CHEMICAL CONTROL AND COORDINATION PROBLEM SOLVING

IMP

Hypersecretion of growth hormone in adults does not cause further increase in height because

1. growth hormone becomes inactive in adults
2. epiphyseal plates close after adolescence
3. bones loose their sensitivity to growth hormone in adults
4. muscle fibres do not grow in size after birth

Which of the following is a temporary endocrine gland in the human body?

(a) pineal gland

(b) corpus cardiacum

(c) corpus Luteum → Progesterone

(d) corpus allatum

GnRH, a hypothalamic hormone, needed in reproduction, acts on

(a) anterior pituitary gland and stimulates secretion of LH and oxytocin

(b) anterior pituitary gland and stimulates secretion of LH and FSH

(c) posterior pituitary gland and stimulates secretion of oxytocin and FSH

(d) posterior pituitary gland and stimulates secretion of LH and relaxin

Name a peptide hormone which acts mainly on hepatocytes, adipocytes and enhances cellular glucose uptake and utilisation.

(a) Insulin

(b) Glucagon

(c) Secretin

(d) Gastrin

Graves disease is caused due to?

1. hyposecretion of thyroid gland → Cretinism, Myxoedema, simple goitre (Iodine def. in diet)
2. hypersecretion of thyroid gland
3. hyposecretion of adrenal gland
4. hypersecretion of adrenal gland

The posterior pituitary gland is not a 'true' endocrine gland because.

1. it is provided with a duct
2. it only stores and releases hormones
3. it is under the regulation of hypothalamus
4. it secretes enzymes

Changes in GnRH pulse frequency in females is controlled by circulating levels of:-

(a) estrogen and inhibin

(b) progesterone only

(c) progesterone and inhibin

(d) estrogen and progesterone

Which one of the following hormones is not involved in sugar metabolism?

(a) Cortisone } Zona fasciculata, increase blood glucose levels

(b) Aldosterone → Mineralocorticoid ~~→ maintain~~ the ionic balance of Na^+, K^+, Cl^- & H_2O in blood & ECF
→ Zona glomerulosa

(c) Insulin - β

(d) Glucagon - α

Which one of the following hormones though synthesised elsewhere, is stored and released by the master gland?

(a) Antidiuretic hormone

(b) Luteinzing hormone

(c) Prolactin

(d0 Melanocyte stimulating hormone

A chemical signal that has both endocrine and neural roles is

(1) melatonin

(2) calcitonin

(3) epinephrine

(4) cortisol

Select the answer which correctly matches the endocrine gland with the hormone it secretes and its function/deficiency symptom

Endocrine gland	Hormone	Function/deficiency symptoms
(a) Anterior pituitary	Oxytocin	Stimulates uterus contraction during child birth
(b) Posterior pituitary	Growth Hormone(GH)	Oversecretion stimulates abnormal growth
(c) Thyroid gland	Thyroxine	Lack of iodine in diet results in goitre
(d) Corpus Luteum	Testosterone	Stimulates spermatogenesis

Which one of the following pairs of hormones are the examples of those that can easily pass through the cell membrane of the target cell and bind to a receptor inside it (mostly in the nucleus)?

(a) Insulin and glucagon
(b) Thyroxin and insulin
(c) Somatostatin and oxytocin
(d) Cortisol and testosterone

lipid soluble hormones → Interact c⁻ intracellular receptors

(steroid hormones)

regulate gene expression on chromosome

function by the interaction of Hormone Receptor complex c⁻ the genome

Ans : D

Given ahead is an incomplete table about certain hormones, their source glands and one major effect of each on the body in humans. Identify the correct option for the three blanks A, B and C.

Gland	Secretion	Effect on body
A	Oestrogen	Maintenance of secondary sexual characters
Alpha cells of islets of Langerhans	B	Raises blood sugar level
Anterior pituitary	C	Over secretion leads to gigantism

Options :

	A	B	C
(a)	Placenta	Insulin	Vasopressin
(b)	Ovary	Insulin	Calcitonin
(c)	Placenta	Glucagon	Calcitonin
(d)	Ovary	Glucagon	Growth hormone

α- cells

What is correct to say about the hormone action in humans?

1. Glucagon is secreted by β-cells of islets of Langerhans and stimulates glycogenolysis ✗
2. Secretion of thymosine is stimulated with ageing. ✗
3. In females, FSH first binds with specific receptors on ovarian cell membrane
4. FSH stimulates the secretion of oestrogen and progesterone ✗

Mechanism of Hormone Actn. - V.V.VI MP

Match the source gland with its respective hormone as well as the function.

	Source gland	Hormone	Function
1.	Posterior pituitary	Vasopressin	Stimulates resorption of water in the distal tubules in nephron
2.	Corpus luteum	Oestrogen	Supports pregnancy
3.	Thyroid	Thyroxine	Regulates blood calcium level
4.	Anterior pituitary	Oxytocin	Contraction of uterus muscles during child birth

Post Pituitary

qqq

Endocrine glands are - Ductless glands, pour secretion directly into blood.

(A) Ductless glands whose secretions pour directly into blood .

(B) Have ducts and pour their secretions into blood directly

(C) Have ducts which straight away pour secretions into target organs

(D) All of the above

sss

Ans [A]

Endocrine glands are ductless glands of the endocrine system that secrete their products, hormones, directly into the blood. The major glands of the endocrine system include the pineal gland, pituitary gland, pancreas, ovaries, testes, thyroid gland, parathyroid gland, hypothalamus and adrenal glands.

qqq

Which of the following statements about hormones is I are correct?

I. Hormones are non-nutrient chemicals

II. Hormones act as intercellular messengers

III. Hormones are produced in trace amount

IV. Hormones may be proteins, steroids, glycoproteins and biogenic amines

(A) All

(B) I, II, III

(C) IV

(D) I, III

sss

Ans [A]

Hormones are non-nutrient chemicals which act as intercellular messengers and are produced in trace amounts.Hormones may be proteins, steroids, glycoproteins and biogenic amines

qqq

Which of the following statements is false?

(A) Hormones provide chemical coordination, integration and regulation in the human body

(B) Hormones regulate metabolism, growth and development of our organs

(C) Besides hypothalamus, pituitary, pineal, thyroid, adrenal, parathyroid, thymus, etc., GIT, heart, kidney, etc. also produce hormones.

(D) Hormone can be used again and again like biocatalyst

sss

Ans [D]

Hormones can’t be used again and again like enzymes as after reaction their chemical composition is changed.

Which of the following is not true for hormones?

A They are not available again after the process is over

B Hormones are directly poured into blood

C They induce or inhibit bio-chemical processes

D Each and every hormone of human is always chemically protein

Ans : D

Hormones are specifically acting organic compounds secreted by endocrine glands directly into the blood stream from where these are transported to the target organ. These can induce or. inhibit various biochemical processes and are not available again after the process is over. There are four main classes of hormones, ie, protein and polypeptide hormones, steroid hormones, monoamines and lipid based hormones.

qqq

Which of the following options is false?

(A) Invertebrates possess very simple endocrine systems with few hormones

(B) The hypothalamus is the upper part of diencephelon (part of fore-brain)

(C) The hypothalamus contains several groups of neurosecretory cells (nuclei) which produce hormones

(D) The hypothalamus produces releasing hormones, inhibiting hormones, oxytocin and vasopressin

- Prolactin release factor
- Prolactin Inhibitory factor

sss

Ans [B]

The hypothalamus is located below the thalamus (a part of the brain that relays sensory information) and is in the lower part of diencephalon.

qqq

Hormones have various regulating functions. Which of the following statements does not describe how hormones function?

(A) Hormones act in very low concentration

(B) Hormones act at sites distant from where they are produced

(C) Hormones are transported in blood

(D) None of the above

sss

Ans [D]

Hormones are non-nutrient chemicals which act as intercellular messengers and are produced in trace amounts.It is a chemical produced by endocrine glands and released into the blood and transported to a distantly located target organ.

qqq

Portal blood vessels connect the_____ to the _____–

(A) Hypothalamus, brain

(B) Hypothalamus, posterior pituitary

(C) Hypothalamus, anterior pituitary

(D) Anterior pituitary, posterior pituitary

sss

Ans [C]

The hypophyseal portal system is a system of blood vessels in the microcirculation at the base of the brain, connecting the hypothalamus with the anterior pituitary. Its main function is to quickly transport and exchange hormones between the hypothalamus arcuate nucleus and anterior pituitary gland.

qqq

Hormones released by the posterior pituitary (oxytocin and vasopressin) are produced in the-

(A) Anterior pituitary

(B) Hypothalamus

(C) Pineal

(D) Thymus

sss

Ans [B]

The posterior pituitary (or neurohypophysis) comprises the posterior lobe of the pituitary gland and is part of the endocrine system. Hormones known as posterior pituitary hormones are synthesized by the hypothalamus, and include oxytocin and antidiuretic hormone.

qqq

Pituitary gland is regulated by -

(A) Adrenals

(B) Pineal

(C) Thyroid gland

(D) Hypothalamus

sss

Ans [D]

The hormones of the pituitary gland help regulate the functions of other endocrine glands. The pituitary gland has two parts—the anterior lobe and posterior lobe—that have two very separate functions. The hypothalamus sends signals to the pituitary to release or inhibit pituitary hormone production

qqq

Which of the following options is false?

(A) The posterior pituitary is under the direct neural regulation of the hypothalamus

(B) Somatostatin from the hypothalamus inhibits the release of growth hormone (GH) from the anterior pituitary

(C) GnRH from the hypothalamus stimulates anterior pituitary to release gonadotrophins

(D) None of the above

sss

Ans [D]

Posterior pituatary is under direct control of hypothalamus. Somatostatin from hypothalamus inhibits release of growth hormone from anterior pituatary. Gnrh from hypothalamus stimulates anterior pituatary to release gonadotrophins.

Neurohypophysis also known as **posterior pituitary**, stores and releases two hormones called oxytocin and vasopressin which are actually synthesised by the **hypothalamus** and are transported axonally to neurohypophysis. Therefore, **the posterior pituitary is under the direct neural regulation of the hypothalamus**.

qqq

Which of the following options is correct?

(A) Posterior pituitary is connected to hypothalamus by nerve fibres

(B) Anterior pituitary is connected to hypothalamus by portal vessel

(C) Posterior pituitary is connected to hypothalamus by portal vessel

(D) Both a and b

sss

Ans [D]

The hypothalamus is connected to the anterior lobe of the pituitary gland by means of a special portal blood system. Moreover, the hypothalamus is directly connected to the posterior lobe of the pituitary gland by means of neurons.

qqq

The pituitary gland is located in a bony cavity called _____ and is attached to _____ by a stalk –

(A) Sella tursica, hypothalamus

(B) Sella tursica, cerebrum

(C) Sella tursica, thyroid

(D) Sella tursica, pineal

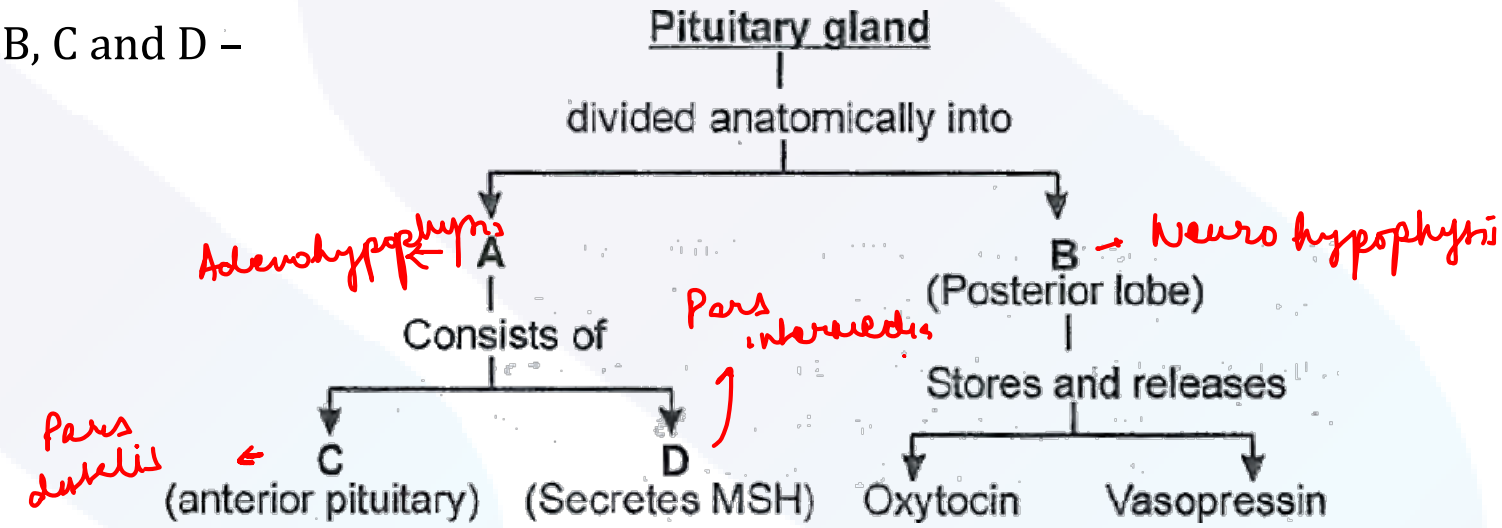
sss

Ans [A]

Pituitary gland is situated in sella turcica cavity of sphenoid bone and is connected to hypothalamus via infundibulum (stalk)

qqq

Identify A, B, C and D –



(A) A- Neurohypophysis, B -Adenohypophysis, C - Pars distalis, D - Pars intermedia

(B) A-Adenohypophysis, B - Neurohypophysis, C - Pars intermedia, D - Pars distalis

(C) A-Adenohypophysis, B - Neurohypophysis, C - Pars distalis, D - Pars intermedia

(D) A- Neurohypophysis, B - Adenohypophysis, C - Pars intermedia, D - Pars distalis

sss

Ans [C]

Pituitary gland is divided into anterior and posterior lobes. Anterior lobe is adenohypophysis that is further divided into pars distalis and pars intermedia.