

Past Papers

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ



MID – Lecture 13 to 17
metabolism

﴿ وَإِن تَتَوَلَّوْا يَسْتَبَدِلْ قَوْمًا غَيْرَكُمْ ثُمَّ لَا يَكُونُوا أَمْثَلَكُمْ ﴾

اللهم استعملنا ولا تستبدلنا

لا تنسوا اهلنا من خالص دعائكم

Written by:

- Mahmood Alabsi



Q1 : fructose 2,6-bisphosphate :

- A) Is required for gluconeogenesis
- B) Synthesis is stimulated by insulin
- C) Is increased by cyclic AMP
- D) Inhibits phosphofructokinase (PFK_!)
- E) Stimulates fructose 1,6-bisphosphatase

Answer : B

Q2: inhibited by glucose -6 phosphate:

- A. Glucokinase
- B. Hexokinase
- C. Both A and B
- D. None of the above

Answer : B

Q3 : which of the following enzymes is absent in muscle but present in liver ?

- A) Hexokinase
- B) Lactate dehydrogenase
- C) Glucose 6-phosphatase
- D) Glycogen phosphorylase

Answer : C

Q4 : which enzyme would be impaired in case of Biotin deficiency ?

- A) Fructose 1,6-phosphatase
- B) Pyruvate kinase
- C) PEP carboxykinase
- D) Pyruvate carboxylase
- E) Malate dehydrogenase

Answer : D

Q5: During fight or flight (stressful situation), which of the following is observed?

- A. α -cAMP synthesis is activated, and downstream phosphorylation takes place
- B. β -Glycogen synthase is activated
- C. Inhibitor Protein becomes inactive
- D. Decreased rate of glycogenolysis

Answer : A

Q6: A glucose molecule ends up as X acetyl CoA. They produce after entering TCA Y NADH, Z GTP and P FADH₂. (only in TCA)

- a-X = 2. Y= 3. Z= 1. P=1.
- b-X = 3. Y= 6. Z= 3. P=3
- c-X = 1. Y= 6. Z= 2. P=2
- d-X = 2. Y= 6. Z= 2. P=2

Answer : D

Q7: The enzyme which is involved in glycogen metabolism and does not exist in muscles is:

- a-Glycogen synthase
- b-Glucose 6 phosphatase
- c-Glucose 1 phosphatase
- d-Glycogen phosphorylase

Answer : B

Q8:POMPE disease is caused by a deficiency in:

- a-Glucose 6 phosphatase
- b-Glycogen phosphorylase
- c-Lysosomal glucosidase
- d-Phosphoglucomutase

Answer : C

Q9: Which of the following is true about pyruvate dehydrogenase?

- a-It catalyses a reversible reaction
- b-It contains four coenzymes
- c-Its deficiency causes lactic acidosis
- d-It is inhibited by the presence of ADP

Answer : C

Q10: Which of the following is not a common intermediate between glycolysis and gluconeogenesis?

- a-Glucose 6-phosphate
- b-Phosphoenolpyruvate
- c-Oxaloacetate
- d-Fructose 1,6-bisphosphate

Answer : C

Q11: Glycolysis is inhibited by elevated concentrations of fructose 2,6-bisphosphate”

- A. true
- B. false
- C. It depends

Answer : false

Q12: Source of glucose after 20 hours of fasting:

- A. diet
- B. Gluconeogenesis
- C. Glucogenesis
- D. glycolysis
- E. All are correct

Answer : B

Q12: which one of the following conditions decrease the oxidation of acetyl

- A- a high availability of calcium
- B- a high acetyl coA/ coA ratio
- C- a low ATP/ADP ratio
- D- a low NAD⁺/NADH ratio

Answer : D

Q13: Which of the following reaction is irreversible:

- A-PEP to pyruvate
- B-fructose-6-phosphate to fructose-1,6-bisphosphate
- C-glucose to glucose-6-phosphate
- D- all of the above

Answer : D



Q14: glucose-6 phosphatase present in all tissue except the liver:

A-true

B-false

Answer : B

Q15: ATP needed in gluconeogenesis:

- A-5
- B-6
- C-4
- D-2

Answer : B

16: one of the functions of the fluoride in toothpaste :

- A. inhibits the enzyme “enolase” of the bacteria
- B. inhibits the enzyme “aldolase” of the bacteria
- C. inhibits the enzyme “phosphofructokinase” of the bacteria
- D. inhibits the enzyme “phosphoglucoisomerase” of the bacteria
- E. 2 or more are correct

Answer : A

Q17: What is true about gluconeogenesis?

- A)enhanced by alcohol.
- B)activated in prolonged fasting in the kidneys.
- C)happens in mitochondria.
- D)happens only during exercise.

Answer : B

Q18: Excess glycogen in muscle with normal blood sugar and is a problem in muscle's:

- A. transferase
- B. Glucose phosphatase
- C. glycogen phosphorylase
- D. glycogen synthase
- E. None of the above

Answer : C

Q19:rate limiting step of glycolysis:

- A-PFK-1
- B-PFK-2
- C-MUTASE
- D-ALDOLASE

Answer : A

Q20: someone suffering from hypoglycemia between meals, he has high levels of free fat in blood (sth like that), high glycogen levels but normal structure & enlarged liver. What is the problem?

- A) Phosphoglucomutase deficiency
- B) Glycogen phosphorylase deficiency
- C) Glucose-6-phosphatase deficiency

Answer : B

Q21: True or False:

glycogen synthase is responsible for making alpha (1-4) and alpha (1 6) linkages in glycogen.

- A. True
- B. false

Answer : B

Q22: Well fed state and we have High insulin to glucagon ratio which of the following enzymes will be activated?

- A) glycogen phosphorylase kinase
- B) adenylate kinase
- C) pyruvate kinase
- D) fructose 2,6 biphosphatase
- E) all of the above

Answer : C

Q23:About Glycogen phosphorylase kinase what is true:

- A) found in well fed state
- B) found in liver only not muscle
- C) ATP activates it
- D) phosphatase inhibits it
- E) all of the above

Answer : D

Q24: A 40-years-old male with hypoglycemia and hyperlacticacidemia, What is the most likely deficient enzyme?

- a) Galactokinase.
- b) Glucose 6-phosphatase.
- c) Fructokinase.
- d) GALT.
- e) b+d.

Answer : E

Q25: Which of the following is true about the enzyme producing NADH in the glycolytic pathway?

- a) It produces 1, 3-biphosphoglycerate and NADH
- b) It catalyzes irreversible reaction
- c) It uses NAD⁺ and dihydroxyacetone phosphate as substrates
- d) It uses FADH₂ and glyceraldehyde 3-phosphate as substrates

Answer : A

Q26: The correct statement about glycolysis?

- a) There are 3 kinases and all are regulated.
- b) There are 3 kinases and the second one catalyzes the committed step.
- c) There are 4 kinases and the 3th one is NOT regulated.
- d) There are 4 kinases and the first one catalyzes the committed step.
- e) More than one of the above.

Answer : C

Q27: Which of the following statements about gluconeogenesis is correct?

- a) Pyruvate is first converted to phosphoenolpyruvate by Phosphoenolpyruvate carboxykinase
- b) Fructose 1, 6-biphosphatase converts fructose 1, 6-bisphosphate into fructose 1-phosphate
- c) Glucose 6-phosphatase hydrolyzes glucose 6-phosphate to release glucose into the blood
- d) Glucose 6-phosphatase hydrolyzes glucose 6-phosphate and is found in liver and muscle

Answer : C

Q28: The active form of glycogen _____ is phosphorylated; the
Active form of glycogen _____ is dephosphorylated.

- a. hydrolase; dehydrogenase
- b. dehydrogenase; hydrolase
- c. hydrolase; synthase
- d. phosphorylase; synthase
- e. synthase; phosphorylase

Answer : D

Q29: The precursor to glycogen in the glycogen synthase reaction is:

- a. glucose-1-phosphate
- b. glucose-6-phosphate
- c. UDP-glucose
- d. UTP-glucose
- e. none of the above

Answer : C

Q30: In glycogen, the chains are formed by _____ glycosidic linkages while the branches are _____ glycosidic linkages.

- a. alpha-1,4; alpha-1,6
- b. alpha-1,6; alpha-1,4
- c. beta-1,4; alpha-1,6
- d. beta-1,6; alpha-1,4
- e. none of the above

Answer : A

Q31: The key regulatory enzyme in glycogen breakdown is:

- a. synthase
- b. phosphorylase
- c. phosphatase
- d. isomerase
- e. kinase

Answer : B

Q32: Phosphorylase b is converted to phosphorylase a by:

- a. protein kinase a
- b. protein kinase b
- c. phosphorylase kinase
- d. adenylyl cyclase
- e. none of the above

Answer : C

Q33: The active form of glycogen synthase is:

- a. phosphorylated
- b. dephosphorylated
- c. oxidized
- d. reduced
- e. isomerized

Answer : B

Q34: activators of the enzyme pyruvate kinase include:

- A. Insulin
- B. Fructose 1,6-bisphosphate
- C. Fructose 2,6-bisphosphate
- D. A + B
- E. None of the above

Answer : D

Q35: Glucagon controls the entry of glycolysis by altering the enzymatic action of PFK2, this results in the inhibition of :

- A. Fructose,6,phosphate into fructose,1,fructose6,phosphate
- B. Fructose1,6biphosphate into fructose2,6,biphosphate
- C. Fructose1,6biphosphate into fructose 6,phosphate

Answer : A

Q36: which enzyme participates in both glycolytic and gluconeogenic pathways?

- A. Glucose-6-phosphate
- B. PEP carboxylase
- C. Fructose-1,6,phosphatase
- D. Glucokinase
- E. Glyceraldehyde 3-phosphate dehydrogenase

Answer : E

Q37:Fructose 2,6,biphosphate :

- A. is required for gluconeogenesis
- B. stimulates fructose 1,6,biphosphatases
- C. increased by cAMP
- D. inhibits PFK1

Answer : C

Q38: Rate of Glycolysis is increased by

- A. Increased Insulin/glucagon ratio
- B. ATP
- C. Citrate
- D. Increased glucagon/insulin ratio

Answer : A

Q39:rate limiting enzyme of glycolysis :

- A. hexokinase
 - B. phosphatase1
 - C. Phosphofructokinase1
 - D. Aldolase
- A. E. glucokinase

Answer : C

Q40: a substrate for glycogen synthase is :

- A. Glucose-6-phosphate
- B. glucose-1-phosphate
- C. UDP-glucose
- D. free glucose

Answer : C

Q41: Both glucagon and epinephrine stimulate _____ and inhibit _____

- A. glycogen synthesis / breakdown
- B. glycogen breakdown / synthesis
- C. glycolysis / gluconeogenesis
- D. cAMP breakdown / cAMP formation
- E. Glucose uptake / release

Answer : B

Q42: Which enzyme activates glycogen phosphorylase?

- A. glycogen phosphorylase
- B. Protein Kinase A
- C. Debranchingenzyme
- D. Phosphorylase kinase
- E. Phosphoprotein phosphatase

Answer : D

Q43: Which of the following enzymes cleaves glucose residues from glycogen chains?

- A. glucose phosphorylase
- B. Protein Kinase A
- C. Debranching enzyme
- D. Phosphorylase kinase
- E. Phosphoprotein phosphatase

Answer : C

Q44: Insulin promotes glycogen synthesis in the liver by:

- A. inhibiting glycogen synthase
- B. binding to phosphorylase
- C. causing the dephosphorylation of both phosphorylase and glycogen synthase
- D. activating phosphorylase
- E. facilitating the entry of glucose to the cell

Answer : C

Q45: Which enzyme forms $\alpha(1-6)$ linkages?

- A. glycogen phosphorylase
- B. Protein Kinase A
- C. glycogen branching enzyme
- D. Phosphorylasekinase
- E. Phosphoprotein phosphatase

Answer : C

Q46: All of the following co-factors are required in the pyruvate dehydrogenase complex except :

- A. lipoic acid
- B. NAD⁺
- C. TPP
- D. FAD
- E. All are required

Answer : E

Q47: Which one of the following reactions is unique to gluconeogenesis?

- a. Phosphoenolpyruvate \rightarrow pyruvate
- b. 1,3-Bis-phosphoglycerate \rightarrow 3-phosphoglycerate
- c. Lactate \rightarrow pyruvate
- d. Glucose 6-phosphate \rightarrow fructose 6-phosphate
- e. Oxaloacetate \rightarrow phosphoenolpyruvate

Answer : E

Q48: The following is CORRECT about monosaccharide metabolism:

- a. Glucose can be converted to fructose by aldose reductase.
- b. Galactose-1-phosphate can be combined with glucose in mammary glands by lactose synthase protein A and B.
- c. Fructose intolerance is a result of fructokinase deficiency.
- d. Fructose and galactose entry into cells is insulin dependent.
- e. Fructose metabolism is faster than glucose metabolism.

Answer : E

Q49: When glycogen phosphorylase is active, the following change occurs:

- a. Fructose-1,6-bisphosphatase is activated.
- b. Alcohol dehydrogenase is activated.
- c. Glycogen synthase is activated.
- d. Glycogen kinase phosphorylase is inactivated.
- e. Phosphoglucomutase is activated.

Answer : E

Q50: What is the effect of the metabolism of ethanol by alcohol dehydrogenase on gluconeogenesis?

- a. More alanine is produced due to pyruvate production during ethanol metabolism resulting in an increase in gluconeogenesis.
- b. NADPH production is increased, and this interacts with pentose phosphate pathway and activates it.
- c. NAD⁺ production is increased, and this would increase the production of pyruvate that can activate gluconeogenesis.
- d. The cytochrome system and catalase are inactivated leading to a reduction in gluconeogenesis.
- e. Oxaloacetate is decreased due to the increase in NADH during ethanol metabolism resulting in a decrease in gluconeogenesis.

Answer : E

Q51: Which one of the following statements concerning glycolysis is CORRECT?

- a. The regulated reactions are also the reversible reactions.
- b. Hexokinase is important in hepatic glucose metabolism following consumption of a carbohydrate-containing meal.
- c. Glycolysis is activated by glucagon.
- d. The conversion of glucose to lactate requires the presence of oxygen.
- e. AMP is a potent activator of phosphofructokinase.

Answer : E

Q52: A newborn with organomegaly in several organs due to glycogen storage in lysosomes was diagnosed with Pompe's disease. The biochemical deficiency in this patient is:

- a. Glucose-6-phosphatase deficiency
 - b. Lysosomal glucosidase deficiency
 - c. Glycogenin deficiency.
 - d. Glycogen phosphorylase deficiency
- A. e. α -1,6 glycosidase deficiency

Answer : B

Q53: The cofactor required by the enzyme that produces oxaloacetate from pyruvate is.

- a. Coenzyme A.
- b. Pantothenic Acid
- c. Lipoic Acid
- d. NADH
- e. Biotin

Answer : E

Q54: The reaction that is catalyzed by phosphofructokinase-1:

- a. is activated by high concentrations of ATP and citrate.
- b. uses fructose 1-phosphate as a substrate.
- c. is inhibited by fructose 2,6-bisphosphate.
- d. is near equilibrium in most tissues.
- e. is the rate-limiting reaction of the glycolytic pathway.

Answer : E

Q55: The main role of the glucose produced by gluconeogenesis in the liver is:

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

Answer : C

Q56: The active form of glucose required by glycogen synthase is

- a. UDP-Glucose.
- b. Glucose 6-Phosphate.
- c. Glucose 1-Phosphate.
- d. UTP-Glucose.
- e. ADP-Glucose

Answer : A

Q57: Glycolysis is inhibited by

- a. Hydrogen ions.
- b. phosphorylation of glyceraldehyde 3- phosphate dehydrogenase.
- c. high ADP/ATP ratio.
- d. fructose 2,6 bisphosphate.
- e. dephosphorylation of pyruvate kinase.

Answer : A

Q58: One of the following is true regarding ethanol metabolism:

- A. Acetate produced in mitochondria by ALDH
- B. Acetate produced in blood by ADH
- C. Acetate produced in cytosol by ALDH
- D. Acetaldehyde produced in mitochondria by ALDH
- E. Once Acetate produced remain in liver

Answer : A

Q59: The main enzyme system/s is catalyzing ethanol to acetaldehyde is/are?

- A. Alcohol dehydrogenase
- B. Catalase
- C. Cytochrome P450 2E1
- D. All the above

Answer : A

Q60: The following statement is CORRECT about ethanol metabolism:

- A. It begins at the cytosol of a hepatocyte by alcohol dehydrogenase
- B. It produces acetate as a final product in the cytosol of a hepatocyte by acetaldehyde dehydrogenase
- C. It increases NAD⁺/NADH ratio resulting in inhibition of gluconeogenesis
- D. Ethanol is converted to acetaldehyde mainly by the cytochrome P450 2E1
- E. It consumes NADPH when metabolized by the peroxisomal catalase

Answer : A

For any feedback, scan the code or click on it.



Corrections from previous versions:

Versions	Question #	Before Correction	After Correction
V1 → V2	29 37 53	D A A	C C E
V2 → V3			