Disorders of carbohydrate metabolism

1. **Point the main reactions that lead to hyperglycemia during decreased production of insulin.**
    1. Activation of glycolysis
    2. Activation of glycogenolysis
    3. Activation of gluconeogenesis
    4. Decrease in lipogenesis
    5. Decrease in entrance of glucose in insulin dependent tissues
2. **Point the main reactions that can lead to hypoglycemia during increased production of insulin.**
    1. Activation of glycolysis
    2. Activation of glycogenesis
    3. Activation of gluconeogenesis
    4. Decrease in lipogenesis
    5. Increase in entrance of glucose in insulin dependent tissues
3. **Which of the following statements about metabolic actions of insulin are true?**
    1. Its activates gluconeogenesis
    2. Its activates glycolysis
    3. Its inhibits the breakdown of glycogen
    4. Its inhibits the proteins glycosylation
    5. Its activates lipogenesis
    6. Its inhibits the proteolysis
4. **Which of the following statements about counterregulatory hormone – the epinephrine are true?**
    1. Its activates gluconeogenesis
    2. Its activates synthesis of glycogen
    3. Its inhibits the proteins glycosylation
    4. Its activates lipolysis
    5. Its activates glycolysis
5. **Point the clinical signs and symptoms of hypoglycemia.**
    1. Appearance of a hunger
    2. Acetone odor from the mouth
    3. Tremor in hands
    4. Weakness
    5. Sweating
    6. Anxiety, confusion
6. **Point the pathogenetic factors of hyperosmolar coma.**
    1. Hyperosmolality in extracellular department
    2. Cellular hyperhydration
    3. Uncompensated ketoacidosis
    4. Profound hyperglycemia
    5. Hypovolemia
    6. Increased level of glycated HbA
7. **Which of the following signs and symptoms about ketoaciditic diabetic coma are true.**
    1. Blood glucose levels reaching an average about 50-100 mmol/l
    2. Plasma osmolality – about 300 mosmol/l
    3. Confusion
    4. Acetone odor from the mouth
    5. Kussmaul breathing
    6. Nausea, vomiting
8. **Which of the following signs and symptoms about hyperosmolar diabetic coma are true.**
    1. Blood glucose levels reaching an average about 50-100 mmol/l
    2. Plasma osmolality – about 300 mosmol/l
    3. Increased level of glycated HbA
    4. Confusion
    5. Hypovolemia
    6. Ketonemia
9. **Point the metabolic derangements and their consequences due to insulin deficiency.**
    1. Activation of gluconeogenesis
    2. Activation of glycogenolysis
    3. Hyperglycemia
    4. Decreased synthesis of glycogen in the liver
    5. Polyuria
    6. Stimulation of glucose uptake in fat
10. **The polyuria at diabetes mellitus occurs as a result of:**
    1. Hyperglycemia - glucose levels reaching an average about 10 mmol/l
    2. Hyperglycemia - glucose levels reaching an average about 7 mmol/l
    3. Ketonemia
    4. Retinophaty
11. **Point the main derangements in the protein metabolism and their consequences due to insulin deficiency.**
    1. Increased urea content in the blood and negative nitrogen balance
    2. Increased active transport of amino acids into body cells
    3. Decreased breakdown of proteins
    4. Decreased resistance of an organism
    5. Weakening of reparative processes in an organism
    6. Aminoaciduria

12. Point the main derangements in the lipid metabolism and their consequences due to insulin deficiency.

1. Increased contents of atherogenic lipoproteins (VLDL, LDL)
2. Increased contents of FFA in the blood
3. Increased synthesis of triglycerides from FFA
4. Activation of lipolysis
5. Increased synthesis of ketone bodies

13. Point the main derangements in the water-electrolyte metabolism and their consequences due to insulin deficiency.

1. Decreased Na content in the blood
2. Cell dehydration
3. Thirst
4. Metabolic alkalosis
5. Increased osmolality in the blood
6. Polyuria (osmotic diuresis)

14. The insulin resistance can occur as a result of:

1. Activation of the insulinase
2. Synthesis of biologically uneffective (ineff, effectloss) insulin
3. Synthesis of autoantibodies to the insulin receptor
4. Increased affinity to the insulin receptors
5. Reduce levels of active intermediates in the insulin signaling pathway

15. Which of the characteristics listed below are typical for the carbohydrates disorders at insulin deficiency:

1. Activation of glycogenesis
2. Activation of proteins glycosylation
3. Activation of glucose phosphorylation
4. Decreased synthesis 0f glycogen from lactate
5. Increased synthesis and accumulation of the sorbitol in the tissues

16. The polyuria can develops during:

1. DM
2. Lack of vasopressin action (diabetes insipidus)
3. Retinophaty with failure in function of proximal tubules
4. Blood glucose level average about 4-5 mmol/l

17. The hyperglycemia can develop due to:

1. Deficiency of insulin
2. Deficiency of glucocorticoids (cortisol)
3. Insulin resistance
4. Excess of glucagon

18. The diabetic ketoacidosis occurs as a result of:

1. Activation of lipolysis
2. Activation of NADP-H resynthesis
3. Increased transport of FFA into the liver
4. Decreased lipogenesis
5. Increased FFA oxidation in the liver
6. Increased ketone production by the liver due to inhibition of Krebs cycle

19. The chronic complications of DM are:

1. Immunodeficiency states
2. Microvascular disease
3. Macrovascular disease
4. Retinophaty
5. Increased resistance to the tumor
6. Foot ulcers

20. Point the pathogenetic factors of microvascular disease.

1. Sorbitol deposition in vascular wall
2. Decreased content lipid in the blood
3. Vascular wall lesions with antibodies and circulating immune complexes
6. Increase in glycosylation of proteins in basement membrane
4. Hypoxia

21. Point the pathogenetic factors of type 1 DM.

1. Genetic predisposition
2. Damage β-cells with cytokines
3. Autoimmune destruction of β-cells
4. Insulitis
5. Hypoglycemia
6. Action of viral and chemical triggers on β-cells

22. Point the pathogenetic factors of type 2 DM.

1. Genetic predisposition
2. Obesity
3. Insulin resistance of peripheral tissues
4. Autoimmune insulitis
5. β-cells disfunction and exhaustion
6. Hypoglycemia

23. In adipose tissue, insulin:

1. Increases triglyceride storage
2. Increases glucose transport into fat cells
3. Stimulates intracellular lipolysis
4. Activates lipoproteinlipase

24. Which of the following statements about insulin is true?

1. It facilitates protein synthesis
2. It increases gluconeogenesis
3. It increases the breakdown of triglycerides in adipose tissue
4. It facilitates the transport of glucose into target cells

25. Which of the following statements about insulin is true?

1. It inhibits the lipoproteinlipase of adipose tissue
2. It increases the entrance of fatty acids into adipocytes
3. It stimulates the synthesis of triglycerides within adipocytes
4. It increases the transport of amino acids into adipocytes

26. Which of the following statements about insulin is true?

1. It contributes to the accumulation of energy in the body
2. It facilitates the protein synthesis
3. It increases gluconeogenesis
4. It inhibits the lipolysis in adipose tissue

27. Which of the following statements about insulin is true?

1. It facilitates the active transport of amino acids into body cells
2. It increases the intracellular protein synthesis
3. It decreases the protein breakdown
4. It has several mitogenic functions

28. Which of the listen below hormones have a a)hypoglycemic or b) hyperglycemic actions?

1.Glucagon 4. Catecholamines
2. Insulin 5. Glucocorticoid hormones
3. Growth hormone

29. In hepatocytes insulin diminishes

1. Very-low-density lipoprotein (VLDL) synthesis
2. Fatty acid synthesis
3. Glycolysis
4. Gluconeogenesis

30. For each of the characteristics listed below choose whether it corresponds to (A) type 1 diabetes, (B) type 2 diabetes or (C) both types of diabetes

1. Increased blood glucose levels
2. Increased contents of triglycerides in blood
3. The absolute lack of insulin
4. The relative insufficiency of insulin
5. Is characterized by increased insulin resistance

31. Glucagon

1. Stimulates ketogenesis
2. Amino acids are the major glucagon secretagogue
3. Inhibits glycogenolysis
4. Stimulates gluconeogenesis
5. Is produced by α-cells of the pancreas

32. Glucagon

1. Activates gluconeogenesis
2. Enhances lipolysis in adipose tissue
3. Facilitates the transport of amino acids into hepatocytes
4. Activates the lipoprotein lipase in endothelium of adipose tissue

33. In hepatocytes, insulin

1. Inhibits gluconeogenesis
2. Inhibits protein synthesis
3. Inhibits very low density lipoprotein synthesis
4. Promotes storage of glucose as glycogen

34. In muscles, insulin

1. Promotes the uptake of glucose from the extracellular space
2. Stimulates protein breakdown
3. Promotes glycolysis and carbohydrate oxidation
4. Stimulates glycogen synthesis

II level

1. **List the main levels in carbohydrate disorders (3).**
2. **Name the main causes of hyperglycemia (4).**
3. **Name the main causes of hyporglycemia (5).**
4. **Name the counterregulatory hormones (4).**
5. **The three major acute complications of DM are…**
6. **The most commonly identified signs and symptoms of diabetes referred to three "polys" These are: 1. …… 2. …… 3. …….**
7. **The chronic complications of diabetes mellitus include**:

1. ….. 2. ….. 3. ….. 4. …..