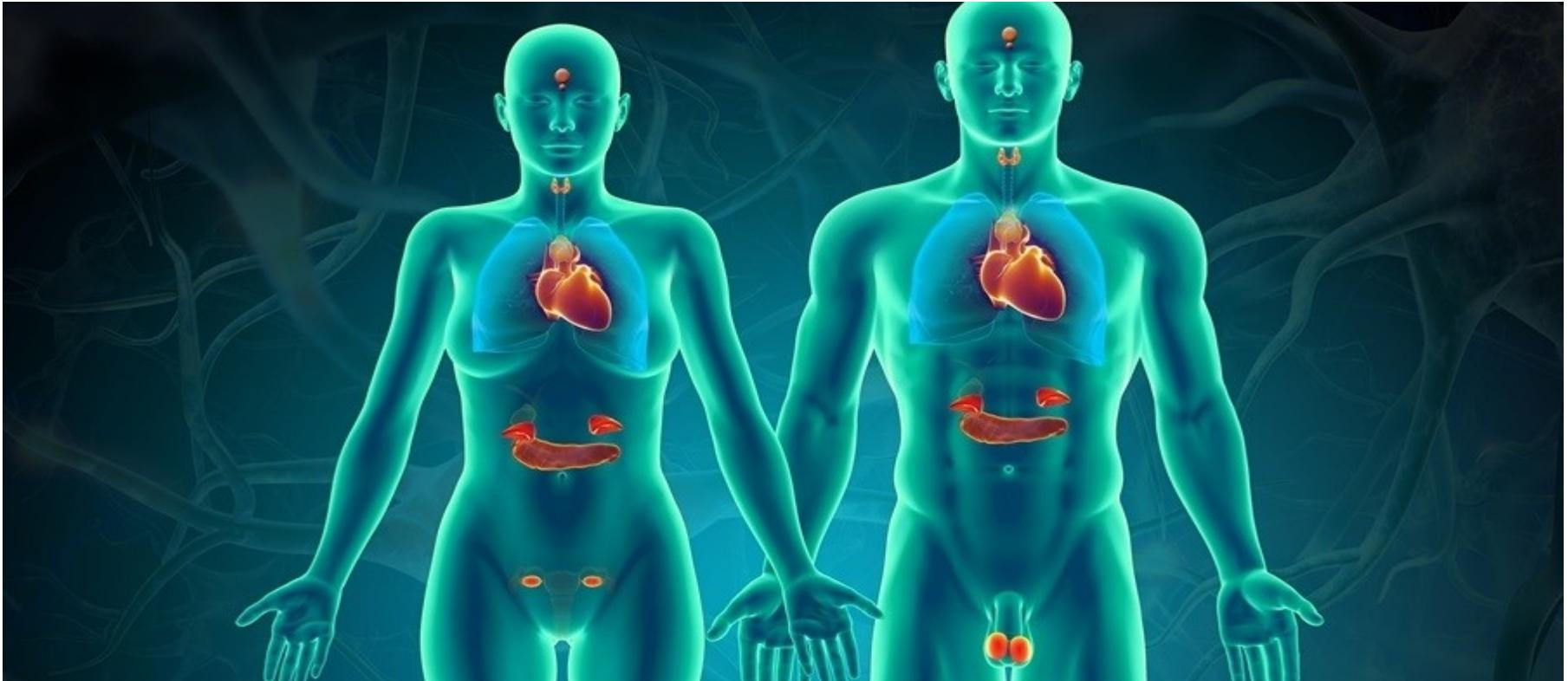


ENDOCRINE SYSTEM



**BY,
MRS.S.LAVANYA DEVI**

SYNOPSIS

- **ENDOCRINOLOGY**
- **ENDOCRINOLOGIST**
- **STRUCTURE AND FUNCTIONS OF ENDOCRINE SYSTEM**
- **PATHOLOGY**
- **DIAGNOSTIC TESTS AND PROCEDURES**
- **MEDICAL TERMS**
- **ABBREVIATIONS**

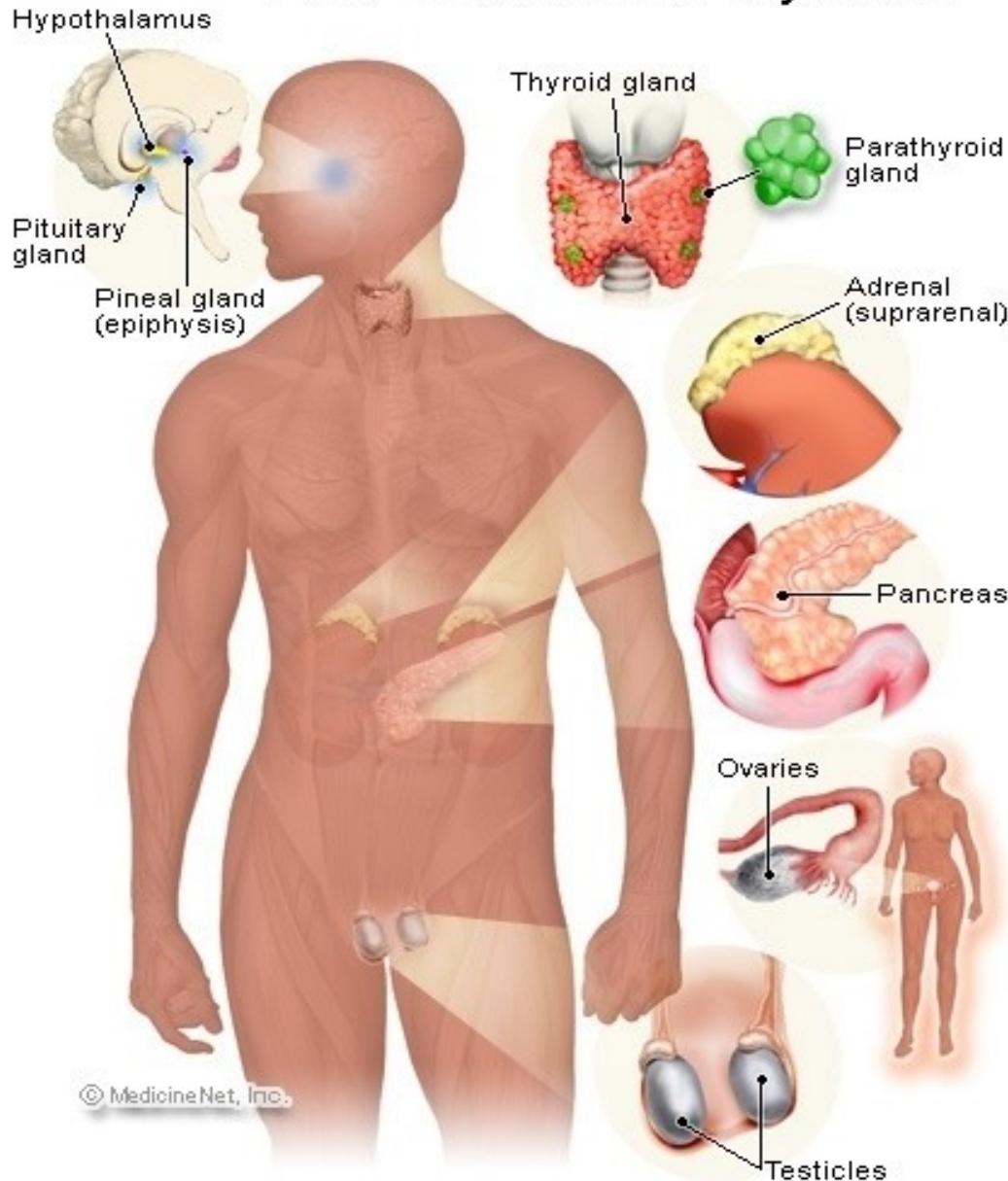
GENERAL TERMS

- **Endocrinology** is the medical study of the structure and workings of the endocrine system, the associated diseases and conditions, and their treatment.
- A physician who specializes in the diagnosis and treatment of endocrine disorders is called an **endocrinologist**.
- The functions of the body are regulated by two major control systems: **the nervous system, and the endocrine system**.
- The **endocrine system**, also called the **hormonal system**

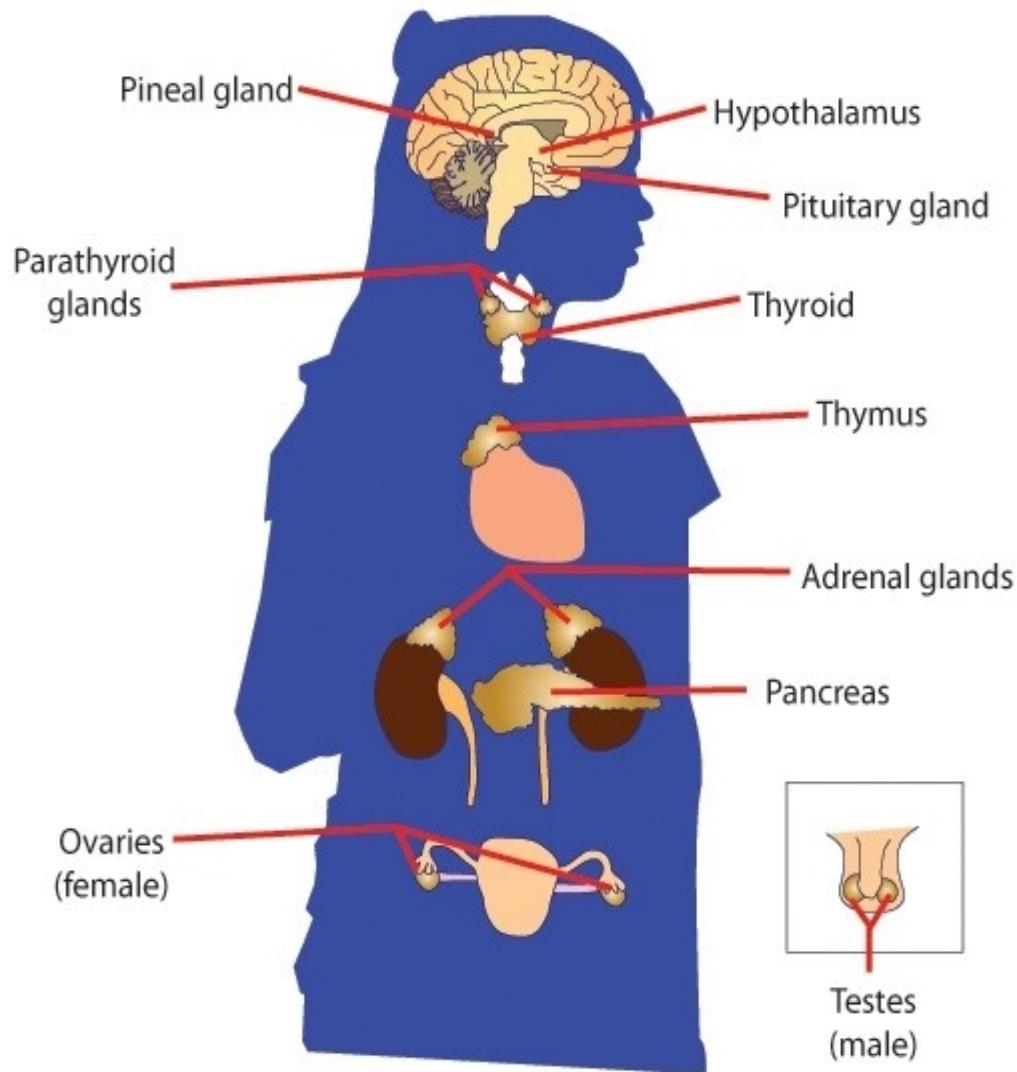
FUNCTIONS OF ENDOCRINE SYSTEM

- regulates the **metabolic functions** of the body including the rates of chemical reactions in **cells**
- secretion of chemical substances called **hormones**, growth, and **homeostasis**.
- allows the body to **coordinate the actions of many organs** at the same time, and it is vital to normal growth and survival

The Endocrine System



The Endocrine System



GLAND

- A **gland** is any organized collection of cells that secrete or excrete a substance.
- The body contains two types of glands: **endocrine glands and exocrine glands.**
- The **endocrine glands** secrete chemical substances directly into the bloodstream.
- On the other hand, the **exocrine glands** send their output through ducts.

- The endocrine system consists of glands that secrete hormones.
- They are connected in a functional sense through **hormones, chemical messengers** that are carried by the blood from glands to the cells upon which they act.
- Each hormone binds with **particular receptors**, which are contained in specific target tissues.
- Each hormone has its own receptor, and the two interact much **like a lock and key**.
- When a hormone binds with its receptor, the receptor initiates specific biological activities.

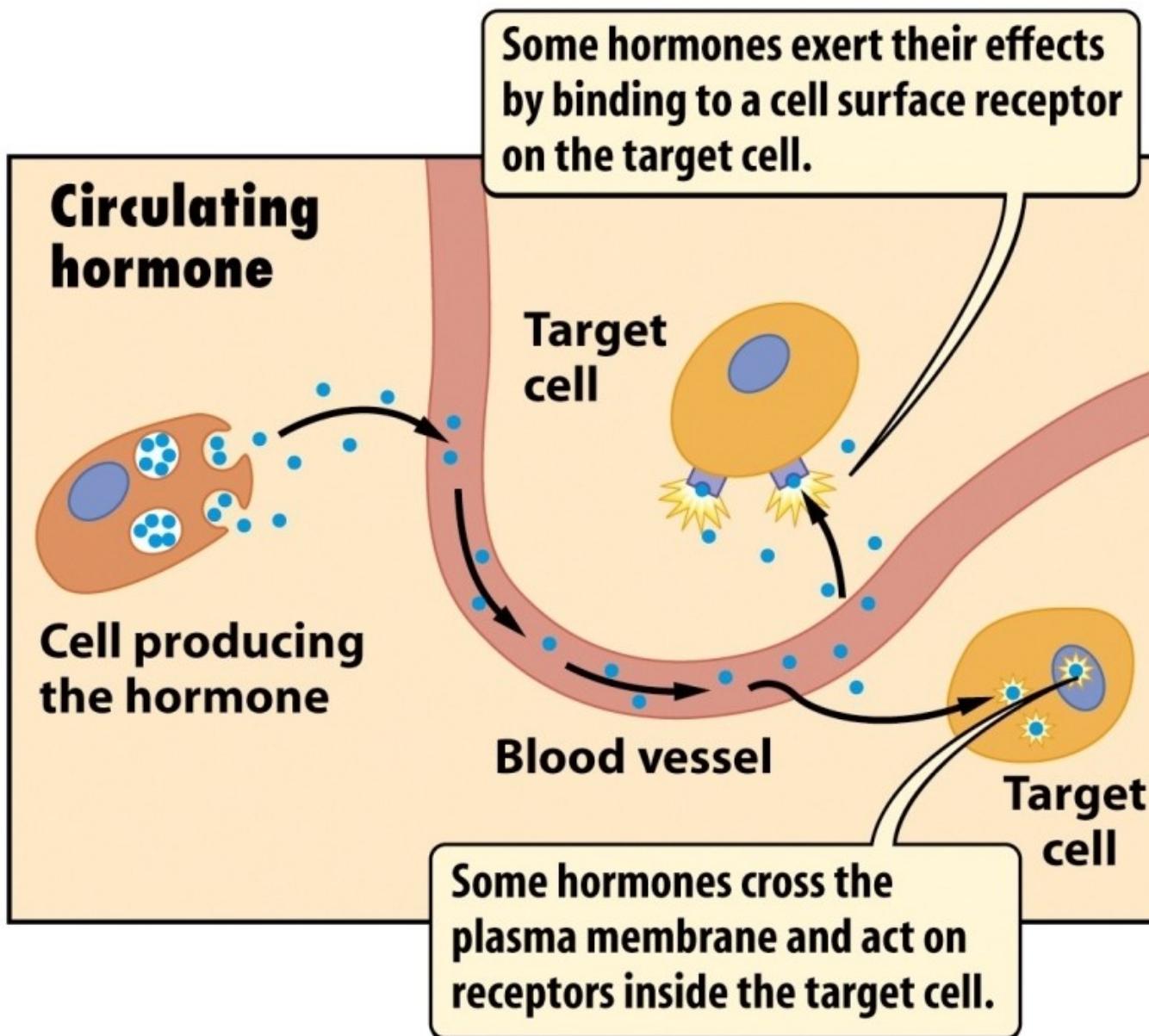


Figure 24-1 Discover Biology 3/e
© 2006 W.W. Norton & Company, Inc.

TABLE 18-1**ENDOCRINE TISSUE (APART FROM MAJOR GLANDS): LOCATION, SECRETION, AND ACTION**

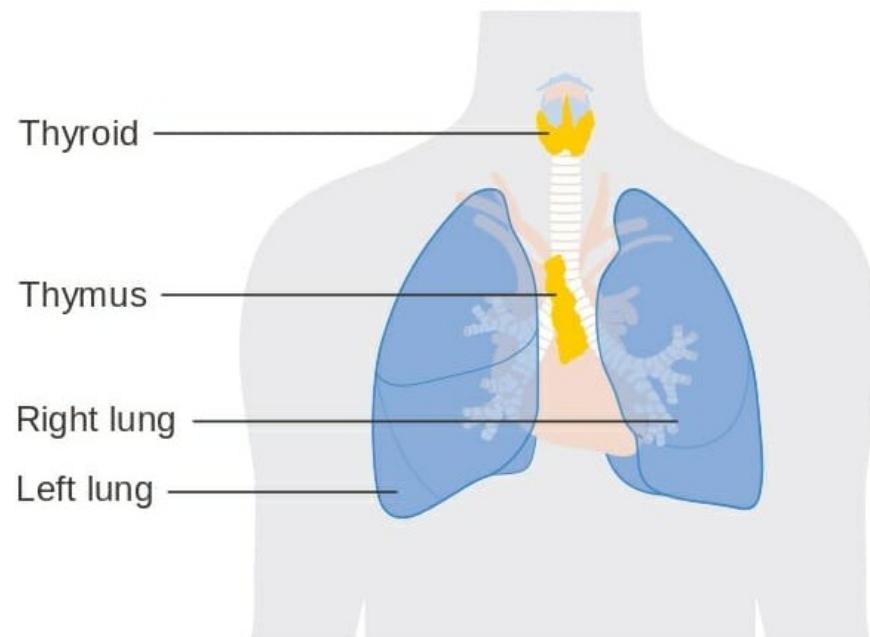
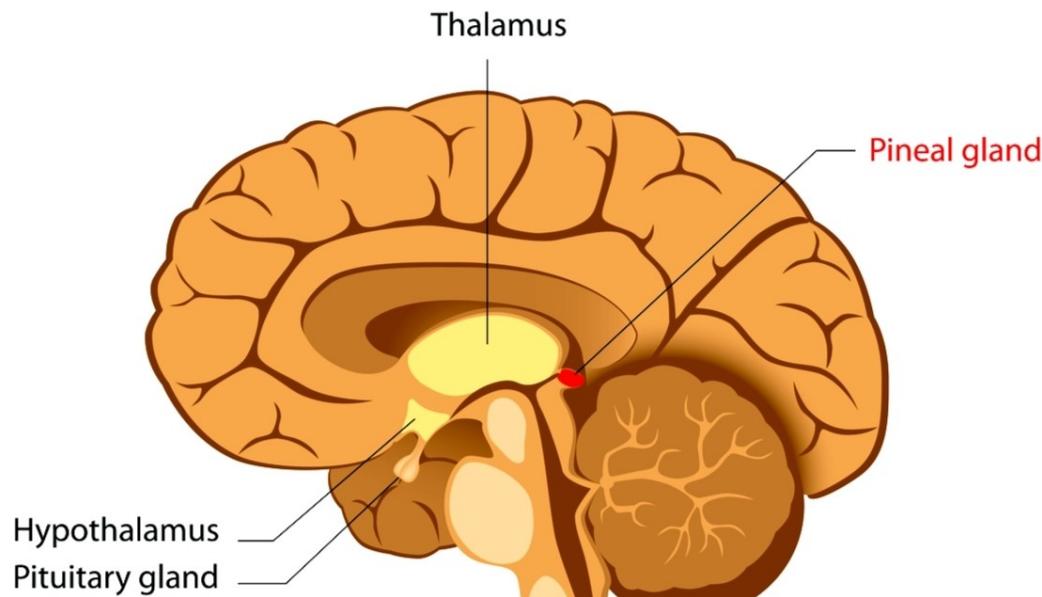
Location	Secretion	Action
Body cells	Prostaglandins	Aggregation of platelets Contract uterus Lower acid secretion in stomach Lower blood pressure
Gastrointestinal tract	Cholecystokinin Gastrin Secretin	Contracts gallbladder Stimulates gastric secretion Stimulates pancreatic enzymes
Kidney	Erythropoietin	Stimulates erythrocyte production
Pineal gland	Melatonin	Induces sleep and affects mood
Placenta	Human chorionic gonadotropin	Sustains pregnancy
Skin	Vitamin D	Affects absorption of calcium

ENDOCRINE GLANDS

- [1] thyroid gland
- [2] parathyroid glands (four glands)
- [3] adrenal glands (one pair)
- [4] pancreas (islets of Langerhans)
- [5] pituitary gland
- [6] ovaries in female (one pair)
- [7] testes in male (one pair)
- [8] pineal gland
- [9] thymus gland

PINEAL GLAND

- The pineal and the thymus glands, are included as endocrine glands because they are ductless
- The pineal gland, located in the central portion of the brain, secretes melatonin.
- Melatonin functions to support the body's "biological clock" and is thought to induce sleep.

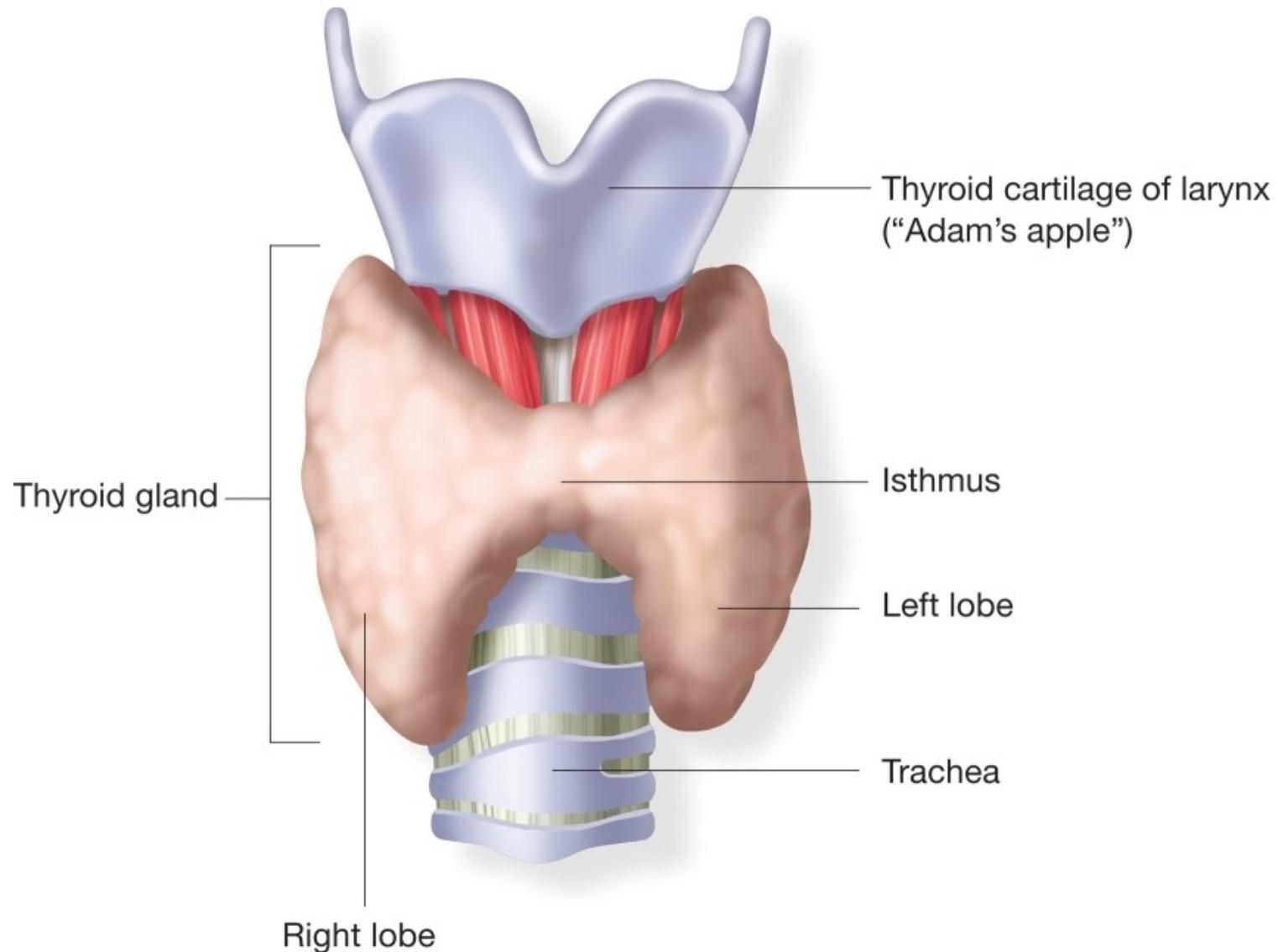


THYMUS GLAND

- The **thymus gland** is located behind the sternum, and like the pineal gland, little is known about it.
- It **secretes thymosin**, which promotes the development and **functioning of the immune** system in newborns.
- This gland is relatively large in a child but shrinks as one ages.

THYROID GLAND

- Composed of a **right and a left lobe** on either side of the trachea
- **just below a large piece of cartilage** called the thyroid cartilage (ADAM'S APPLE)
- **The isthmus of the thyroid gland** is a narrow strip of glandular tissue that **connects the two lobes** on the ventral (anterior) surface of the trachea



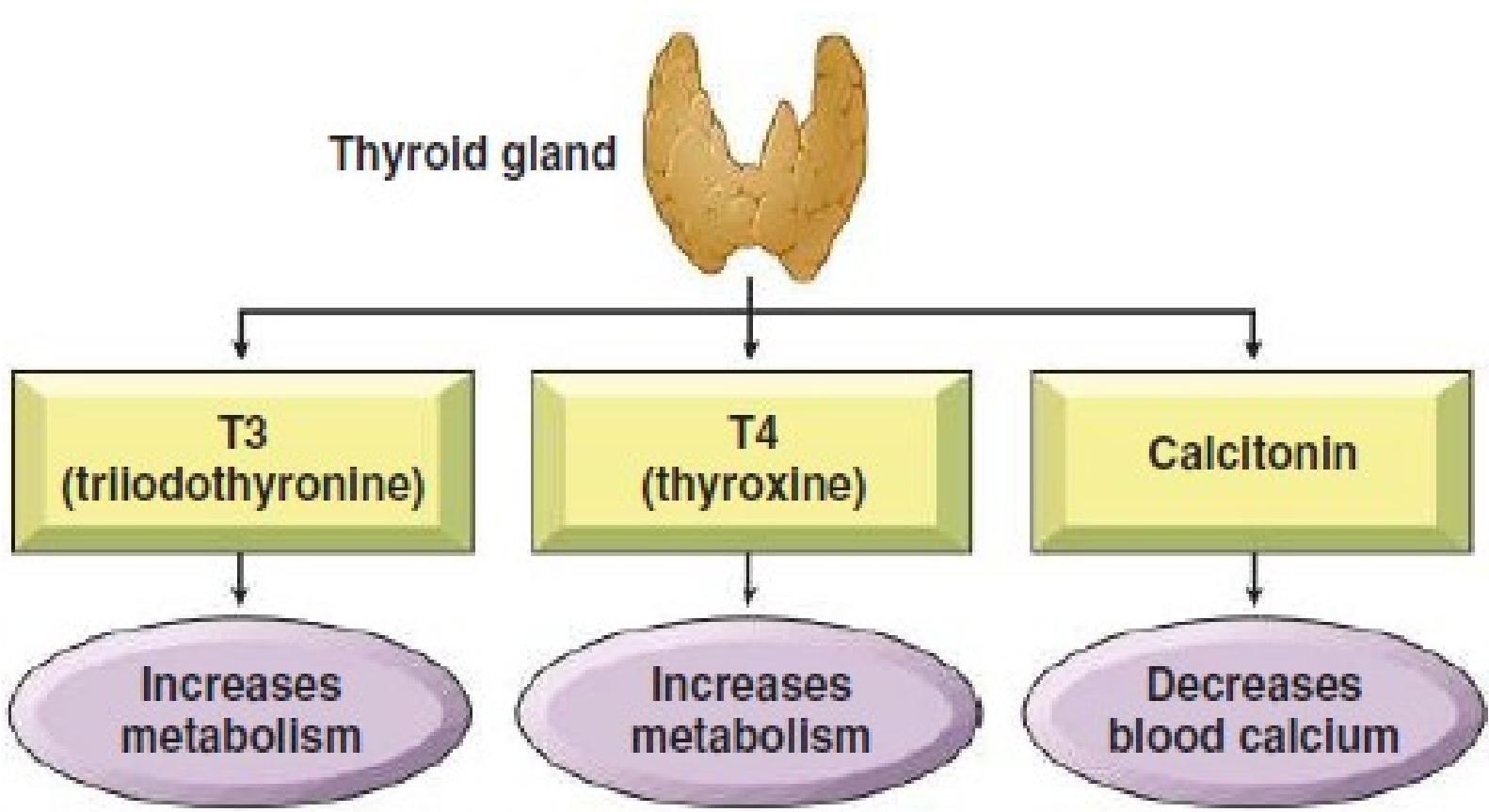
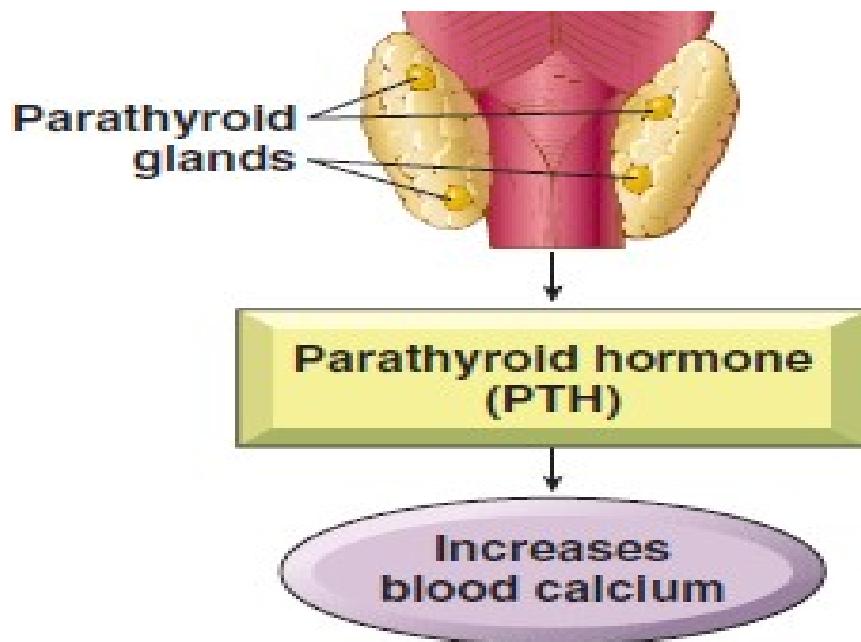


FIGURE 18-3 The thyroid gland: its hormones and actions.

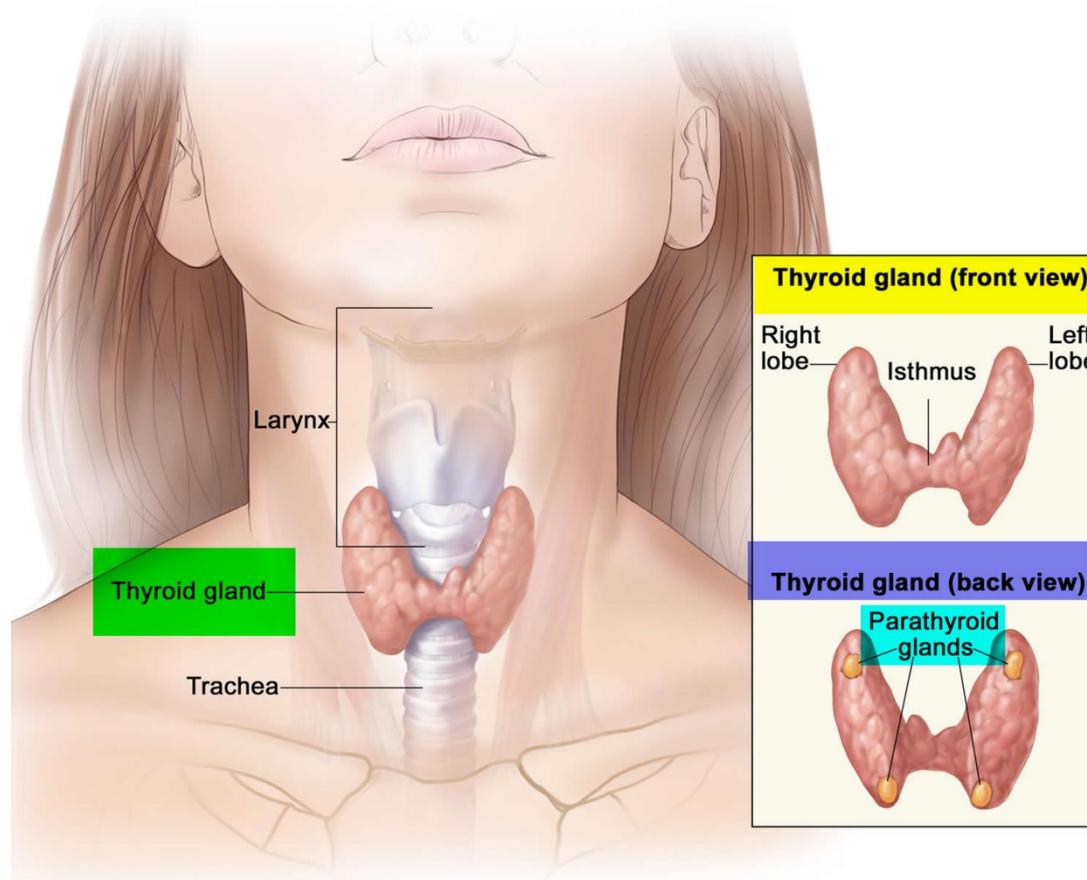
PARATHYROID GLANDS

- The parathyroid glands are **four small oval bodies** located on the dorsal aspect of the thyroid gland. Also called **Parathormone**

- .

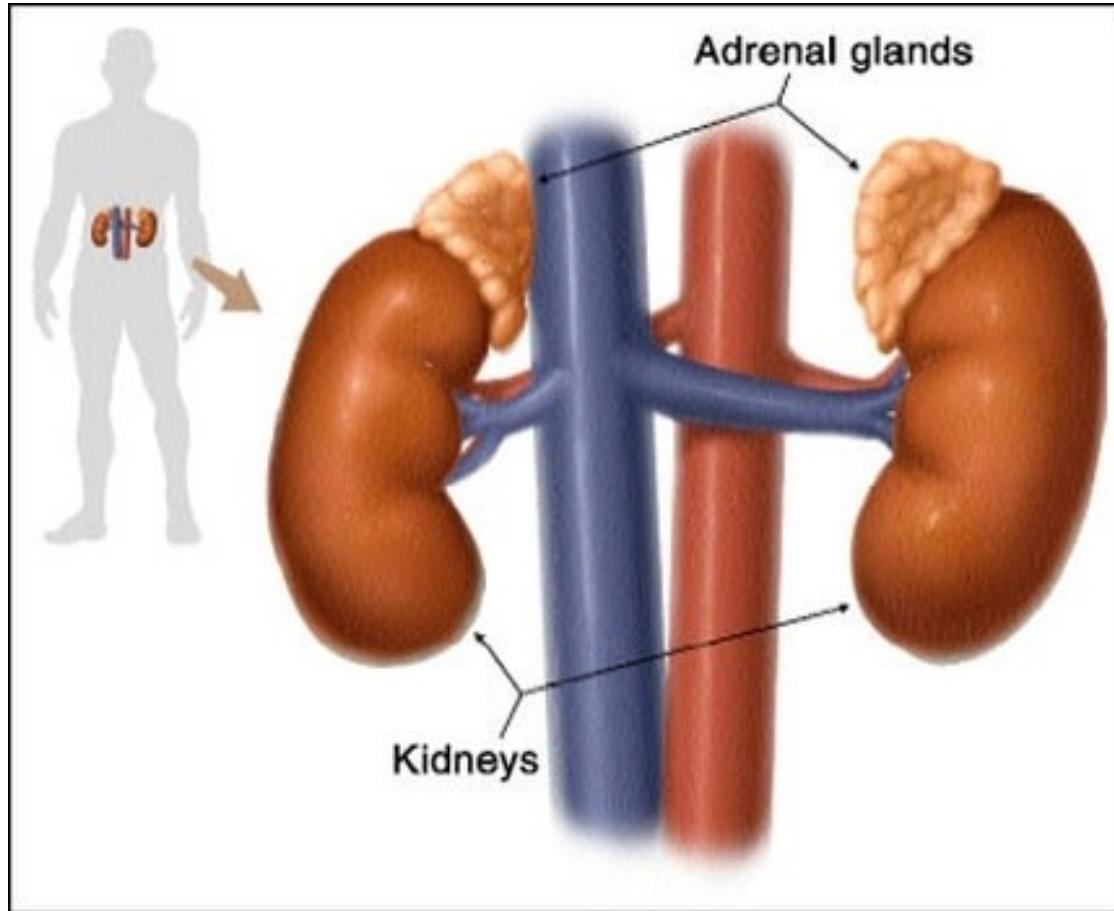


Anatomy of the Thyroid and Parathyroid Glands



ADRENAL GLANDS

- The adrenal glands are two small glands, one on top of each kidney
- **Each gland consists of two parts:**
 - an outer portion, the adrenal cortex and
 - an inner portion, the adrenal medulla.
- The adrenal cortex and adrenal medulla are two glands in one, secreting different hormones.



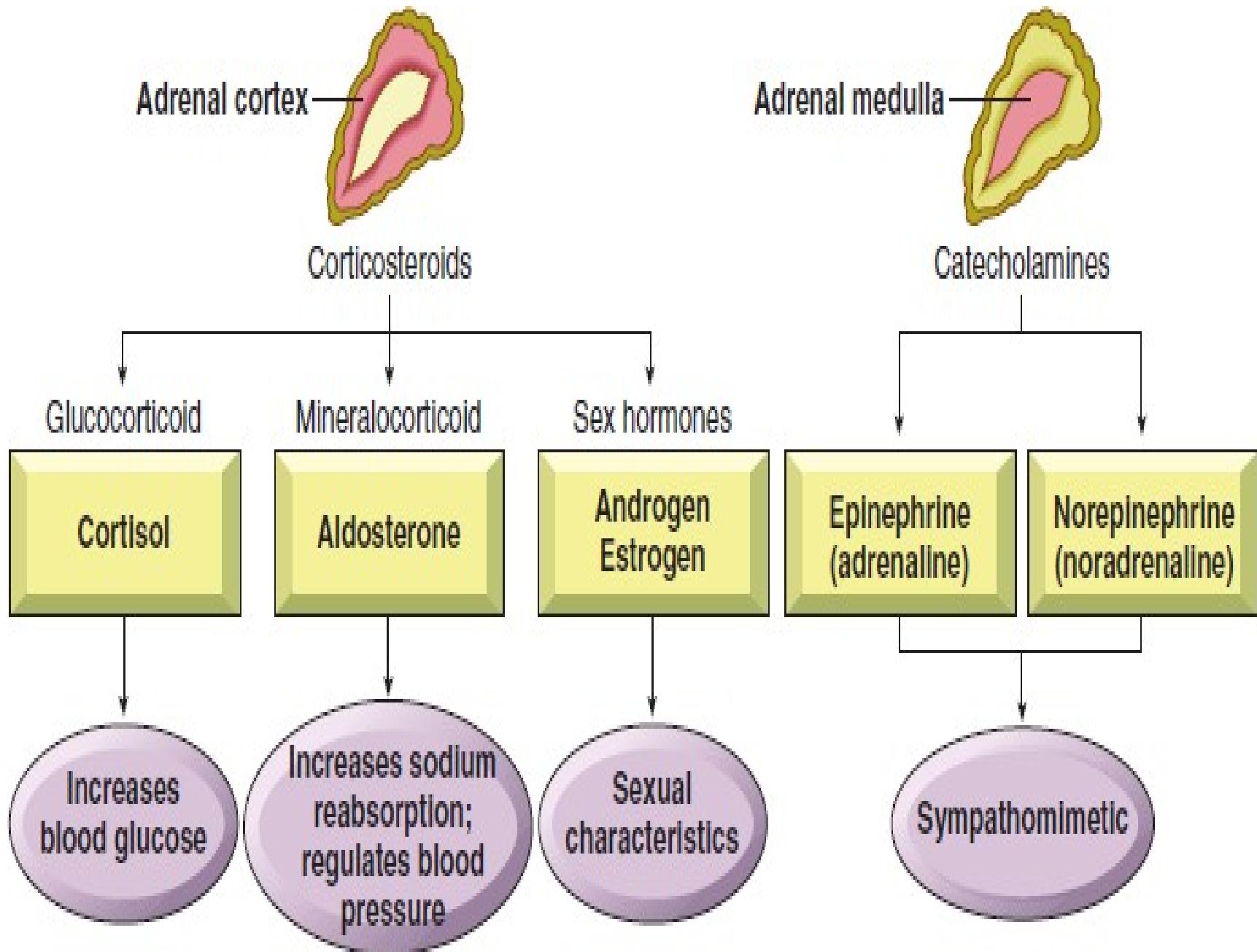


FIGURE 18-7 The adrenal cortex and adrenal medulla: their hormones and actions.

PANCREAS

- The **pancreas** is located near and partly behind the stomach in the region of the first and second lumbar vertebrae
- The endocrine tissue of the pancreas consists of specialized hormone-producing cells called **the islets of Langerhans or islet cells.**
- More than 98% of the pancreas consists of exocrine cells (glands and ducts). These cells secrete digestive enzymes into the gastrointestinal tract.
- The islets of Langerhans produce **insulin (produced by beta cells)** and **glucagon (produced by alpha cells)**. Both play a role regulating blood glucose (sugar) levels.homeostasis

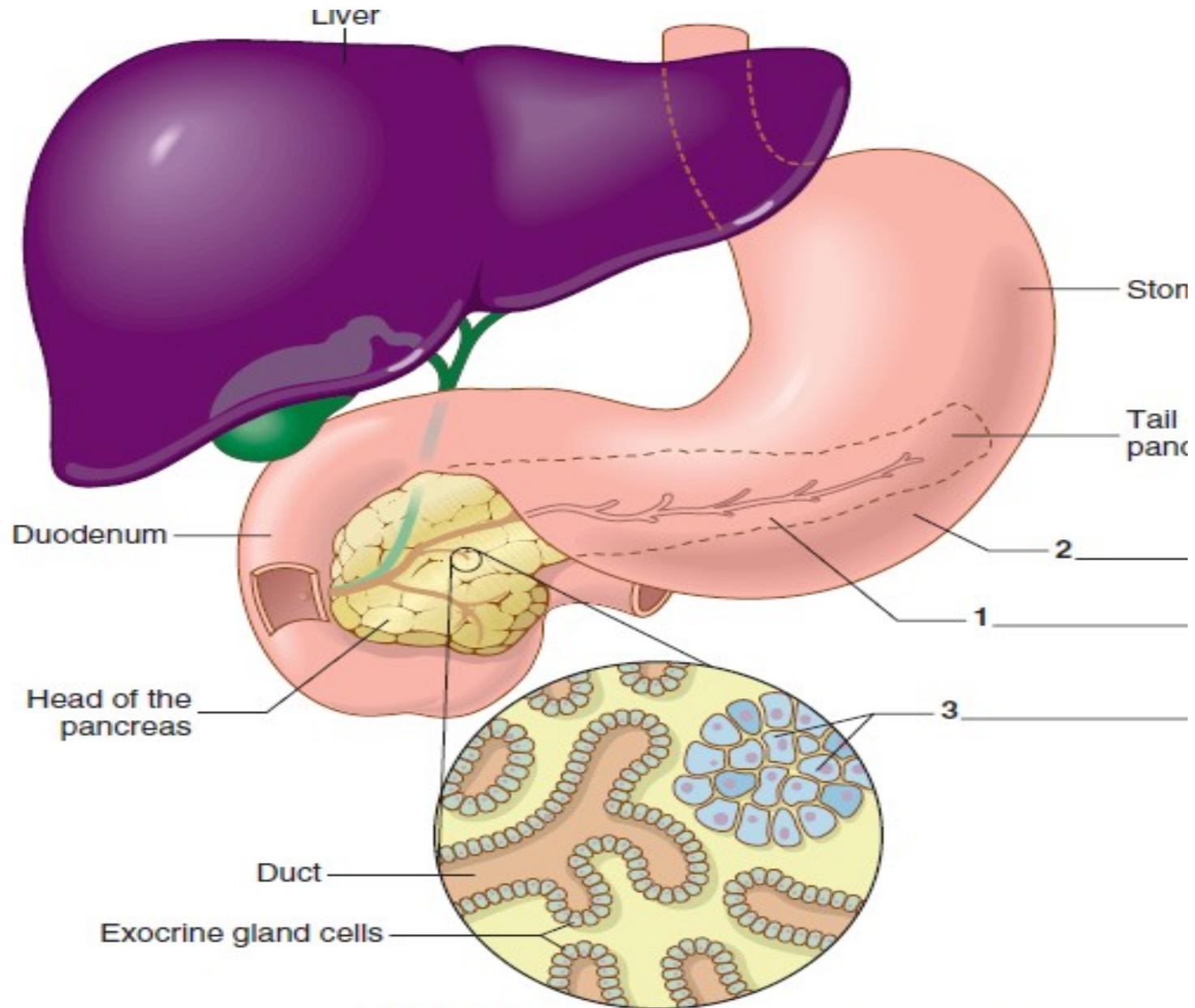
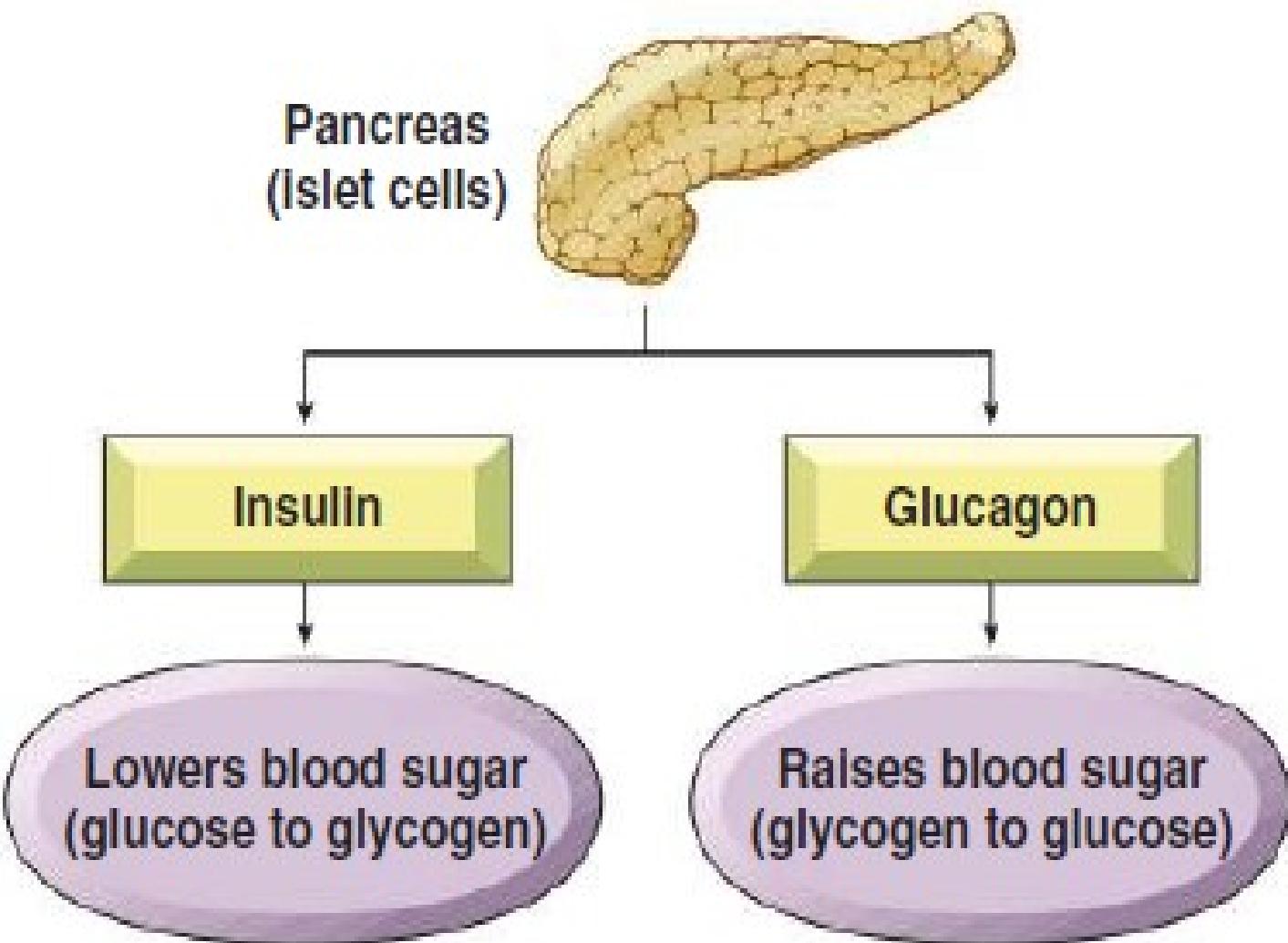
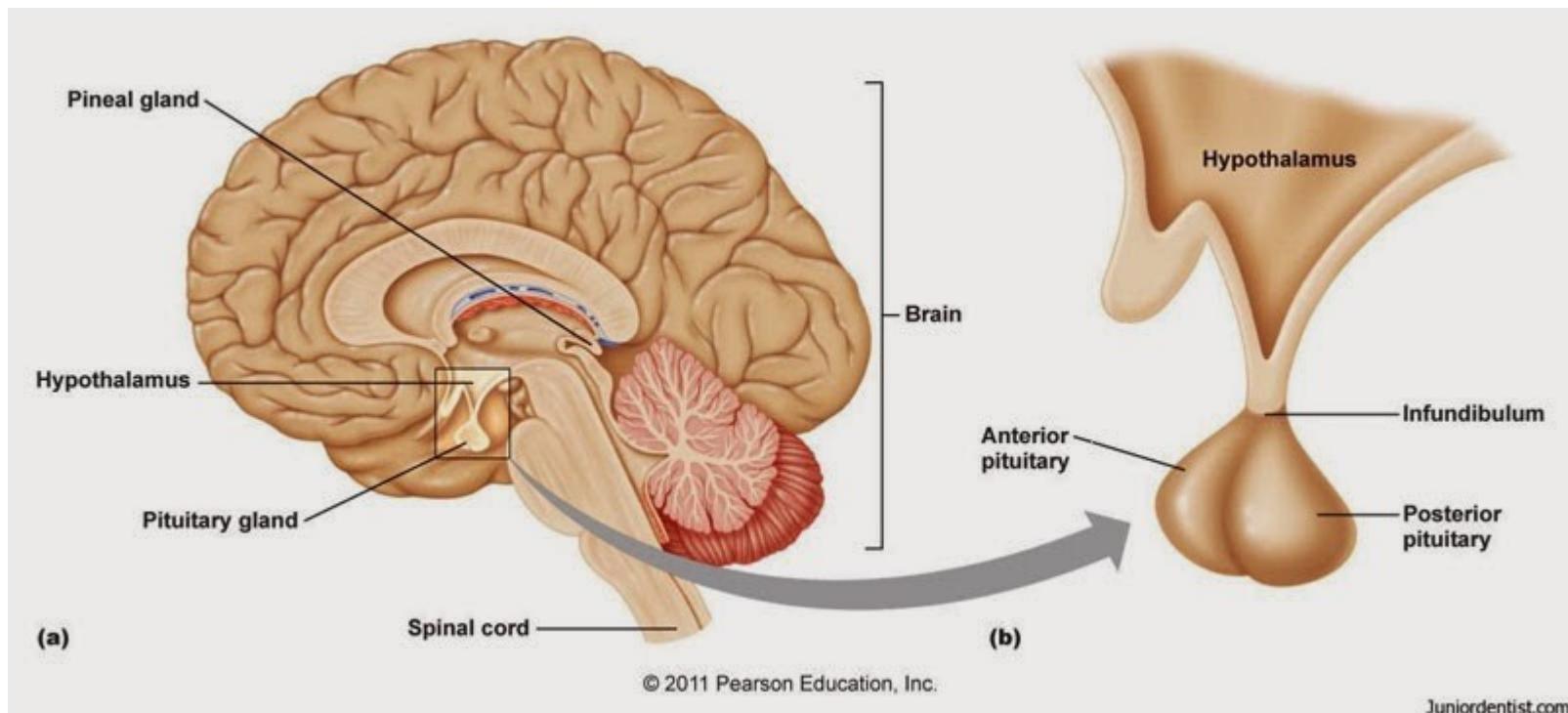


FIGURE 18-8 The pancreas and surrounding organs.

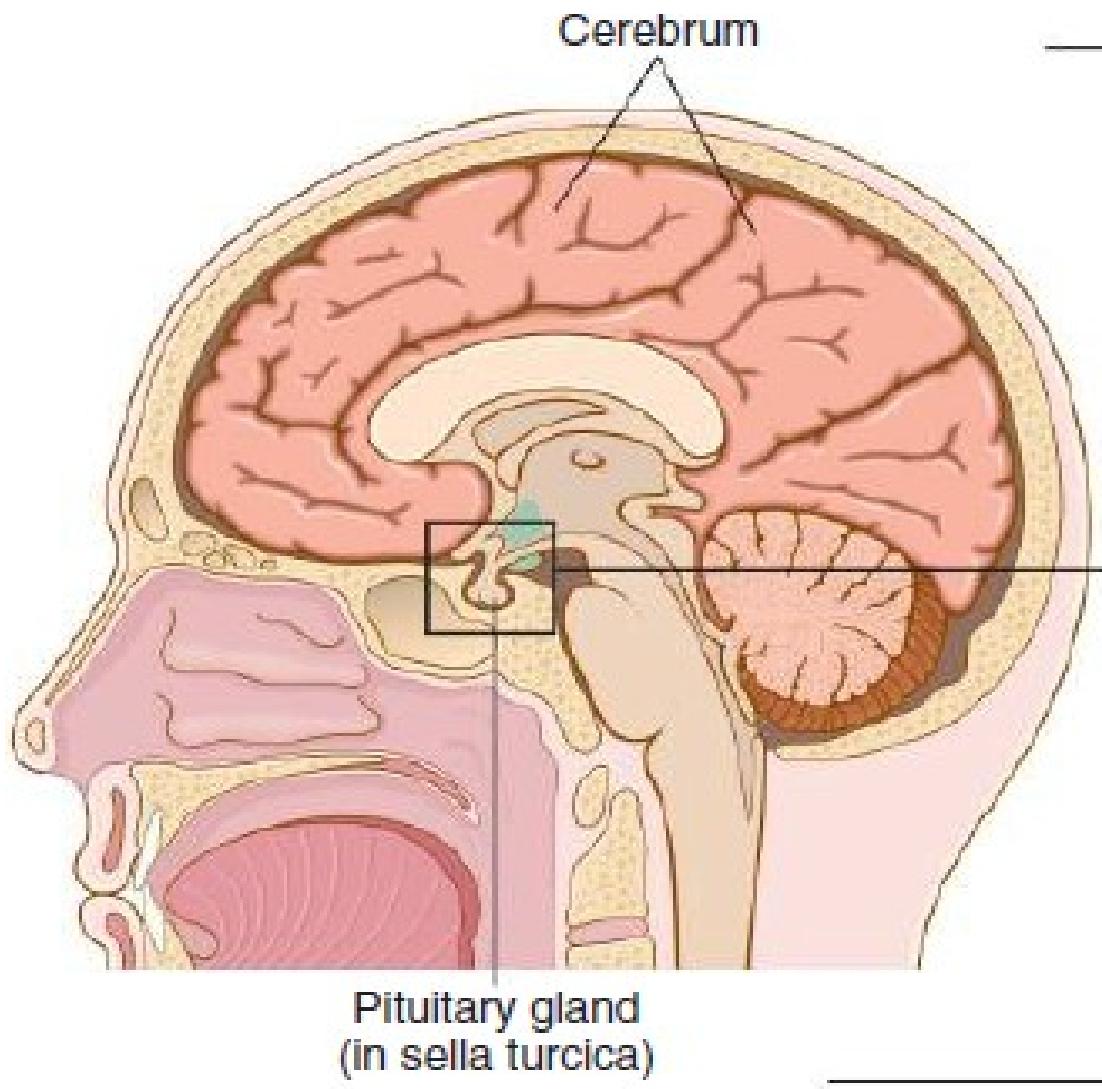


HYPOTHALAMUS AND PITUITARY



- The **hypothalamus** is part of the brain, but it is considered an **endocrine gland** because it releases its hormones into the blood to act at sites outside the brain.
- The primary function of the hypothalamus is to control the actions of the **pituitary gland**.
- The pituitary gland sits in the **sella turcica**, a bony cavity at the base of the brain.
- Physiologically, the pituitary gland is divided into the **anterior pituitary gland (adenohypophysis)** and the **posterior pituitary gland (neurohypophysis)**.

- **Pituitary gland - “master gland”**
- Instructions for other glands to secrete hormones.
- Hypothalamus directs the behavior of the pituitary gland
- The hypothalamus receives instructions from the central nervous system concerning what hormones the pituitary should secrete.
- Because the release of these hormones is controlled by neurons, they are called **neuro hormones**

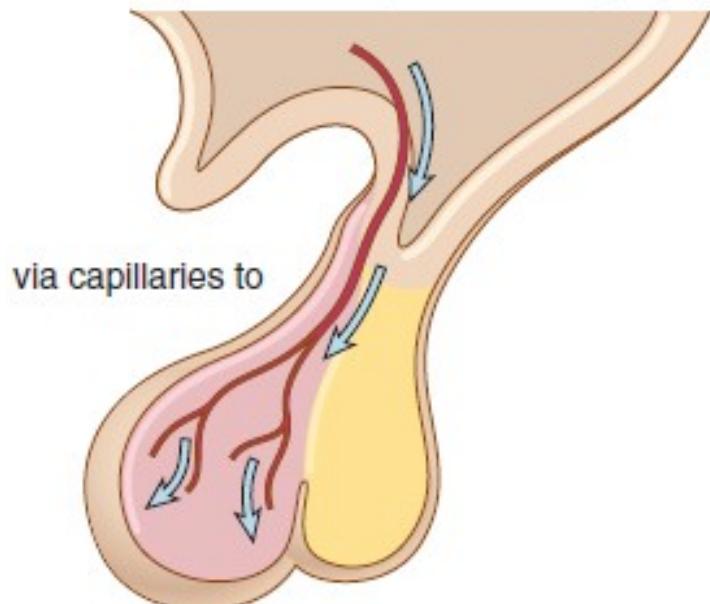


- Hypothalamic-releasing hormones
 - corticotropin-releasing hormone (CRH)
 - stimulates ACTH
 - gonadotropin-releasing hormone (GnRH)
 - stimulates LH, FSH, PRL (prolactin)
 - growth hormone-releasing hormone (GHRH) - GH (growth hormone)
 - thyrotropin-releasing hormone (TRH) - TSH, PRL

- Hypothalamic inhibiting hormones
 - dopamine – inhibits PRL, LH, FSH, TSH
 - somatostatin – inhibits GH, TSH

HYPOTHALAMUS

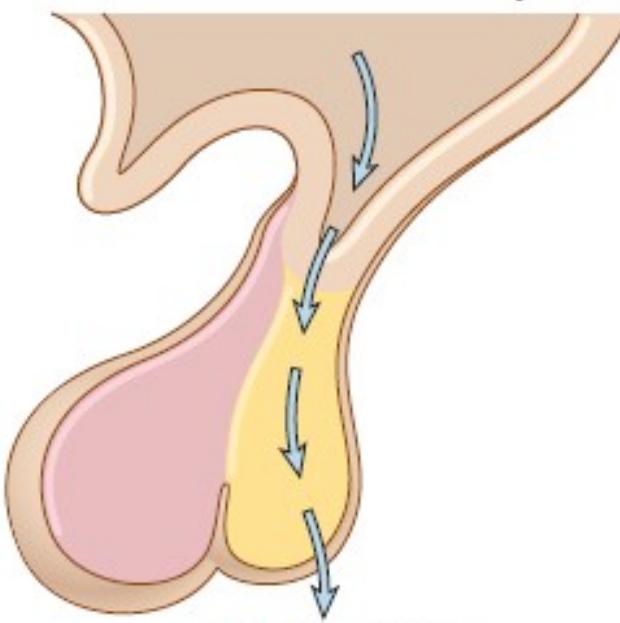
secretes releasing and inhibiting factors



anterior pituitary
(adenohypophysis)

↓
Secretes hormones

secretes hormones directly to

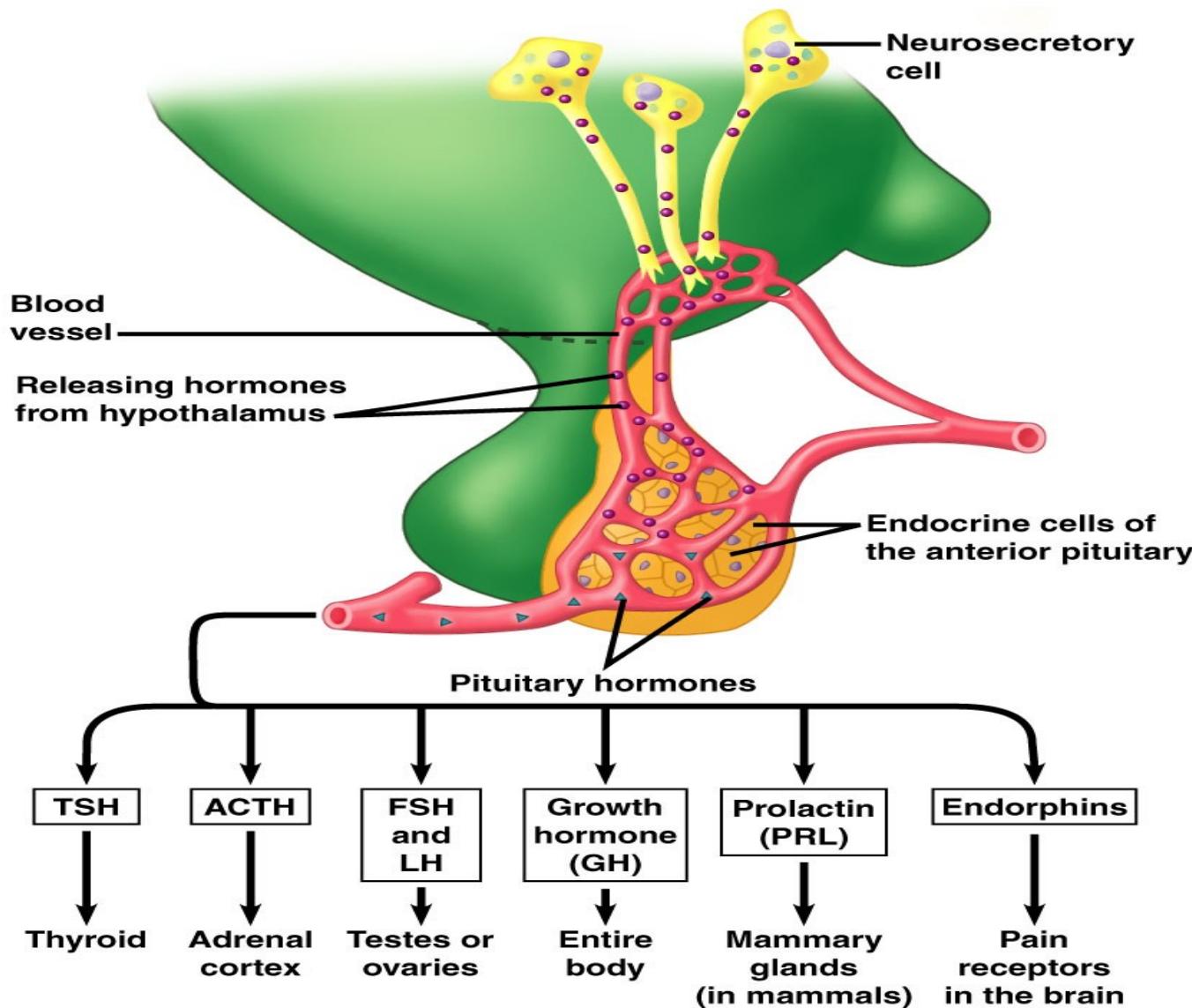


posterior pituitary
(neurohypophysis)

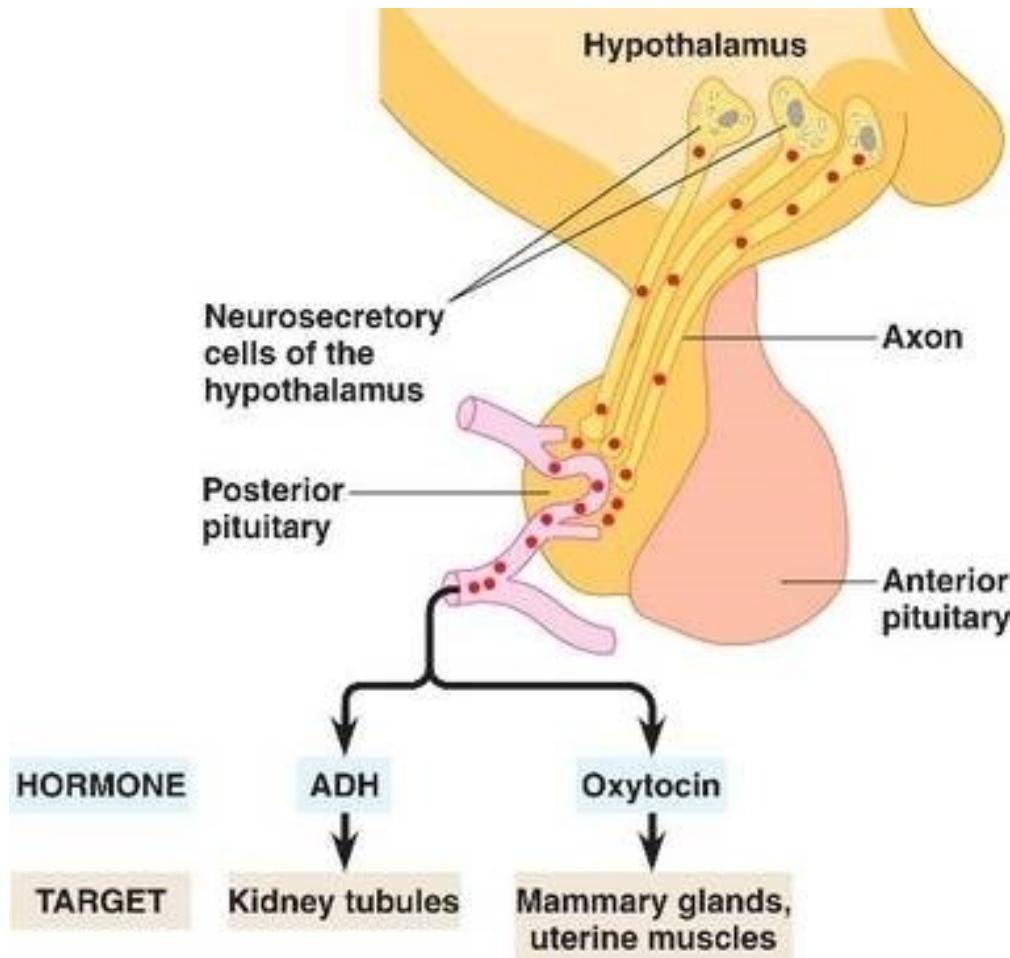
B

↓
Stores and releases hormones

ADENOHYPOPHYSIS



NEUROHYPOPHYSIS



ADH - ALSO
CALLED
VASOPRESSIN

OVARIES

- The **ovaries are two small glands** located in the lower abdominal region of the female.
- The ovaries produce the female gamete, the **ovum**, as well as **hormones** that are **responsible for female sex characteristics and regulation of the menstrual cycle**.

OVARIAN HORMONES

GONADOTROPHIN(GnRH)



ANTERIOR PITUITARY



FSH,LH



FSH -STIMULATES OVARIES , LH - STIMULATES OVULATION



ESTROGEN (ESTRADIOL , ESTRONE) AND PROGESTERONE

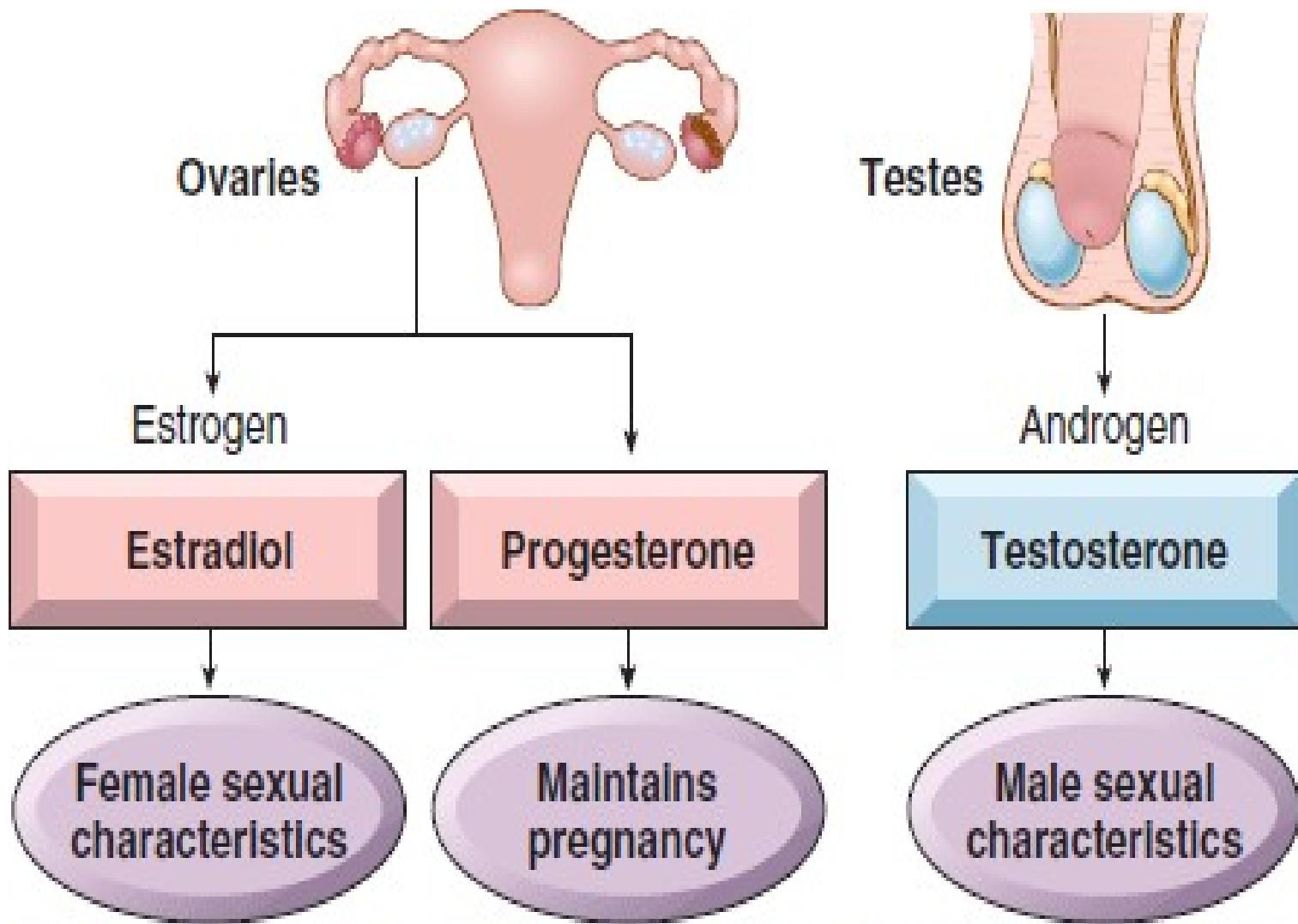


FIGURE 18-13 The ovaries and testes: their hormones and actions.

TESTES

- The testes are **two small ovoid glands** suspended from the inguinal region of the male by the spermatic cord and surrounded by the scrotal sac.
- The testes produce the **male gametes, spermatozoa**, as well as the male hormone **called testosterone**.

TESTICULAR HORMONES

GONADOTROPHIN GnRH(HYPOTHALAMUS)

ANTERIOR PITUITARY



FSH , LH



STIMULATES TESTIS



ANDROGEN - TESTO STERONE

TABLE 18-2**MAJOR ENDOCRINE GLANDS: THE HORMONES THEY PRODUCE AND THEIR ACTIONS**

Endocrine Gland	Hormone	Action
Thyroid	<ul style="list-style-type: none">• Thyroxine (T4); triiodothyronine (T3)• Calcitonin	<ul style="list-style-type: none">• Increases metabolism in body cells• Decreases blood calcium
Parathyroids	<ul style="list-style-type: none">• Parathyroid hormone	<ul style="list-style-type: none">• Increases blood calcium
Adrenals		
Cortex	<ul style="list-style-type: none">• Cortisol (glucocorticoid)• Aldosterone (mineralocorticoid)• Androgens, estrogens (sex hormones)	<ul style="list-style-type: none">• Increases blood sugar• Increases reabsorption of sodium• Secondary sex characteristics
Medulla	<ul style="list-style-type: none">• Epinephrine (adrenaline)• Norepinephrine (noradrenaline)	<ul style="list-style-type: none">• Sympathomimetic• Sympathomimetic
Pancreas		
Islet cells	<ul style="list-style-type: none">• Insulin• Glucagon	<ul style="list-style-type: none">• Decreases blood sugar (glucose to glycogen)• Increases blood sugar (glycogen to glucose)

Pituitary

Anterior lobe	<ul style="list-style-type: none">Growth hormone (GH) (somatotropin)Thyroid-stimulating hormone (TSH)Adrenocorticotrophic hormone (ACTH)Gonadotropins<ul style="list-style-type: none">Follicle-stimulating hormone (FSH)Luteinizing hormone (LH)Prolactin (PRL)	<ul style="list-style-type: none">Increases bone and tissue growthStimulates thyroid gland and thyroxine secretionStimulates adrenal cortex, especially cortisol secretionOogenesis and spermatogenesisPromotes ovulation; testosterone secretionPromotes growth of breast tissue and milk secretion
Posterior lobe	<ul style="list-style-type: none">Antidiuretic hormone (ADH) (vasopressin)Oxytocin	<ul style="list-style-type: none">Stimulates reabsorption of water by kidney tubulesStimulates contraction of the uterus during labor and childbirth
Ovaries	<ul style="list-style-type: none">EstrogensProgesterone	<ul style="list-style-type: none">Promote development of ova and female secondary sex characteristicsPrepares and maintains the uterus in pregnancy
Testes	<ul style="list-style-type: none">Testosterone	<ul style="list-style-type: none">Promotes development of sperm and male secondary sex characteristics

METABOLISM

- **Metabolism** is the total of all chemical and physical changes that occur in body tissue, and it must be closely regulated to **maintain homeostasis**.
- It consists of two processes: **anabolism** and **catabolism**.
- **Anabolism** involves building complex substances (proteins) from simple substances. It requires energy and occurs in all cells as they maintain themselves, divide to form new cells, and produce substances such as hormones.
- **Catabolism** is the process of breaking down larger molecules into smaller ones, resulting in the release of energy

MEDICAL TERMS

COMBINING FORMS: GLANDS

COMBINING FORM	MEANING
aden/o	gland
adrenal/o	adrenal gland
gonad/o	sex glands (ovaries and testes)
pancreat/o	pancreas
parathyroid/o	parathyroid gland
pituitar/o	pituitary gland; hypophysis
thyr/o, thyroid/o	thyroid gland

COMBINING FORM	MEANING
andr/o	male
calc/o, calci/o	calcium

COMBINING FORM	MEANING		
cortic/o	cortex, outer region	home/o	sameness
crin/o	secrete	hormon/o	hormone
dips/o	thirst	kal/i	potassium 
		lact/o	milk
estr/o	female	myx/o	mucus
gluc/o	sugar	natr/o	sodium 

COMBINING FORM	MEANING	SUFFIX	MEANING
phys/o	growing	-agon	assemble, gather together
somat/o	body	-emia	blood condition
ster/o	solid structure	-in, -ine	substance
toc/o	childbirth	-tropin	stimulating the function of (to turn or act on)
toxic/o	poison	-uria	urine condition
ur/o	urine		

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
	Glyco - sugar

PATHOLOGY

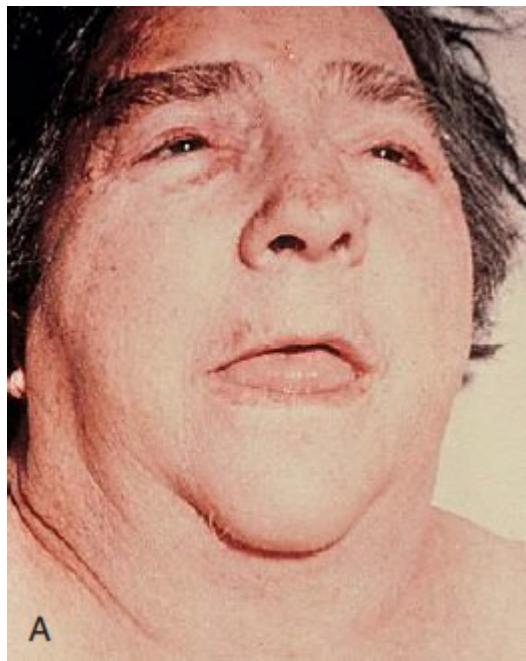
- **THYROID GLAND**
- Enlargement of the thyroid gland is **goiter**
- **Endemic (en- = in; dem/o = people) goiter** occurs in certain regions where there is a lack of iodine in the diet.
- Another type of goiter is **nodular or adenomatous goiter**, in which hyperplasia occurs as well as formation of nodules and adenomas



FIGURE 18-15 **A, Goiter.** Notice the wide neck, indicating enlargement of the thyroid gland. Goiter comes from the Latin *guttur*, meaning throat. **B, Exophthalmos in Graves disease.** Note the staring or startled expression resulting from periorbital edema (swelling of tissue around the eyeball or orbit of the eye). Exophthalmos usually persists despite treatment of Graves disease.

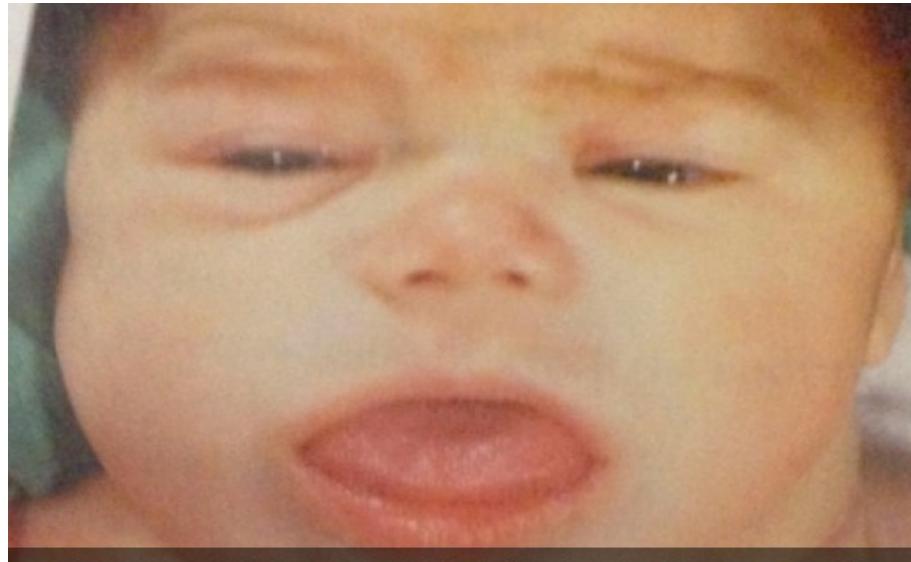
- **Hypersecretion**
- **hyperthyroidism** – Over activity of the thyroid gland; **thyrotoxicosis**.
- The most common form of this condition is **Graves disease** (resulting from autoimmune processes) - **exophthalmos** (protrusion of the eyeballs, or proptosis)

- **Hyposecretion**
- **hypothyroidism** - Underactivity of the thyroid gland-thyroidectomy, thyroiditis, endemic goiter, destruction of the gland by irradiation
- **Myxedema** is advanced hypothyroidism in adulthood.
- **Cretinism**, extreme hypothyroidism during infancy and childhood leads to a lack of normal physical and mental growth.
- **Neoplasms**
- **thyroid carcinoma** - Cancer of the thyroid gland.



A

FIGURE 18-16 A, Myxedema. Note the dull, puffy, yellowed skin; coarse, sparse hair; prominent tongue.



**CRETINISM IS AN EXTREME FORM
OF HYPOTHYROIDISM PRESENT AT BIRTH OR SHORTLY THEREAFTER**

CRETINISM

PARATHYROID GLANDS

- ***Hypersecretion***
- **Hyperparathyroidism** - Excessive production of parathormone.
- ***Hyposecretion***
- **hypoparathyroidism** - Deficient production of parathyroid hormone - tetany (constant muscle contraction).

ADRENAL CORTEX

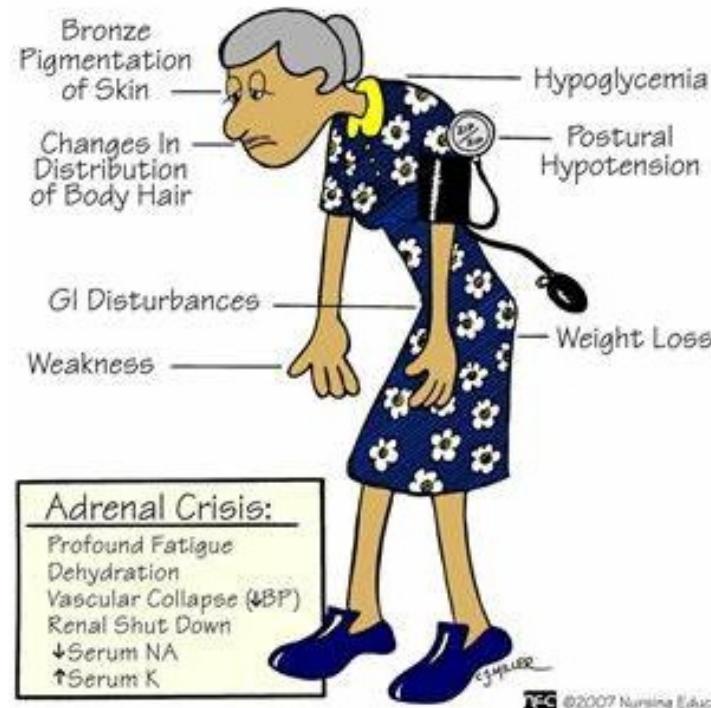
- **Hypersecretion**
- **adrenal virilism** - Excessive secretion of adrenal androgens.
- **Adrenal hyperplasia** - or more commonly adrenal adenomas or carcinomas can cause virilization in adult women. Signs and symptoms include amenorrhea, hirsutism (excessive hair on the face and body), acne, and deepening of the voice.
- **Cushing syndrome** - Group of signs and symptoms produced by excess **cortisol** from the adrenal cortex.



B, Cushing syndrome. Elevated plasma levels of cortisol (steroids) produce obesity, rounded facial appearance (moon-face), thin skin that bruises easily, and muscle weakness.

- **Hyposecretion**
- Addison disease – Hypo functioning of the adrenal cortex.

ADDISON'S DISEASE



Notice the darker skin discoloration, especially evident on the face.

ADRENAL MEDULLA

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

PANCREAS

- *Hypersecretion*
- **Hyperinsulinism** - Excess secretion of insulin causing hypoglycemia.
- *Hyposecretion*
- **diabetes mellitus (DM)** - Lack of insulin secretion or resistance of insulin in promoting sugar, starch, and fat metabolism in cells.

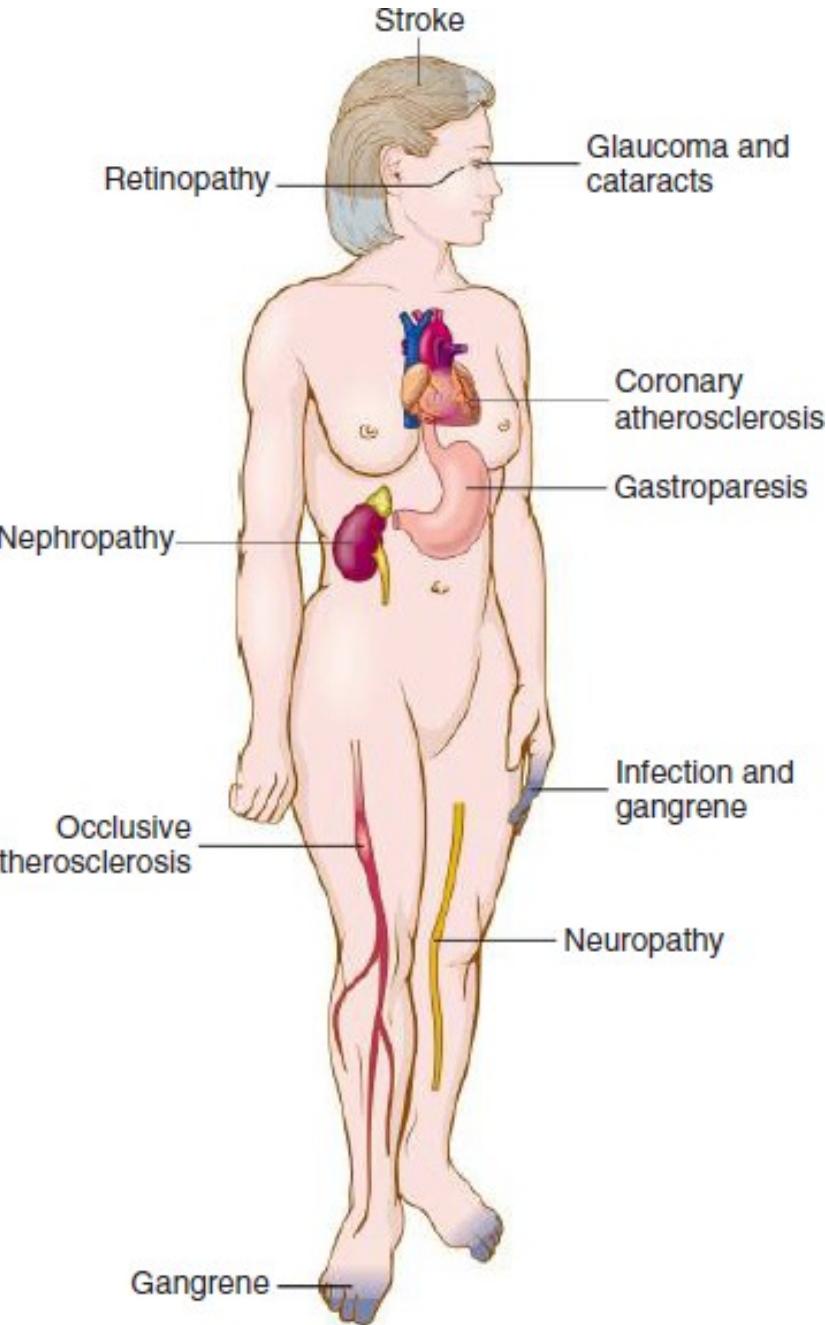
- Type 1 diabetes is an autoimmune disease. Autoantibodies against normal pancreatic islet cells are present
- Type 2 diabetes - Patients often are older, and usually there is a family history of type 2 diabetes. Obesity is very common

TABLE I8-3 COMPARISON OF TYPE 1 AND TYPE 2 DIABETES MELLITUS

Category	Type 1*	Type 2†
Clinical features	Usually occurs before age 30 Abrupt, rapid onset of symptoms Little or no insulin production Thin or normal body weight at onset Ketoacidosis often occurs	Usually occurs after age 30 Gradual onset; asymptomatic Insulin usually present 85% are obese Ketoacidosis seldom occurs
Symptoms	Polyuria (glycosuria promotes loss of water) Polydipsia (dehydration causes thirst) Polyphagia (tissue breakdown causes hunger)	Polyuria sometimes seen Polydipsia sometimes seen Polyphagia sometimes seen
Treatment	Insulin	Diet (weight loss); oral hypoglycemics or insulin

- PRIMARY COMPLICATION OF DM:
- HYPERGLYCEMIA
- LEADS TO KETOACIDOSIS
- HYPOGLYCEMIA
- INSULIN SHOCK
 - (OVERDOSE OF INSULIN)

SECONDARY COMPLICATIONS



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 (leading to water retention and low sodium levels in the body)
- *Hyposecretion*
- **diabetes insipidus (DI)** - Insufficient secretion of antidiuretic hormone (vasopressin).
- Insipidus means tasteless, reflecting the condition of dilute urine, as opposed to mellitus, meaning sweet or like honey, reflecting the sugar content of urine in diabetes mellitus.

TABLE 18-4

ABNORMAL CONDITIONS OF ENDOCRINE GLANDS

Endocrine Gland	Hypersecretion	Hyposecretion
Adrenal cortex	<ul style="list-style-type: none">• Adrenal virilism• Cushing syndrome	<ul style="list-style-type: none">• Addison disease
Adrenal medulla	<ul style="list-style-type: none">• Pheochromocytoma	
Pancreas	<ul style="list-style-type: none">• Hyperinsulinism	<ul style="list-style-type: none">• Diabetes mellitus
Parathyroid glands	<ul style="list-style-type: none">• Hyperparathyroidism (hypercalcemia, osteoporosis, kidney stones)	<ul style="list-style-type: none">• Hypoparathyroidism (tetany, hypocalcemia)
Pituitary—anterior lobe	<ul style="list-style-type: none">• Acromegaly• Gigantism	<ul style="list-style-type: none">• Dwarfism• Panhypopituitarism
Pituitary—posterior lobe	<ul style="list-style-type: none">• Syndrome of inappropriate antidiuretic hormone	<ul style="list-style-type: none">• Diabetes insipidus
Thyroid gland	<ul style="list-style-type: none">• Exophthalmic goiter (Graves disease, thyrotoxicosis)• Nodular (adenomatous) goiter	<ul style="list-style-type: none">• Cretinism (children)• Endemic goiter• Myxedema (adults)

Condition or Disease	Description
acidosis	Blood pH is below normal (less than 7.34) and is therefore acidic.
Acromegaly	Hypersecretion of pituitary growth hormone in adults whose growth is complete, leading to thickening of skull bones and peripheral body parts.
Addison disease	Also known as adrenocortical insufficiency because the adrenal cortex atrophies. Characterized by weight loss, weakness, fatigue, hypoglycemia, and heart changes.
adenoma	A benign neoplasm of cells that may function as a gland.
alkalosis	Blood pH is above normal (greater than 7.45) and is therefore basic, or alkalotic.
cretinism	Hypothyroidism in infants that may lead to abnormalities if left untreated.
Cushing syndrome	Hyperfunction of the adrenal cortex that leads to such symptoms as moon face, trunkal obesity, weakness, hypertension, kidney damage, psychiatric disturbances, and others.
Dehydration	Excess loss of water from the body.

diabetes insipidus	Chronic excretion of large amounts of dilute urine, usually due to inadequate vasopressin (ADH).
diabetes mellitus (DM)	Disease in which plasma glucose control is defective because of insulin deficiency or decreased target-cell response to insulin. The categories of diabetes mellitus listed in Table 19-4. Table 19-5 lists the methods of classifying diabetes mellitus during pregnancy.
diabetic ketoacidosis	Acute, life-threatening emergency in type 1 diabetes characterized by increased plasma glucose and ketones, high urinary loss, and metabolic acidosis, which may lead to coma and death. Also called <i>diabetic acidosis</i> or <i>diabetic coma</i> .
diuresis	Increase in urine excretion; can be indicative of diabetes mellitus or a sign of chronic interstitial nephritis.

dwarfism	The condition of being abnormally undersized. There are many types and causes, one of which is lack of growth hormone.
euthyroid goiter	An enlargement of the thyroid gland, not due to neoplasm. Also called a <i>goiter</i> .
galactorrhea	The secretion of milky discharge, primarily in women and rarely in men.
Gigantism	A condition of abnormal size or overgrowth of the entire body or any of its parts, which can be due to excess growth hormone occurring prior to the fusing of endplates to bones.
glucosuria	Urine with an abnormal concentration of glucose. Also called <i>glycosuria</i> .
Graves disease	An autoimmune disorder characterized by an increase in metabolic rate, weakness, severe weight loss, goiter, exophthalmus, or pretibial (shin) myxedema.

Hashimoto thyroiditis	Hypothyroidism due to autoimmune destruction of the thyroid gland.
hirsutism	An abnormal amount of hair, particularly in women.
hypercalcemia	Excessive calcium in the serum, almost always caused by hyperparathyroidism or malignancy.
hyperglycemia	Plasma glucose concentration increased above normal levels, which is the common feature of diabetes mellitus, and can lead to organ and tissue damage.
hyperkalemia	High serum potassium often due to a defect in renal excretory ability, which may lead to cardiac toxicity, flaccid paralysis, and hypoventilation.
hyperlipidemia	Several types of disorders characterized by increased levels of lipoproteins in the plasma. Can lead to cardiovascular disease. Also called <i>hyperlipoproteinemia</i> .

hypernatremia	High plasma sodium that may lead to thirst, weakness, fatigue, neurological deficits, and occasionally coma or death.
hyperparathyroidism	Excessive amounts of parathyroid hormone, resulting in hypercalcemia, and leading to disturbances of bones, kidneys, intestines, and the central nervous system.
hyperpituitarism	Excessive secretion of hormones from the anterior lobe of the pituitary gland. It can lead to growth-related conditions such as acromegaly and gigantism.
hyperthyroidism	Excessive activity of the thyroid gland with an increase in secretion of thyroid hormone, resulting in weight loss, weakness, and other symptoms.
hypocalcemia	Low total serum calcium, which may result in muscle spasms, lethargy, and acute confusion. May also be chronic.
hypoglycemia	Plasma glucose concentration is below normal levels.
hypokalemia	Low serum potassium, which may lead to heart arrhythmias, muscle weakness, mental changes, and death.

hypolipidemia	A below normal level of plasma lipoprotein. May be associated with cardiovascular disease. Also called <i>hypolipoproteinemia</i> .
hyponatremia	Low plasma sodium. Acutely it may cause coma, seizures, and death.
hypoparathyroidism	Deficient secretion of parathyroid hormones, resulting in severe muscle spasms due to hypocalcemia.
hypopituitarism	Deficient secretion of hormones by the anterior lobe of the pituitary gland. It can lead to insufficient secretion of LH, FSH, GH, and TSH.
hypothyroidism	Diminished activity of the thyroid gland with a decrease in production of thyroid hormones.

metabolic acidosis	Decreased pH and bicarbonate concentration in the body fluids caused by accumulation of acids or abnormal loss of bases.
metabolic alkalosis	Increased pH due to high bicarbonate concentration in body fluids from excessive intake of alkaline substances and loss of acid through urination or vomiting.
multiple endocrine neoplasia (MEN)	Inherited disorder of three distinct types, characterized by tumors of multiple endocrine glands as well as neural tumors. Also called <i>Sipple syndrome</i> .
myxedema	Hypothyroidism developed during adulthood and characterized by hard edema of subcutaneous tissues, fatigue, mental slowness, cold intolerance, muscle weakness, and dry hair.
obesity	Excessive accumulation of fat in the body.
papillary carcinoma	The most common type of thyroid cancer.

pheochromocytoma	A neoplasm of the adrenal medulla (chromaffin cells) leading to increased epinephrine and norepinephrine secretion and resulting in severe hypertension.
polyphagia	The condition of hunger or increase in appetite.
respiratory acidosis	Acidosis (too much acid) caused by retention of carbon dioxide, due to inadequate pulmonary ventilation.
respiratory alkalosis	Alkalosis (too much base) resulting from abnormal loss of CO ₂ due to hyperventilation.
Tay-Sachs disease	An inherited fatal disorder characterized by the body's inability to properly process fat with deposition of fats in central and peripheral nerves.
tetany	Muscle twitches or spasms resulting from an increase in nerve impulses due to hypocalcemia.
thyroid cancer	Carcinoma of the thyroid gland. There are four main types: papillary, follicular, medullary, and undifferentiated.
thyroiditis	Inflammation of the thyroid.
thyrotoxicosis	A disease caused by excessive quantities of thyroid hormones.

Category	Description
type 1 immune mediated diabetes	Formerly known as insulin-dependent diabetes mellitus (IDDM). Requires the use of insulin since the pancreas produces little to none. Occurs typically during childhood or adolescence; most common type of diabetes mellitus diagnosed before age 30.
type 2	Formerly known as non-insulin-dependent diabetes mellitus (NIDDM). Affects the way in which the body uses food. Typically diagnosed in patients over 30 years of age.
type 3	Diabetes mellitus with other conditions or syndromes.
type 4 impaired glucose tolerance (IGT)	Glucose levels between normal and diabetic.
type 5 gestational diabetes	A carbohydrate intolerance that develops in 2% to 5% of all pregnancies and disappears when a pregnancy is over.

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.
- RBS , PPBS
- **The glycosylated hemoglobin (HbA1c) test** - by measuring the percentage of red blood cells with glucose attached, monitors long-term glucose control. A high level indicates poor glucose control in diabetic patients.
- **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.
- **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.

ABBREVIATIONS

Abbreviation	Meaning
ABGs	arterial blood gases
ACTH	adrenocorticotrophic hormone
ADH	antidiuretic hormone
BS	blood sugar
Ca	calcium
DI	diabetes insipidus; diagnostic imaging
DKA	diabetic ketoacidosis
DM	diabetes mellitus
FBS	fasting blood sugar
FSH	follicle-stimulating hormone
GH	growth hormone
hGH	human growth hormone
GTT	glucose tolerance test

IDDM	insulin-dependent-diabetes mellitus
IGT	impaired glucose tolerance
K	potassium
LDL	low-density lipoprotein
LH	luteinizing hormone
MEN	multiple endocrine neoplasia
Na	sodium
NIDDM	non-insulin-dependent diabetes mellitus
NPH	neutral protamine Hagedorn (insulin)
OGTT	oral glucose tolerance test
OXT, OXY	oxytocin

PBI	protein-bound iodine
PGH	pituitary growth hormone
PRL	prolactin
PTH	parathyroid hormone
RAI	radioactive iodine
RAIU	radioactive iodine uptake
RH	releasing hormone
T ₃	triiodothyronine
T ₄	thyroxine
TSH	thyroid-stimulating hormone

THANK YOU