Exercises

Question 1:

Define the following:

(a) Exocrine gland **(b)** Endocrine gland **(c)** Hormone

Answer 1:

(a) Exocrine Glands

Glands that discharge secretions into ducts are known as exocrine glands. Sebaceous gland in the skin, salivary gland in the buccal cavity, etc. ectopic collections of sebaceous glands in oral cavity are called Fordyce granules are examples of exocrine glands.

(b) Endocrine Glands

Glands that do not discharge their secretions into ducts are known as endocrine glands. Instead, these glands discharge their secretions directly into the blood. Pituitary gland, thyroid gland, adrenal gland, etc. are examples of endocrine glands.

(c) Hormones

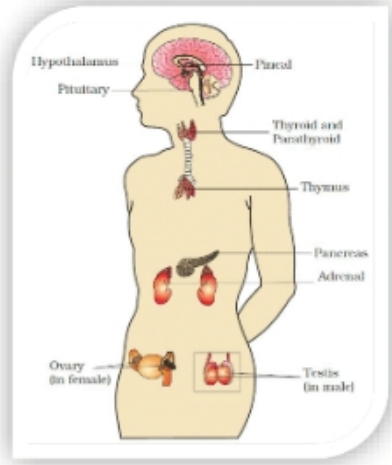
Hormones are chemical messengers that regulate physiological processes in living organisms. They act upon specific cells/tissues/organs which are called target cells/tissues/organs.

Question 2:

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

Answer 2:

The location of various endocrine glands in the human body can be illustrated as follows:



Question 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
(d) Transmission of a nerve impulse across a chemical synapse

Answer 3:

(a) Hypothalamus

Hormones secreted by the hypothalamus include Releasing Hormones. These hormones stimulate the secretions of the pituitary hormone. Examples of these hormones are:

- Gonadotrophin-releasing hormone
- Thyrotrophin-releasing hormone
- Somatotropin-releasing hormone
- Adrenocorticotrophin-releasing hormone

Inhibiting Hormones inhibit the secretions of the pituitary hormone. Examples of these hormones are:

- Somatostatin
- Growth-inhibiting hormone
- Melanocyte-inhibiting hormone

(b) Pituitary: The pituitary gland has two components i.e., adenohypophysis and neurohypophysis. Hormones secreted by the adenohypophysis are:

- Growth hormone (GH)
- Prolactin
- Thyroid-stimulating hormone (TSH)
- Adrenocorticotrophic hormone (ACTH)
- Luteinizing hormone (LH)
- Follicle-stimulating hormone (FSH)
- Melanocyte-stimulating hormone (MSH) Hormones secreted by the neurohypophysis are:
  - Oxytocin
  - Vasopressin

(c) Thyroid: The thyroid gland secretes 3 hormones namely, thyroxin, triiodothyronin and calcitonin (t3 t4)

(d) Parathyroid: Secretes a hormone known as parathyroid hormone.

(e) Adrenal: The adrenal gland is divided into 2 parts, the outer adrenal cortex and the inner adrenal medulla. Hormones of adrenal cortex include the following:

- Mineralocorticoids: Secreted is known as aldosterone.
- Glucocorticoids: secretes is cortisol.

Hormones of adrenal medulla are adrenaline and nor-adrenalin.
(f) Pancreas insulin and glucagon.
(g) Testis: testosterone.
(h) Ovary: estrogen and progesterone.
(i) Thymus: Hormones secreted by the thymus are thymosins.
(j) Atrium: The walls of the atrium secrete atrial natriuretic factor.
(k) Kidney: erythropoietin.
(l) G-I tract: Gastrin, secretin, cholecystokinin (CCK), and gastric inhibitory peptide (GIP).

Question 4:
Fill in the blanks:

Hormones	**Target gland**
(a) Hypothalamic hormones	_____
(b) Thyrotrophin (TSH)	_____
(c) Corticotrophin (ACTH)	_____
(d) Gonadotrophins (LH, FSH)	_____
(e) Melanotrophin (MSH)	_____

Answer 4:

Hormones	**Target gland**
(a) Hypothalamic hormones	Pituitary
(b) Thyrotrophin (TSH)	Thyroid
(c) Corticotrophin (ACTH)	Adrenal
(d) Gonadotrophins (LH, FSH)	Ovary, Testis
(e) Melanotrophin (MSH)	Melanocyte

Question 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

Answer 5:

(a) Parathyroid hormone (PTH)

Its main function is to increase the level of calcium in blood. It promotes the reabsorption of calcium from nephrons and also, promotes the absorption of calcium from digested food. Hence, it plays an important role in maintaining calcium balance in the body.

(b) Thyroid hormones

Thyroxine, triiodothyronin, and thyrocalcitonin are secreted by the thyroid gland. Thyroxine maintains the basal metabolic rate of the body and regulates the carbohydrate, fat, and protein metabolism. Water and electrolyte balance is also maintained by thyroid hormones. Thyrocalcitonin or calcitonin lowers calcium level in blood plasma. It plays a significant role in calcium levels along with parathyroid hormone.

(c) Thymosins

Thymosin is secreted by the thymus gland. Major role in immunity and also. Thymosins also help in the development of sex glands.

(d) Androgens

Testosterone is a male sex hormone that regulates the development of secondary sex characteristics such as facial hair, hoarse voice, development of reproductive organ, etc. Androgens also regulate the development, maturation, and functions of various male accessory organs such as epididymis and prostate glands. It stimulates spermatogenesis and formation of mature sperms. It also influences male sexual behaviour.

(e) Estrogens

Estrogen is the female sex hormone that controls the development of secondary sex characteristics such as enlargement of breasts and development of female reproductive organs. It plays a role in the development, growth and maturation of female secondary characteristics. It also helps in the development of growing ovarian follicles.

(f) Insulin and Glucagon

They regulate the blood glucose level in the body. α-cells secrete glucagon that maintain a normal blood glucose level in the body, whereas ÃŽÂ²-cells secrete insulin that regulates the storage of glycogen in the liver.

- Function of insulin (conversion of glucose to glycogen). The rapid conversion of glucose from the blood to glycogen in hepatocytes and adipocytes results into a decreased glucose level. Insulin also prevents the formation of glucose from non-carbohydrate substances such as proteins and fats. So, it acts as a regulator of carbohydrate metabolism.
- Function of glucagon - The main function of the glucagon is to increase the level of glucose when there is a deficiency of glucose in the body. This process is known as glycogenolysis.

Question 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

Answer 6:

(a) Hyperglycemic Hormone and Hypoglycemic Hormone
Hyperglycemic hormone is glucagon, while hypoglycemic hormone is insulin.
(b) Hypercalcemic Hormone
Parathyroid hormone (PTH) is hypercalcemic hormone.
(c) Gonadotrophi Chormones
Luteinizing hormone and follicle stimulating hormones are examples of gonadotrophic hormone.
(d) Progestational Hormone
Progesterone is a progestational hormone.
(e) Blood Pressure Lowering Hormone
Nor-adrenalin is a blood pressure lowering hormone.
(f) Androgens and Estrogens
Testosterone is an example of androgen, while an example of estrogen is estradiol.

Question 7:

Which hormonal deficiency is responsible for the following?
(a) Diabetes mellitus **(b)** Goitre **(c)** Cretinism

Answer 7:

(a) Diabetes mellitus
Diabetes mellitus is characterized by abnormally high glucose levels in the blood due to the deficiency of hormone, called insulin.

(b) Goitre
Goitre is characterised by an abnormal enlargement of the thyroid gland due to the deficiency of thyroxin hormone in the body.

(c) Cretinism
Cretinism is characterized by stunted growth in the baby due to the deficiency of thyroid hormone in the body.

Question 8:

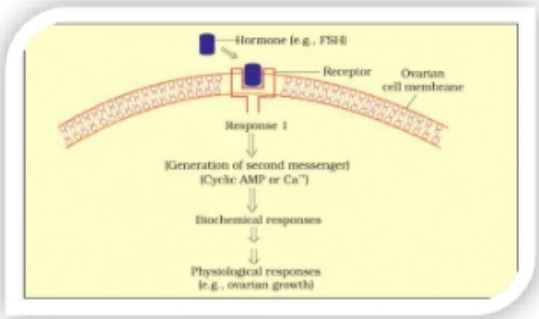
Briefly mention the mechanism of action of FSH.

Answer 8:

Follicle stimulating hormone (FSH) is secreted by the pars distalis region of the anterior pituitary. In the ovary, FSH stimulates the growth and maturation of ovarian follicle. As the follicle grows and matures, it releases an inhibitory hormone known as inhibin that ends the process of FSH production.

Action of FSH: Follicle stimulating hormone produces its effect by binding to its specific receptors present on the ovarian cell membrane.

Binding of FSH hormone to its receptor leads to the formation of hormone receptor complex. . The ovarian follicles mature and release a mature ovum in the fallopian tube for fertilization.



Question 9:

Match the following:

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

Answer 9:

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