BIOLOGY

NEET / AIIMS

CRASH COURSE

CHEMICAL COORDINATION AND INTEGRATION

SMART ACHIEVERS

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CHEMICAL COORDINATION AND INTEGRATION

1. There are special chemicals which act as hormones and provide chemical coordination, integration and regulation in the human body.
2. These hormones regulate metabolism, growth and development of our organs, the endocrine glands or certain cells.
3. The endocrine system is composed of hypothalamus, pituitary and pineal, thyroid, adrenal, pancreas, parathyroid, thymus and gonads (testis and ovary).
4. In addition to these, some other organs, e.g., gastrointestinal tract, kidney, heart etc., also produce hormones.
5. The pituitary gland is divided into three major parts, which are called as pars distalis, pars intermedia and pars nervosa.
6. Pars distalis produces six trophic hormones.
7. Pars intermedia secretes only one hormone, while pars nervosa (neurohypophysis) secretes two hormones.
8. The pituitary hormones regulate the growth and development of somatic tissues and activities of peripheral endocrine glands.
9. Pineal gland secretes melatonin, which plays a very important role in the regulation of 24-hour (diurnal) rhythms of our body (e.g., rhythms of sleep and state of being awake, body temperature, etc.).
10. The thyroid gland hormones play an important role in the regulation of the basal metabolic rate, development and maturation of the central neural system, erythropoiesis, metabolism of carbohydrates, proteins and fats, menstrual cycle.
11. Another thyroid hormone, i.e., thyrocalcitonin regulates calcium levels in our blood by decreasing it.
12. The parathyroid glands secrete parathyroid hormone (PTH) which increases the blood Ca2+ levels and plays a major role in calcium homeostasis.
13. The thymus gland secretes thymosins which play a major role in the differentiation of T-lymphocytes, which provide cell-mediated immunity.
14. In addition, thymosins also increase the production of antibodies to provide humoral immunity.
15. The adrenal gland is composed of the centrally located adrenal medulla and the outer adrenal cortex.
16. The adrenal medulla secretes epinephrine and norepinephrine.
17. These hormones increase alertness, pupilary dilation, piloerection, sweating, heart beat, strength of heart contraction, rate of respiration, glycogenolysis, lipolysis, proteolysis.
18. The adrenal cortex secretes glucocorticoids and mineralocorticoids.
19. Glucocorticoids stimulate gluconeogenesis, lipolysis, proteolysis, erythropoiesis, cardio-vascular system, blood pressure, and glomerular filtration rate and inhibit inflammatory reactions by suppressing the immune response.

20. Mineralocorticoids regulate water and electrolyte contents of the body.
21. The endocrine pancreas secretes glucagon and insulin.
22. Glucagon stimulates glycogenolysis and gluconeogenesis resulting in hyperglycemia.
23. Insulin stimulates cellular glucose uptake and utilisation, and glycogenesis resulting in hypoglycemia.
24. Insulin deficiency and/or insulin resistance result in a disease called diabetes mellitus.
25. The testis secretes androgens, which stimulate the development, maturation and functions of the male accessory sex organs, appearance of the male secondary sex characters, spermatogenesis, male sexual behaviour, anabolic pathways and erythropoiesis.
26. The ovary secretes estrogen and progesterone.
27. Estrogen stimulates growth and development of female accessory sex organs and secondary sex characters.
28. Progesterone plays a major role in the maintenance of pregnancy as well as in mammary gland development and lactation.
29. The atrial wall of the heart produces atrial natriuretic factor which decreases the blood pressure.
30. Kidney produces erythropoietin which stimulates erythropoiesis.
31. The gastrointestinal tract secretes gastrin, secretin, cholecystokinin and gastric inhibitory peptide.
32. These hormones regulate the secretion of digestive juices and help in digestion.

EXERCISE

Q.1 Endocrine glands are those which pour their secretions directly into
(1) Ducts (2) Blood (3) (1) and (2) both (4) None of these

Q.2 Who is the "Father of Endocrinology"
(1) Whittaker (2) Einthovin (3) Pasteur (4) Thomas Addison

Q.3 Which one of the following is not a gland
(1) Pancreas (2) Pituitary (3) Adrenal (4) Kidney

Q.4 What is hormone
(1) Glandular secretion (2) Enzyme
(3) Chemical messenger (4) Organic complex substance

Q.5 Hormones may be
(1) Amino acid derivatives (2) Peptides
(3) Steroids (4) All the above

Q.6 Action of the peptide hormone on a target cell is mediated by
(1) A cytoplasmic receptor (2) Cyclic AMP
(3) ATP (4) Epinephrine

Q.7 According to the accepted concept of hormone action, if receptor molecules are removed from target organs
(1) The target organ will continue to respond to the hormone without any difference
(2) The target organ will continue to respond to the hormone but will require higher concentration
(3) The target organ will not respond to the hormone
(4) The target organ will continue to respond to the hormone but in the opposite way

Q.8 Vasopressin is concerned with
(1) General metabolism (2) Regulation of heart beat
(3) Urine formation (4) Child birth

Q.9 Inadequate production of STH in early life may result in
(1) Gigantism (2) Acromegaly (3) Sterility (4) Dwarfism

Q.10 The posterior lobe of the pituitary is
(1) Glandular (2) Neural (3) Ganglionic (4) Vascular

Q.11 The other name of anterior pituitary is
(1) Neurohypophysis (2) Pars tuberalis (3) Pars intermedia (4) Adenohypophysis

Q.12 Neurohypophysis secretes the
(1) Vasopressin and ACTH (2) ADH and pitocin
(3) Pitressin and ACTH (4) Oxytocin and LTH

Q.13 The process of spermatogenesis and sperm formation is under the regulatory influence of
(1) FSH (2) ADH (3) LH (4) LTH

Q.14 Hypersecretion of growth hormone by pituitary results in
(1) Dwarfism (2) Gigantism (3) Cretinism (4) Myxoedema

Q.15 Adrenocorticotropin is a hormone of
(1) Pituitary (2) Adrenal (3) Thyroid (4) Adrenal medulla

Q.16 Which of the following pituitary hormone is a direct action hormone
(1) MSH (2) ICSH (3) ACTH (4) TSH

Q.17 If there is deficiency of ADH (antidiuretic hormone), its effect would be
(1) The volume of urine will increase (2) The volume of urine will decrease
(3) The pH of urine will change from 4.8 to 8.0 (4) Secretion of urochrome will take place

Q.18 Pituitary gland is found in
(1) Brain (2) Trachea (3) Gonads (4) Pancreas

Q.19 Contraction of the uterus, increase in arterial pressure and reduction in urine output are produced by
(1) Oxytocin and ACTH (2) Vasopressin and TSH
(3) ADH and ACTH (4) Oxytocin and vasopressin

Q.20 Diabetes incipidus is under the control of
(1) Aldosterone (2) ADH (3) ACTH (4) TSH

Q.21 Somatostatin is secreted by
(1) Hypothalamus (2) Pituitary (3) Pineal (4) Thyroid

Q.22 Thyrotropin-Releasing Factor (TRF) is produced by
(1) Cerebrum (2) Optic lobe (3) Cerebellum (4) Hypothalamus

Q.23 The source of somatostatin is same as that of
(1) Thyroxine and calcitonin (2) Insulin and glucagon
(3) Somatotropin and prolactin (4) Vasopresin and oxytocin

Q.24 In a pregnant woman having prolonged labour pains, if child birth has to be hastened i.e to aid parturition, it is advisable to administer a hormone that can
(1) Activate the smooth muscles (2) Increase the metabolic rate
(3) Release glucose into the blood (4) Stimulate the ovary

Q.25 Which hormone stimulates the secretion of milk during sucking of milk by baby
(1) Oxytocin (2) Relaxin (3) Prolactin (4) Progesteron

Q.26 High increase in oxytocin level in a pregnant lady results in
(1) Increased synthesis of milk (2) Decrease is haemoglobin %
(3) Abortion (4) High blood pressure

Q.27 Diabetes is due to
(1) Na+ deficiency (2) Hormonal deficiency
(3) Enzyme deficiency (4) Iodine deficiency

Q.28 An overdose of intravenous insulin may lead to the death of an individual due to
(1) An excessive increase of blood glucose (2) An excessive decrease of blood glucose
(3) An inhibition of glucagon secretion (4) An over production of histamine

Q.29 Diabetes mellitus is caused due to the deficiency of insulin which is secreted by
(1) Alpha cells (2) Beta cells (3) Pituitary (4) Thyroid

Q.30 The hormone glucagon
(1) Has the opposite effect as that of insulin (2) Is produced in the beta cells of pancreas
(3) Converts glucose into glycogen (4) Is used in the treatment of diabetes mellitus

Q.31 A disease characterised by raised levels of blood glucose as well as increased fat and protein metabolism is
(1) Diabetes (2) Cancer (3) Ulcer (4) Enlargement of pancreas

Q.32 Hormone involved in the discharge of pancreatic juice in mammals is
(1) Secretin (2) Gastrin (3) Cholecystokinin (4) Enterogasterone

Q.33 Which hormone has the anti-insulin effect
(1) Calcitonin (2) Cortisol (3) Oxytocin (4) Aldosterone

Q.34 Beta and alpha cells secrete the following hormones in respective order
(1) Insulin and glucagon (2) Glucagon and insulin
(3) Testosterone and progesterone (4) Adrenaline and nor–adrenaline

Q.35 Pancreas secretes
(1) Digestive enzymes (2) Insulin (3) Glucagon (4) All the above

Q.36 Somatostatin hormone is secreted by
(1) α - cells (2) β - cells (3) δ cells (4) All the above

Q.37 Similarity between the secretion of thyroid and adrenal is that both the secretions
(1) Are proteins (2) Are steroid
(3) Increase glucose metabolism (4) Control mineral metabolism

Q.38 Disease caused by deficiency of iodine is
(1) Goitre (2) Myxodema (3) Cretinism (4) Tetany

Q.39 Which disease is caused by the deficiency of thyroxin in the adults
(1) Diabetes insipidus (2) Diabetes mellitus (3) Myxoedema (4) Exopthalmic goitre

Q.40 Cretinism is due to
(1) Excess growth hormone (2) Absence of insulin
(3) Excess adrenaline (4) Hyposecretion of thyroid in childhood (Thyroxin)

Q.41 'Exophthalmic goitre' (Grave's disease) is caused due to
(1) Hypofunction of the thyroid (2) Hyperfunction of the thyroid
(3) Hypofunction of the parathyroid (4) Hyperfunction of the parathyroid

Q.42 Substance responsible for metamorphosis
(1) Estrogen (2) Thyroxine (3) Propandiol (4) Glucagon

Q.43 Metamorphosis can be accelerated by
(1) I2 (2) P (3) K (4) Ca

Q.44 Hypothyroidism has one of the following features
(1) Weight loss
(2) Increased metabolic rate
(3) Accumulation of albumin protein and polysaccharides below skin
(4) Irritability

Q.45 High incidence of goitre is seen in the mountaineous region because of
(1) Deficiency of iodine in water (2) Deficiency of iodine in food
(3) Presence of antagonistic agents (4) (1) and (2) both

Q.46 When the thyroid secretion is too much, the gland itself gets enlarged, conversely, if the secretion is too little, the gland gets
(1) Enlarged (2) Reduced (3) Disappeared (4) None of above

Q.47 The other name for autoimmune thyroiditis is
(1) Addison's disease (2) Simmond's disease
(3) Hashimoto's disease (4) Cushing's disease

Q.48 Hypoparathyroidism results to
(1) Upset in metabolism (2) Improper gonodial function
(3) Convulsions and tetany (4) Nervousness and wasting

Q.49 Parathormone induces
(1) Increase in serum calcium level (2) Decrease in serum potassium level
(3) Increase in blood sugar level (4) Decrease in blood sugar level

Q.50 Which of the following two hormones have antagonistic effects
(1) Parathormone and calcitonin (2) FSH and LH
(3) Oestrogen and progesterone (4) ADH and melatonin

Q.51 Insulin increases glucose uptake in all the following structures except
(1) Cardiac muscle (2) Skeletal muscle (3) Adipose tissue (4) Intestinal mucosa

Q.52 Parathormone is secreted during
(1) Increased blood calcium level (2) Decreased blood calcium level
(3) Increased blood sugar level (4) Decreased blood sugar level

Q.53 Which one affects liver, muscle and adipose tissue
(1) Androgen (2) Insulin (3) Progesterone (4) Glucagon

Q.54 The secretion of aldosterone by adrenal cortex is directly controlled by
(1) Blood Plasma K^+ ion concentration (2) Plasma Ca^{2+} ion concentration
(3) Level of blood angiotensin (4) (1) and (3) are correct

Q.55 The mineralocorticoid hormone of the adrenal cortex which causes the Na retention and K excretion is
(1) Corticosol (2) Corticosterone (3) Progesterone (4) Aldosterone

Q.56 Cushing's syndrome and myxoedema are associated with these glands respectively
(1) Thyroid, adrenal (2) Adrenal, thyroid (3) Parathyroid, thyroid (4) Adrenal, pituitary

Q.57 Blood pressure is controlled by
(1) Adrenal (2) Thyroid (3) Thymus (4) Corpus luteum

Q.58 The functioning of adrenal medulla gland is similar to those of nerves because
(1) Adrenal medulla and nervous system are derived from embryonic mesoderm
(2) Adrenal medulla and nerves secrete similar chemicals such as adrenaline and nor-adrenaline
(3) Adrenal medulla does not secrete any hormone
(4) Adrenal medulla is made up of nervous tissue

Q.59 When a normal man's heart is injected with physiological concentration of adrenaline it causes
(1) Decreased rate (2) Systolic arrest
(3) Sustained increased rate (4) First increased rate then normal rate

Q.60 According to one of the theory of ageing, the decline and disappearance of which gland by late middle age is the primary cause of ageing
(1) Parathyroid (2) Thyroid (3) Thymus (4) Posterior lobe of pituitary

Q.61 According to recent knowledge, the pineal body is considered as
(1) A vestigial organ (2) An organ of intelligence
(3) An endocrine gland (4) An organ of involuntary action

Q.62 Daily rythms are usually associated with
(1) Pineal (2) Pituitary (3) Thymus (4) Hypothalamus

Q.63 Continued secretion of milk is maintained by
(1) Prolactin (2) Progesterone (3) Estrogen (4) Relaxin

Q.64 Progesterone is
(1) An enzyme for digesting proteins
(2) A hormone to initiate uterine contraction during child birth
(3) An amino acid which may cause alcaptonuria
(4) A hormone concerned with retention and growth of pregnancy

Q.65 All the hormone are proteins, peptides and amino acid derivatives except
(1) Hormone of ovary (2) Thyroid hormone
(3) Parathyroid hormone (4) Pancreatic hormone

Q.66 Which one of the following is temporary endocrine gland
(1) Pineal (2) Pancreas (3) Placenta (4) Parathyroid

Q.67 Pregnancy hormone is
(1) Oestrogen (2) Androgen (3) Progesterone (4) Gestron

Q.68 "Pheromones" in insects are secreted from
(1) Endocrine glands (2) Exocrine glands (3) Corpus allata (4) Digestive tract

Q.69 Pheromone is -
(1) A product of endocrine gland (2) Used for animal communication
(3) Messenger RNA (4) Always protein

AIIMS Special

Instructions for following questions (Q.70 to Q.84).

(1) If both Assertion & Reason are true and the reason is the correct explanation of the assertion, then mark (1).
(2) If both Assertion & Reason are true but the reason is not the correct explanation of the assertion, then mark (2).
(3) If Assertion is true statement but Reason is false, then mark (3).
(4) If both Assertion and Reason are false statements, then mark (4).

Q.70 **Assertion :** Diabetes insipidus is marked by excessive urination and too much thirst for water.
Reason : Anti diuretic hormone (ADH) is released by posterior lobe of pituitary gland.

Q.71 **Assertion :** Insulin is not given orally.
Reason : Insulin hormone is lipid soluble and directly enters inside the cell membrane.

Q.72 **Assertion :** Chorionic gonadotrophin prevents the corpus luteum from involuting.
Reason : It has property similar to luteinizing hormone.

Q.73 **Assertion :** Thyroxine shows calorigenic effect.
Reason : Thyroxine increases catabolism, produces energy and increases body temperature.

Q.74 **Assertion :** Inhibin is secreted by the corpus luteum.
Reason : They inhibit the FSH and GnRH production.

Q.75 **Assertion :** Adrenal gland have dual origin.
Reason : The adrenal cortex develop from endoderm while adrenal medulla develop from mesoderm.

Q.76 **Assertion :** Vasopressin in also called as antidiuretic hormone
Reason : Vasopressin reduces the loss of water in the urine by increasing water reabsorption in the nephrons.

Q.77 **Assertion :** Oxytocin is also known as Anti Diuretic hormone (ADH).
Reason : Oxytocin can cause an increase in the renal reabsorption of water.

Q.78 **Assertion :** Failure of secretion of hormone vasopressin causes diabetes mellitus in the patient.
Reason : Vasopressin reduces the volume of urine by increasing the reabsorption of water from the urine.

Q.79 **Assertion :** Adrenal cortex is called the gland for 'fight, fright and flight'.
Reason : The hormones adrenaline and noradrenaline help the body to combat against stress and emergency conditions.

Q.80 **Assertion :** Hormones are also called chemical messengers or information molecules.
Reason : These carry the message of target cells to the endocrine glands.

Q.81 **Assertion :** Metamorphosis of tadpole larva occurs in presence of thyroxine hormone.
Reason : A thyroidless tadpole larva just increases in size and fails to metamorphosize.

Q.82 **Assertion :** Goitre is very less reported in the persons near the coastal areas.
Reason : Iodine is abundantly present in the sea water.

Q.83 **Assertion :** Pancreas is a purely endocrine gland.
Reason : It is totally endocrine and secretes only hormones.

Q.84 **Assertion :** FSH is a gonadotrophic and gametokinetic hormone.
Reason : FSH controls gametogenesis in both testes and ovaries.

ANSWER KEY

Q.1	2	Q.2	4	Q.3	4	Q.4	3	Q.5	4	Q.6	2	Q.7	3
Q.8	3	Q.9	4	Q.10	2	Q.11	4	Q.12	2	Q.13	1	Q.14	2
Q.15	1	Q.16	1	Q.17	1	Q.18	1	Q.19	4	Q.20	2	Q.21	1
Q.22	4	Q.23	2	Q.24	1	Q.25	1	Q.26	3	Q.27	2	Q.28	2
Q.29	2	Q.30	1	Q.31	1	Q.32	1	Q.33	2	Q.34	1	Q.35	4
Q.36	3	Q.37	3	Q.38	1	Q.39	3	Q.40	4	Q.41	2	Q.42	2
Q.43	1	Q.44	4	Q.45	4	Q.46	1	Q.47	3	Q.48	3	Q.49	1
Q.50	1	Q.51	4	Q.52	2	Q.53	2	Q.54	1	Q.55	4	Q.56	2
Q.57	1	Q.58	2	Q.59	4	Q.60	3	Q.61	3	Q.62	1	Q.63	1
Q.64	4	Q.65	1	Q.66	3	Q.67	3	Q.68	2	Q.69	2	Q.70	2
Q.71	3	Q.72	1	Q.73	1	Q.74	2	Q.75	3	Q.76	1	Q.77	4
Q.78	4	Q.79	4	Q.80	3	Q.81	3	Q.82	3	Q.83	4	Q.84	1