PHARMACOLEARN

It’s Important to Know!

BP201T — Human Anatomy and Physiology II

B.Pharm Semester 2 · Unit 4 — Endocrine System

Unit IV: Endocrine System

The endocrine system uses hormones released into blood to coordinate growth, metabolism, reproduction, stress responses and homeostasis.

Hormones and mechanisms of action

Hormones may be peptides, proteins, steroids or amino-acid derivatives. Water-soluble hormones usually bind receptors on the cell surface and use intracellular signalling pathways. Lipid-soluble hormones usually cross the cell membrane and bind intracellular receptors that can regulate gene transcription.

Pituitary gland

The pituitary gland has anterior and posterior parts. The anterior pituitary releases growth hormone, prolactin, thyroid-stimulating hormone, adrenocorticotropic hormone, follicle-stimulating hormone and luteinising hormone. The posterior pituitary releases oxytocin and antidiuretic hormone made in the hypothalamus.

Thyroid and parathyroid glands

Thyroid hormones increase metabolic activity and support growth and development. Calcitonin is produced by thyroid parafollicular cells. Parathyroid hormone increases blood calcium through actions on bone, kidney and vitamin D activation.

Adrenal glands, pancreas, pineal gland and thymus

The adrenal cortex produces mineralocorticoids, glucocorticoids and adrenal androgens. The adrenal medulla produces catecholamines. The endocrine pancreas contains islets with cells that release hormones involved in glucose regulation. The pineal gland secretes melatonin, which participates in biological timing. The thymus supports maturation of T lymphocytes, especially during early life.

Unit IV: Frequently asked questions

Q: What is the difference between endocrine and exocrine secretion?

A: Endocrine glands release hormones into blood without ducts. Exocrine glands release products through ducts onto a surface or into a cavity.

Q: What is the role of antidiuretic hormone?

A: Antidiuretic hormone increases water reabsorption in the kidney collecting ducts, helping regulate plasma osmolality and water balance.

Q: Which hormones are released by the anterior pituitary?

A: The principal hormones are growth hormone, prolactin, thyroid-stimulating hormone, adrenocorticotropic hormone, follicle-stimulating hormone and luteinising hormone.

Unit IV: Key takeaways

- Hormones coordinate distant functions and maintain homeostasis.
- Peptide hormones commonly act through membrane receptors.
- Steroid hormones commonly act through intracellular receptors.
- The pituitary links hypothalamic control with several endocrine organs.
- Adrenal, thyroid, parathyroid and pancreatic hormones regulate major body functions.

Unit IV: Clinical correlation

Clinical correlation: diabetes mellitus. Inadequate insulin action raises blood glucose and changes carbohydrate, lipid and protein metabolism.