

Pituitary gland - what is another name for this gland? **Hypophysis**

The stalk like structure called the **infundibulum** attaches the pituitary to the **hypothalamus**, which controls the secretion of the pituitary.

Pituitary gland has two lobes. The posterior pituitary gland is called the **neurohypophysis** and the anterior pituitary gland is called the **adenohypophysis**

The **neurohypophysis** is a downgrowth from the brain and is composed of neural tissue.

Adenohypophysis						neurohypophysis	
GH	TSH	ACTH	FSH	LH	PRL	Oxytocin	ADH

Hormones from the neurohypophysis are regulated **neurally**

Hormones from the adenohypophysis are regulated **hormonally**

Oxytocin- stimulates uterine contractions during childbirth & milk ejection

ADH- Targets kidney tubules to reabsorb more water to inhibit or prevent urine formation

GH- stimulates most cells to enlarge & divide, major targets are bone and skeletal muscle

TSH- stimulates normal development and secretory activity of thyroid

ACTH- stimulates the adrenal cortex to release corticosteroids

FSH- stimulates production of gametes (egg or sperm)

LH- promotes production of gonadal hormones & helps mature follicles of egg, triggers ovulation and release of estrogen and progesterone

PRL- stimulates milk production in females

Thyroid gland consists of three main parts: **follicles**, **colloid**, and **parafollicular cells**

Two hormones are secreted from the thyroid. **Thyroid hormone (TH)** is stored in follicle lumen, and **calcitonin** is produced by the parafollicular cells.

Thyroid hormone is regulated **hormonally**

Effects of TH:

- **Increases basal metabolic rate and heat production**
- **Regulates tissue growth and development**
- **Maintains blood pressure**

Calcitonin is regulated **humorally**

Higher-than-normal doses inhibits **osteoclast activity**, prevents the release of  $\text{Ca}^{2+}$  from bone matrix, and stimulates  **$\text{Ca}^{2+}$  uptake and incorporation into bone matrix**

Parathyroid gland contains **parathyroid cells** that secrete **parathyroid hormone (PTH)**

PTH is regulated **humorally**

Functions of PTH:

- **Stimulate osteoclasts to digest bone matrix and release  $\text{Ca}^{2+}$  to blood**
- **Enhances reabsorption of  $\text{Ca}^{2+}$  and secretion of phosphate ( $\text{PO}_4^{3-}$ ) by kidneys**
- **Promotes activation of vitamin D by the kidneys which leads to increased absorption of  $\text{Ca}^{2+}$  by intestinal mucosa**

Adrenal gland - what is another name for this gland? **Suprarenal glands**

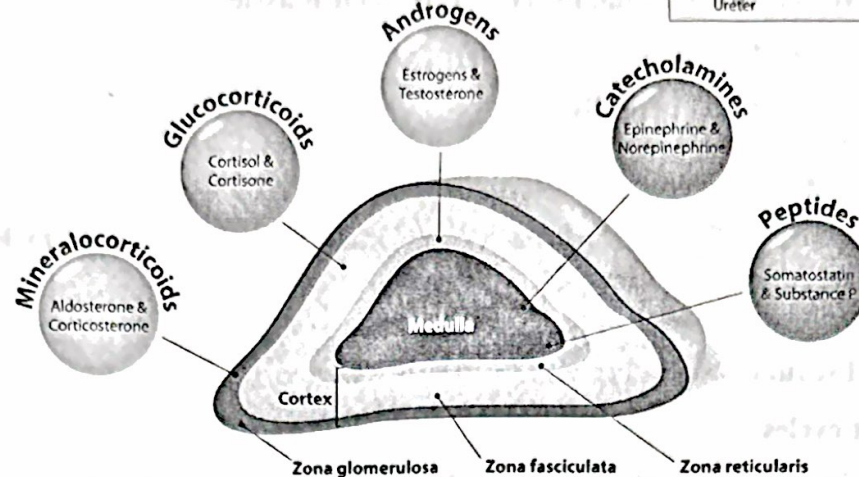
The two main parts of the adrenal gland are the **adrenal cortex** and the **adrenal medulla**

The adrenal cortex produces hormones collectively called **corticosteroids**

The three main layers of the adrenal cortex are **zona glomerulosa**, **zona fasciculata**, and **zona reticularis**

# ADRENAL GLAND

(hormones)



Aldosterone is regulated **hormonally (ACTH)**, **humorally**, and by **renin-angiotensin-aldosterone mechanism**

What is the main function of aldosterone? **Stimulates Na reabsorption and  $K^+$  elimination by kidneys**

Cortisol is regulated **hormonally**

Cortisol functions:

- **Influence metabolism of most cells and help us resist stressors**
- **Keep blood glucose levels relatively constant**
- **Maintain blood pressure by increasing action of vasoconstrictors**

Gonadocorticoids are **sex steroids** that are regulated **hormonally** and contribute to:

- **Onset of puberty and appearance of secondary sex characteristics**
- **Sex drive in women**
- **Source of estrogens in postmenopausal women**

The adrenal medulla contains **chromaffin** cells that synthesize catecholamines **epinephrine** and **norepinephrine**

Catecholamine effects:



- Vasoconstriction
- Increased heart rate
- Increased blood glucose levels
- Blood diverted to the brain, heart, and skeletal muscle

These hormones are regulated **neurally**

Pineal gland is composed of cells called **pinealocytes** that secrete the hormone **melatonin**

Melatonin effects:

- Timing of sexual maturation and puberty
- day/night cycles
- Physiological processes that show rhythmic variations (body temps, sleep, appetite)
- Production of antioxidant and detoxification molecules in cells

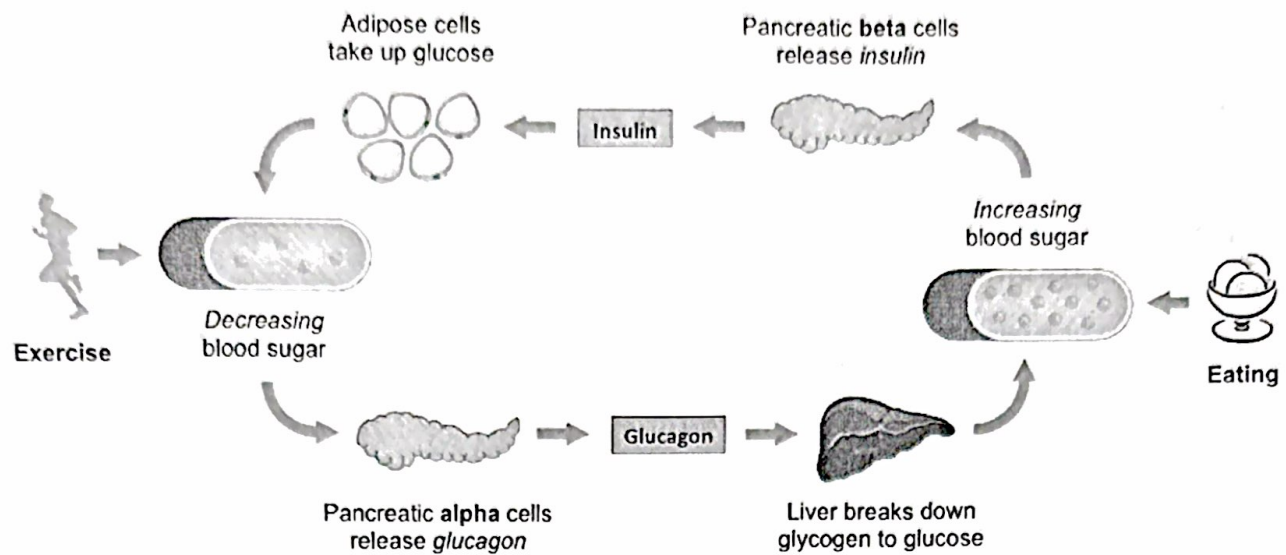
The pancreas contains both **exocrine** and **endocrine** cells.

The **acinar cells** are the exocrine cells.

The **pancreatic islets** contain endocrine cells.

Within the pancreatic islets, alpha cells produce **glucagon** and beta cells produce **insulin**

Both hormones are regulated **humorally**



Within the gonads, **ovaries** produce estrogen and **progesterone**, and testes produce **testosterone**

Gonadal hormones are regulated **hormonally**

Estrogen functions:

- **Maturation of reproductive organs**
- **Appearance of secondary sexual characteristics**
- **With progesterone, causes breast development and cyclic changes in uterine mucosa**

Testosterone functions:

- **Initiates maturation of male reproductive organs**
- **Causes appearance of male secondary sexual characteristics and sex drive**
- **Necessary for normal sperm production**
- **Maintains reproductive organs in functional state**

The thymus gland is large in **infancy**, and diminishes in size with age. It produces the hormone **thymosin**

Thymosins are essential to production and programming of **T-cells**