

Written Q

1. Def and site of glycolysis
2. Enumerate key enzymes of glycolysis
3. Compare () aerobic and anerobic glycolysis
4. Mention biomedical importance of glycolysis
5. Enumerate fat of pyruvate
6. Mention the significance of lactate production in anerobic glycolysis ?
7. Mention importance of glycolysis ?
8. Compare hexokinase and glucokinase ?
9. Mention hormonal regulation of glycolysis ?

MCQ

1. A 55-year-old alcoholic was brought to the emergency department by his friends. During their usual nightly gathering at the local bar, he had passed out and they had been unable to revive him. The physician ordered an injection of thiamine followed by overnight parenteral glucose. In the next morning, the patient was alert and coherent, serum thiamine level was normal, and blood glucose level was 73 mg/dl. The IV line was removed, and he was taken home. Which of the following enzymes is thiamine-dependent and essential for glucose oxidation in the brain?

- A. Glucokinase
- B. Pyruvate kinase
- C. Lactate dehydrogenase
- D. Acetyl-CoA carboxylase
- E. Pyruvate dehydrogenase

E

<p>2. Under anaerobic conditions, 1 molecule of glucose yields.....ATP.</p> <p>A. 1 B. 2 C. 4 D. 24 E. 38</p>	B
<p>3. The end-product of aerobic glycolysis is:</p> <p>A. Lactate B. Pyruvate C. Acetyl-CoA D. Citrate E. Oxaloacetate</p>	B
<p>4. Oxidative decarboxylation of pyruvate requires:</p> <p>A. NADP+ B. Cytochromes C. Pyridoxal phosphate D. COASH E. NADH+H+</p>	D
<p>5. In glycolysis, the conversion of 1 mol of fructose 1,6- bisphosphate to 2 mol of pyruvate results in the formation of:</p> <p>A. 1 mol NAD+ and 2 mol of ATP B. 1 mol NADH and 1 mol of ATP C. 2 mol NAD+ and 4 mol of ATP D. 2 mol NADH and 2 mol of ATP E. 2 mol NADH and 4 mol of ATP</p>	E

<p>6. The conversion of pyruvate to acetyl CoA and CO₂:</p> <p>A. is reversible.</p> <p>B. involves the participation of lipoic acid.</p> <p>C. occurs in the cytosol.</p> <p>D. depends on the coenzyme biotin.</p>	B
<p>7. Before pyruvic acid enters the TCA cycle it must be converted to:</p> <p>a. α-ketoglutarate</p> <p>b. Citrate</p> <p>c. Lactate</p> <p>d. Acetyl CoA</p> <p>e. Succinate</p>	D
<p>8. As regards glycolysis,</p> <p>A. Glucagon increases its rate.</p> <p>B. It requires NADP⁺.</p> <p>C. glucose is cleaved into two three carbon compounds.</p> <p>D. It takes place in the inner mitochondrial membrane.</p> <p>E. The end product is DHAP</p>	C
<p>9. Which of the following results from pyruvate kinase deficiency?</p> <p>a) Hemolytic anemia</p> <p>b) Increased production of ATP</p> <p>c) Increased production of NADH+H</p> <p>d) Lactic acidosis</p> <p>e) Stimulation of glycolysis</p>	A
<p>10. What is the rate limiting enzyme in glycolysis?</p> <p>a) Glucose -6- phosphatase</p> <p>b) Glycerokinase</p> <p>c) Glycogen Synthetase</p> <p>d) Pyruvate carboxylase</p> <p>e) Pyruvate kinase</p>	E

<p>11. Of the allosteric activators of glycolysis in the liver, which of the following is the most important in allowing the liver to maintain a normal blood glucose level?</p> <p>A-Citrate. B-ATP. C-Fructose 2,6-biphosphate. D-Glucose 6-phosphate. E- Acetyl CoA.</p>	C
<p>12. The end product of glycolysis in RBCs is:</p> <p>a. pyruvic acid. b. acetyl CoA. c. CO₂ and water. d. lactic acid. e. malonyl CoA.</p>	D
<p>13. The product formed in the first substrate level phosphorylation in glycolysis is:</p> <p>a) 2-phosphoglycerate b) 1-3-biphosphoglycerate c) 3-phosphoglycerate d) Pyruvate</p>	C
<p>14. A substrate for the enzyme aldolase is:</p> <p>a) Glucose-1-phosphate b) Galactose-6-phosphate c) Fructose 1,6 biphosphate d) Isocitric acid e) Galactose-1-phosphate</p>	C

<p>15. The following is an enzyme required for glycolysis:</p> <ul style="list-style-type: none"> a) Pyruvate kinase b) Pyruvate carboxylase c) Glucose-phosphatase d) Glycerol kinase 	A
<p>16. Dietary deficiency of thiamin inhibits the activity of the enzyme:</p> <ul style="list-style-type: none"> a) Fumarase b) Pyruvate dehydrogenase c) Pyruvate kinase d) Phosphofructokinase e) Enolase 	B
<p>17. Following an early-morning run, a 29-year-old man consumes an all-American breakfast consisting of cereal, eggs, bacon, sausage, pancakes with maple syrup, doughnuts, and coffee with cream and sugar. Which of the following proteins will most likely be activated in his liver after breakfast:</p> <ul style="list-style-type: none"> a) Cytoplasmic PEP carboxykinase b) Plasma membrane GLUT-4 transporter c) Cytoplasmic phosphofructokinase d) Mitochondrial carnitine transporter e) Cytoplasmic glycogen phosphorylase 	C
<p>18. The reaction catalyzed by the following enzyme is freely reversible:</p> <ul style="list-style-type: none"> a) hexokinase b) phosphohexose isomerase c) pyruvate kinase d) phosphofructokinase 	B

<p>19. The main regulatory enzyme of glycolysis is:</p> <ul style="list-style-type: none"> a) Glycerate kinase b) Pyruvate dehydrogenase c) Phosphofructokinase d) Pyruvate carboxylase 	C
<p>20. Glycolysis is considered as the only source of energy in:</p> <ul style="list-style-type: none"> a) adipose tissue b) RBCs c) liver d) heart 	B
<p>21. Glycolysis in RBCs include all the following are true except:</p> <ul style="list-style-type: none"> a) it ends by lactic acid & oxidized NAD b) the energy production is 6 moles of ATP c) it gives 2.3 diphosphoglycerate the stimulate HBO₂ dissociation at peripheral tissue d) in vitro it is inhibited by fluoride 	B
<p>22. Which of the following kinase catalyzes thermodynamically reversible reactions?</p> <ul style="list-style-type: none"> a) hexokinase b) phosphofructokinase c) phosphoglycerate kinase d) pyruvate kinase 	C
<p>23. Which of the following statements concerning glycolysis is correct?</p> <ul style="list-style-type: none"> a) Conversion of glucose to lactate requires O₂ b) Hexokinase is important in hepatic glucose metabolism only in the absorptive period following CHO diet c) Conversion of glucose to lactate yields FADH₂ d) Rate limiting reaction is PFK-1 	D

<p>24. Oxidation of one molecule of glucose to 2 molecules of pyruvate in brain produces ATP</p> <p>a) 3 b) 7 c) 2 d) 8</p>	D
<p>25. Glycolysis is always anaerobic in:</p> <p>a) liver b) brain c) kidneys d) erythrocytes</p>	D
<p>26. Anaerobic glycolysis of glucose-6-phosphate yields:</p> <p>a-2ATP b-3 ATP c-4 ATP d-6 ATP e-10 ATP</p>	B
<p>27. Which of the following is NOT required for the oxidative decarboxylation of pyruvate to form acetyl-CoA?</p> <p>a. NAD⁺ b. lipoic acid c. FAD d. CoA-SH e. ATP</p>	E

<p>28. Which of the following enzyme needs TPP as coenzyme?</p> <ul style="list-style-type: none"> a- pyruvic dehydrogenase complex b- glutamic dehydrogenase c- glucose-6-P dehydrogenase d- pyruvate kinase e- citrate synthase 	A
<p>29. The two major factors determining whether a cell oxidizes glucose by aerobic glycolysis or by anaerobic glycolysis via:</p> <ul style="list-style-type: none"> a- FADH₂ and number of mitochondria b- Ca and AMP c- Oxygen pressure and number of mitochondria d- NADH and ATP/ADP ratio e-amount of glucose in diet 	C
<p>30. Which of the following enzymes their deficiency cause hemolytic anemia?</p> <ul style="list-style-type: none"> a- pyruvate kinase b- pyruvate dehydrogenase c- glucose-6- phosphatase d- glucokinase e- phosphoglycerate mutase 	A
<p>31. Which of the following fragments cannot be converted directly to pyruvate?</p> <ul style="list-style-type: none"> a.alanine b.phosphoenol pyruvate c.lactate d.oxaloacetate e.acetyl coA 	E

<p>32. Free inorganic phosphate is incorporated (added) in the substrate by:</p> <p>a-pyruvate kinase b-enolase c-phosphoglycerate kinase d-glyceraldehyde-3-phosphate dehydrogenase</p>	D
<p>33. ATP is an allosteric inhibitor of:</p> <p>a- phosphofructokinase b-phosphohexose isomerase c-glyceraldehyde -3-P dehydrogenase d-phosphoglycerate kinase</p>	A
<p>34. Glucose-6-P is allosteric inhibitor of:</p> <p>a- Glucokinase b-hexokinase c-phosphohexose isomerase d- phosphofructokinase</p>	B
<p>35. Substrate-linked phosphorylation in glycolysis is catalyzed by:</p> <p>a-hexokinase b-phosphofructokinase c-phosphoglycerate kinase d-glucokinase</p>	C
<p>36. Oxidation of glucose by glycolysis, NADH is formed during synthesis of which one of the following metabolites:</p> <p>a-G-6-P b-pyruvate c-fructose-6-phosphate d-1.3 biphosphoglycerate</p>	D

<p>37. In the process of glycolysis several different steps of reactions take place. which one of the following statements relating to them is correct:</p> <p>a-all of the intermediates reactants derived from glucose are phosphorylated</p> <p>b-two of the reactions are irreversible</p> <p>c-four of the reactions involve net hydrolysis of ATP</p> <p>d- three of the reactions are catalyzed by specific reversible kinase</p>	A
<p>38. Glucokinase:</p> <p>a-found in muscle</p> <p>b. has low affinity to glucose</p> <p>c. catalyze reversible reactions</p> <p>d. allosterically inhibited by G.6.P</p>	B
<p>39. Which of the following statements –concerning glucokinase is correct?</p> <p>a-catalyze 1st step in glycolysis in brain, muscles</p> <p>b. It acts mainly during fasting</p> <p>c.it is stimulated by insulin</p> <p>d. it is allosterically inhibited by end-product</p>	C
<p>40. Which of the following enzymes catalyse formation of compound with very high energy phosphate?</p> <p>a-pyruvate kinase</p> <p>b-phosphoglycerate kinase</p> <p>c-phosphofrucutokinase</p> <p>d-glyceraldehyde -3-P dehydrogenase</p>	D
<p>41. Which of the following reactions constituents an isomerization?</p> <p>a-Glucose → glucose-6-P</p> <p>b.glucose-6-P → Fructose-6-P</p> <p>c.1.3 DPG → 3 P glycerate</p> <p>d.2 phosphoglycerate → 3 phosphoglycerate</p> <p>e.2 phosphoglycerate → phosphoenolpyruvate</p>	B

<p>42. Glucokinase has high Km while hexokinase has low Km, so:</p> <p>a-glucokinase is active at low blood glucose level b- glucokinase is active at high blood glucose level c- hexokinase is active at high blood glucose level d-a,c</p>	B
<p>43. Why phosphofructokinase rather than hexokinase is the pacemaker of glycolysis?</p> <p>a-glucose-6-phosphate is not solely a glycolytic intermediate b-hexokinase has low Km for glucose c-hexokinase is inhibited by feedback inhibition d- None of above</p>	A
<p>44. The following is inducible enzyme:</p> <p>a-glucokinase b-hexokinase c-phosphohexose isomerase d-aldolase</p>	A
<p>45. The main regulatory enzyme of glycolysis is:</p> <p>a-glycerate kinase b-pyruvate dehydrogenase c-phosphofructokinase d-pyruvate carboxylase</p>	C
<p>46. In glycolysis, 1.3 DPG is located at point:</p> <p>Glucose → G.6.P → A → B → C → D → E → F → 2 phosphoglycerate → H → K → Lactate</p> <p>a-B b.E c.F d.G</p>	B

<p>47. In the pathway above, ATP is consumed between:</p> <p>a-A-B b.B,C,D c.C,D,E d.E-F</p>	A
<p>48. In the pathway above, F1.6 di-phosphate is located at point:</p> <p>a-A b-B c-C d-D e-E</p>	B
<p>49. Which of the following is a dead metabolite of glycolysis?</p> <p>a-fructose-6-P b-fructose 1.6 diphosphate c-fructose 2.6 diphosphate d-DHAP</p>	D
<p>50. Hepatic pyruvic kinase is inhibited by:</p> <p>a-insulin b-aspartic c-alanine d-AMP</p>	C
<p>51. Compared with the resting state a vigorously contracting muscle shows:</p> <p>A-an increased conversion of pyruvate to lactate b- increase conversion of pyruvate to CO₂ c-decreased concentration of AMP d-decreased level of fructose 2,6 bi-phosphate e-decreased ratio of NADH/NAD</p>	A

<p>52. Phosphoglycerate kinase produces ATP via:</p> <ul style="list-style-type: none"> a- oxidative phosphorylation b- substrate –linked phosphorylation c- phosphorolysis d- oxidative decarboxylation 	B
<p>53. The enzyme that produced NADH from triose phosphate in glycolysis:</p> <ul style="list-style-type: none"> a- uses NAD and DHAP as substrates b- produces 1,3 DPG c-called 3-phosphoglycerate kinase d- rate limiting enzyme of the pathway 	B
<p>54. The enzyme inhibited by fluoride in glycolysis:</p> <ul style="list-style-type: none"> a) PFK1 b) Enolase c) Pyruvate kinase d) Glyceraldehyde 3 phosphate dehydrogenase 	B