrenal cortex.

Aldosterone-Secreted by the adrenal cortex; increases salt (sodium) reabsorption.

Androgen-Male hormone secreted by the testes and to a lesser extent by the adrenal cortex; testosterone is an example.

Antidiuretic Hormone (ADH)-Secreted by the posterior lobe of the pituitary gland. ADH (vasopressin) increases reabsorption of water by the kidney.

Calcitonin-Secreted by the thyroid gland; decreases blood calcium levels.

Cortisol-Secreted by the adrenal cortex; increases blood sugar. It is secreted in times of stress and has an anti-inflammatory effect.

Epinephrine (adrenaline)-Secreted by the adrenal medulla; increases heart rate and blood pressure and dilates airways (sympathomimetic). It is part of the body's "fight or flight" reaction.

Estradiol-Estrogen (female hormone) secreted by the ovaries.

Estrogen-Female hormone secreted by the ovaries and to a lesser extent by the adrenal cortex. Examples are estradiol and estrone.

Follicle-Stimulating Hormone (FSH)-Secreted by the anterior lobe of the pituitary gland. FSH stimulates hormone secretion and egg production by the ovaries and sperm production by the testes.

Glucagon Secreted by alpha islet cells of the pancreas; increases blood sugar by conversion of glycogen (starch) to glucose.

Growth Hormone (GH); Somatotropin-Secreted by the anterior lobe of the pituitary gland; stimulates growth of bones and soft tissues.

Insulin-Secreted by beta islet cells (Latin insula means island) of the pancreas. Insulin helps glucose (sugar) to pass into cells, and it promotes the conversion of glucose to glycogen.

Luteinizing Hormone (LH)-Secreted by the anterior lobe of the pituitary gland; stimulates ovulation in females and testosterone secretion in males.

Norepinephrine-Secreted by the adrenal medulla; increases heart rate and blood pressure (sympathomimetic). Nor- in chemistry means a parent compound from which another is derived. Also called noradrenaline.

Oxytocin (OT)-Secreted by the posterior lobe of the pituitary gland; stimulates contraction of the

uterus during childbirth.

Parathormone (PTH)-Secreted by the parathyroid glands; increases blood calcium.

Progesterone-Secreted by the ovaries; prepares the uterus for pregnancy.

Prolactin (PRL)-Secreted by the anterior lobe of the pituitary gland; promotes milk secretion.

Somatotropin (STH)-Secreted by the anterior lobe of the pituitary gland; growth hormone.

Testosterone-Male hormone secreted by the testes.

Thyroid-stimulating hormone (TSH); thyrotropin Secreted by the anterior lobe of the pituitary gland. TSH acts on the thyroid gland to promote its functioning. HINT: TSH is not secreted by the thyroid gland.

Thyroxine (T4)-Secreted by the thyroid gland; also called tetraiodothyronine. T4 increases metabolism in cells.

Triiodothyronine (T3)-Secreted by the thyroid gland; T3 increases metabolism in cells HINT: The extra n in thyronine avoids the combination of two vowels (o and i).

Vasopressin-Secreted by the posterior lobe of the pituitary gland; antidiuretic hormone (ADH). Vasopressin increases water reabsorption and raises blood pressure.

RELATED TERMS VOCABULARY

Catecholamines-Hormones derived from an amino acid and secreted by the adrenal medulla.

Epinephrine is a catecholamine.

Corticosteroids-Hormones (steroids) produced by the adrenal cortex. Examples are cortisol (raises sugar levels), aldosterone (raises salt reabsorption by kidneys), and androgens and estrogens (sex hormones).

Electrolyte-Mineral salt found in the blood and tissues and necessary for proper functioning of cells; potassium, sodium, and calcium are electrolytes.

Glucocorticoid-Steroid hormone secreted by the adrenal cortex; regulates glucose, fat, and protein metabolism. Cortisol raises blood sugar and is part of the stress response.

Homeostasis-Tendency of an organism to maintain a constant internal environment.

Hormone-Chemical, secreted by an endocrine gland, that travels through the blood to a distant organ or gland where it influences the structure or function of that organ or gland.

Hypothalamus-Region of the brain lying below the thalamus and above the pituitary gland. It secretes releasing factors and hormones that affect the pituitary gland.

Mineralocorticoid-Steroid hormone secreted by the adrenal cortex to regulate mineral salts (electrolytes) and water balance in the body. Aldosterone is an example.

Receptor-Cellular or nuclear protein that binds to a hormone so that a response can be elicited.

Sella Turcica-Cavity at the base of the skull; contains the pituitary gland.

Sex Hormones-Steroids (androgens and estrogens) produced by the adrenal cortex to influence male and female sexual characteristics.

Steroid-Complex substance related to fats (derived from a sterol, such as cholesterol), and of which many hormones are made. Examples of steroids are estrogens, androgens, glucocorticoids, and mineralocorticoids. Ster/o means solid; -ol means oil.

Sympathomimetic-Pertaining to mimicking or copying the effect of the sympathetic nervous system.

Adrenaline (epinephrine)-is a sympathomimetic hormone (it raises blood pressure and heart rate and dilates airways).

Target Tissue-Cells of an organ that are affected or stimulated by specific hormones.

COMBINING FORMS: GLANDS

Combining Form	Meaning
Aden/o	Gland
Adrenal/o	Adrenal gland
Gonad/o	Sex gland

Pancreat/o	Pancreas
Parathyroid/o	Parathyroid gland
Pituitar/o	Pituitary gland
Thyr/o, thyroid/o	Thyroid gland

COMBINING FORMS: RELATED TERMS

Combining Form	Meaning
Andr/o	Male
Calc/o, calci/o	Calcium
Cortic/o	Cortex, outer region
Crin/o	Secrete
Dips/o	Thirst
Estr/o	Female
Gluc/o	Sugar
Glyc/o	Sugar
Home/o	Sameness
Hormon/o	Hormone
Kal/i	Potassium
Lact/o	Milk
Myx/o	Mucus
Natr/o	Sodium
Phys/o	Growing
Somat/o	Body
Ster/o	Solid structure
Toc/o	Childbirth
Toxic/o	Poison
Ur/o	Urine

Suffix	Meaning
-agon	Assemble, gather together
-emia	Blood condition
-in, -ine.	Substance
-trophin	Stimulating the Function of
-uria	Urine condition

Prefix.	Meaning
Eu-	Good, normal
Hyper-	Excessive; above
Hypo-	Deficient; below; under; less than normal
Oxy-	Rapid, sharp,, acid
Pan-	All
Poly-	Many or increased
Tetra-	Four
Tri-	Three

PATHOLOGY

THYROID GLAND

HYPERSECRETION

Hyperthyroidism-Overactivity of the thyroid gland; thyrotoxicosis

HYPOSECRETION

Hypothyroidism-Underactivity of the thyroid gland; myxedema is advanced hypothyroidism in adulthood; cretinism is an extreme hypothyroidism during infancy and childhood leads to a lack of normal physical and mental growth

NEOPLASMS

Thyroid Carcinoma-Cancer of the thyroid gland.

PARATHYROID GLANDS

HYPERSECRETION

Hyperparathyroidism-Excessive production of parathormone

HYPOSECRETION

Hypoparathyroidism-Deficient production of parathyroid hormone

ADRENAL CORTEX

HYPERSECRETION

Adrenal Virilism-Excessive secretion of adrenal androgens

Cushing Syndrome-Group of signs and symptoms produced by excess cortisol from the adrenal cortex

HYPOSECRETION

Addison Disease-Hypofunctioning of the adrenal cortex

ADRENAL MEDULLA

HYPERSECRETION

Heochromocytoma-Benign tumor of the adrenal medulla; tumor cells stain a dark or dusky (phe/o) color (chrom/o)

HYPOSECRETION

Diabetes Mellitus (DM)-Lack of insulin secretion or resistance of insulin in promoting sugar, starch, and fat metabolism in cells

-**Type 1 Diabetes** is an autoimmune disease. Autoantibodies against normal pancreatic islet cells are present. Onset is usually in early childhood but can occur in adulthood, and the etiology involves destruction of the beta islet cells, producing complete deficiency of insulin in the body. Patients usually are thin and require frequent injections of insulin to maintain a normal level of glucose in the blood. Type 1 requires patients to monitor their blood glucose levels several times a day using a glucometer. To test sugar levels with this device, the user pricks a finger to draw blood. At a minimum, patients test before each meal and at bedtime, but many test up to 12 times a day. Patients must continually (every day) balance insulin levels with food and exercise. In addition to injecting insulin into the body (buttocks, thighs, abdomen and arms), it also is possible to administer insulin through a portable pump, which infuses the drug continuously through a indwelling needle under the skin.

-**Type 2 Diabetes** is a separate disease from type 1. Patients often are older, usually with a family history of type 2 diabetes. Obesity is very common. The islet cells are not initially destroyed, and there is a relative deficiency of insulin secretion with a resistance by target tissues to insulin. Insulin resistance usually develops 5 to 10 years before type 2 diabetes is diagnosed, and is associated with an increased risk of cardiovascular disease. Often, high blood pressure, high cholesterol, and central abdominal obesity are seen in people who have insulin resistance. Treatment of type 2 diabetes is with diet, weight reduction, exercise, and, if necessary, insulin or oral hypoglycemic agents. Oral hypoglycemic agents stimulate the release of insulin from the pancreas and improve the body's sensitivity to insulin.

Both type 1 and type 2 diabetes are associated with primary and secondary complications. The primary complication of type 1 is hyperglycemia. Hyperglycemia can lead to ketoacidosis (fats are improperly burned, leading to an accumulation of ketones and acids in the body). Ketoacidosis also

can result from illness or infection, and initial symptoms may be upset stomach and vomiting. Hypoglycemia occurs when too much insulin is taken. Insulin shock is severe hypoglycemia caused by an overdose of insulin, decreased intake of food, or excessive exercise. Signs and symptoms are sweating, hunger, confusion, trembling, nervousness, and numbness. Treatment of severe hypoglycemia is with either a shot of glucagon or intravenous glucose to restore normal blood glucose levels. Convulsions, coma, and loss of consciousness can result if treatment is not given.

Secondary (long-term) complications may appear many years after the patient develops diabetes. These include destruction of retinal blood vessels (diabetic retinopathy), causing visual loss and blindness; destruction of the kidneys (diabetic nephropathy), causing renal insufficiency and often requiring hemodialysis or renal transplantation; destruction of blood vessels, with atherosclerosis leading to stroke, heart disease, and peripherovascular ischemia (gangrene, infection, and loss of limbs); and destruction of nerves (diabetic neuropathy) involving pain or loss of sensation, most commonly in the extremities. Loss of gastric motility (gastroparesis) also occurs. As a result of hormonal changes during pregnancy, gestational diabetes can occur in women with a predisposition to diabetes during the second or third trimester of pregnancy. After delivery, blood glucose usually returns to normal. Type 2 diabetes may develop in these women later in life.

PITUITARY GLAND: ANTERIOR LOBE

HYPERSECRETION

Acromegaly-Hypersecretion of growth hormone from the anterior pituitary after puberty, leading to enlargement of extremities

Gigantism-Hypersecretion of growth hormone from the anterior pituitary before puberty, leading to abnormal overgrowth of body tissues

HYPOSECRETION

Dwarfism-Congenital hyposecretion of growth hormone; hypopituitary dwarfism

Panhypopituitarism-Deficiency of all pituitary hormones

PITUITARY GLAND: POSTERIOR LOBE

HYPERSECRETION

Syndrome of Inappropriate ADH (SIADH)-Excessive secretion of antidiuretic hormone

HYPOSECRETION

Diabetes Insipidus (DI)-Insufficient secretion of antidiuretic hormone (vasopressin)

LABORATORY TESTS

Fasting Plasma Glucose (FPG)-Also known as fasting blood sugar test. Measures circulating glucose level in a patient who has fasted at least 8 hours

Serum and Urine Tests-Measurement of hormones, electrolytes, glucose, and other substances in serum (blood) and urine as indicators of endocrine function

Thyroid Function Tests-Measurement of T3, T4, and TSH in the bloodstream

CLINICAL PROCEDURES

Exophthalmometry-Measurement of eyeball protrusion (as in Graves disease) with an exophthalmometer

Computed Tomography (CT) Scan-X-ray imaging of endocrine glands in cross section and other views, to assess size and infiltration by tumor

Magnetic Resonance Imaging (MRI)-Magnetic waves produce images of the hypothalamus and pituitary gland to locate abnormalities

Thyroid Scan-Scanner detects radioactivity and visualizes the thyroid gland

Ultrasound Examination-Sound waves show images of endocrine organs