

**CBSE Class 11 Biology**  
**NCERT Solutions**  
**Chapter 22**  
**Chemical coordination and integration**

**1. Define the following:**

**(a) Exocrine gland**

**(b) Endocrine gland**

**(c) Hormone**

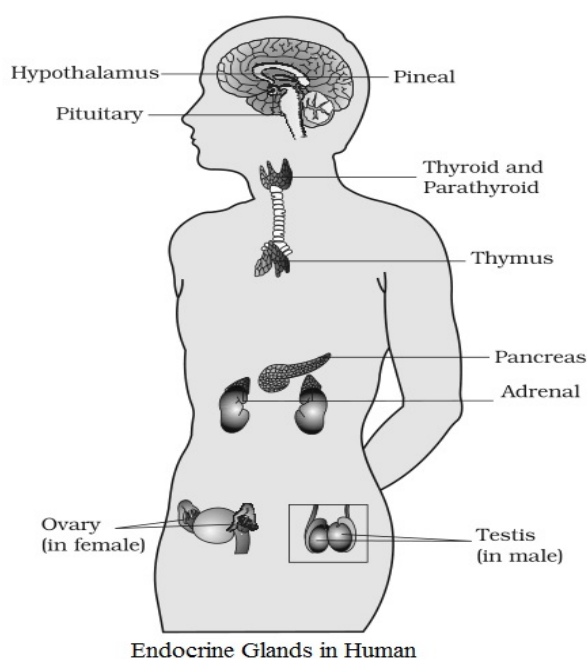
**Ans. (a) Exocrine gland:** Glands that discharge their secretions into ducts are known as exocrine glands.

**(b) Endocrine gland:** Glands that do not discharge their secretions into ducts are known as endocrine glands. These glands discharge their secretions directly into the blood.

**(c) Hormone:** Hormones are non-nutrient chemicals which act as intercellular messengers and are produced in trace amounts.

**2. Diagrammatically indicate the location of the various endocrine glands in our body.**

**Ans.**



**3. List the hormones secreted by the following:**

**(a) Hypothalamus**

**(b) Pituitary**

**(c) Thyroid**

**(d) Parathyroid**

**(e) Adrenal**

**(f) Pancreas**

**(g) Testis**

**(h) Ovary**

**(i) Thymus**

**(j) Atrium**

**(k) Kidney**

**(l) G-I Tract**

**Ans. (a) Hypothalamus**

→ Thyrotropin Releasing Hormone (TRH)

→ Gonadotrophin releasing hormone (GnRH)

→ Somatotropin-releasing hormone

→ Adrenocorticotrophin-releasing hormone

→ Prolactin releasing Hormone

→ Growth-inhibiting hormone

→ Melanocyte-inhibiting hormone

**(b) Pituitary gland**

→ Growth Hormone (GH)

→ Prolactin (PRL)

→ Thyroid Stimulating Hormone (TSH)

→ Adrenocorticotrophic Hormone (ACTH)

→ Luteinizing Hormone (LH)

→ Follicle Stimulating Hormone (FSH)

→ Melanocyte Stimulating hormone (MSH)

• Neurohypophysis also known as posterior pituitary

→ Oxytocin

→ Vasopressin

**(c) Thyroid gland**

- Thyroxin
- Triiodothyronin
- Calcitonin

**(d) Parathyroid**

- Parathyroid Hormone

**(e) Adrenal gland**

- Mineralocorticoids (mainly aldosterone)
- Glucocorticoids (mainly cortisol)
- Adrenaline
- Nor-adrenaline

**(f) Pancreas**

- Insulin
- Glucagon

**(g) Testis**

- Testosterone

**(h) Ovary**

- Estrogen
- Progesterone

**(i) Thymus**

- Thymosins

**(j) Atrium**

- Atrial Natriuretic factor

**(k) Kidney**

- Erythropoietin

**(l) G-I Tract**

- Gastrin
- Secretin
- Cholecystokinin (CCK)
- Gastric inhibitory peptide (GIP)

---

**4. Fill in the blanks:**

**Hormones Target gland**

**(a) Hypothalamic hormones** \_\_\_\_\_

- (b) Thyrotrophin (TSH) \_\_\_\_\_  
(c) Corticotrophin (ACTH) \_\_\_\_\_  
(d) Gonadotrophins (LH, FSH) \_\_\_\_\_  
(e) Melanotrophin (MSH) \_\_\_\_\_

**Ans. (a)** Pituitary gland

(b) Thyroid gland

(c) Adrenal gland

(d) Ovary, Testis

(e) Melanocyte

---

**5. Write short notes on the functions of the following hormones,**

(a) Parathyroid hormone (PTH)

(b) Thyroid hormones

(c) Thymosins

(d) Androgens

(e) Estrogens

(f) Insulin and Glucagon

**Ans. (a) Parathyroid hormone (PTH):** It is secreted by Parathyroid gland. It increases the  $\text{Ca}^{2+}$  levels in the blood. PTH promotes the reabsorption of calcium from nephrons and also, promotes the absorption of calcium from digested food. Thus, it plays an important role in calcium balance in the body.

**(b) Thyroid hormones:** Thyroid hormones play an important role in the regulation of the basal metabolic rate. These hormones also support the process of red blood cell formation. Thyroid hormones control the metabolism of carbohydrates, proteins and fats. Maintenance of water and electrolyte balance is also influenced by thyroid hormones. Thyroid gland also secretes a protein hormone called thyrocalcitonin (TCT) which regulates the blood calcium levels.

**(c) Thymosins:** It play a major role in the differentiation of T-lymphocytes, which provide cell-mediated immunity. It also promote production of antibodies to provide humoral immunity.

**(d) Androgens:** It regulate the development, maturation and functions of the male accessory sex organs like epididymis, vas deferens, seminal vesicles, prostate gland, urethra etc. Androgens mainly testosterone stimulate muscular growth, growth of facial and axillary

hair, aggressiveness, low pitch of voice etc. It stimulates spermatogenesis and formation of mature sperms and also influences male sexual behaviour.

**(e) Estrogens:** It produce wide ranging actions such as stimulation of growth and activities of female secondary sex organs, development of growing ovarian follicles, appearance of female secondary sex characters (e.g., high pitch of voice, etc.), mammary gland development. Estrogens also regulate female sexual behaviour.

**(f) Insulin and Glucagon:** These hormones are secreted by pancreas and helps in regulation of glucose level in body.

Insulin plays a major role in the regulation of glucose homeostasis. It acts mainly on hepatocytes and adipocytes (cells of adipose tissue), and enhances cellular glucose uptake and utilisation. It also stimulates conversion of glucose to glycogen (glycogenesis) in the target cells.

Glucagon plays an important role in maintaining the normal blood glucose levels. Glucagon acts mainly on the liver cells (hepatocytes) and stimulates glycogenolysis resulting in an increased blood sugar (hyperglycemia). It also stimulates the process of gluconeogenesis which also contributes to hyperglycemia.

---

**6. Give example(s) of:**

**(a) Hyperglycemic hormone and hypoglycemic hormone**

**(b) Hypercalcemic hormone**

**(c) Gonadotrophic hormones**

**(d) Progestational hormone**

**(e) Blood pressure lowering hormone**

**(f) Androgens and estrogens**

**Ans. (a)** Hyperglycemic hormone → Glucagon

hypoglycemic hormone → Insulin

**(b)** Hypercalcemic hormone → Parathyroid hormone (PTH)

**(c)** Gonadotrophic hormones → Luteinizing hormone and Follicle stimulating hormone

**(d)** Progestational hormone → Progesterone

**(e)** Blood pressure lowering hormone → Nor-adrenaline

**(f)** Androgens and estrogens → Testosterone

---

7. Which hormonal deficiency is responsible for the following:

(a) Diabetes mellitus

(b) Goitre

(c) Cretinism

Ans. (a) Diabetes mellitus → Insulin

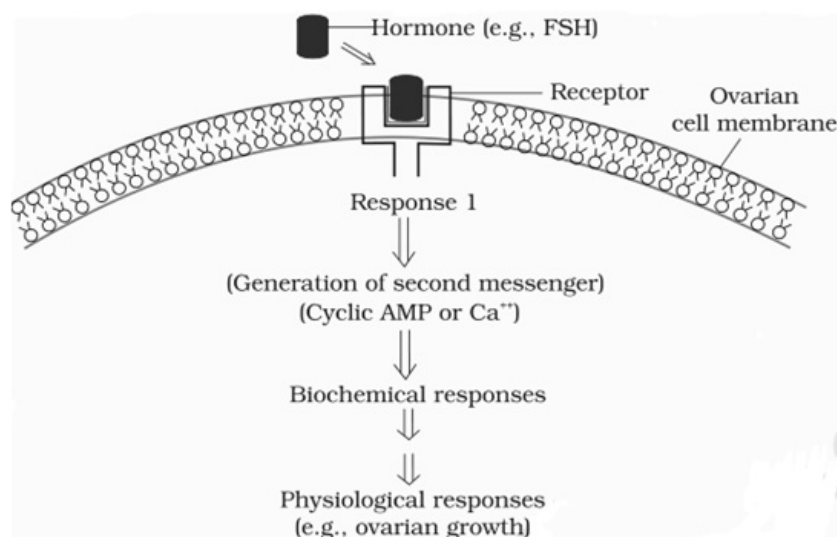
(b) Goitre → Thyroxin hormone

(c) Cretinism → Thyroxin hormone

8. Briefly mention the mechanism of action of FSH.

Ans. Follicle stimulating hormone (FSH) stimulates growth and development of the ovarian follicles in females.

FSH produces its effect by binding to its specific receptors present on the ovarian cell membrane. Binding of FSH hormone to its specific receptor present over the cell surface activates an enzyme called adenylate cyclase. This enzyme converts ATP into cyclicAMP. The cyclicAMP is called the second messenger and carries out various biochemical responses in the cell by activating the existing enzyme system in the cell. The biochemical responses then lead to physiological responses like ovarian growth.



9. Match the following:

Column I	Column II

(a) T4	(i) Hypothalamus
(b) PTH	(ii) Thyroid
(c) GnRH	(iii) Pituitary
(d) LH	(iv) Parathyroid

**Ans.**

Column I	Column II
(a) T4	(ii) Thyroid
(b) PTH	(iv) Parathyroid
(c) GnRH	(i) Hypothalamus
(d) LH	(iii) Pituitary