



عنوان المحاضرة

المحاضرة التاسعة : الجهاز الغدي الصماوي

Endocrine System

ZUHEIR ALSHEHABI

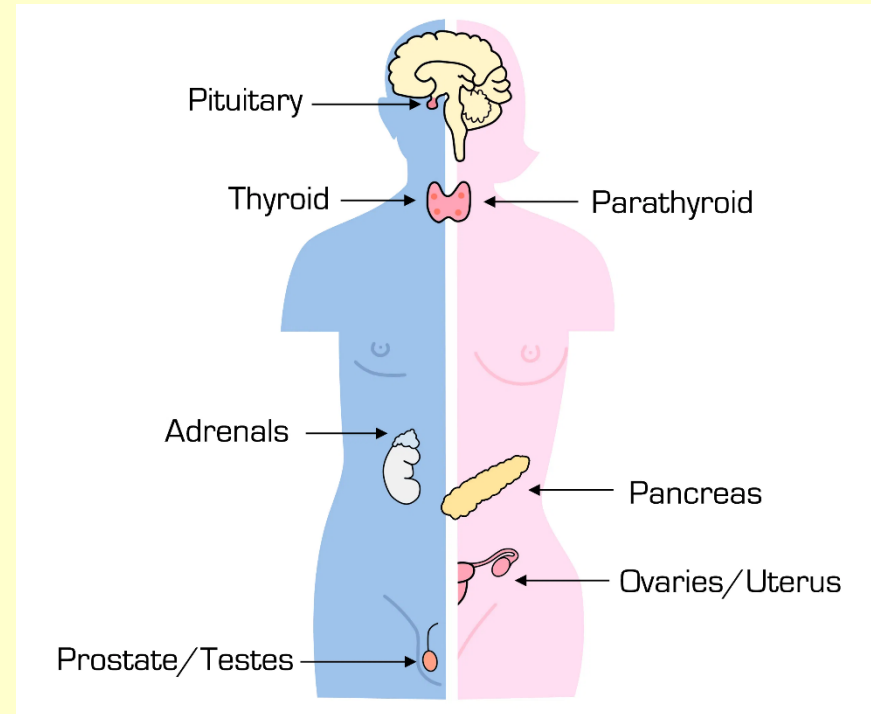
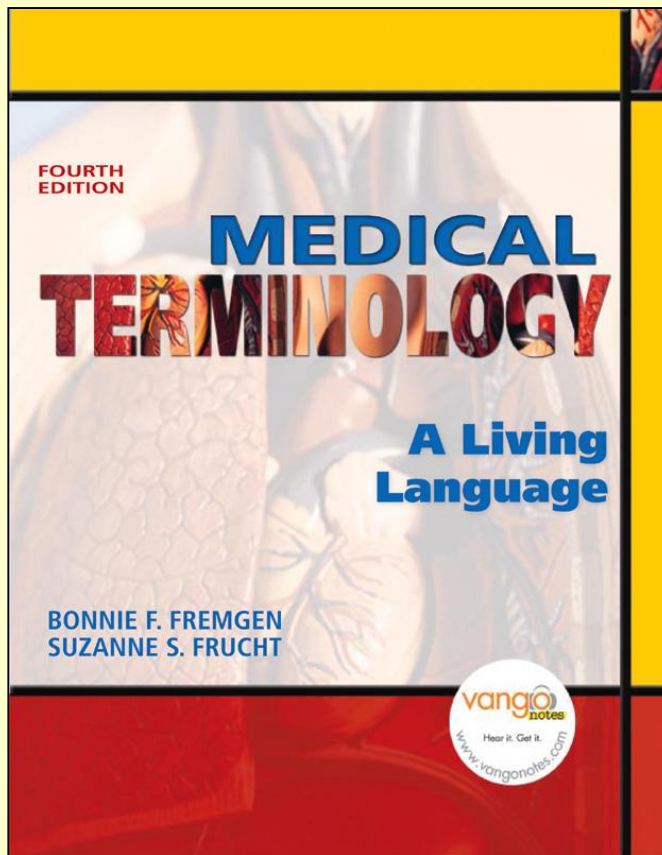
MD, PHD, FASCP

2022

<https://manara.edu.sy/>

Medical Terminology

A Living Language



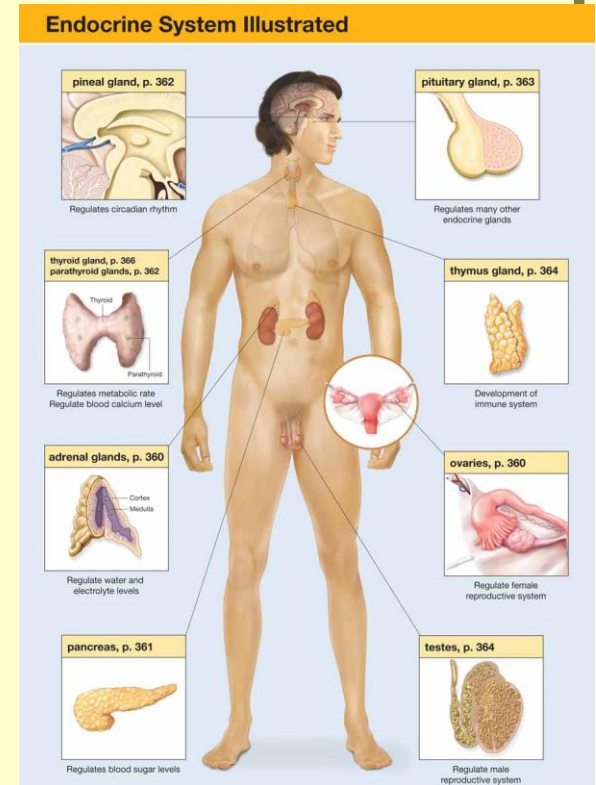
Endocrine System

الجهاز الغدي الصماوي

Endocrine System at a Glance

- Organs of the Endocrine System

- Adrenal glands الكظر
- Ovaries المبيضين
- Pancreas (islets of Langerhans) البنكرياس (جزر لانغرهانس)
- Parathyroid glands جارات الدرق
- Pituitary gland النخامي
- Testes الخصيتين
- Thyroid gland الدرق



Endocrine System Combining Forms

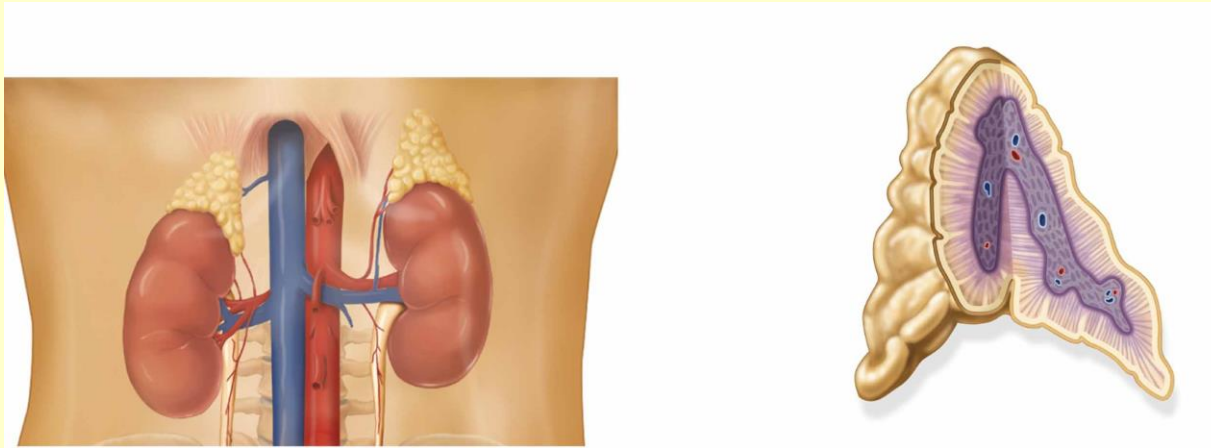
● acr/o	نهایات	extremities
● adren/o	کظر	adrenal glands
● andr/o	ذکري	male
● calc/o	کالسيوم	calcium
● estr/o	أنثوي	female

Endocrine System Combining Forms

- glyc/o سكر sugar
- gonad/o الغدد الجنسية sex glands
- home/o مثلي sameness
- ophthalm/o عيني eye

Adrenal Glands الكظر

- Two glands, one located above each kidney
- Each gland is composed of two sections:
 - **Adrenal cortex**
 - **Adrenal medulla**



Adrenal Cortex

- Hormones are referred to as **corticosteroids**
 - Secreted by adrenal cortex
 - Steroid hormones
- Three different families of corticosteroids
 - **Mineralocorticoids**
 - **Glucocorticoids**
 - **Steroid sex hormones**

Adrenal Cortex

قشر الكظر

- Mineralocorticoid الستيروئيدات المعدنية
 - Example: **aldosterone**
 - Regulates sodium (Na^+) and potassium (K^+) levels
- Glucocorticoid الستيروئيدات السكرية
 - Example: **cortisol**
 - Regulates carbohydrates
- Steroid sex hormones الستيروئيدات الجنسية
 - **Androgens**, **estrogen**, and **progesterone**
 - Regulate secondary sexual characteristics

Adrenal Medulla لب الكظر

- Inner portion
- Secretes **epinephrine** and **norepinephrine**
 - Epinephrine is also called **adrenaline**
- Critical during emergency situations
 - Increases blood pressure
 - Increases heart rate
 - Increases respiration rate

Adrenaline = Stress hormone

HOW STRESS AFFECTS THE BODY

BRAIN

Difficulty concentrating, anxiety, depression, irritability, mood, mind fog

CARDIOVASCULAR

higher cholesterol, high blood pressure, increased risk of heart attack and stroke

JOINTS AND MUSCLES

increased inflammation, tension, aches and pains, muscle tightness

IMMUNE SYSTEM

decreased immune function, lowered immune defenses, increased risk of becoming ill, increase in recovery time

SKIN

hair loss, dull/brittle hair, brittle nails, dry skin, acne, delayed tissue repair

GUT

nutrient absorption, diarrhea, constipation, indigestion, bloating, pain and discomfort

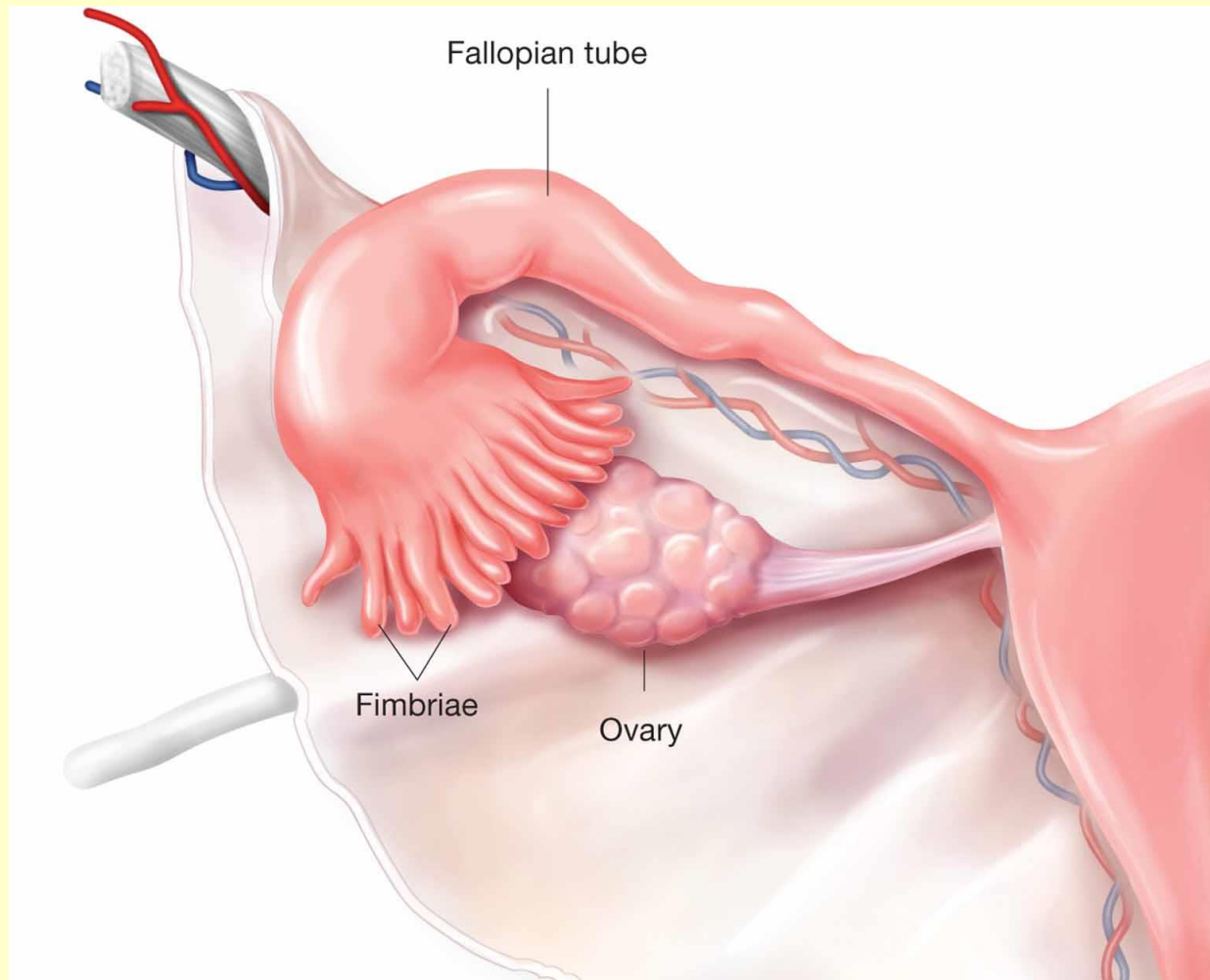
REPRODUCTIVE SYSTEM

decreased hormone production, decrease in libido, increase in PMS symptoms



Ovaries المبيضين

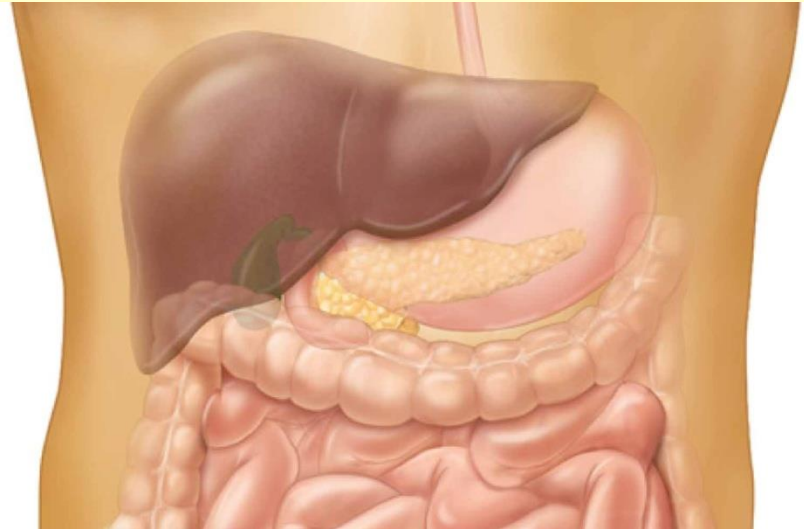
- Two ovaries located in pelvic cavity of females
- Secrete female sex hormones, estrogen and progesterone يفرز الاستروجين والبروجسترون
- Estrogen is responsible for:
 - Female sexual characteristics
 - Regulation of menstrual cycle
- Progesterone
 - Maintains suitable uterine environment for pregnancy



The ovaries. المبيضين

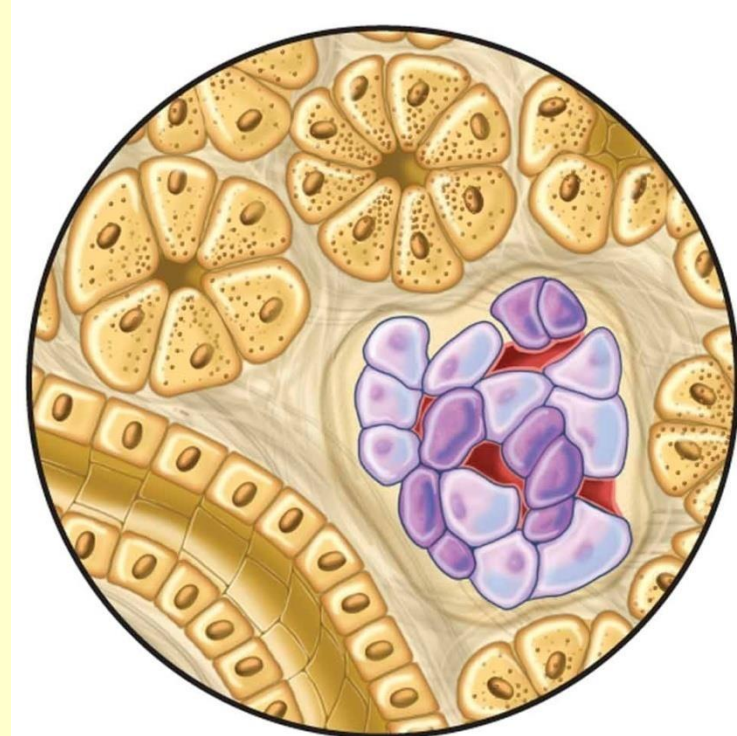
البنكرياس : غدة مشتركة Pancreas

- Located along lower curvature of stomach
- Only organ that has both endocrine and exocrine functions

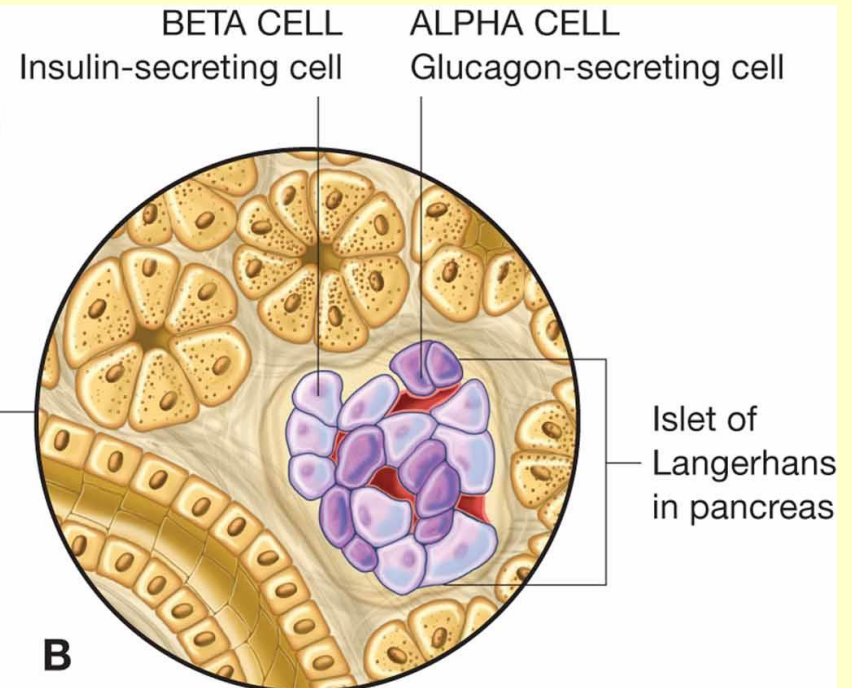
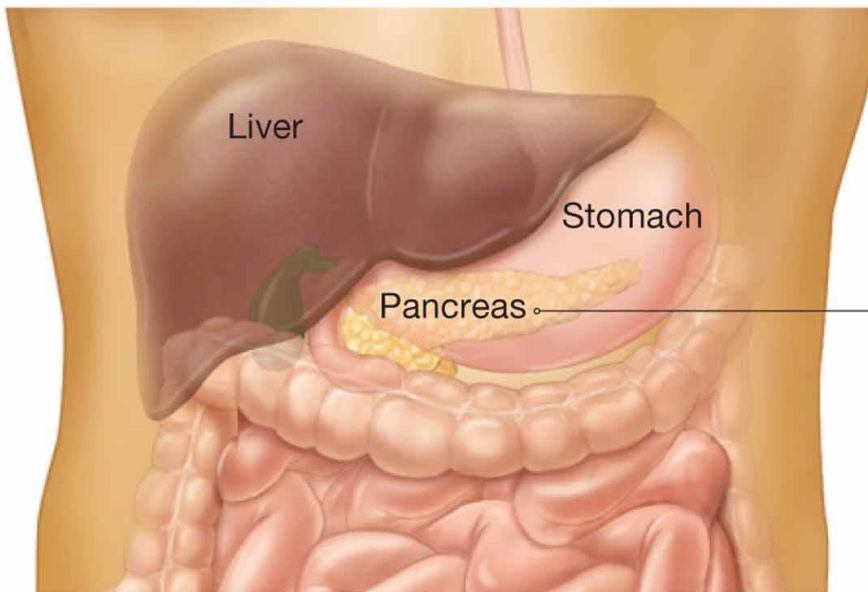


Pancreas

- Exocrine portion
 - Releases **digestive enzymes** through duct into duodenum
- Endocrine sections of the pancreas
 - **Islets of Langerhans**
 - Produce **insulin** and **glucagon**



A



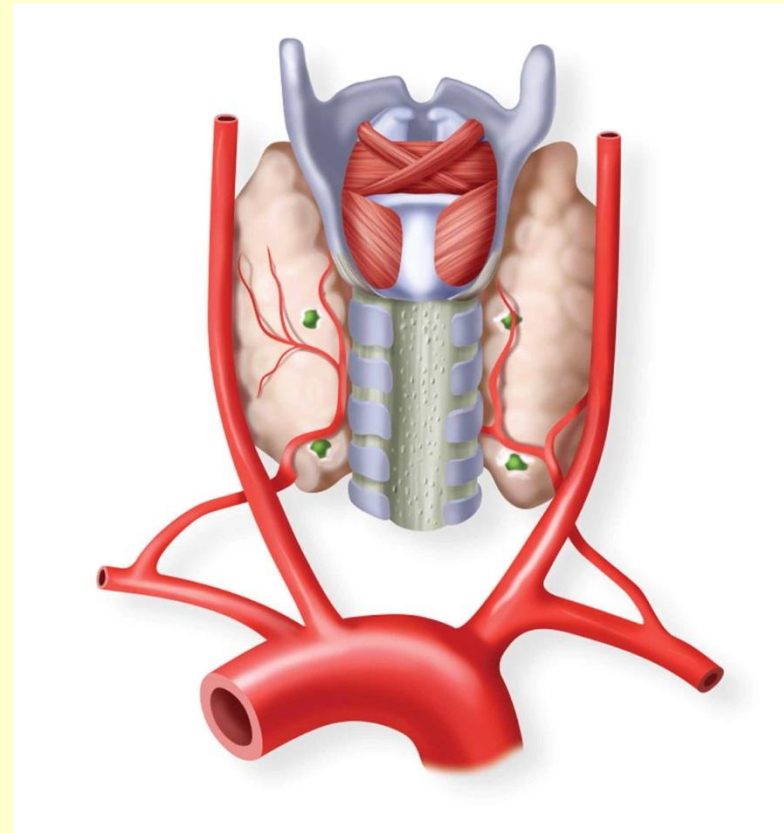
B

Glucagon-raises blood glucose level
Insulin-lowers blood glucose level

The pancreas.

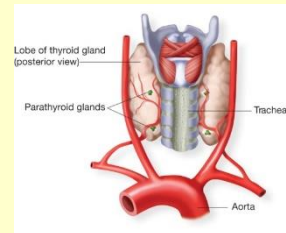
Parathyroid Glands جارات الدرق

- Four tiny glands
- Located on dorsal surface of thyroid gland



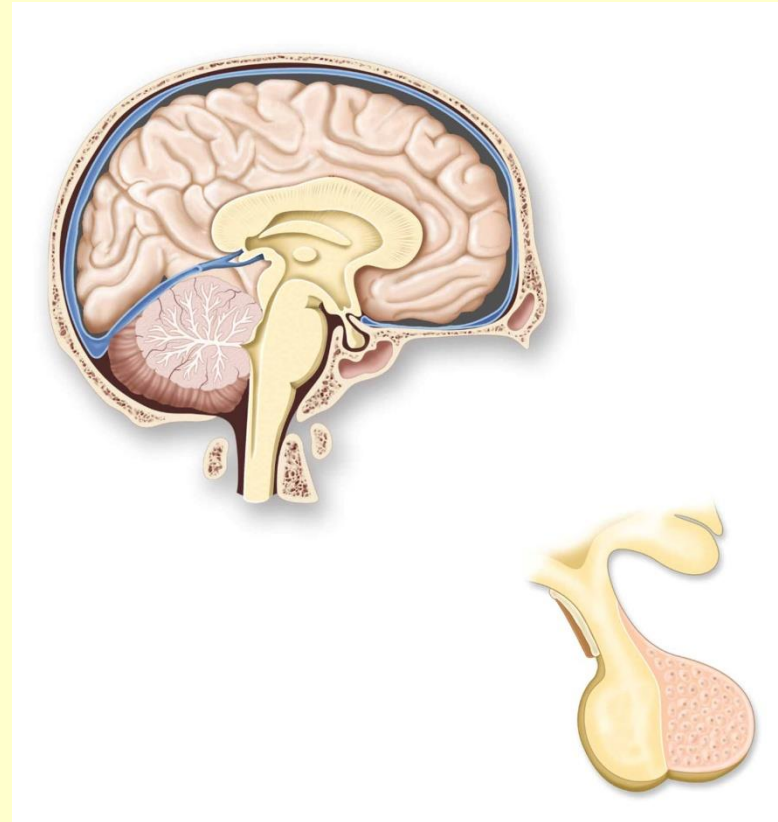
Parathyroid Glands

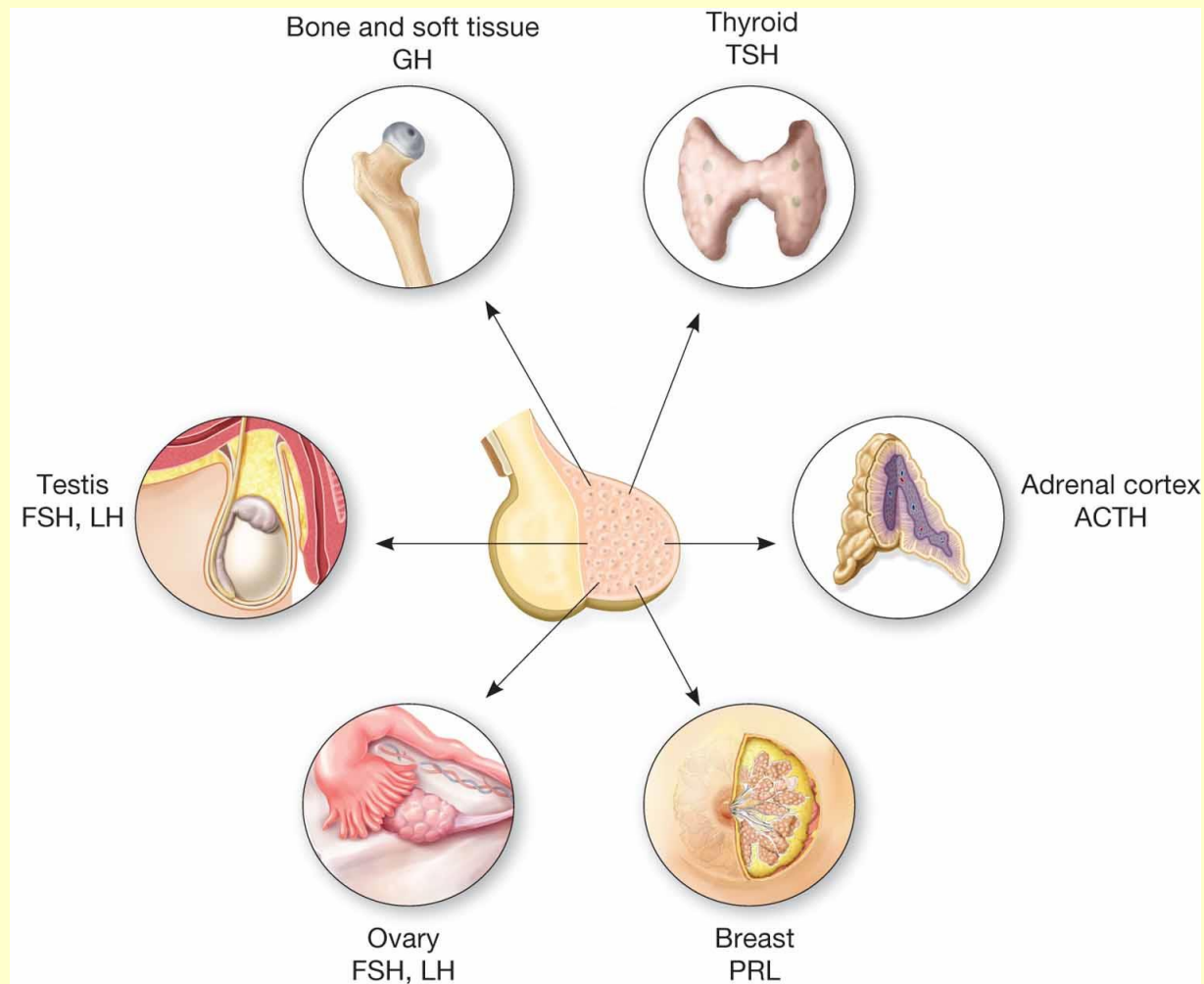
- Secretes **parathyroid hormone** (PTH) هرمون جارات الدرق
 - Regulates level of **calcium** in bloodstream
- If calcium levels in blood fall too low:
 - Parathyroid hormone levels in the blood increase
 - Stimulate bone breakdown
 - Releasing more calcium into bloodstream



Pituitary Gland النخامى

- Small marble-shaped gland
- Located underneath brain
- Divided into **anterior** and **posterior lobes**
- Regulated by **hypothalamus**



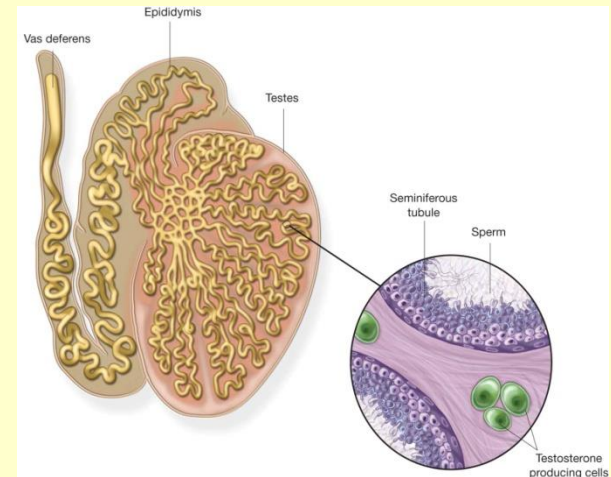


The different hormones and target tissues for the anterior pituitary.

النخامى الأمامية

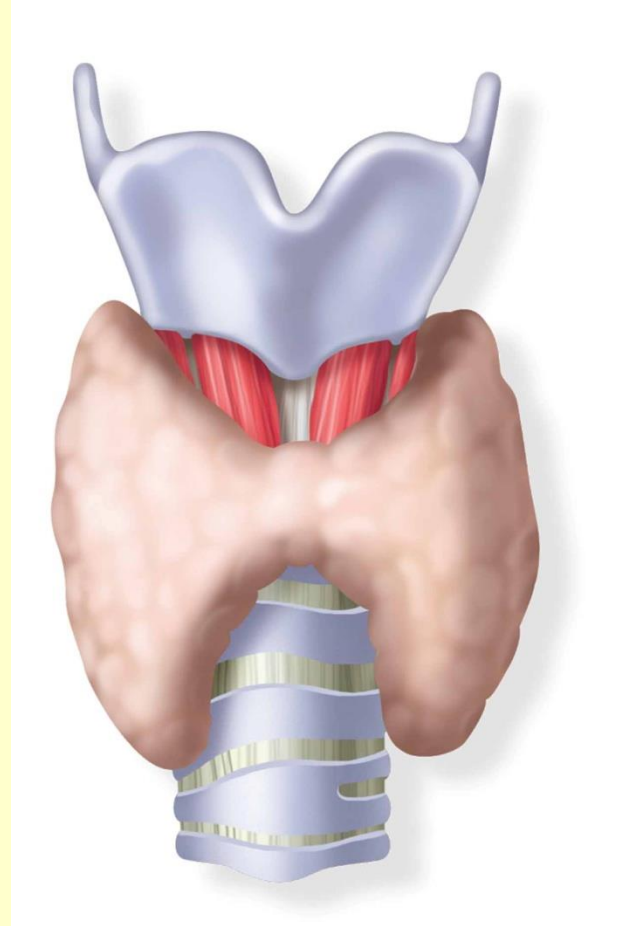
Testes الخصية

- Two oval glands located in scrotum
- Secrete male sex hormone, **testosterone**
- Testosterone
 - Produces male secondary sexual characteristics
 - Regulates sperm production



Thyroid Gland الدرق

- Located on either side of trachea
- Resembles a butterfly in shape
- Divided into right and left lobes



Word Building with calc/o & crin/o

hyper– –emia	Hypercalcemia فرط كلس الدم	excessive calcium in blood
hypo– –emia	Hypocalcemia نقص كلس الدم	low calcium in blood

Word Building with glyc/o, kal/i, & natr/o

hyper– –emia	hyperglycemia	excessive sugar in blood
hypo– –emia	hypoglycemia	low sugar in blood
hyper– –emia	hyperkalemia	excessive potassium in blood
hypo– –emia	hyponatremia	low sodium in blood

Word Building with parathyroid/o

hyper– –ism	Hyperparathyroidism فرط نشاط جارات الدرق	state of excessive parathyroid
hypo– –ism	Hypoparathyroidism نقص نشاط جارات الدرق	state of insufficient parathyroid

Word Building with pituitar/o & thym/o

–ary	Pituitary نخامي	pertaining to pituitary
hypo– –ism	Hypopituitarism نقص نشاط النخامي	state of low pituitary
hyper– –ism	Hyperpituitarism فرط نشاط النخامي	state of excessive pituitary

Word Building with thyr/o & thyroid/o

–al	thyroidal	pertaining to thyroid
–ectomy	thyroidectomy	removal of thyroid
hyper– –ism	hyperthyroidism	state of excessive thyroid
hypo– –ism	hypothyroidism	state of low thyroid

Endocrine System Vocabulary

Acidosis	excessive acidity of body fluids
edema	excessive fluid in body tissues
endocrinology	diagnosis and treatment of conditions of endocrine glands
Exophthalmos جحوظ العينين	protruding eyeballs
Gynecomastia تثدي	development of breast tissue in males
Hirsutism شعرانية	excessive amount of hair



A photograph of a woman with exophthalmos. This condition is associated with hypersecretion of the thyroid gland. (*Custom Medical Stock Photo, Inc.*)

Gynecomastia الثديي



Hirsutism الشعرانية



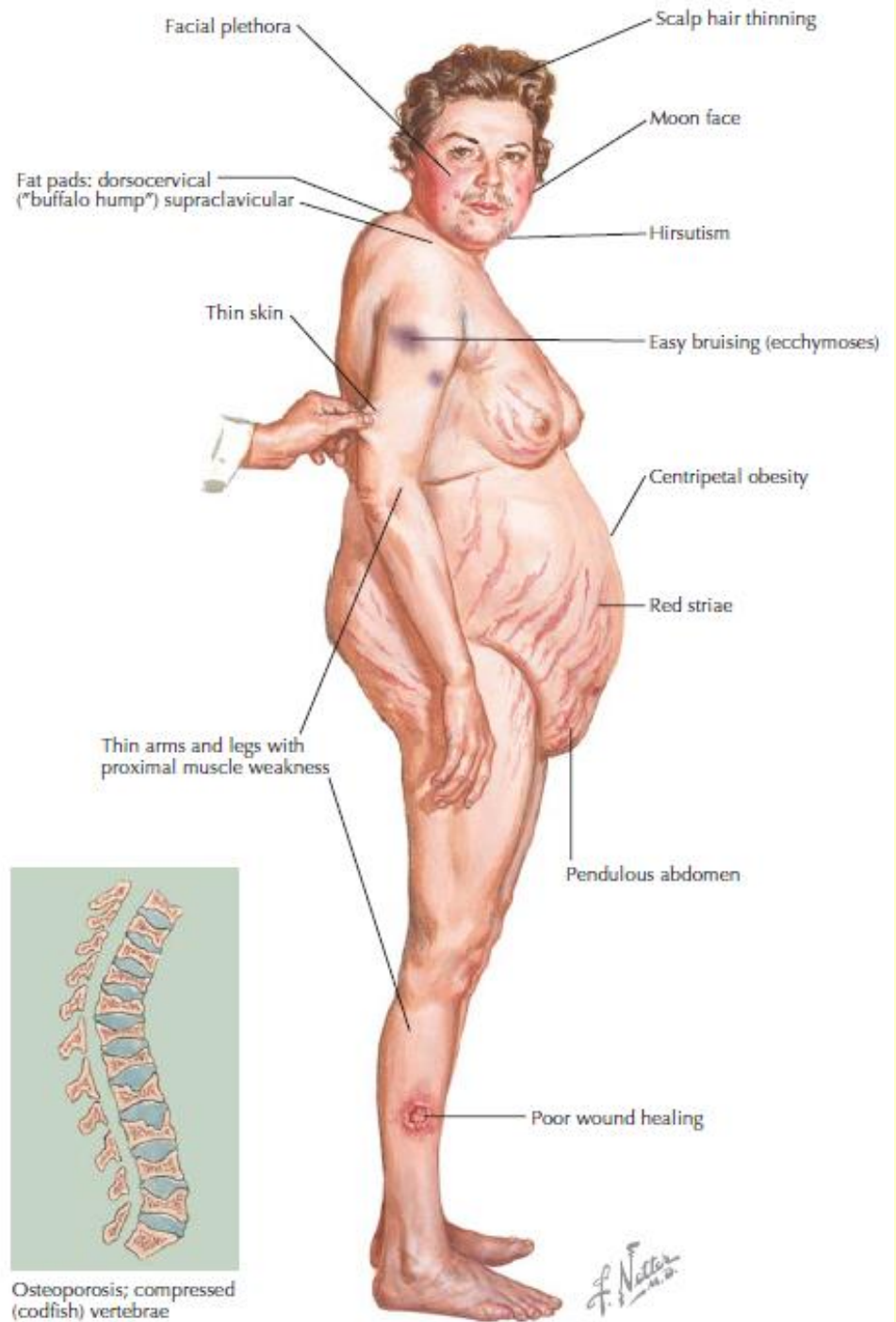
Endocrine System Vocabulary

Obesity السمنة	having abnormal amount of fat
Syndrome المتلازمة	group of symptoms and signs that combine to present a clinical picture of disease or condition

Adrenal Gland Pathology

Cushing's syndrome متلازمة كوشنغ	hypersecretion of adrenal cortex; symptoms include weakness, edema, excess hair growth, and osteoporosis
pheochromocytoma	hypersecretion of epinephrine by adrenal medulla tumor; usually benign; symptoms include anxiety, heart palpitations, dyspnea, and headache

متلازمة كوشنغ





الوجه القمري - متلازمة كوشنغ Cushing's syndrome.

Pancreas Pathology

diabetes mellitus
(DM)

الداء السكري

- Chronic disorder of carbohydrate metabolism
- Results in hyperglycemia and glycosuria
- Two very distinct types:
 - insulin-dependent
 - non-insulin-dependent

Diabetes Mellitus الداء السكري

- **Insulin-dependent diabetes mellitus (IDDM)**
 - Also called **Type 1**
 - Develops early in life
 - Destruction of islet cells
 - Person makes too little insulin
 - Must take insulin injections
- **Non-insulin-dependent diabetes mellitus (NIDDM)**
 - Also called **Type 2**
 - Develops later in life
 - Person makes enough insulin, but it has lost ability to regulate cells
 - Do not take insulin
 - Treated by diet, exercise, and oral medications

Pancreas Pathology

diabetic retinopathy	accumulation of damage to retina; complication of diabetes mellitus
ketoacidosis	acidosis due to excess of acidic ketone bodies; serious complication of diabetes mellitus
peripheral neuropathy	damage to nerves in lower legs and hands as a result of diabetes mellitus
insulinoma	islet of Langerhans tumor; secretes excessive amount of insulin

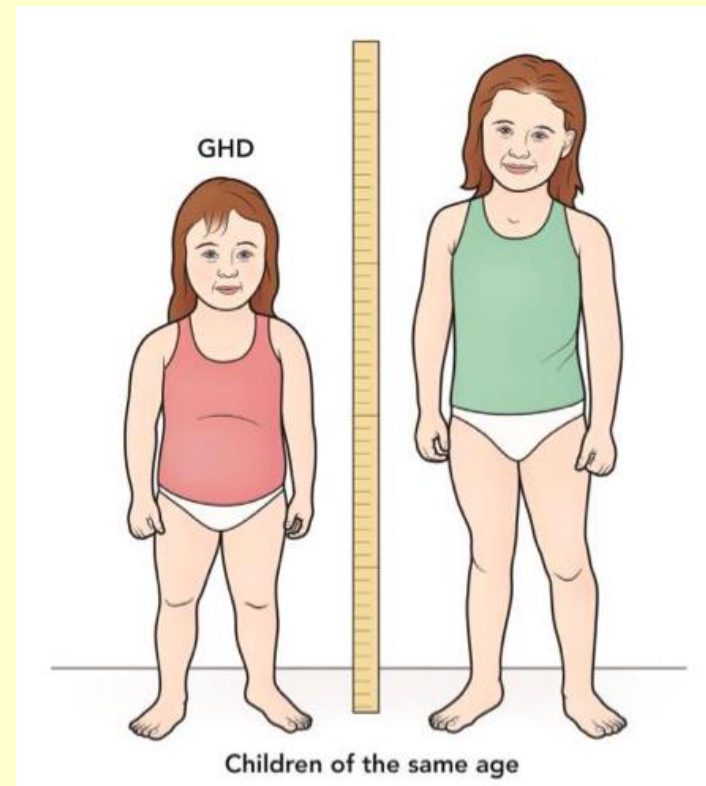
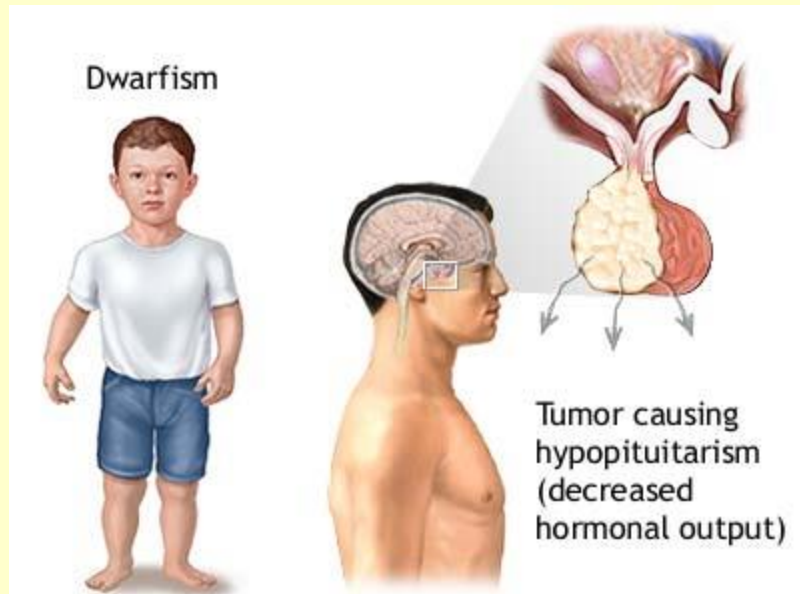
Pituitary Gland Pathology

Acromegaly ضخامة النهايات	chronic hypersecretion of growth hormone in adults; causes enlargement of bones of head and extremities
diabetes insipidus (DI)	hyposecretion of antidiuretic hormone; symptoms include polyuria and polydipsia
Dwarfism القزامة	hyposecretion of growth hormone in children; causes short stature



Acromegaly. The hand on the right is from a normal person, the hand on the left is a person with acromegaly. (*Bart's Medical Library/Phototake NYC*)

GHD Dwarfism القزامة النخامية



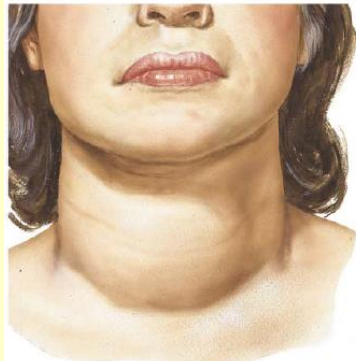
Thyroid Gland Pathology

Goiter السلعة الدرقية	enlarged thyroid gland
Graves' disease داء غريف	hypersecretion of thyroid; symptoms include exophthalmos and goiter

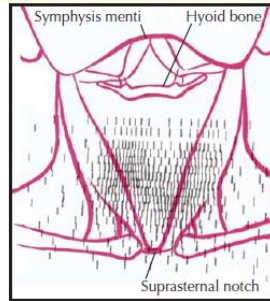
Thyroid Gland Pathology

Goiter السلعة الدرقية

enlarged thyroid gland

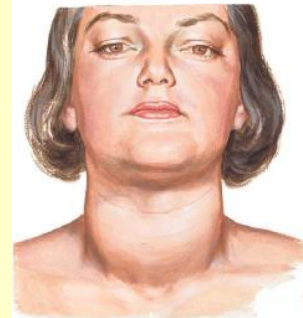
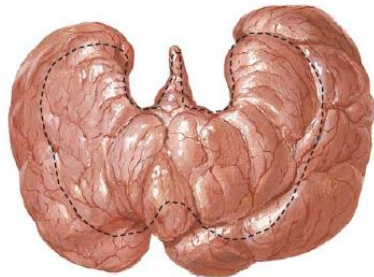


Diffuse goiter of moderate size



Scintigram

Diffuse enlargement and engorgement of thyroid gland (broken line indicates normal size of gland)



Moderate size nontoxic diffuse goiter



Large diffuse goiter



Nodular goiters



Thyroid Gland Pathology

Graves' disease داء غريف

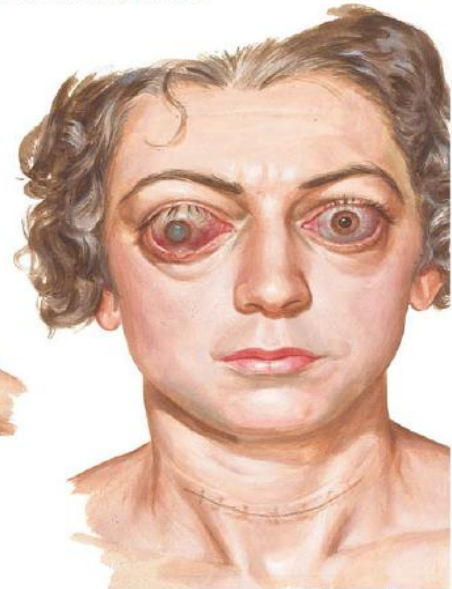
hypersecretion of thyroid;
symptoms include
exophthalmos and goiter



Moderately severe ophthalmopathy



Testing for resiliency



Severe progressive ophthalmopathy

Clinical Laboratory Tests

fasting blood sugar (FSB)	measures glucose in bloodstream after 12-hour fast
glucose tolerance test (GTT)	measures blood sugar level over several hours after person drinks large dose of glucose
two-hour postprandial glucose tolerance test	measures blood glucose level two hours after a meal

Clinical Laboratory Tests

protein bound iodine test (PBI)	measures T_4 blood level; iodine in the hormone becomes bound to blood proteins
thyroid function test (TFT)	measures levels of T_3 , T_4 , and TSH in blood

Endocrine System Pharmacology

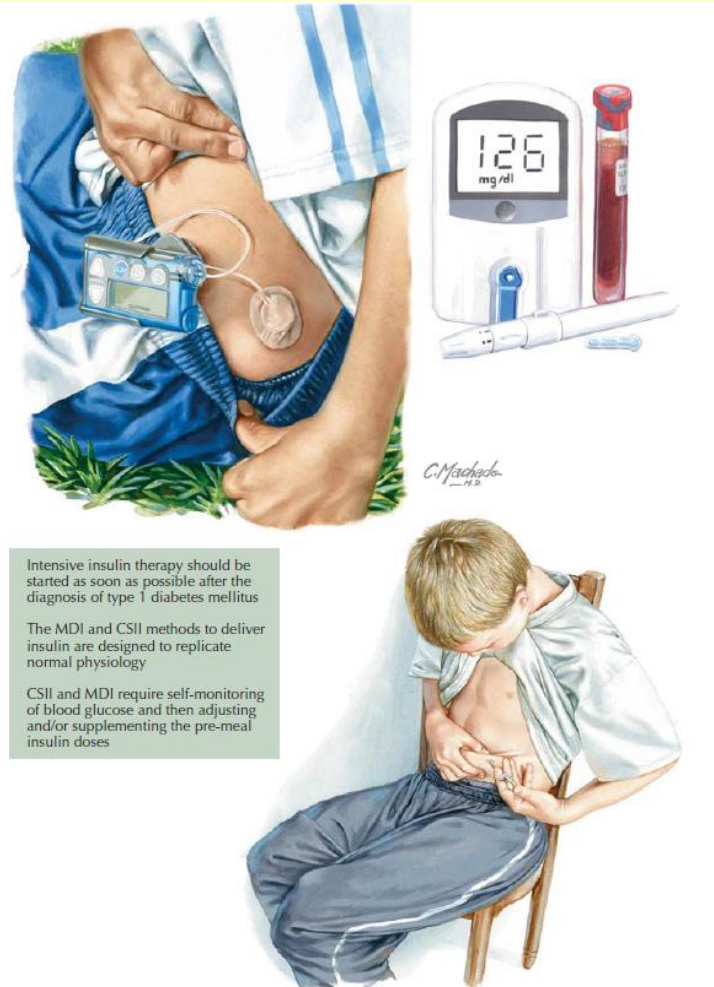
antithyroid agents مضادات الدرق	blocks production of thyroid hormones	Tapazole
Corticosteroids الستيروئيدات القشرية	replaces adrenal cortex hormones	Deltasone
human growth hormone therapy العلاج بهرمون النمو البشري	replaces growth hormone	Genotropin , Protropin

Endocrine System Pharmacology

Insulin الانسولين	treats type 1 diabetes mellitus	Humulin L
oral hypoglycemic agents العوامل الخافضة لسكر الدم الفموية	decreases blood sugar in type 2 diabetics	Glucophage , Glucotrol
thyroid replacement hormone الهرمون المعويض للدرق	replaces thyroid hormones	Levo-T, Cytomel

Endocrine System Pharmacology

علاج السكري من النمط الأول بالانسولين



Intensive insulin therapy should be started as soon as possible after the diagnosis of type 1 diabetes mellitus

The MDI and CSII methods to deliver insulin are designed to replicate normal physiology

CSII and MDI require self-monitoring of blood glucose and then adjusting and/or supplementing the pre-meal insulin doses

Endocrine System Abbreviations

ACTH	adrenocorticotrophic hormone
ADH	antidiuretic hormone
β	beta
BMR	basal metabolic rate
DI	diabetes insipidus
DM	diabetes mellitus

Endocrine System Abbreviations

FBS	fasting blood sugar
FSH	follicle-stimulating hormone
GH	growth hormone
GTT	glucose tolerance test
IDDM	insulin-dependent diabetes mellitus
K ⁺	potassium
LH	luteinizing hormone

Endocrine System Abbreviations

MSH	melanocyte-stimulating hormone
Na ⁺	sodium
NIDDM	non-insulin-dependent diabetes mellitus
NPH	neutral protamine Hagedorn (insulin)
PBI	protein-bound iodine
PRL	prolactin
PTH	parathyroid hormone

Endocrine System Abbreviations

RAI	radioactive iodine
RIA	radioimmunoassay
T ₃	triiodothyronine
T ₄	thyroxine
TFT	thyroid function test
TSH	thyroid-stimulating hormone

Thank You

