Dr.Diala Material

018&019 past papers:

Q1: What is the net yield of NADH when 1 mole of glucose 6-phosphate is oxidized by aerobic glycolysis to yield pyruvate?

A) 0 mole of NADH

B) 1 mole of NADH

C) 2 mole of NADH

D) 3 mole of NADH

Answer:C

Q2: The most important controlled step in the glycolytic pathway is:

A) the formation of fructose 1,6-bisphosphate by PFK1

B) the formation of glucose 6-phosphate

C) the formation of glyceraldehyde 3 phosphate

D) the formation of phosphoenolpyruvate .

Answer:A

Q3 : activators of the enzyme pyruvate kinase include :

A) insulin

B) fructose 1,6-bisphosphate

C) fructose 2,6-bisphosphate

D) A+B

Answer:D

Q4: Glucagon controls the entry of glucose into glycolysis by altering the enzymatic function of PFK-2

This inhibition results in the conversion of :

A) fructose,6-phosphate into fructose 2,6-bisphosphate

B) fructose 1,6-bisphosphate into fructose 2,6-bisphosphate

C) fructose 2,6-bisphosphate into fructose,6-phosphate

Answer:C

Q5 : which of the following enzyme of glycolysis catalyze the reaction of phosphoenolpyruvate (PEP) to pyruvate while making one molecule of ATP in the process?

A) enolase

B)phosphoglycerate kinase

C) pyruvate kinase

D) aldolase

Answer:C

Q6 : An enzyme in liver which is part of both the glycolytic and gluconeogenic pathway is :

A) glucose 6-phosphatase

B)PEP carboxykinase

C)fructose 1,6-bisphosphatase

D) glucokinase

E) glyceraldehyde 3-phosphate dehydrogenase

Answer:E

Q7 : fructose 2,6-bisphosphate :

A) Is required for gluconeogenesis

B) Synthesis is stimulated by insulin

C) Is increased by cyclic AMP

D) Inhibits phosphofructokinase (PFK1)

E) Stimulates fructose 1,6-bisphosphatase

Answer:B

Q8: glycolysis will cease if :

A) Phosphofructokinase is activated

B) Mitochondria aren't present in the cell

C) NADH is not oxidized

Answer:C

Q9 : The rate of glycolysis is increased by :

A) Increased insulin/glucagon ratio

B) ATP

C) Citrate

Answer:A

Q10: under anaerobic conditions , a primary product of glycolysis is:

A) Pyruvate

B) Lactate

C) ethanol

Answer:B

Q11 : Which of the following enzymes of glycolysis is/are regulated?

A) Glucokinase/hexokinase

B) Aldolase

C) Pyruvate kinase

D) A AND C

Answer:D

Q12: The rate-limiting enzyme in glycolysis is :

A) Hexokinase

B) Glucokinase

C) Phosphatase-1

D) Phosphofructokinase-1

E) Aldolase

Answer:D

Q13: the enzyme that has low km and low Vmax for glucose is :

A) Hexokinase

B) Glucokinase

C) Phosphofructokinase-1

D) Aldolase

Answer:A

Q14 : pyruvate carboxylase :

A) Requires acetyl CoA for activity

B) Occurs in the cytosol

C) Catalyze an irreversible reaction in glycolysis

D) Produces carbon dioxide

Answer:A

Q15: inhibited by glucose -6 phosphate:

A) Glucokinase

B) Hexokinase

C) Both A and B

D) None of the above

Answer:B

Q16: under anaerobic conditions , skeletal muscle tissue may continue to generate ATP from glucose metabolism (via glycolysis) , resulting in the conversion of glucose to :

A) Acetyl-CoA

B) Succinate

C) Lactate

D) Citrate

E) Malonate

Answer:C

Q17: glucokinase , the liver enzyme has which of the following properties :

A) A lower Km for glucose than hexokinase

B) Can be inhibited by glucose6-phosphate

C) A higher Km for glucose than hexokinase

Answer:C

Q18: 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

Q19: 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

Q20 : which of the following is (are) unique reaction(s) for Gluconeogenesis:

A) Pyruvate to oxaloacetate

B) Glucose 6-phosphate to glucose

C) Fructose 1,6 bisphosphate to fructose 6-phosphate

D) All of the above

E) None of the above

Answer:D

21) Citrate is used as :

A)PFK inhibitor

B)PFK activator

C)Hexokinase inhibitor

D)Glucokinase inhibitor

Answer:A

22) Diabetic patient lost consciousness after she injected herself with insulin, we gave her glucagon and she recovered very fast. What metabolic pathway was activated?

A) Glycogenesis
B) Glycogen phosphorylase kinase activates glycogen phosphorylase
C) PFK2 is activated forming more Fructose 2,6-BP
D) Pyruvate kinase is allosterically activated

Answer:B

23) One of the following is not a substrate for gluconeogenesis:

A) Succinate
B) Acetate
C) Glycerol
D) Glutamate
E)Malate

Answer:B

24) Cleavage of fructose 1-phosphate will form:

A) Glyceraldehyde and DHAP
B) G3P and DHAP
C) Dihydroxyacetone and G3P
D)Dihydroxyacetone and Glyceraldehyde

Answer:A

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

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

Answer:A

26) Classic galactosemia happens because of deficiency in the enzyme that catalyses:

A) Exchange between galactose 1-phosphate and UDP glucose

B) Phosphorylation of galactose into galactose 1-phosphate
C) Isomerization of glucose 1-phosphate to galactose 1-phosphate
D) Epimerization of UDP-glucose and UDP-galactose

Answer:A

27) 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

28) POMPE disease is caused by a deficiency in:

A) Glucose 6 phosphatase
B) Glycogen phosphorylase
C) Lysosomal glucosidase
D) Phosphoglucomutase

Answer:C

29)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

30) Which of the following is true regarding isomaltase?

A) It is found in the saliva
B) It has an α (1-6) glycosidase activity
C) It is a soluble enzyme
D) It cleaves α (1-4) glycosidic bond in dextrins

Answer:B

31) Which of the following is a not a common intermediate between glycolysis and gluconeogenesis?

A) Glucose 6-phosphate
B) Phoshoenolpyruvate
C) Oxaloacetate
D) Fructose 1,6-bisphosphate

Answer:C

32) An athlete's diet consists of 75g protein, 150g carbohydrates, 50g fats and 20g indigestible fibers (cellulose). Given that each gram of protein gives 4kcal, calculate total Calories in this diet.

A) 1350
B) 1400
C) 1450
D) 1500

Answer:A

33)The conversion of glucose to fructose

a. requires NADPH.
b. requires glucokinase.
c. involves reduction to sorbitol.
d. occurs by isomerization reaction.

e. proceeds through CDP-fructose.

Answer:C

34)The Na+ monosaccharide cotransporter.

a. uses ATP to drive the transport of sodium with glucose.

b. is present in plasma membrane of hepatocytes. C

c. is insulin dependent.

d. transfers glucose from high to low concentration by facilitated diffusion.

e. is involved in glucose reabsorption in proximal tubules.

Answer:E

35)Fructose poisoning results from deficiency of

a. Phosphofructokinase.

b. Sucrase isomaltase.

c. Triose kinase.

d. Aldolase B

e. Fructokinase

Answer:D

36)One of the following enzymes catalyzes a common step between glycolysis and gluconeogenesis

a. Pyruvate carboxylase.

b. pyruvate kinase.

c. glucose 6-phosphatase.

d. Phosphofructokinase.

e. glycerate 3-phosphate kinase

Answer:E

37)Lactate synthase

a. requires lactalbumin in males.
b. requires ATP as a source of energy.
c. is not normally expressed in males.
d. uses UDP-galactose as a substrate.
e. is present only in lactating mammary glands.

Answer:D

38)The high NADH/NAD+ ratio caused by alcohol intoxication inhibits:
a. gluconeogenesis.
b. hexokinase.
c. glycolysis.
d. glycogen degradation.
e. conversion of pyruvate to lactate.

Answer:C

39)One of the following enzymes is common between gluconeogenesis and production of glucose from liver glycogen.
a. glucose 6- phosphatase.
b. phosphorylase.
c. phosphoglucose isomerase.
d. hexokinase.
e. fructose 2,6 bisphosphatase.

Answer:A

40)The products of glycolysis under aerobic conditions in the muscle are
a. pyruvate, NADPH and ATP.
b. lactate, NADH and ATP.
c. lactate and ATP.

d. pyruvate, NADH and ATP.
e. lactate, NADPH and ATP.

Answer:D

41)The active form of glucose required by glycogen synthase is
a. UDP-Glucose.
b. Glucose 6-Phosphate.
c. Glucose l-Phosphate.
d. UTP-Glucose.
e. ADP-Glucose

Answer:A

42)The immediate product(s) of glycogen degradation by glycogen phosphorylase in the liver is(are)
a. glucose 1,6– bisphosphate.
b. glucose 1-phosphate.
c. glucose 6-phosphate.
d. glucose.
e. all answers are true.

Answer:B

43)The glucose transporter GLUT4
a. is found in the pancreatic cells.
b. is found in liver cells.
c. can transport glucose against concentration gradient.
d. is actually fructose transporter.
e. is insulin sensitive.

Answer:E

44)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

2011-2017 past papers:

1-True about lactic acid fermentation?
Answer: it oxidizes NADH to NAD+

2-this statement is right or wrong?
"Glycolysis is inhibited by elevated concentrations of fructose 2,6-bisphosphate"
Answer: wrong phosphofructokinase (a committed step in glycolysis) is activated by Fructose 2,6- bisphosphate and by AMP (it sends a message that we don't have enough ATP so increase glycolysis).

3-Source of glucose after 20 hours of fasting:
Answer: gluconeogenesis

4-Wrong about H2O2?
Answer: produced by catalase

5-The enzyme that does not produce reactive oxygen species?
Answer: Catalase.

6-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

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

A-true

B-false

Answer:B

8-ATP needed in gluconeogenesis:((how much energy in general))

A-5

B-6 يعني هما اعتبروا انه ATP و GTPواحد

C-4

D-2

Answer:B

9-the amount of ATP that needed to transfer single pyruvate to glucose:

Answer: 3 نفس التعليل السابق

10-one of the functions of the fluoride in toothpaste :

Answer: inhibits the enzyme “enolase” of the bacteria which prevents dental caries.

11-Wrong about alcohol fermentation from glucose:

A)use pyruvate decarboxylase.

B) release CO2.

C)produce 1ATP per glucose.

D)produce NAD+ from NADH.

Answer: produce 1ATP per glucose

12-The products of anaerobic glycolysis?

1)2 ATP, 2 acetyl coA, 2 CO2

2)2 ATP, 2 pyruvate, 2 NADH

3)2 ATP, 2 ethanol, 2 CO2

4)2 ATP, 2 lactate

Answer: 2 ATP, 2 lactate.

13-What is true about gluconeogenesis?
1)enhanced by alcohol.
2)activated in prolonged fasting in the kidneys.
3)happens in mitochondria.
4)happens only during exercise.
Answer: activated in prolonged fasting in the kidneys.

14-Triose phosphate isomerase converts?
Answer: interconverts DHAP and GAP.

15.A pregnant woman suffering from galactosemia, it wouldn't be a problem if she had:
Answer: udp-glucose epimerase

16-Excess glycogen in muscle with normal blood sugar and is a problem in muscle's:
Answer: glycogen phosphorylase

17-Severe hypoglycemia:
Answer:G-6-Phosphatase (deficiency)

18-One of these is not involved in the activity of PKA:
Answer:Activation of Phosphodiesterase

19-Right statement about Aldose reductase:
Answer:All of the above كان في خيارين produces sorbitol from glucose , produces galactitol from galactose

20- Involved in both glycogen lysis and glycogen synthesis:
Answer:Production of glucose 1 p

21-Well fed state:

Answer:Glycogen synthesis and glycolysis

22-Wrong about NO:
Answer:Synthesized from Asparagine

23-Right about fructose 2,6-bisphosphate:
Answer:High insulin/glucagon ratio

24-Mismatch between enzyme and its allosteric effector:
Answer:PFK-->Glucose-2,6 bisphosphate

25-Not important in gluconeogenesis:
Answer:Acetyl coa

26-Phosphorylase b activated in the muscles by :
Answer:AMP

27-Wrong about G6PD: (deficiency)
Answer:Reduced ATP

28-Red blood cells glycolysis produce:
Answer:2lactate +2ATP

29-Why muscle glycogen cannot rise blood glucose?
Answer:no glucose-6-phosphatase

30-Phosphorylation inhibit what enzyme in liver ?
Answer-pyruvate kinase

31-Common between glycogen synthesis and degradation:
Answer:Phosphoglucomutase

32-A person has exercise intolerant when he did exercise no Lactate is profuse , which enzyme defected ?

Answer:Phosphofructokinase

33-Gluconeogenesis increase with:
Answer:activated by acetyl coA

34- glucose and galactose are:
Answer:C4 epimers

35-most common type of glucose is D-form:
Answer:true

36-the enzyme that convert cAMP to AMP:
A-adenylyl cyclase
B-phosphodiesterase
C-G-protein
D-protein kinase
Answer:B

37-liver:
A-GLUT 3
B-GLUT 2
C-GLUT 4
D-GLUT 5
Answer:B

38-all of the following about GLUT true except:
A-facilitated diffusion
B-sodium independent
C-ATP dependent
D-tissue specific pattern
Answer:C

39-products of aerobic glycolysis:
A-2 ATP
B-2 NADH

C-2 pyruvate
D- ALL
Answer : D

40-rate limiting step of glycolysis:
A-PFK-1
B-PFK-2
C-MUTASE
D-ALDOLASE
Answer:A

41-enzyme that make dehydration at glycolysis:
Answer: enolase

42-After carbohydrate-rich meal, glucose absorption depends on:
Answer: Na-K antiport.

43-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?
1)Phosphoglucomutase deficiency
2)Glycogen phosphorylase deficiency
3)Glucose-6-phosphatase deficiency
Answer: Glycogen phosphorylase deficiency

44-Cataract formation and problems in lens in uncontrolled diabetes is due to :
Answer: sorbitol accumulation.

45- True or False: glycogen synthase is responsible for making alpha (1 4) and alpha (1 6) linkages in glycogen.
Answer:false

46-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 bisphosphatase
E) all of the above

Answer: pyruvate kinase

47*IMPORTANT*About Glycogen phosphorylase kinase what is true

A) found in well fed state

B) found in liver only not muscle

C) calcium activates it

D) phosphatase inhibits it

E) all of the above

Answer: D

REMEMBER the General rule: phosphorylation of an enzyme that increases the level of glucose will convert it into an active enzyme, while the phosphorylation of an enzyme which utilizes glucose will inhibit it.

48- A child that vomits and is weak when he takes sucrose containing food, and the symptoms fade when he is fed from his mom's milk, the child has deficiency in:

Answer: Aldolase B

49-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.

F))All of the above.

Answer:b+d.

50-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:It produces 1, 3-biphosphoglycerate and NADH

51-When one molecule of glucose is oxidized to two molecules of lactate during anaerobic glycolysis, which of the following statements is false?

a) Glyceraldehyde 3-P dehydrogenase reaction produces 2 ATP molecules

b) Lactate dehydrogenase reaction produces no ATP

c) Pyruvate kinase reaction produces 2 ATP molecules

d) Phosphofructokinase-1 reaction uses 1 ATP molecule

Answer:Glyceraldehyde 3-P dehydrogenase reaction produces 2 ATP molecules

52-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 3rd one is NOT regulated.

d) There are 4 kinases and the first one catalyzes the committed step.

e) More then one of the above.

Answer:There are 4 kinases and the 3rd one is NOT regulated

53- How many ATP molecules does the glycolysis contribute in the whole cellular respiration ?

a) 2

b) 4

c) 8

d) 36

Answer:8

54-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

55-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:phosphorylase; synthase

56-The precursor to glycogen in the glycogen synthase reaction is:

a. glucose-1-phospate

b. glucose-6-phosphate

c. UDP-glucose

d. UTP-glucose

e. none of the above

Answer:UDP-glucose

57-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:alpha-1,4; alpha-1,6
58-The key regulatory enzyme in glycogen breakdown is:
a. synthase
b. phosphorylase
c. phosphatase
d. isomerase
e. kinase
Answer:phosphorylase

59- The key regulatory enzyme in glycogen synthesis is:
a. synthase
b. phosphorylase
c. phosphatase
d. isomerase
e. kinase
Answer:synthase

60-The formation of primers to initiate glycogen synthesis is carried out by:
a. glycogenin
b. oxidase
c. reductase
d. kinase
e. synthase
Answer:glycogenin

61-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:phosphorylase kinase

62- The active form of glycogen synthase is:

a. phosphorylated

b. dephosphorylated

c. oxidized

d. reduced

e. isomerized

Answer: dephosphorylated

63-The enzyme which removes the glucose residue at branch points of glycogen during glycogen breakdown is:

a. glycogen synthase

b. debranching enzyme

c. phosphoglucose mutase

d. none of the above

Answer:debranching enzyme

64-The two hormones that signal for glycogen breakdown are:

a. norepinephrine and glucagon

b. calcitonin and glucagon

c. glucagon and epinephrine

d. insulin and epinephrine

e. calcitonin and epinephrine

Answer:glucagon and epinephrine

65- Why is glycogen branching important?

a. slower breakdown/synthesis

b. faster breakdown/synthesis

c. decreases solubility

d. increases solubility

e. b + d

Answer:b + d

66-A 15-year old type 1 diabetic faints after injecting himself with insulin. He is administered glucagon and rapidly recovers consciousness. Glucagon induces activity of:

a. glycogen synthase

b. glycogen phosphorylase

c. glucokinase

d. hexokinase

e. UDP glucose pyrophosphorylase

Answer:glycogen phosphorylase

142-A 15-year old type 1 diabetic faints after injecting himself with insulin. He is administered glucagon and rapidly recovers consciousness. Glucagon induces activity of: a. glycogen synthase b. glycogen phosphorylase c. glucokinase d. hexokinase e. UDP glucose pyrop hosphorylase Answer:glycogen phosphorylase

67- A 30-year old presents with intractable vomiting and inability to eat or drink for the past 3 days. His blood glucose level is normal. Which of the following is most important for maintenance of blood glucose?

a. spleen

b. heart

c. skeletal muscle

d. lysosome

e. liver

Answer:liver

68-Which enzyme is not present in muscle?

a. phosphorylase b

b. hexokinase

c. glucose-6-phosphatase

d. glycogen synthase

e. lactate dehydrogenase

Answer:glucose-6-phosphatase

69-During the breakdown of glycogen, free glucose is formed from which of the following?

a. glucose residues in an alpha 1,4 glycosidic linkages

b. the reducing end

c. the nonreducing end
d. glucose residues in alpha 1,6 glycosidic linkages
e. hydrolysis of glucose 1-phosphate
Answer:glucose residues in alpha 1,6 glycosidic linkages
70-TRUE/FALSE: Glycogen synthesis and breakdown are reversible reactions of each other
Answer:False

71-Which glycogen storage disease is related to severe hypoglycemia and hepatomegaly fatty liver?
a. von gierk's disease
b. McArdle syndrome
c. pomp disease
d. glucose 6-phosphatase disease
e. a + d
Answer:von gierk's disease

72- which of the following diseases is contributed to massive cardiomegaly?
a. von gierk's disease
b. McArdle syndrome
c. pomp disease
d. glucose 6-phosphatase disease
e. a + d
Answer:pomp disease

73-Which one of following statements about glycogen metabolism is correct?
a) Glycogen is synthesized in the liver in the fed state, then exported to other tissues in low density lipoproteins.
b) Glycogen reserves in liver and muscle will meet energy requirements for several days in prolonged fasting.
c) Liver synthesizes more glycogen when the hepatic portal blood concentration of glucose is high because of the activity of glucokinase in the liver.
d) Muscle synthesizes glycogen in the fed state because glycogen phosphorylase is activated in response to insulin.

e) The plasma concentration of glycogen increases in the fed state.
Answer:C

74-Which of the following is the major energy source for sperm cells?
a. glucose
b. lactose
c. galactose
d. sucrose
e. fructose
Answer: fructose

75- Which of the following are an example of epimers?
a. glucose and galactose
b. glucose and ribose
c. mannose and glucose
d. glucose and sucrose
e. a + c
Answer: e

76-Which of the following carbohydrates is a triose?
a. glucose
b. ribose
c. ribulose
d. glyceraldehyde
e. none of the above
Answer: glyceraldehyde

77-Phosphorylation of fructose at carbon #1 to produce fructose 1-phosphate is mediated by:
a. fructokinase
b. aldolase B
c. aldolase A
d. aldolase C
e. a + b

Answer: fructokinase

78-Fructose 1-phosphate is cleaved by:
a. aldolase A
b. aldolase B
c. aldolase C
d. fructokinase
e. aldose reductase
Answer: aldolase B

79-Fructosuria is caused by:
a. fructokinase deficiency
b. aldolase B deficiency
c. aldolase C deficiency
d. phosphofructose kinase deficiency
e. a + d
Answer: fructokinase deficiency

80-aldolase B deficiency results in:
a. no phosphorylation of fructose
b. fructose poisoning
c. accumulation of fructose 1-phosphate
d. fructosuria
e. b + c
Answer: b + c

81-TRUE/FALSE: Lactic acidosis is a result of aldolase B deficiency.
Answer: TRUE

82- Glucose is _____ to sorbitol, then sorbitol is _____ to fructose
a. oxidized/reduced
b. oxidized/interconverted
c. reduced/oxidized
d. reduced/reduced
e. none of the above

Answer:reduced/oxidized

83-Glucose reduction to sorbitol is mediated by which enzyme?

a. aldolase

b. aldose reductase

c. sorbitol dehydrogenase

d. aldose dehydrogenase

e. sorbitol reductase

Answer:aldose reductase

84-Sorbitol oxidation to fructose is mediated by which enzyme?

a. aldolase

b. aldose reductase

c. sorbitol dehydrogenase

d. aldose dehydrogenase

e. sorbitol reductase

Answer:sorbitol dehydrogenase

85-All of the following are sources of galactose EXCEPT:

a. lactose

b. glycolipids

c. glycoproteins

d. mannose

e. a + b

Answer:mannose

86-The exchange reaction involves which enzyme:

a. GALT

b. GLUT

c. galactokinase

d. epimerase enzyme

e. none of the above

Answer:GALT

87- Isomerization between UDP-glucose and UDP- galactose is mediated by:
a. GALT
b. epimerase
c. galactokinase
d. galactosyl transferase
e. alpha-lactalbumin
Answer:epimerase

88-The structure of lactose synthase includes:
a. galactosyl transferase
b. alpha-lactalbumin
c. protein A
d. protein B
e. all of the above
Answer: all of the above

89- synthetase is:
a. ATP independent
b. ATP dependent
c. AMP independent
d. AMP dependent
e. a + d
Answer:ATP dependent

90-which of the following when found in less than normal amount results in glycogen storage disease V?
A. Hexokinase
B. Glucose-6-phosphatase
C. Glycogen phosphorylase
D. Lactate dehydrogenase
Answer:Glycogen phosphorylase

91-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:All are required

92-Which of the following enzymes cleaves glucose residues from glycogen chains?
A. glycogen phosphorylase
B. Protein Kinase A
C. Debranching enzyme
D. Phosphorylase kinase
E. Phosphoprotein phosphatase
Answer:Debranching enzyme

93-Which of the following results in hepatomegaly?
A. Glycogen storage disease type I
B. Glycogen storage disease type II
C. Glycogen storage disease type III
D. Glycogen storage disease type V
E. Glycogen storage disease type VII
Answer:A

Lipids

THE YOLLOW QESTIONS ARE EXCLUDED

1) Requires vitamin B12:

A-Oxidation of odd numbered FA.

B-Oxidation of unsaturated fatty acid

C-Acetyl CoA Carboxylase

D-Convert acetyl coA to Malonyl CoA

Ans:A

2))The step required to activate\start TAG synthesis?

A- activation of fatty acids by addition of CoA.

B- B-forming DHAP

ANS : A

3) True about TAG synthesis:

A-DHAP is reduced to glycerol phosphate in adipose tissue

B-Glycerol kinase play important role

C-It's not a hormone sensitive process

D-Phosphatidate is not on the pathway of TAG synthesis

ANS : A

4) butyric acid is formed by synthase by which of the following :-

a- oxidation of long fatty acid

b- b- condensation of malonyl and acetyl

ANS : B

5))TAG is produced in adipose tissue, which is true ?

a- needs NADPH

c- needs glycerol kinase c- needs active glycolysis

d- d- b+c

ANS:C

6) The fatty acid that has NO double bonds :

a) Butyric acid.

b) Palmitic acid.

c) Capric acid.

d) All the above

ANS: D

7) produces diacyl glycerol and inositol 3 phosphate from PIP2?

a- phospholipase b

b- b- phospholipase d

c- c- phospholipase a

d- d- phospholipase c

ANS : D

8) Which of the following is used in the oxidation of very long fatty acid and not in long or short chain fatty acids?

a. NAD+

b. FAD

c. H2O

d. O2.

ANS : D

9))One of the following increases ketone bodies synthesis:

a. High free fatty acids concentration in the blood

b. Low blood levels of Glucagon

c. Inhibition of beta oxidation

d. Inhibitions of hormone sensitive lipases

ANS : A

10) Glycerol after TAG hydrolysis

a. is used in the liver and muscle for glycolysis

b. used to resynthesize fat in the liver

c. is used in the liver for gluconeogenesis

d. is metabolized in the kidney and excreted in the urine

ANS : C

-LIPPINCOTT'S Q.:

1-When oleic acid, 18:1(9), is desaturated at carbon 6 and then elongated, what is the product?

A. 19:2(7,9)

B. 20:2 (n-6)

C. 20:2(6,9)

D. 20:2(8,11)

2-**A 4-month-old child is being evaluated for fasting hypoglycemia. Laboratory tests at admission reveal low levels of ketone bodies, free carnitine, and acylcarnitines in the blood. Free fatty acid levels in the blood were elevated. Deficiency of which of the following would best explain these findings?**

A. Adipose triglyceride lipase

B. Carnitine transporter

C. Carnitine palmitoyltransferase I

D. Long-chain fatty acid dehydrogenase

3-A teenager, concerned about his weight, attempts to maintain a fat-free diet for aperiod of several weeks. If his ability to synthesize various lipids were examined, he
would be found to be most deficient in his ability to synthesize:

A. cholesterol.

B. glycolipids.

C. phospholipids.

D. prostaglandins.

E. triacylglycerol.

4-**In preparation for a trip to an area of India where chloroquine-resistant malaria is endemic, a young man is given primaquine prophylactically. Soon thereafter, he**
develops a hemolytic condition due to a deficiency in glucose 6-phosphate dehydrogenase. A less-than-normal level of which of the following is a consequence of the enzyme deficiency and the underlying cause of the hemolysis?

A. Glucose 6-phosphate

B. Oxidized form of nicotinamide adenine dinucleotide
C. Reduced form of glutathione
D. Ribose 5-phosphate

5-**Septic shock, a state of acute circulatory failure characterized by persistent arterial hypotension (low blood pressure) and inadequate organ perfusion refractory to fluid resuscitation, results from a severe inflammatory response to bacterial infection. It has a high mortality rate and is associated with changes in the level of nitric oxide**.
Which statement concerning septic shock is most likely correct?
A. Activation of endothelial nitric oxide synthase causes an increase in nitric oxide.
B. High mortality is the result of the long half-life of nitric oxide.
C. Lysine, the nitrogen source for nitric oxide synthesis, is deaminated by bacteria.
D. Overproduction of nitric oxide by a calcium-independent enzyme is the cause of the hypotension..

6-**An individual who has recently been prescribed a drug (atorvastatin) to lower cholesterol levels is advised to limit consumption of grapefruit juice, because high intake of the juice reportedly results in an increased level of the drug in the blood, increasing the risk of side effects. Atorvastatin is a substrate for the cytochrome P450 enzyme CYP3A4, and grapefruit juice inhibits the enzyme**.
Which statement concerning P450 enzymes is most likely correct?
A. They accept electrons from reduced nicotinamide adenine dinucleotide (NADH).
B. They catalyze the hydroxylation of hydrophobic molecules.
C. They differ from nitric oxide synthase in that they contain heme.
D. They function in association with an oxidase.

7-In male patients who are hemizygous for X-linked glucose

6-**phosphate dehydrogenase deficiency, pathophysiologic consequences are more apparent in red blood cells (RBC) than in other cells such as in the liver. Which one of the following provides the most reasonable explanation for this different response**?.

A. Excess glucose 6-phosphate in the liver, but not in RBC, can be channeled to glycogen, thereby averting cellular damage.
B. Liver cells, in contrast to RBC, have alternative mechanisms for supplying the reduced nicotinamide adenine dinucleotide phosphate required for maintaining cell integrity.
C. Because RBC do not have mitochondria, production of ATP required to maintain cell integrity depends exclusively on the shunting of glucose 6-phosphate to the pentose phosphate pathway.
D. In RBC, in contrast to liver cells, glucose 6-phosphatase activity decreases the level of glucose 6-phosphate, resulting in cell damage

Answers:

1-D.

Fatty acids are elongated in the endoplasmic reticulum by adding two carbons at a time to the carboxylate end
(carbon 1) of the molecule. This pushes the double bonds at carbon 6 and carbon 9 further away from carbon 1. 20:2(8,11) is an n-9 (ω-9) fatty acid.

2-B.

A defect in the carnitine transporter (primary
carnitine deficiency) would result in low levels of carnitine in the blood (as a result of increased urinary loss) and low levels in the tissues. In the liver, this decreases fatty acid oxidation and ketogenesis. Consequently, blood levels of free fatty acids rise. Deficiencies of adipose triglyceride lipase would decrease fatty acid availability Deficiency of carnitine palmitoyltransferase I would result in elevated blood carnitine. Defects in any of the enzymes of β-oxidation would

result in secondary carnitine deficiency, with a rise in acylcarnitines.

3-D.

Prostaglandins are synthesized from arachidonic acid. Arachidonic acid is synthesized from linoleic acid, an essential fatty acid obtained by humans from dietary lipids. The teenager would be able to synthesize all other compounds but, presumably, in somewhat decreased amounts.

4-C.

Glutathione (GSH) is essential for red cell integrity and is maintained in its reduced (functional) form by nicotinamide adenine dinucleotide phosphate (NADPH)-dependent glutathione reductase. The NADPH is generated by the oxidative portion of the pentose phosphate pathway. Individuals with a deficiency of the initiating and regulated enzyme of this pathway, glucose 6-phosphate dehydrogenase (G6PD), have a decreased ability to generate NADPH and, therefore, a decreased ability to keep GSH functional. When treated with an oxidant drug such as primaquine, some patients with G6PD deficiency develop a hemolytic anemia. Primaquine does not affect glucose 6-phosphate levels. Nicotinamide adenine dinucleotide is neither produced by the pentose phosphate pathway nor used as a coenzyme by GSH reductase.

5-D.

Overproduction of short-lived (not long-lived) nitricoxide (NO) by calcium-independent, inducible nitric oxide synthase (iNOS) results in excessive vasodilation leading to hypotension. NOS uses arginine, not lysine, as the source of the nitrogen. The endothelial enzyme (eNOS) is constitutive and produces low levels of NO at a consistent rate.

6-B.

The P450 enzymes hydroxylate hydrophobic compounds, making them more water soluble. Reduced nicotinamide adenine dinucleotide phosphate (NADPH) from the

pentose phosphate pathway is the electron donor. The electrons are first transferred to the coenzymes of cytochrome P450 reductase and then to the P450 enzyme. Both the P450 enzymes and the nitric oxide synthase enzymes contain heme.

7-B.

Cellular damage is directly related to decreased
ability of the cell to regenerate reduced glutathione, for which large amounts of reduced nicotinamide adenine dinucleotide phosphate (NADPH) are needed, and red blood cells (RBCs) have no means other than the pentose phosphate pathway of generating NADPH. It is decreased product (NADPH), not increased substrate (glucose 6-phosphate), that is the problem. RBCs do not have glucose 6-phosphatase. The pentose phosphate pathway does not generate ATP.