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DEPARTMENT: PRECLINICAL SCIENCES

DISCIPLINE: BIOCHEMISTRY 2

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SUBJECTS

1. Energy transfer from catabolic reactions to energy-consuming processes is achieved through:
a. ATP;
b. NADH (H +);
c. FADH2;
d. GTP;
e. the energy transfer is carried out through all the above-mentioned compounds.

2. The tricarboxylic acid cycle (citric acid cycle or Krebs cycle) aims to:
a. oxidation of coenzyme NADH (H^+) to NAD^+;
b. transfer of hydrogen from acetyl coenzyme A to NAD^+ and FAD coenzymes
c. oxidation of coenzyme FADH2;
d. removal of carbon atoms from the acetyl radical in the form of CO_2;
e. answers b and d are correct.

3. In order to be absorbed, the oligo- and polysaccharides compounds from food are digested under the action of enzymes called:
a. amylases;
b. glycosidases;
c. lipases;
d. peptidases;
e. any of the mentioned enzymes, because they are all hydrolases.

4. The starch in the food is completely hydrolyzed to maltose at the level:
a. oral cavity, under the action of the pancreatic α-amylase enzyme;
b. oral cavity, under the action of salivary α-amylase enzyme;
c. small intestine, under the action of the pancreatic α-amylase enzyme;
d. small intestine, under the action of both isoenzymes of α-amylase, salivary and pancreatic;
e. the large intestine, under the action of hydrolytic enzymes produced by the intestinal bacteria.

5. The statement about lactose is correct:
a. it is hydrolyzed in the oral cavity by the action of the lactase enzyme;
b. it is transformed into lactic acid by anaerobic fermentation in the small intestine;
c. it is hydrolyzed in the monosaccharides α-glucose and β-fructose under the action of lactase produced by the intestinal mucosa;
d. it is hydrolyzed into two α-glucose molecules by the action of the lactase enzyme from pancreatic juice;
e. it is hydrolyzed into α-glucose and β-galactose by the action of lactase produced by the intestinal mucosa.

6. The statement about glycogenolysis is correct:
a. it is the hydrolysis process by which glucose stored in glycogen is released;
b. it is the process by which glucose from starch and glycogen is released as glucose-1-phosphate;
c. the first enzyme involved in this process is glucose-6-phosphatase, which releases a glucose radical from the non-reducing ends of the polysaccharide chains;
d. it is a phosphorylation process by which phosphorylated glucose molecules are released, under the action of phosphorylase a;
e. it is the most important process by which nerve cells obtain glucose from glycogen.

7. Choose the correct statement:
a. the anabolism of glucose to carbon dioxide and water in order to obtain energy in the form of ATP is called glycolysis;
b. complete glucose degradation occurs in the cytoplasm;
c. the end product of glucose degradation in cells without mitochondria is lactic acid;
d. cytoplasmic glucose degradation leads to the formation of 2 moles of ATP / mol of glucose;
e in the cells that have mitochondria and are supplied with sufficient O_2, cytoplasmic glucose degradation stops at lactic acid.

8. By going through the cytoplasm stages of glycolysis, 2 moles of glyceraldehyde-3-phosphate lead to:
a. 1 mol ATP;
b. 2 moles ATP;
c. 3 moles ATP;
d. 4 moles ATP;
e. 8 moles ATP.

9. Glyceraldehyde-3-phosphate dehydrogenase enzyme catalyzes:
a. a reaction involving NAD^+ / $NADH$ ($H^{+)}$ coenzyme;
b. reaction that convert 1,3-diphosphoglyceric acid into glyceraldehyde-3-phosphate;
c. the reaction that convert glyceraldehyde-3-phosphate into 1,3-diphosphoglyceric acid;
d. a reaction that is part of the cytoplasm degradation of glucose;
e. all previous answers are correct.

10. The enzyme lactate dehydrogenase catalyzes:
a. a mitochondrial reaction by which pyruvic acid is converted to lactic acid;
b. a mitochondrial reaction by which lactic acid is converted to pyruvic acid;
c. the reaction by which glycolysis is supplied with coenzyme NADH (H^+);
d. a fast re-oxidation of NADH (H^+) coenzyme for glyceraldehyde-3-phosphate dehydrogenase enzyme can continue glycolysis in cells without mitochondria and in other eukaryotic cells until O_2 supply allows pyruvic acid to transfer into mitochondria;
e. all previous answers are correct.

11. The statement about glucose degradation to lactic acid is correct:
a. it is also called anaerobic glycolysis because it takes place without the participation of oxygen;
b. the enzymes involved in the stages of this process are localized in the cytoplasm;
c. it takes place with great intensity in the first stages of effort in the skeletal muscle;
d. when large amounts of lactic acid are accumulated in the cell, the pH drops and this leads to inhibition of the enzymes involved in glycolysis;
e. all previous answers are correct.

12. Which of the following compounds is involved in H transfer from the reduced coenzymes resulting from cytoplasmic glucose degradation in the mitochondria:
a. pyruvic acid;
b. lactic acid;
c. glycerol-3-phosphate;
d. lactate;
e. phosphoenolpyruvic acid

13. The 2-deoxyglucose compound is:
a) substrate for the hexokinase enzyme, following the action of which it is formed an ester which is not a substrate for the next enzyme in glycolysis, the process thus being blocked;
b) glucose isomer;
c) glycolysis intermediate;
d) precursor for gluconeogenesis;
e) glycolysis activator.

14. Which of the following statements is correct:
a) arsenites and arsenates inhibit glycolysis;
b) arsenites and arsenates activate glycolysis, thus causing an increase in ATP concentration in cells;
c) arsenites and arsenates replace phosphoric radicals in ATP formation, causing an energy collapse of cells;
d) arsenites and arsenates are used as anticoagulants;
e) arsenites and arsenates are not toxic for the animal body.

15. The reaction is given:
$A + NAD^+ + CoA\text{-}SH \rightarrow CH3 - CO- S\text{-}CoA + B + CO2$
Compound A of the above reaction is:
a) lactic acid;

b) pyruvic acid;
c) glycerol;
d) 3-phosphoglyceric acid;
e) both pyruvic acid and lactic acid.

16. Compound B in the reaction from item 15 can be:
a) reduced nicotinamide dinucleotide;
b) oxidized dinucleotide nicotinamide;
c) reduced flavinadenine dinucleotide;
d) oxidized flavinadenin dinucleotide;
e) reduced nicotinamide dinucleotide phosphate.

17. The enzyme that catalyzes the reaction from item 15 is:
a) lactate dehydrogenase;
b) pyruvate dehydrogenase;
c) glyceraldehyde 3-phosphate dehydrogenase;
d) phosphoglycerate;
e) enolase.

18. Acetyl-CoA is not a precursor for biosynthesis:
a) β-hydroxybutyric acid;
b) cholesterol;
c) stearic acid;
d) phosphoenolpyruvic acid;
e) is a precursor for the biosynthesis of all the mentioned compounds.

19. Which of the the statement about the pentose phosphates pathway is correct:
a) it leads to the formation of a large amount of $NADP^+$;
b) it leads to the formation of NADPH (H^+);
c) it has as a product ribose;
d) it is a source of ATP;
e) it is an alternative way of using galactose.

20. About glycolysis it is correctly to say that:
a) it is a metabolic pathway that leads to obtaining 38 moles of ATP from one mole of glucose;
b) it is a sequence of catabolic reactions that take place in the cytosol;
c) in erythrocytes the end product is pyruvic acid;
d) it needs the presence of coenzyme $FADH_2$;
e) none of the above answers is correct.

21. The process by which lactic acid is metabolized is called:
a) glycolysis;
b) gluconeogenesis;
c) glycogenolysis;
d) glycogen synthesis;
e) pentose phosphates pathway.

22. The correct statement about the Cori Cycle is:
a) it ensures the metabolism of lactic acid resulting from glycolysis;
b) it contributes to the prevention of lactic acidosis;
c) it ensures the reuse of lactic acid;
d) it realizes transport of the lactic acid to the liver;
e) all the above answers are correct.

23. Because the reduced NADH (H^+) coenzyme resulting in cytosol from glycolysis cannot penetrate into the mitochondria, only the transfer of hydrogen to the inner mitochondrial membrane is ensured. Which of the following compounds is involved in this transfer:
a) glycerol-3-phosphate;
b) mitochondrial glyceraldehyde-3-phosphate-dehydrogenase;
c) cytoplasmic glycerol-3-phosphate-dehydrogenase;
d) dihydroxyacetone phosphate
e) all the mentioned compounds are involved, ensuring the transfer of hydrogen to the coenzyme FAD.

24. The reduced coenzyme $NADH_2$ results from the reaction catalyzed by:
a) hydroxyacyl CoA-dehydrogenase;
b) glycogen synthase;
c) fatty acyl-CoA- dehydrogenase;
d) β- ketoacyl-CoA thiolase
e) pyruvate.

25. Under the action of cytoplasmic lipases, triacylglycerols are hydrolyzed in glycerol and fatty acids. The destination of the resulting glycerol may be as follows:
a) it is transformed into the glycolic aldehyde, going through the stages of glycolysis;
b) at the hepatic level, it enters the gluconeogenesis;
c) is used for the biosynthesis of other glycerides;
d) is used for the biosynthesis of other complex lipids;
e) depending on the needs of the cell, respectively of the body, glycerol can be used by any of the mentioned metabolic pathways.

26. Carnitine is a compound that facilitates the transfer of:
a) pyruvic acid in mitochondria;
b) short-chain fatty acids in mitochondria;
c) long-chain fatty acids in mitochondria;
d) fatty-acyl-CoA in mitochondria;
e) medium-chain fatty acids in mitochondria.

27. The number of reduced NADH (H^+) coenzymes resulting from the 4 reactions of β-oxidation by 1 mole of butyric acid (C4) is:
a) 1 reduced NADH (H^+) coenzyme;
b) 2 reduced coenzymes NADH (H^+);
c) 3 reduced coenzymes NADH (H^+);
d) 4 reduced NADH (H^+) coenzymes;
e) 0 reduced NADH (H^+) coenzymes.

28. The number of reduced FADH2 coenzymes resulting from β-oxidation of 2 moles of butyric acid (C4) is:
a) 1 reduced $FADH_2$ coenzyme;
b) 2 reduced $FADH_2$ coenzymes;
c) 3 reduced $FADH_2$ coenzymes;
d) 4 reduced $FADH_2$ coenzymes;
e) 0 reduced $FADH_2$ coenzymes.
29. The number of moles of acetyl-CoA resulting from β-oxidation of 3 moles of butyric acid (C4) is:
a) 1 mole;
b) 2 moles;
c) 4 moles;
d) 6 moles;
e) 8 moles.

30. The energy balance (in the form of ATP) resulting from the complete degradation of 2 moles of butyric acid (C4) is:
a) 56 moles ATP;
b) 28 moles ATP;
c) 58 moles ATP;
d) 33 moles ATP;
e) 64 moles ATP.

31. Propionyl-CoA cannot result from:
a) β-oxidation of pentanoic acid:
b) degradation of some amino acids such as valine, isoleucine, methionine, threonine;
c) side chain degradation of cholesterol;
d) β-oxidation of palmitic acid (C_{16});
e) β-oxidation of heptanoic acid (C_7).

32. Excessive acetyl-CoA production occurs in the following situations:
a) in states of prolonged malnutrition, when the glycogen reserve has been consumed;
b) in diabetic patients, who cannot use glucose efficiently;
c) after prolonged physical exertion, correlated with low glucose intake;
d) when fat cells release large quantities of free fatty acids, which, by β-oxidation, produce an amount of acetyl-CoA that exceeds the need of energy;
e) excess of acetylCoA results in any of the situations presented above.

33. The process by which excess of acetyl-CoA is transformed into acetyl acetic acid, β-hydroxybutyric acid and acetone is called:
a) ketogenesis and occurs in the cytosol of all cells;
b) ketogenesis and occurs in the cytosol of hepatocytes;
c) ketogenesis and occurs in the mitochondria of all cells;
d) ketogenesis and occurs in the hepatocyte mitochondria;
e) ketonemia determines the state of metabolic acidosis.

34. The statement about β-hydroxybutyric acid is incorrect:

a) represents a form of metabolism for the acetyl-CoA excess;
b) it can be used by some cells (including nerve cells) as an energy substrate and can be converted to acetyl-CoA;
c) can result from β-oxidation of fatty acids with even number of carbon atoms;
d) by oxidation / dehydrogenation leads to lactic acid;
e) is a precursor for the cytoplasmic biosynthesis of butyryl-CoA.

35. About malonyl-CoA the statement is correct;
a) is intermediate in the cytolplasmatic biosynthesis of fatty acids;
b) is intermediate of the tricarboxylic acid cycle (Krebs);
c) is an intermediate for glucose biosynthesis;
d) is the final product of the degradation of butanoic acid;
e) belongs to the group of ketone bodies.

36. The pathway of fatty acid biosynthesis by elongation is located in:
a) external mitochondrial membrane;
b) cytoplasm;
c) peroxisomes;
d) mitochondrial matrix;
e) endoplasmic reticulum.

37. The metabolic pathways of fatty acid biosynthesis, although located in distinct subcellular compartments, both the malonyl-CoA pathway and the elongation pathway, go through a similar sequence of reactions, acylation, reduction, dehydration, reduction. What is coenzyme used in both metabolic pathways:
a) NAD^+;
b) NADH (H^+);
c) $NADP^+$;
d) NADPH (H^+);
e) $FADH_2$.

38. For glyceride biosynthesis it is used:
a) glycerol-3-phosphate or α-glycerophosphate;
b) activated fatty acids in the form of acyl-CoA fatty acids;
c) acyltransferase enzyme;
d) phosphatase enzyme;
e) all the mentioned compounds are necessary.

39. Coenzyme NADPH (H +) is required for the functioning of the following dehydrogenases:
a) β-ketoacyl-ACP reductase;
b) malate-dehydrogenase;
c) β-hydroxybutyrate dehydrogenase;
d) lactate dehydrogenase;
e) acyltransferase.

40. What is the particular feature common to the enzymes α-glycerol kinase, hexokinase, pyruvate carboxylase:
a) are part of the same metabolic pathway, glycolysis;

b) catalyzes reactions resulting from ATP consumption;
c) belong to the class of enzymes called "Hydrolases";
d) catalyzes reactions that are part of the tricarboxylic acid cycle (Krebs);
e) all the above answers are correct.

41. Which of the following enzymes is involved in gastric protein digestion:
a) pepsin;
b) trypsin;
c) enteropeptidase;
d) trypsinogen;
e) carboxypeptidase.

42. The transformation of pepsinogen, the inactive precursor of pepsin, into the active enzyme, takes place under the action of:
a) trypsin;
b) enteropeptidase;
c) hydrochloric acid;
d) chymotrypsin;
e) intestinal juice.

43. Which of the following hydrolytic enzymes is biosynthesized as an inactive precursor, called proenzyme or zymogen:
a) α-amylase;
b) elastase;
c) lipase;
d) glucokinase;
e) fatty acid synthase

44. After being subjected to hydrolysis under the action of proteases in the stomach, intestine and cells of the intestinal mucosa, the proteins are absorbed as:
a) peptones;
b) amino acids;
c) large polypeptides;
d) proteoses;
e) proteins are absorbed in all these forms.

45. The intracellular hydrolysis of endogenous proteins is correct:
a) is a highly specialized process, localized in lysosomes and proteasomes;
b) it is necessary for the replacement of used proteins;
c) it is necessary for the replacement of proteins that have not been properly synthesized, either from the point of view of the primary structure (replacement of one or more amino acids) or of the secondary, tertiary and / or quaternary structures;
d) plays an important role in controlling the cell cycle evolution, including the initiation of apoptosis;
e) all the above answers are correct.

46. The labeling of the proteins to be degraded at the level of the proteasomes is done by binding to:
a) carnitine;
b) creatinine;
c) ubiquitin;
d) ATP;
e) phosphate radical.

47. The oxidative deamination of the amino acid alanine (CH3-CH (NH2) -COOH) results in:
a) α-hydroxypropionic acid (CH3-CH (OH) -COOH), along with ammonia;
b) propionic acid (CH3-CH2-COOH), together with ammonia;
c) pyruvic acid (CH3-CO-COOH), together with ammonia;
d) propylamine (CH3-CH2-CH2-NH2), next to CO2;
e) the correct answers are a, b and c.

48. The statement regarding biogenic amines is incorrect:
a) results from amino acids under the action of enzymes called aminoacyl decarboxylases;
b) are compounds with specific biological actions;
c) can be used as precursors in gluconeogenesis;
d) when they come from the decarboxylation of amino acids with several amino groups they are called polyamines;
e) biologic amines resulting from lysine or arginine play a role in regulating nucleic acid biosynthesis.

49. Glutamate pyruvate transaminase (GPT) also called Alanin-aminotransferase (ALT) and Glutamat-Oxaloacetat-Transaminase (GOT) also referred to as Aspartat-aminotransferase (AST) are enzymes of the transaminase class, also used in clinical diagnosis. The coenzyme of these enzymes is:
a) oxidized nicotinamide dinucleotide phosphate;
b) reduced nicotinamide dinucleotide;
c) pyridoxal phosphate
d) reduced flavinadenindinucleotide;
e) coenzyme A.

50. Transamination is a complex process of amino acid degradation and biosynthesis, which makes the connection between protein metabolism and the tricarboxylic acid cycle (Krebs), glycolysis, urea cycle. The couple of compulsory compounds present in any transamination is:
a) alanine / pyruvic acid;
b) oxalylacetic acid / aspartic acid;
c) glutamic acid / oxalylacetic acid;
d) glutamic acid / α-ketoglutaric acid;
e) aspartic acid / glutamic acid.

51. Which of the following compounds is not part of the urea cycle:
a) ornithine;
b) glycine;
c) citrulline;

d) arginine;
e) argininosuccinic acid

52. The urea cycle takes place in:
a) erythrocytes;
b) adipose tissue cells;
c) striated muscle fibers;
d) hepatocytes;
e) myocardium.

53. Carbamoyl phosphate results from condensation of ammonia with the bicarbonate anion which is the form of CO2 transport. About this compound the statement is correct:
a) it is formed with ATP release;
b) the enzyme that catalyzes the reaction of formation of this compound is called carbamoyl phosphate synthetase
c) performs a correlation with gluconeogenesis, since it forms in the hepatocyte cytosol;
d) performs a correlation with the tricarboxylic acid cycle (Krebs), since oxidized coenzymes resulting from the cycle are used in the reaction of formation of this compound;
e) all the above answers are correct.

54. The form of ammonia elimination in birds is:
a) urea;
b) uric acid;
c) both uric acid and urea;
d) urea, eliminated by saliva;
e) amino acids.

55. Which of the following metabolic processes does not require, for initiation, consumption of ATP:
a) tricarboxylic acid cycle (Krebs);
b) glycolysis;
c) urea cycle;
d) intracellular proteolysis;
e) glycogen.

56. The scheme is given:

$$\text{2-phosphoenolpyruvic acid} + A \xrightarrow{(1)} B + ATP$$
$$\downarrow + ATP + HCO_3^- \xrightarrow{(2)} C$$

Compound B in the above scheme is:
a) pyruvic acid;
b) lactic acid;
c) oxalylacetic acid;
d) fumaric acid;
e) acetyl- CoA

57. Compound C in the above scheme is:
a) pyruvic acid;
b) lactic acid;
c) oxalylacetic acid;
d) fumaric acid;
e) acetyl-CoA

58. The enzyme that catalyzes the transformation of A into C is:
a) pyruvate;
b) pyruvate carboxylase;
c) pyruvate dehydrogenase;
d) fumarase;
e) phosphoglycerate kinase

59. About the reaction (1) from item 56 the correct statement is:
a) is part of the tricarboxylic acid cycle (Krebs);
b) is a cytoplasmic reaction;
c) contributes to glycerol biosynthesis;
d) is not part of glycolysis;
e) is an anaplerotic reaction.

60. About the reaction (2) from item 56 the correct statement is :
a) is an exergonic reaction;
b) contributes to glycerol biosynthesis;
c) does not run with energy consumption;
d) is an anaplerotic reaction;
e) answers "a" and "b" are correct.

61. Point mutations affect:
a) one of the nitrogenous bases of a codon, resulting in a modified codon, which causes the insertion of another amino acid in the polypeptide chain;
b) the number of codons, by the loss of one or more, which determines the biosynthesis of a protein with a different primary structure;
c) the number of codons by the appearance of one or more additional codons, which determines the appearance of one or more additional amino acid sequences;
d) three-dimensional conformation of polypeptide chains;
e) answers a and d are correct.

62. The intoxication of animals with organophosphorus compounds is due to:
a) the action of these compounds on acetylcholine, which is degrade;
b) the inhibitory action of these compounds on the acetylcholinesterase enzyme, which causes the accumulation of acetylcholine;
c) the denaturing action of these compounds on proteins;
d) the action of these compounds on glycolysis;
e) the action of these compounds on lipid metabolism.

63. Glycogenoses are metabolic diseases with genetic determination. The gene that may undergo mutations leading to dysfunctional enzymes is:
a) glucose-1-phosphatase;
b) pyrophosphorylase;
c) galactose-1-phosphate transferase;
d) the branching enzyme;
e) the answers "a", "b" and "d" are correct.

64. Metabolic correlations between carbohydrates and lipids cannot be established through:
a) FAD and NAD^+ coenzymes;
b) NADPH (H^+) coenzyme;
c) coenzyme A;
d) acetyl-CoA
e) glycine.

65. Choose the correct answer regarding gluconeogenesis:
a) is a process localized in hepatocytes by which glucose is synthesized from acetyl-CoA;
b) is a process localized in hepatocytes by which glucose is converted into urea;
c) is a process localized in hepatocytes by which glucose is biosynthesized from non-carbohydrates precursors (lactic acid, glycerol, glucose generating amino acids);
d) is the process of glucose obtaining from glycogen;
e) answers "c" and "d" are correct.

66. Which of the following compounds are located in the inner mitochondrial membrane:
a) coenzyme Q;
b) cytochrome c_1;
c) FMN-protein;
d) cytochrome a + a_3;
e) all the mentioned compounds.

67. The metabolic pathway in which the compounds chosen in the previous item is called:
a) electron transport chain;
b) oxidative phosphorylation;
c) tricarboxylic acid cycle;
d) β-oxidation;
e) all the mentioned metabolic pathways are located in the inner mitochondrial membrane.

68. Which of the following physiological conditions can lead to intensification of urea cycle which results in increased uremia:
a) high protein diet;
b) diet high in carbohydrates;
c) starvation;
d) high fat diet;
e) answers "a" and "c" are correct.

69. Ubiquinone or coenzyme Q is:
a) enzyme involved in isoprenyl radical transfer;
b) a protein component of the respiratory chain;

c) the only non-protein component of the electron transport chain;
d) enzyme with prosthetic group of hem type;
e) answers "b" and "d" are correct.

70. Tyramine comes from the amino acid tyrosine following a process of:
a) transamination;
b) decarboxylation;
c) hydrolytic deamination;
d) oxidative deamination;
e) hydrolysis.

71. The correct statement regarding ornithine is:
a) is a diamino monocarboxylic amino acid involved in β-oxidation;
b) is a diamino monocarboxylic amino acid involved in urea cycle;
c) is a monoamino dicarboxylic amino acid involved in urea cycle;
d) is a monoaminodicarboxylic amino acid involved in glycolysis;
e) answers "b" and "c" are correct.

72. Hexokinase is:
a) the enzyme that catalyzes the first reaction of glycolysis;
b) the enzyme that catalyzes the formation of glucose-1-phosphate;
c) the enzyme that catalyzes the isomerization of glucose-6-phosphate to fructose-6-phosphate;
d) hydrolase class enzyme;
e) an enzyme of the oxidoreductase class.

73. Fructose-6-phosphate is:
a) a phosphoric ester of fructose;
b) a metabolite in glycolysis;
c) an intermediary in the pentose phosphate pathway;
d) an intermediary in the metabolism of sucrose;
e) all the above answers are correct.

74. The complete degradation of 2 moles of pyruvic acid results in:
a) 15 moles ATP;
b) 30 moles of ATP;
c) 2 moles ATP;
d) 2 moles GTP;
e) 24 moles ATP.

75. The glutamic acid is transformed, by a transamination reaction, into α-ketoglutaric acid, which may enter the tricarboxylic acid (Krebs) cycle. The number of NADH (H^+) coenzymes resulting from 3 moles of α-ketoglutaric acid that travel this metabolic pathway is:
a) 9 moles;
b) 12 moles;
c) 6 moles;
d) 2 moles;
e) 3 moles.

76. Oxalylacetic acid (oxaloacetate) coupled with acetyl-CoA forms the first intermediate in the tricarboxylic acid (Krebs) cycle. This is called:
a) citric acid (citrate);
b) isocitric acid (isocitrate);
c) L-malic acid (malate);
d) acetyl-CoA;
e) succinic acid.

77. Oxalylacetic acid is formed from the reaction:
a) aspartic acid with pyruvic acid, under the action of the pyruvate enzyme transaminase;
b) aspartic acid with α-ketoglutaric acid, under the action of the aspartate-aminotransferase enzyme;
c) pyruvic acid with bicarbonate anion, with consumption of ATP, under the action of the enzyme pyruvate carboxylase;
d) pyruvic acid with coenzyme A, under the action of the pyruvate dehydrogenase enzyme;
e) answers "b" and "c" are correct.

78. Glycogenin is:
a) protein involved in glycogenolysis;
b) protein involved in glycogenogenesis;
c) protein involved in gluconeogenesis;
d) protein involved in glycolysis;
e) a macroergic compound.

79. It is an endergonic process:
a) glycolysis;
b) gluconeogenesis;
c) urea cycle;
d) tricarboxylic acid cycle (Krebs)
e) both, urea cycle and gluconeogenesis are endergonic processes.

80. Choose the correct statement:
a) fatty acids with less than 12 carbon atoms in the molecule are absorbed directly through the intestinal mucosa;
b) all the fatty acids resulting in the intestinal level from the action of the pancreatic lipase are transferred to the cells of the intestinal mucosa where they are re-esterified with glycerol to form new glycerides which will then be integrated into the plasma lipoprotein complexes;
c) cholesterol is not absorbed in the intestine;
d) degradation of fatty acids resulting from the cytoplasmic hydrolysis of glycerides takes place, as does glycolysis, in the cytoplasm;
e) the statements "a" and "d" are correct.

81. The complete degradation of 2 moles of stearic acid, (C18) produces:
a) 148 moles ATP;
b) 108 moles ATP;

c) 147 moles ATP;
d) 294 moles of ATP;
e) 296 moles ATP.

82. From β-oxidation of 3 moles palmitic acid (C16) results:
a) 7 moles of NADH (H +);
b) 21 moles FADH2;
c) 131 moles ATP;
d) 393 moles ATP
e) answers "b" and "d" are correct;

83. The reaction is given:
R-COOH + ATP + X → Y + AMP + PPi

Choose the incorrect statement about this reaction:
a) is a cytosolic reaction;
b) compound X is acetyl-CoA;
c) compound Y is fatty acyl-CoA;
d) the enzyme involved is called fatty acyl-CoA synthetase;
e) compound X is CoA-SH.

84. The translocase is:
a) the enzyme involved in the transfer of the activated fatty acids through the internal mitochondrial membrane;
b) the enzyme that participates in the non-oxidative stages of the pentose phosphate pathway
c) a glycolysis enzyme;
d) a Krebs cycle enzyme;
e) an enzyme of the urea cycle.

85. Transketolase and transaldolase are:
a) enzymes involved in glycolysis;
b) enzymes involved in β-oxidation;
c) enzymes of the tricarboxylic acid cycle;
d) enzymes that function coupled to the shunt of the pentosophosphates;
e) none of the answers is correct.

86. The statement of the Pentose Phosphate Pathway is incorrect:
a) leads to the formation of a large amount of $NADP^+$;
b) leads to the formation of NADPH (H^+);
c) it also has ribozo-5-phosphate as its product;
d) is not a source of ATP;
e) is an alternative way of using glucose.

87. Acetyl-CoA is a precursor for biosynthesis of:
a) pyruvic acid;
b) ornithine;
c) stearic acid;
d) urea;

e) glucose.

88. The highest amount of energy in form of ATP is obtained from:
a) cytoplasmic degradation of 2 moles of glucose (C6);
b) complete degradation of 2 moles of glucose (C6);
c) complete degradation of 2 moles of caproic acid (C6);
d) complete degradation of one mole of lauric acid (C12);
e) in the case of releasing, after complete degradation, an equal number of moles of CO_2 in all cases, the same amount of energy is obtained.

89. Which of the following intermediate metabolites cannot be transformed into amino acids:
a) pyruvic acid;
b) oxalylacetic acid;
c) α-ketoglutaric acid;
d) butyric acid;
e) all can be transformed into amino acids.

90. The following statement about aldolase is incorrect:
a) is an enzyme that is part of glycolysis;
b) is a cytoplasmic enzyme;
c) is a hydrolase;
d) is a liase
e) has as fructose-1,6-diphosphate substrate.

91. The reaction below is catalyzed by an enzyme that has as coenzyme pyridoxal phosphate, a derivative of vitamin B6:
$A + B \leftrightarrow C + D$

The correct statement about this reaction is:
a) if A is glutamic acid and B is pyruvic acid, then C is α-ketoglutaric acid and D is alanine;
b) if A is glutamic acid and B is oxalylacetic acid, then C is α-ketoglutaric acid and D is aspartic acid;
c) if the answer "a" is correct, then the enzyme is called glutamate-pyruvate transaminase (GPT) or alanine aminotransferase (ALT);
d) if the answer "b" is correct, then the enzyme is called glutamate-oxalylacetate transaminase (GOT) or aspartate aminotransferase (AST);
e) all the above statements are correct.

92. The statement about acetyl acetic acid is incorrect:
a) it results from 3-hydroxy-3-methylglutaryl-CoA;
b) may results from β-oxidation of butyric acid (C4);
c) can result from β-oxidation of stearic acid (C18);
d) is a precursor for alanine biosynthesis;
e) it decomposes spontaneously into acetone and water.

93. The statement regarding the compound HOOC - CH2 - CH2 - CO - S - CoA is incorrect:

a) it is called succinyl-CoA;
b) results from the deamination of aspartic acid;
c) is an intermediate of the tricarboxylic acid cycle;
d) link the propionyl-CoA connection with the tricarboxylic acid cycle;
e) by transforming it into succinic acid it releases energy stored in the form of GTP.

94. Oxidative phosphorylation is located in:
a) mitochondrial matrix;
b) external mitochondrial membrane;
c) internal mitochondrial membrane;
d) cytoplasm;
e) peroxisomes.

95. Enoil-CoA hydrase is an enzyme involved in:
a) β-oxidation of fatty acids with an even number of carbon atoms in the mitochondria;
b) β-oxidation of long-chain fatty acids in peroxisomes;
c) β-oxidation of fatty acids with odd number of carbon atoms;
d) reaction to convert 2-phosphoglyceric acid into 2-phosphoenolpyruvic acid;
e) the answers "a", "b" and "c" are correct.

96. It is not part of the isomerase class:
a) the enzyme that catalyzes the transformation of ribozo-5-phosphate into ribulozo-5-phosphate;
b) the enzyme that catalyzes the conversion of glucose-6-phosphate into fructose-6-phosphate;
c) the enzyme that catalyzes the conversion of glyceraldehyde-3-phosphate into 1,3-diphosphoglyceric acid;
d) the enzyme that catalyzes the conversion of glyceraldehyde-3-phosphate into dihydroxyacetone phosphate;
e) the enzyme that catalyzes the transformation of 3-phosphoglyceric acid into 2-phosphoglyceric acid.

97. Which of the following compounds is not intermediate in the tricarboxylic acid (Krebs) cycle:
a) acetyl-CoA;
b) isocitrate;
c) fumarate;
d) malate;
e) all the mentioned compounds are intermediates of the Krebs cycle.

98. Pantothenic acid or vitamin B5 enters the structure:
a) the acyl-acyl carrier protein (ACP) carrier group;
b) glutamic acid;
c) glycogenin;
d) coenzyme A
e) answers "a" and "d" are correct.

99. About pyruvic acid the following statement is incorrect:

a) by decarboxylation it is transformed into oxalylacetic acid, anaplerotic reaction of supplying the tricaboxylic acid (Krebs) cycle with intermediates;
b) under the action of the pyruvate dehydrogenase complex, it is transformed into acetyl-CoA;
c) it can be transformed into the amino acid alanine;
d) may enter gluconeogenesis;
e) can be transformed into lactic acid.

100. Which of the following compounds is not a macroergic compound:
a) ATP;
b) GTP;
c) UTP;
d) GPT;
e) all are macroergic compounds.

Bibliography

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