

TO THE GLORY AND HONOUR OF GOD

ENDOCRINE PHYSIOLOGY SAQS AND MCQS FOR LEVEL 2 MBCHB, BDS AND PHARMACY

1. Draw a diagram to illustrate at cellular level, the mechanism of action of the thyroid hormones.
2. Describe the mechanism of the physiological role of oxytocin.
3. List the main physiological functions where oestrogen hormone is involved.
4. Describe the hormonal control of cardiac output.
5. Describe the pattern of release of adrenocorticotrophic hormone (ACTH) and list its effects on the adrenal cortex.
6. List the actions of insulin in glucose regulation.
7. Describe the control of blood glucose.
8. Explain the renal actions of calcitonin.
9. With the aid of a diagram, describe the mechanism of steroids.
10. Describe the mechanism of regulation of the physiological action of oxytocin.
11. List the physiological function of cortisol.
12. List the physiological function of calcitriol(1,25DHCC)
13. Describe the possible causes of adrenal hypersecretion of androgens.
14. Briefly describe heat exhaustion and its effects.
15. Briefly explain five abnormalities of thermoregulation.
16. Describe the role of five hormones involved in human lactation.
17. In table form, show factors that stimulate and those that inhibit growth hormone secretion.
18. Briefly describe how hypothalamus regulates feeding.
19. Describe the synthesis of thyroid hormones
20. Describe the factors that stimulate and inhibit the following hormones;
 - a. ACTH
 - b. Cortisol
 - c. Aldosterone
21. Outline seven functions of Sertoli cells

TO THE GLORY AND HONOUR OF GOD

22. Compare and contrast oogenesis spermatogenesis
23. Describe the placenta as an endocrine organ
24. Describe the endocrine changes which take place in pregnancy
25. Describe the effects of cortisol on the body

MCQS SECTION

1. Regarding the endocrine pancreas;
 - A. The beta cells produce insulin and amylin.
 - B. Alpha cells constitute about 25% of the islet cell mass.
 - C. Pancreatic Polypeptide is produced by the F cells.
 - D. Somatostatin produced by the alpha cells inhibits Growth Hormone synthesis.
 - E. Delta cells produce Insulin like Growth Factors.

2. The following statements regarding the actions of hormones produced by the endocrine pancreas are true;
 - A. Insulin inhibits glucagon secretion.
 - B. Amylin stimulates insulin secretion.
 - C. Somatostatin inhibits the secretion of both insulin and glucagon.
 - D. Glucagon stimulates insulin secretion.
 - E. Insulin stimulates

3. Concerning the structure and chemistry of insulin;
 - A. Pro-insulin is composed of three amino acid chains.
 - B. Formation of insulin from pro-insulin occurs in the Golgi apparatus.
 - C. Insulin circulates in blood bound to protein.
 - D. Insulin has a half-life of 6 – 15 hrs in circulation.
 - E. Insulin is removed from circulation by the action of the enzyme insulinase.

4. The effects of insulin on carbohydrate metabolism include;
 - A. Insulin increases the rate of glucose transport into the resting muscle.
 - B. Insulin activates liver glycogenesis.
 - C. Insulin stimulates the activity of the enzyme glucokinase which “traps” glucose in the hepatocyte.
 - D. Insulin inhibits the enzyme glucose phosphatase.

TO THE GLORY AND HONOUR OF GOD

- E. Insulin promotes conversion of excess glucose into fatty acids.
5. Regarding The effects of Insulin on Fat metabolism
- A. Insulin is a “fat sparer”.
 - B. Insulin inhibits hormone sensitive lipase.
 - C. Insulin deficiency will result in increased serum free fatty acids.
 - D. Insulin deficiency results in increased ketone bodies in circulation.
 - E. Insulin increases the levels of plasma cholesterol and phospholipids.
6. The effects of insulin on protein metabolism include;
- A. Insulin increases tissue uptake of amino acids.
 - B. In the absence of insulin the ribosomal translation machinery is activated.
 - C. Insulin decreases the rate of amino acid release from tissues.
 - D. Insulin stimulates the use of amino acids for gluconeogenesis.
 - E. Insulin deficiency results in excessive plasma amino acid levels.
7. The following are insulin secretagogues.
- A. Arginine.
 - B. Exercise.
 - C. Glucagon.
 - D. Secretin
 - E. Fasting
8. Concerning glucagon.
- A. It produces a profound hypoglycemic effect on injection.
 - B. It promotes glycogenesis.
 - C. It enhances gluconeogenesis.
 - D. It activates the adenylyl cyclase mechanism.
 - E. It increases serum free fatty acid levels.
9. The following are features of diabetes mellitus;
- A. Glycosuria.
 - B. Intracellular dehydration.
 - C. Polyphagia
 - D. Weight loss.
 - E. Ketosis.
10. Concerning Calcium in plasma;

TO THE GLORY AND HONOUR OF GOD

- A. 40% of calcium is bound to protein in plasma.
- B. Ionized calcium accounts for 10% of all calcium in blood.
- C. Ionized accounts for 50% of total body calcium.
- D. Inorganic phosphates decrease levels of calcium that are protein bound.
- E. Ionized calcium is in a steady equilibrium with protein bound calcium.

11. Adrenocorticotrophic Hormone (ACTH) secretagogues include;

- A. Somatomedins
- B. Trauma
- C. Fluid loss e.g. dehydration
- D. Low serum cortisol
- E. Low serum aldosterone

12. Growth hormone

- A. Is closely related to prolactin, ACTH and insulin in structure
- B. It is 90% protein bound giving it a long half life.
- C. Its receptors that are described as serpentine and G protein linked
- D. Activates receptors of the JAK 2 =- STAT pathway
- E. Produces positive nitrogen and phosphorus balance and a fall in BUN and amino acid level.

13. The peptide hormones of the anterior pituitary

- A. Have a short half-life of approximately 20 minutes
- B. Act through serpentine receptors on the cell membrane of target cells
- C. Act as transcription factors at receptor sites
- D. Do not have their production markedly increased in Panhypopituitarism
- E. Are all single chain polypeptides.

14. Thyroid stimulating hormone

- A. Increases uptake of iodine by thyroid gland
- B. Decreases rate of formation of thyroglobulin
- C. Increases heat production.
- D. Induces hypertrophy and hyperplasia of thyroid cells
- E. Levels are increased in Graves' disease.

15. Regarding the adrenal glands

TO THE GLORY AND HONOUR OF GOD

- A. Secretion from the adrenal medulla is regulated by angiotensin II
- B. Epinephrine in man, is normally secreted from nerves endings
- C. In plasma 90% of dopamine is found in its inactive form
- D. The methylation of epinephrine gives rise to norepinephrine
- E. Epinephrine containing cells also contain opioid peptides

16. Parathyroid hormone

- A. Is produced by the Chief cells of the thyroid gland
- B. Stimulates renal 24, 25 hydroxylase.
- C. Raises the serum phosphate level
- D. Activates the osteoblasts directly.
- E. Increases calcium excretion by the kidneys.

17. Concerning the thyroid hormones

- A. They are net catabolic
- B. Excessive T_3 results in upregulation of B_1 receptors in cardiac myocytes
- C. 5' 3' deiodinase is essential for central (pituitary) conversion of T_4 to T_3
- D. Iodine deficiency results in a toxic nodular goiter
- E. They have half lives of about 0.5 to 7 hours.

18. Concerning growth hormone

- A. It is stimulated by testosterone and estrogen
- B. It results in linear but not cortical bone growth
- C. Obese individuals have increased levels
- D. Long term starvation and fasting decrease its levels
- E. It causes increased production of free fatty acids.

19. The following are true regarding the hormone cortisol

- A. It increases production of liver proteins and enzymes
- B. Enhances glycogenolysis.
- C. Enhances glucose utilization by muscle tissue
- D. It results in decreased free fatty acids and triglycerides in circulation
- E. Excess production can cause fluid sodium depletion.

TO THE GLORY AND HONOUR OF GOD

20. 21-hydroxylase deficiency;

- A. It is the commonest cause of congenital adrenal hyperplasia.
- B. Results in hypotension.
- C. Results in intolerance to fasting.
- D. Causes female Virilization
- E. Causes excess loss of sodium in urine.

21. Features of congenital hypothyroidism include;

- A. Sensori-neural deafness.
- B. Diarrhea.
- C. Early bone ossification.
- D. Delayed secondary sexual characteristics
- E. All the above

22. Concerning Thyroid Binding Proteins;

- A. Estrogens stimulate their synthesis.
- B. Albumin binds the largest amounts of T_3 and T_4 .
- C. They bind 99.98% of T_4 and 99.8% of T_3
- D. Transthyretin has the greatest affinity for thyroid hormones.
- E. Thyroid binding globulin is produced by the follicular cells of the thyroid gland.

23. Aldosterone.

- A. Its receptor – ligand complex functions as a transcription factor in target cells.
- B. It has cortisol –like effects in high concentrations.
- C. When produced by an adrenal cortex adenoma results in Conn's syndrome.
- D. Combines with a highly specific plasma membrane receptor to mediate final Effects
- E. Combines with a nuclear receptor.

24. Concerning adrenal pathophysiology

- A. Cushing's syndrome results in hyperpigmentation.
- B. There is sodium retention in Cushing's syndrome.
- C. Addison's disease results in Hypokalemia.
- D. Addison's disease results in hyperglycemia and glycosuria.
- E. 17 hydroxylase deficiencies will result in Virilization in females.

25. Regarding insulin like growth factors;

TO THE GLORY AND HONOUR OF GOD

- A. They are have a longer half life than growth hormone
- B. They are highly protein bound
- C. Deficiency causes Achondroplastic Dwarfism.
- D. The receptors have two alpha and two beta sub-units.
- E. They inhibit synthesis of somatotropin's mRNA.

26. The following are effects of thyroid hormones;

- A. Promotion of Na^+ efflux from cells through action on Na^+/K^+ ATPase expression.
- B. Opposing the effects of Growth Hormone on bone.
- C. Support the effects of estrogen on epiphyseal centers in long bones
- D. Increasing oxygen consumption by the brain.
- E. Promote the effects of insulin on fat metabolism.

27. The following stimulate the release of a hormone from the posterior pituitary.

- A. Surgery.
- B. Cigarette smoking (nicotine).
- C. Fasting.
- D. Exercise.
- E. Hyperosmolarity.

28. The following will stimulate parathyroid hormone synthesis.

- A. High levels of Vitamin D.
- B. Low levels of phosphate.
- C. Low levels of ionized calcium.
- D. Acidosis.
- E. Alkalosis.

29. The effects of hypercalcemia include;

- A. Hyper-reflexia.
- B. Lethargy and coma.
- C. Hypercalciuria.
- D. Hyperphosphatemia.
- E. Tingling and Numbness.

30. Which of the following statements are true?

TO THE GLORY AND HONOUR OF GOD

- A. ACTH causes glycogenolysis through an effect on liver cells.
- B. Glucagon increases gluconeogenesis
- C. Pancreatic F cells produce amylin and pancreatic polypeptide.
- D. Primary hypothyroidism is associated with increased plasma levels of iodide.
- E. Hashimotos Thyroiditis is due to antibodies against TSH.