

الثقة احمد المهيدات علي المطالفة قيس البطوش -- حمزة طراد Full Mark

Question 17 / 40

Sucrase is a _____ enzyme that is used in digestion of _____ bond:

- Mucosal cell-membrane bound, alpha 1,6
- Mucosal cell-membrane bound, alpha 1,2
- Pancreatic, alpha 1,4
- Mucosal cell-membrane bound, beta 1,4
- Pancreatic, alpha 1,1

Question 13 / 40

The following reaction is the rate limiting step in tricarboxylic acid cycle:

- Isocitrate to alpha-ketoglutarate
- Oxaloacetate to citrate
- Citrate to isocitrate
- Malate to oxaloacetate
- Succinate to fumarate

Question 12 / 40

All of the following can result in lactic acidosis EXCEPT:

- Respiratory failure associated with COVID19
- Reduced tricarboxylic acid cycle activity
- Uncontrolled haemorrhage
- Direct inhibition of oxidative phosphorylation
- Activated gluconeogenesis

Question 8 / 40

Pyruvate kinase deficiency results in:

- Hemolytic anemia due to premature red blood cell death
- Increased ATP production in red blood cells
- Increased production of pyruvate from phosphoenolpyruvate in red blood cells
- Higher flexibility of the affected cells
- Higher competition of glyceraldehyde-3-phosphate with phosphate group on the active site

Question 6 / 40

Which one of the following reactions is unique to gluconeogenesis?

- Lactate -- pyruvate
- Phosphoenolpyruvate -- pyruvate
- Oxaloacetate -- phosphoenolpyruvate
- Glucose 6-phosphate -- fructose 6-phosphate
- 1,3-Bis-phosphoglycerate -- 3-phosphoglycerate

Question 2 / 40

Feed-forward activation has the following effect

- Pathways move fast
- Slow production of the final product
- Tight regulation of enzymes
- Inter-connection of pathways
- Little consumption of energy

Question 3 / 40

Metabolism can be regulated by enzymes through the following mechanisms EXCEPT:

- Enzyme amount
- Allosteric regulation
- Feedback inhibition
- Accessibility of the substrate
- Activation of second messengers

Question 2 / 40

Feed-forward activation has the following effect

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Question 5 / 40

What is the effect of a competitive inhibitor on the kinetics of an enzyme that follows Michaelis-Menten kinetics?

- It makes the enzyme require more substrate to reach a zero-order reaction rate
- It shifts the reaction rate plot to the left
- It lowers the maximal velocity of the enzyme
- It shifts a first-order reaction to a zero-order reaction
- The enzyme becomes substrate-independent

Question 11 / 40

The following is indicative of liver damage

- increased level of alanine transaminase (ALT)
- decreased ratio of alanine transaminase (ALT)/aspartate transaminase (AST)
- increased amount of Lactate dehydrogenase 2
- increased ratio of lactate dehydrogenase 1/lactate dehydrogenase 5
- increased level of troponin

Question 15 / 40

One of the following is NOT TRUE in regards to pepsinogen

- It is a proenzyme.
- It is a zymogen.
- Its activation is irreversible.
- It is pH-independent.
- It has aspartate in the active site.

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Question 16 / 40

One of the following is TRUE in regards to abzymes

1. They target enzymes and inhibit them
2. They bind to active sites of enzymes
3. They catalyze reactions
4. They are made against original substrates
5. They accelerate enzymatic reactions

Question 18 / 40

When cAMP binds to protein kinase A (PKA), it does NOT cause this

1. It activates the enzyme.
2. It releases the catalytic subunit from the regulatory subunit.
3. It increases the phosphorylation of PKA targets.
4. It causes the exchange of GDP for GTP.
5. It alters the quaternary structure of PKA.

Question 19 / 40

The majority of the daily need of energy is used for:

1. Resting metabolic rate
2. Thermic effect of food
3. Physical activity
4. Thinking process
5. Driving anabolic pathways

Question 26 / 40

The designation of CTP based on its effect on aspartate transcarbamoylase (ATCase) is

- It is a homotropic modifier
- It is an allosteric inhibitor
- It is a $K_{0.5}$ activator
- It is a V_{max} inhibitor
- It is a heterotropic activator

Question 33 / 40

When substrate concentration is lower than K_m ,

- The reaction is not affected by non-competitive inhibitors
- The reaction is first order
- K_2 is very high
- Changes in substrate concentration have little effect on reaction velocity
- Lineweaver-Burke plot cannot be used to estimate maximal velocity

Question 34 / 40

You have discovered enzyme Y and you suspect it is an isozyme of enzyme X. How would you know that it is an isozyme?

- Although their V_{max} would be different, their catalytic efficiency should be the same.
- They exist in different tissues.
- They are inhibited by the same molecules.
- Just add the same substrates and check for the products.
- If one catalyzes a reaction, the other catalyzes the reverse reaction.

Question 38 / 40

You have an enzymatic reaction where the velocity of the reaction is 20% of the maximal velocity. At this reaction, the substrate concentration is equal to

- 10% of K_m
- 25% of K_m
- 50% of K_m
- 75% of K_m
- 100% of K_m

Question 39 / 40

How does mercury inhibit enzymes?

- It binds to the active site covalently blocking substrate binding.
- It acts as a suicide inhibitor initiating reactions that cannot move forward.
- It binds to the regulatory regions blocking the binding of activators.
- It blocks the formation of disulfide bonds destabilizing enzymes.
- It binds to enzymes resulting in the structural change of the active sites of enzymes.

الخيار الخامس يمكن اعتباره صحيح ايضا

Question 1 / 40

One of the following is NOT true in regards to enzymes

- They undergo structural modification during reactions
- An enzyme is structurally exactly the same before and after reactions
- When coenzymes are required for a reaction, they specify the substrates that bind to enzymes
- Catalytic and substrate binding sites within enzymes' active sites are always distinct
- Initial non-covalent interactions between enzymes and their substrates determine substrate specificity

Question 4 / 40

The biochemical deficiency in Pompe's disease is:

- Glycogenin enzyme deficiency
- Glucokinase deficiency
- Glucose-6-phosphatase deficiency
- Glycogen phosphorylase deficiency
- Lysosomal glucosidase deficiency

Question 7 / 40

Muscle glycogen can be used only inside muscle because:

- Muscles lack glucose-6-phosphatase enzyme
- Muscles lack glucokinase enzyme
- Muscles store a very small amount of glycogen
- Liver stores larger amount of glycogen than in muscles
- Liver have glucose-6-phosphate transporters but muscles do not

Question 21 / 40

The main purpose of the zinc ion in the active site of alcohol dehydrogenase is

- Extracting electrons from alcohol
- Extracting protons from NADH
- Stabilizing the substrate into the active site
- Attracting electrons towards it to facilitate the acid-base reaction
- Linking NAD⁺ and alcohol to each other covalently

Question 20 / 40

Transaminases require this cofactor

1. Magnesium ion
2. Nicotinamide adenine dinucleotide
3. Vitamin C
4. Coenzyme A
5. Pyridoxal phosphate

Question 14 / 40

Copper ion is a prosthetic group of

1. ATP Synthase
2. Cytochrome oxidase
3. NADH dehydrogenase
4. Cytochrome reductase
5. Succinate dehydrogenase

Question 25 / 40

Nitric oxide synthase (NOS) catalyzes the following reversible reaction to produce arginine and nitric oxide that has this structure (N=O). (2 L-arginine + 3 NADPH + 3 H⁺ + 4 O₂ \rightleftharpoons citrulline + 2 nitric oxide + 4 H₂O + 3 NADP⁺). NOS is a

1. Lyase
2. Transferase
3. Dehydrogenase
4. Oxidase
5. Hydrolase

Question 28 / 40

Dinitrophenol inhibits

- NADH oxidation by Complex I
- Electron flow in Complex IV
- ATP hydrolysis to ADP
- Electron flow in electron transport chain and ATP synthesis
- ATP synthesis but not oxidation of NADH

Question 30 / 40

Glycogenesis directly from D-glucose requires:

- Glucose-1-P
- Glucose-6-P
- A debranching enzyme
- UDP-glucose
- Glucosyl transferase

Question 35 / 40

When glycogen phosphorylase is active, the following change occurs:

- Glycogen synthase is activated
- Fructose-1,6-bisphosphatase is activated
- Branching enzyme is activated
- Phosphoglucomutase is activated
- Glycogen kinase phosphorylase is inactivated.

Question 40 / 40

The conversion of pyruvate to acetyl CoA and CO₂:

- is reversible.
- involves the participation of lipoic acid.
- is activated when pyruvate dehydrogenase (PDH, E1) of the pyruvate dehydrogenase complex is phosphorylated by PDH kinase in the presence of ATP.
- occurs in the cytosol.
- depends on the coenzyme biotin.

Question 32 / 40

Removal of carbon from pyruvate by pyruvate dehydrogenase requires

- Biotin
- An oxidized nicotinamide adenine dinucleotide
- A reduced flavin dinucleotide
- Thiamin pyrophosphate
- Coenzyme A

Question 31 / 40

The reaction that is catalyzed by phosphofructokinase-1:

- is activated by high concentrations of ATP and citrate.
- uses fructose 1-phosphate as a substrate.
- is an irreversible rate-limiting reaction of the glycolysis.
- is near equilibrium in most tissues.
- is inhibited by fructose 2,6-bisphosphate.

Question 27 / 40

Which one of the following statements concerning glycolysis is CORRECT?

- The conversion of glucose to lactate requires the presence of oxygen.
- Glucokinase is active in hepatic glycolysis after consuming a carbohydrate-rich meal.
- Fructose 2,6-bisphosphate is a potent inhibitor of phosphofructokinase-1.
- The regulated reactions are also the reversible reactions.
- Glycolysis is activated by glucagon hormone but is inhibited by insulin and epinephrine hormones

Question 23 / 40

The main role of the glucose produced by gluconeogenesis in the liver is:

- To maintain blood glucose levels
- To supply muscles with glucose to be metabolized for energy production
- To be used for lactose production
- To be used for the synthesis of sugar moiety of glycoproteins, glycolipids and proteoglycans
- To be used for glycogen synthesis and storage

Question 24 / 40

The glucose transporter whose expression on cell membrane is increased due to insulin secretion is:

- Glut 4
- Glut 5
- Glut 7
- Glut 1
- Glut 2

Question 22 / 40

How does fluoride reduce dental cavities?

- By inhibition of bacterial enolase
- By inhibition of bacterial glyceraldehyde-3-phosphate dehydrogenase
- By activation of oral tissue glucokinase
- By inhibiting of oral tissue pyruvate kinase
- By activation of bacterial aldolase

Question 34 / 40

At fasting,

- Glucose-6-phosphate activates glucokinase
- The rate of reaction of hexokinase is higher than that of glucokinase
- Glucokinase stops being under hormonal control
- K_m of glucokinase toward glucose becomes higher
- Glucose-6-phosphate inhibits hexokinase

Question 22 / 40

Which one of the following conditions decreases the oxidation of acetyl CoA by the

- A low ATP/ADP ratio
- A low NADH concentration due to rapid oxidation to NAD^+ through the respiratory chain
- A low $NAD^+/NADH$ ratio
- A high concentration of AMP
- A low GTP/GDP ratio

Question 29 / 40

In a cell, you have 5 reactions taking place. They have the following standard reduction potentials or standard changes of free energy. Which reaction is the most favorable? (Reaction A: $\Delta G = -2 \text{ Kcal/sec.mg}$; Reaction B: $\Delta G = + 0.5 \text{ KJ/sec}$; Reaction C: $- 10 \text{ Kcal/sec.ug}$; Reaction D: $\Delta E = + 0.85 \text{ V}$; Reaction E: $\Delta E = -1.3 \text{ V}$)

1. Reaction A
2. Reaction E
3. It depends on cellular localization of the enzymes and substrates
4. It depends on cellular catalytic efficiencies of enzymes and substrate concentrations
5. It depends on V_{max} of the enzymes

Question 13 / 40

Hydrolysis of ATP into ADP and P_i has a ΔG that is equal to (-7 Kcal/mol) . What is the ΔG of free energy knowing that the ratio of ATP to $(ADP+P_i)$ is 1000 to 1. The value of $RT = 0.6 \text{ Kcal/mol}$.

1. It is at equilibrium.
2. It is exergonic but higher than the standard ΔG (between -7 and 0)
3. It is endergonic and higher than the standard ΔG (higher than 7)
4. It is exergonic but lower than the standard ΔG (less than -7)
5. It is endergonic and lower than the standard ΔG (between 0 and 7)