

Chapter 19: Chemical Coordination and Integration

NCERT · Class 11 · Biology

Textbook exercises

Question 1

Define the following:

(a) Exocrine Gland

(b) Endocrine Gland

(c) Hormone

Solution

Ans: Exocrine glands, such as sebaceous glands, sweat glands, salivary glands, and intestinal glands, secrete their secretions on the surface or into a specific region via ducts in order to conduct a metabolic function.

Ans: The endocrine gland is a unique gland (from the epithelium that forms it) that secretes informational molecules or hormones that are injected into the venous blood or lymph to reach the target organ because there is no duct connecting the gland to the target organ. As a result, endocrine glands, such as the thyroid gland, are sometimes known as ductless glands.

Ans: Hormone is a chemical produced by an endocrine gland or a specialized nerve cell and released in very minute amounts into the bloodstream to control the growth or function of a specific tissue organ in a distant area of the body, such as insulin.

Question 2

Diagrammatically Indicates the Location of the Various Endocrine Glands in Our Body.

Solution

Solution coming soon.

Question 3

List the Hormones Secreted by the Following:

Solution

Ans.

Gland	Hormones	Function
Hypothalamus	Releasing & Inhibiting Hormones	Regulate hormone secretion from the pituitary gland
Pituitary (Anterior Lobe)	FSH, LH, TSH, ACTH, GH, Prolactin	Regulate various functions including reproduction, metabolism, growth, and stress response
Pituitary (Posterior Lobe)	Oxytocin, Vasopressin	Regulate muscle contractions (uterus) and water balance
Thyroid	Thyroxine, Triiodothyronine, Calcitonin	Regulate metabolism, growth and development, and calcium levels
Parathyroid	Parathyroid Hormone (PTH)	Regulates calcium levels in the blood
Adrenal Cortex	Glucocorticoids (cortisol), Mineralocorticoids (aldosterone), Sex hormones	Regulate metabolism, blood pressure, and sexual development and function
Adrenal Medulla	Epinephrine (adrenaline), Norepinephrine (noradrenaline)	Help the body respond to stress (fight-or-flight response)

Pancreas	Insulin, Glucagon, Somatostatin	Regulate blood sugar levels
Testis	Androgens (testosterone)	Promote male sexual development and function
Ovary	Estrogens, Progesterone, Relaxin	Regulate female sexual development and function, and prepare the body for childbirth
Thymus	Thymosin	Plays a role in the development of the immune system
Atrium	Atrial Natriuretic Factor (ANF)	Helps regulate blood pressure
Kidney	Renin, Erythropoietin	Regulates blood pressure and red blood cell production
G-I Tract	Gastrin, Secretin, Cholecystokinin, Enterocrinin, Duocrinin, Villikinin	Regulate digestion and nutrient absorption

Question 4

Fill in the Blanks:

Hormones	Target Gland
1. Hypothalamic hormones	
2. Thyrotrophin (TSH)	
3. Corticotropin (ACH)	
4. Gonadotrophins (LH, FSH)	
5. Melanotropin (MSH)	

Solution

Ans:

1. Pituitary
2. Thyroid
3. Adrenal cortex
4. Gonads – Testes in male and ovaries in female
5. Skin.

Question 5

Write short notes on the functions of the following hormones:

Parathyroid Hormones (PTH)

Solution

Ans: Parathyroid hormone raises calcium levels while lowering phosphate levels in the blood.

Thyroid Hormones

Ans: Thyroxine, triiodothyronine, and calcitonin are the three hormones secreted by the thyroid gland. Thyroxine and triiodothyronine regulate the body's overall metabolism, encourage tissue development, and induce tissue differentiation. Calcitonin is a hormone that controls calcium levels in the blood.

Thymosin

Ans: Thymosin is produced by the thymus gland. Cell division is accelerated, T-lymphocyte growth and differentiation are stimulated, and sexual maturity is accelerated.

Androgens

Ans: The testis secretes androgens. They influence male sexual behavior and sex drive by stimulating the development of the male reproductive system, the production of sperm, and the development of male accessory sex characteristics.

Estrogens

Ans: Estrogens are produced by the ovaries. They encourage the female reproductive system to mature and become fully functional, as well as the differentiation of ova and the development of accessory sex characteristics.

Insulin and Glucagon.

Ans: Insulin is produced in the pancreas by the β -cells. It reduces blood glucose levels and stimulates protein and fat synthesis. The α -cells of the pancreas produce glucagon. It causes a rise in blood glucose levels.

Question 6

Give an example(s) of

1. Hyperglycemic Hormone and Hypoglycemic Hormone

Solution

Ans: Parathormone (PTH)

1. Hypercalcemic Hormone

Ans: Glucagon, Insulin

1. Gonadotrophic Hormones

Ans: Follicle-stimulating hormone (FSH) and Luteinizing hormone (LH)

1. Progestational Hormone

Ans: Progesterone

1. Blood Pressure-Lowering Hormone

Ans: Atrial natriuretic factor

1. Androgens and Estrogens.

Ans: Testosterone and Estradiol.

Question 7

Which Hormonal Deficiency is Responsible for the Following?

1. Diabetes Mellitus

Solution

Ans: Diabetes mellitus is characterized by excessively high blood glucose levels caused by a lack of the hormone insulin.

1. Goiter

Ans: Goitre is a condition in which the thyroid gland enlarges abnormally owing to a lack of thyroxine hormone in the body.

1. Cretinism.

Ans: Cretinism is a condition in which a baby's development is slowed owing to a lack of thyroid hormone in the body.

Question 8

Briefly Mention the Mechanism of Action of FSH.

Solution

Ans: (Follicle-stimulating hormone) is a glycoprotein that is lipid insoluble and so cannot penetrate target cells. It forms a hormone-receptor complex by binding to particular receptor molecules on the cell

membrane's surface. The enzyme adenylate cyclase is released from the receptor site as a result of this combination. From ATP, this enzyme produces cell cyclic adenosine monophosphate (cAMP). The cAMP stimulates the cell's existing enzyme system. The metabolic processes in the cell are accelerated as a result of this. The hormone is referred to as the first messenger, whereas cAMP is referred to as the second messenger. The hormone-receptor complex alters the permeability of the cell membrane to allow items to pass across it more easily. As the cell obtains the required ingredients, its actions grow.

Question 9

Column I

1. T₄

2. PTH

3. GnRH

4. LH

Column II

(i) Hypothalamus

(ii) Thyroid

(iii) Pituitary

(iv) Parathyroid.

Solution

Ans:

Column I	Column II
T ₄	Thyroid
PTH	Parathyroid
GnRH	Pituitary
LH	Hypothalamus