

JIPMER QUESTIONS

JIPMER May 2016

Qn1. A 50 yr male with symptoms of fatigue and he has swelling of feet and loss of sensations in legs and anaemia, He also has dilatation of ventricle and high cardiac output state. What is the vitamin deficiency associated with this presentation?

- a) **Vitamin B1**
- b) Vitamin B2
- c) Vitamin B12
- d) Vitamin B3

Thiamine (or vitamin B1) deficiency, also known as *beriberi*, has traditionally been divided into two major types: a "dry" form, in which features of peripheral neuropathy predominate, and a "wet" form, in which signs and symptoms of right-sided heart failure with normal or high cardiac output are the presenting features. A fulminant variant, termed *Shoshin beriberi* (from the Japanese *sho* meaning acute damage, and *shin* meaning heart), complicating either one of the two types, may occur with severe biventricular failure, metabolic acidosis, variable cardiac output with vascular collapse, peripheral cyanosis and eventually death. This syndrome is usually preceded by non-specific symptoms such as generalized fatigue, loss of appetite, and abdominal pain

Qn 2. Not a reversible reaction in ETC

- a) succinate dehydrogenase
- b) Cyt B
- c) **Cytochrome c Oxidase**
- d) NADH reductase

Qn3. A 27 year lady developed severe hyperglycemia in pregnancy and it returned to normal after delivery. Her blood sugar is well

under control without any medications. Her sisters and mother also have history of increased blood glucose during pregnancy, all were euglycemic after delivery. What is the enzyme defect?

- a) **Glucokinase**
- b) PFK
- c) Aldolase
- d) Enolase

Qn4. Utilisation of ketone bodies extra hepatic tissues is by

- A) HMG CoA lyase
- B) HMG CoA synthase
- C) 3 hydroxy dehydrogenase

D) Thiophorase

Qn 5. Hormone elevated in an Alzheimer's patient who was found wandering outside for 24 hours without water and food. That particular hormone can act on the intracellular receptor (normal euglycemic patient)

- A) glucagon (act on Membrane receptor)
- B) growth hormone
- C) epinephrine (act on membrane receptor)
- D) Cortisol ✓

Qn 6. A baby boy 10 month old comes with vomiting, severe jaundice, hepatomegaly and features of irritability on starting weaning with fruit juice. Which of the following enzymes is defective?

- a) **aldolase B**
- b) Fructokinase
- c) glucose 6 phosphatase
- d) Galactose 1 Phosphate Uridyl Transferase

Qn7 (Version 1). What happens to the keto acid which receives an amino group of alanine released from muscle after exercise before getting converted to glucose?

- a) Oxaloacetate
- b) Malate
- c) **Alpha Keto Glutarate**
- d) ?

Qn7 (Version 2). What happens to alanine released from muscle after exercise before getting converted to glucose?

- a) Oxaloacetate
 - b) Malate
 - c) Alpha Keto Glutarate
 - d) ?
- Alanine is converted to Pyruvate, Pyruvate to Oxaloacetate to Glucose
 - & Amino group received by Alpha Keto Glutarate to form Glutamate

Qn 8. A 60 year old female presents for routine examination. She is taking fruits vegetables and multivitamin tablets regularly. Her LMP is 5 years ago. She is very much concerned about the wrinkles around the eyes. Formation of wrinkles is due to defect in

- a) Fibrillin Synthesis
- b) Collagenase
- c) collagen cross linking
- d) Collagen fibrils

Qn 9 Why hemolysis occurs in G6pd deficiency ?

- a) 6 phospho gulanolactone not formed
- b) ?*Decreased oxidative glutathione
- c) lipid peroxides accumulation in RBC
- d) Due to to methemoglobin formation

Explanation: In G6PD deficiency, NADPH level is reduced, so Decreased Reduced Glutathione cannot be formed ...>Which leads to accumulation of free radicals (Lipid peroxides also)

Option b says decreased oxidative Glutathione

Qn 10. In a case of classic homocystinuria what should be supplemented in the diet to prevent heart attacks

- a) pyridoxine.
- b) methionine
- c) methyl cobalmine
- d) Niacin

Qn 11 Endoplasmic reticulum is not site for ?

- a) Glycolysis
- b) Protein synthesis
- c) Protein package
- d) Cell signaling

Nov 2015

1. SNP without a prior sequence information is best identified by

- a) DNA Microarray
- b) PCR
- c) DNA Sequencing
- d) Fusion gene microarray

Using Microarray certain known SNP are arranged and unknown labeled oligonucleotide carrying or suspecting polymorphism is added. So a prior information is needed.

Repeat length Polymorphisms (VNTR) can be detected by Real time PCR or Amplicon length Analysis.

2. FISH used

To locate a known genetic loci

3. Suicidal bag organelle-

- a) Lysosomes
- b) Endoplasmic reticulum
- c) Peroxisome
- d) Mitochondria

4. Apolipoprotein unique to Chylomicron

- a) B48
- b) B100
- c) A1
- d) CII

5. Repeat nucleotide in Telomere results in

- a) Decreased cell division
- b) Increased cell division
- c) Addition of Poly A tail
- d) Addition of SNPs

6. What is the first physiological response following hypoglycemia

- a) Increase in cortisol
- b) Decrease in insulin level
- c) Increase in epinephrine
- d) Increase in Glucagon

Ref Stryer-Biochemistry 7/e Also Harper 30/e

The early fasting state. The blood-glucose level begins to drop several hours after a meal, leading to a decrease in insulin secretion and a rise in glucagon secretion; glucagon is secreted by the α cells of the pancreas in response to allow blood-sugar level

in the fasting state. Just as insulin signals the fed state, glucagon signals the starved state. It serves to mobilize glycogen stores when there is no dietary intake of glucose. The main target organ of glucagon is the liver.

7. False about Gauchers disease

- a) **Enzyme replacement therapy not available**
- b) Splenomegaly is massive and progressive
- c) Infants present with opisthotonus and spasm
- d) ?No mental retardation

8. Denaturation of Proteins

- a) **Primary structure intact**
- b) ?Secondary structure intact
- c) ?Tertiary structure intact
- d) ?No loss of folding

10. Which is true about G6PD deficiency?

- a) Autosomal dominant inheritance
- b) Does not give protection against malarial infection.
- c) Presents as chronic hemolytic anaemia
- d) **Commonly cause neonatal jaundice**

11. Carbohydrate related to Blood group substance

- a) **Fucose**
- b) Xylose
- c) Xylulose
- d) Arabinose

12. Which of the following is wrongly matched

- a) Folate-Anaemia
- b) Zinc-Immunodeficiency
- c) **Iodine –Dry Skin** (This is the least matched)
- d) Iron-Anaemia

13. DNA melting depends on

- a) Length of DNA
- b) Hydrogen bond between Purines
- c) ?Hydrogen bond between Pyrimidines
- d) **G-C Pairs**

14. Enzyme that remove hydrogen from substrate to Oxygen is

- a) Oxygenase
- b) **Oxidase**
- c) Dehydrogenase

15. Megaloblastic anaemia seen in

- a) Ornithine Transcarbamoylase defect
- b) MSUD
- c) Citrullinemia
- d) **Orotic aciduria**

16. Vitamin whose RDA depends on Protein intake is Pyridoxine (Reference Park) Park clearly says RDA of Niacin depends on energy intake NOT on Protein intake alone. Biochemical reason-Almost all amino acid metabolism is dependent on Pyridoxine. RDA of Thiamine depends on carbohydrate intake.

May 2015

1. Which of the following is true about Krebs Cycle? Jipmer May 2015

- A. Pyruvate condenses with Oxaloacetate to form Citrate
- B. **Alpha keto Glutarate is a five Carbon compound**
- C. Oxidative Phosphorylation occurs in the cytoplasm only
- D. Krebs cycle can operate in anaerobic condition

2. Mousy body odour is due to (Jipmer May 2015)

- A. Phenyl Alanine
- B. **Phenyl Acetate**
- C. Phenyl Butazone
- D. Phenyl Acetyl Glutamine

3. Which is the test used to identify mRNA

- A. Southern Blot
- B. Northern Blot**
- C. Western Blot
- D. South Western Blot

4. Regarding Hb A1 C true is

- A. Hemoglobin with a Sugar moiety**
- B. Cannot be used to stratify the renal complication in Diabetes Mellitus
- C. Increase in Diabetic patient with Sickle cell anaemia
- D. Absent in people without Diabetes mellitus

5. True about bilirubin is

- A. Conjugated with Glycerine
- B. Facilitate absorption of carbohydrates from diet.
- C. Is a steroid
- D. Bound to Albumin in circulation**

6. About DNA which of the following is true

- A. The nucleotide of one strand form bonds with nucleotide of opposite strand.**
- B. Cytosine and Uracil differ by one ribose sugar
- C. The information from DNA is copied in the form of tRNA
- D. Each nucleotide pair includes two purines.

Nov 2014

1. Northern blot is used for

- A. DNA
- B. RNA**
- C. Protein
- D. Antigen

2. Rate limiting enzyme of Purine synthesis is

- A. PRPP Glutamyl Amidotransferase**

- B. PRPP Synthetase
- C. Carbamoyl Phosphate Synthetase I
- D. AIR Carboxylase

3. A vitamin derived from amino acid is

- A. Biotin
- B. Pantothenic acid
- C. Niacin**
- D. Folic acid

4. N Acetyl Cysteine replenishes

- A. Glutathione**
- B. Glycine
- C. Glutamate
- D. ?

5. Enzyme common for synthesis of both ketone bodies and Cholesterol

- A. HMG CoA Reductase
- B. HMG CoA Synthase**
- C. Acetyl CoA Carboxylase
- D. HMG CoA Lyase

6. Glucose intolerance is seen in deficiency of

- A. Chromium**
- B. Selenium
- C. Molybdenum
- D. Zinc

7. Mucopolysaccharide that doesn't contain Uronic acid residue is

- a) Heparan Sulphate
- b) Heparin
- c) Chondroitin Sulphate
- d) Keratan Sulphate**

8. True statement regarding telomerase is

- a) It is a reverse transcriptase**
- b) Active in somatic cells
- c) Involved in translation
- d) Helps in shortening of DNA

9. Function of Pseudouridine arm of tRNA

- a) Helps in initiation of translation
- b) Serves as the recognition site of amino acyl tRNA synthetase
- c) Recognises the triple nucleotide codon present in the mRNA.
- d) Helps in initiation of transcription

10. Vitamin for which RDA is based on protein intake is

- a) Niacin
- b) Riboflavin
- c) Pyridoxine
- d) Thiamine

11. In PKU which is true

- a) Tyrosine level decreases
- b) Decreased Phenyl alanine products
- c) Increase in Phenyl Alanine hydroxylase
- d) Dihydrobiopterin reductase deficiency

12. Enzyme increased in the fed state is

- a) Acetyl CoA Carboxylase
- b) Glucose 6 Phosphatase
- c) CPS-1
- d) HMGCoA Oxidase

13. All are poly unsaturated fatty acid except

- a) Linoleic acid
- b) Palmitic acid
- c) Arachidonic acid
- d) Eicosa Pentaenoic acid

14. Epigenetic changes among the following are all except

- a) SnRNA interference
- b) Poly A tailing of the mRNA
- c) Histone acetylation
- d) DNA methylation

15. Substrate level Phosphorylation not seen in:

- a. PhosphoFructokinase
- b. PhosphoGlycerate kinase
- c. Succinate Thiokinase
- d. Pyruvate Kinase

Substrate level Phosphorylations are:

- 1,3BisphosphoGlycerate Kinase
- Pyruvate Kinase
- Succinate Thiokinase

16 Which enzyme is absent in muscle?

- (a) Glucose-6-Phosphatase
- (b) Glycogen phosphorylase
- (c) Enolase
- (d) Thiophorase

Enzymes absent in the muscles are

- Glucose 6 Phosphatase
- Glycerol Kinase (also absent in the White Adipose Tissue)

17. Ketone bodies not utilised by:

- (a) RBC (b) liver
- (c) brain (d) heart

18. Which of the following is false about heparin?

- (a) Releases lipoprotein lipase
- (b) Releases hormone sensitive lipase
- (c) It is an anticoagulant
- (d) It is a Glycosaminoglycan

19.. Which of the following is a Lyase?

- (a) Aldolase B
- (b) Acetyl Co A Synthetase
- (c) Fatty Acyl CoA Dehydrogenase
- (d) Acetyl CoA Carboxylase

Some examples of Lyases are

- HMG CoA Lyase
- ArgininoSuccinateLyase
- ATP Citrate Lyase
- Aldolase
- Fumarase

20. Insulin dependent glucose transport not present in:)

- a. Liver
- b. Adipose tissue
- c. Heart
- d. Skeletal muscles

21. Which is true about enzyme kinetics for competitive inhibition:

- (a) low K_m high affinity
- (b) high K_m high affinity
- (c) High K_m low affinity**
- (d) Low K_m low affinity

Features of competitive inhibition:

- K_m increases, hence the affinity is lowered
- V_{max} remains the same

Features of noncompetitive inhibition:

- K_m remains the same
- V_{max} decreases

Significance of K_m (Michaelis Constant):

- K_m is substrate concentration at $1/2V_{max}$
- Constant for an enzyme substrate pair
- It is called signature of the enzyme
- Higher the K_m , lower is the affinity of the enzyme towards the substrate
- Lower the K_m , higher is the affinity of the enzyme towards the substrate

23 Regarding electron transport chain which is true:

- (a) Cyanide stops the ETC but allows production of ATP
- (b) Oligomycin deplete the ADP
- (c) Atractiloside inhibit the proton transfer through F_0F_1 complex
- (d) Aspirin cause uncoupling of Oxidative phosphorylation**

Option A: Cyanide inhibit Complex IV of ETC, and therefore totally arrest respiration

Option B: Oligomycin blocks the flow of protons through the ATP Synthase

Option C: Atractylolide inhibit the transport of ADP and ATP.

Option D: High dose Aspirin is an uncoupler of Oxidative Phosphorylation.

Hence the answer is d

24. Which of the following will not favour insulin secretion?

- (a) glucagon
- (b) amino acid

- (c) hypokalemia**
- (d) ketone bodies

Factors that favour Insulin secretion are:

- Glucose
- Amino Acids
- Free fatty Acid
- Ketone Bodies
- Glucagon
- Secretin
- Sulfonyl Urea drugs tolbutamide and Glyburide

Factors that block the release of Insulin:

- Epinephrine
- Norepinephrine

Insulin and serum Potassium:

- Insulin pumps extracellular K^+ to intracellular compartment.
 - Hence insulin causes Hypokalemia
- But Hypokalemia never favour insulin secretion

25. Lipoprotein a resembles: (Jipmer 2014)

- (a) plasminogen** (b) plasmin
- (c) thrombin (d) prothrombin

26 Which is a reverse transcriptase:

- (a) Topoisomerase
- (b) Telomerase**
- (c) RNA polymerase II
- (d) DNA polymerase alpha

Reverse transcriptase is RNA dependent DNA Polymerase:

Option A: Topoisomerase is a nicking resealing enzyme, not a reverse transcriptase

Option **B**: Telomerase **has** reverse transcriptase activity.

Option C: RNA polymerase II is an DNA dependent RNA Polymerase, not a reverse transcriptase

Option D: DNAP alpha is a eukaryotic DNA dependent DNA Polymerase But also has Primase activity. Primase is DNA dependent RNA Polymerase, not a reverse transcriptase

27. Which of the following is not an aldose?

- A. Glucose
- B. Mannose
- C. Fructose**
- D. Galactose

28. The enzyme deficient in Refsum's disease

- A. Phytanic acid Oxidase
- B. Lysyl Hydroxylase
- C. Malate Dehydrogenase
- D. DNA Polymerase

29. FAD dependent reaction is

- A. Succinate to Fumarate
- B. Fumarate to Malate
- C. Glucose to Glycogen
- D. A Ketoglutarate to Succinate

30. One of the following is obtained in the by beta oxidation of odd chain fatty acids

- A. Acetyl CoA + Acetyl CoA
- B. Acetyl CoA + Propionyl CoA
- C. Propionyl CoA + Propionyl CoA
- D. Acetyl CoA alone

31. The number of double bonds in the Arachidonic acid

- A. 1
- B. 2
- C. 3
- D. 4

32. Restriction Endonuclease is used in

- A. RFLP
- B. PCR
- C. FISH
- D. SDS-PAGE

33. The Maple Syrup Urine disease is due to defect in

- A. Transamination
- B. Hydroxylation
- C. Deamination
- D. Decarboxylation

34. Glycogenolysis in the muscle do not raise the blood glucose due to lack of which enzyme?

- A. Arginino Succinate Lyase
- B. Lactate Dehydrogenase
- C. Glucose 6 Phosphatase
- D. Pyruvate Kinase

35. Major function of HMP is to provide

- A. ATP
- B. GTP
- C. NADH
- D. NADPH

36. In which of the following copper acts as coenzyme

- A. Carboxy peptidase
- B. Pyruvate Carboxylase
- C. Cytochrome Oxidase
- D. Carbonic Anhydrase

37. The source of Ammonia in urine is

- A. Glutaminase
- B. Urease
- C. Arginase
- D. Glutamate Dehydrogenase

38. Which of the following is not from Aspartate

- A. Anserine
- B. Glucose
- C. Oxaloacetate
- D. Asparagine

39. The function of Cori's Cycle

- A. Fatty acid transport
- B. 2,3 Bisphospho Glycerate transport
- C. Reutilisation of Lactate
- D. Transport of Amino acid across the membrane

40. Carbon Dioxide is not released in the following reactions

- A. β Hydroxy Butyrate Dehydrogenase

- B. α KetoGlutarate Dehydrogenase
- C. Isocitrate Dehydrogenase
- D. Malic Enzyme

41. The conversion of Uroporphyrinogen III to Coproporphyrinogen III is an example of

- A. Deamination
- B. Hydrogenation
- C. Decarboxylation
- D. Dehydrogenation

42. Which is an activator of LCAT?

- A. Apo E
- B. Apo AI
- C. Apo B48
- D. Apo B100

43. Which of the following is a glycolipid?

- A. Cerebroside
- B. Plasmalogen
- C. Sphingomyelin
- D. Lecithin

44. All the enzyme activities are increased in fasting state EXCEPT

- A. Acetyl CoA Carboxylase
- B. Carnitine Acyl Transferase
- C. PEPCK
- D. Pyruvate Carboxylase

45. Which of the following is both polar and ionic?

- A. Arginine
- B. Asparagine
- C. Glutamine
- D. Leucine

46. The amino acid which on decarboxylation gives rise to a potent vasodilator

- A. Histidine

- B. Arginine
- C. Glutamate
- D. Aspartate

47. The synthesis of 1 peptide bond involves

- A. 1 ATP
- B. 2 ATPs
- C. 3 ATPs
- D. 4 ATPs

48. Selenium is a cofactor in the following enzyme

- A. Glutathione Peroxidase
- B. Cytochrome Oxidase
- C. Cytochrome Reductase
- D. Xanthine Oxidase

49. Thiamine act as a cofactor in

- A. Pyruvate to Oxaloacetate
- B. Malonate to Oxaloacetate
- C. Succinate to Fumarate
- D. Pyruvate to Acetyl CoA

50. Enzyme not involved in DNA replication is

- A. Telomerase
- B. Reverse Transcriptase
- C. Restriction Endonuclease
- D. DNA Ligase

51. Copper is required in the collagen synthesis for

- A. Lysyl Hydroxylase
- B. Lysyl Oxidase
- C. Prolyl Hydroxylase
- D. Prolyl Oxidase

52. Amino acid not involved in Protein synthesis

- A. Ornithine
- B. Alanine
- C. Asparagine
- D. Cysteine

53. Niemann Pick Disease is due to deficiency of

- A. Sphingomyelinase
- B. Gangliosidosis
- C. Glucocerebrosidase
- D. Ceramidase

54. Tay Sachs disease is due to accumulation of

- A. GM2 Ganglioside
- B. GM1 Ganglioside
- C. Glucocerebroside
- D. Galactocerebroside

55. Hereditary Fructose Intolerance is due to deficiency of

- A. Aldolase B
- B. Aldolase A
- C. Fructokinase
- D. Sucrase

56. Second messenger is produced from

- A. Phosphatidyl inositol
- B. Phosphatidyl Serine
- C. Phosphatidyl Choline
- D. None

57. Pseudotumour cerebri is caused by hypervitaminosis of

- A. Vitamin D
- B. Vitamin A
- C. Vitamin E
- D. Vitamin K

58. Suicidal enzyme is

- A. Cyclooxygenase
- B. Lipoxygenase
- C. Dehydrogenase
- D. Pyruvate Kinase

59. Bile acids are derived from

- A. Bilirubin
- B. Fatty acid
- C. Cholesterol

D. Amino acids

60. All the following require Biotin as a coenzyme except

- A. Propionyl CoA Carboxylase
- B. Acetyl CoA Carboxylase
- C. Pyruvate Carboxylase
- D. Pyruvate Dehydrogenase

61. The major fuel in the brain after several weeks of starvation is:

- A. Glucose
- B. Fatty Acid
- C. β Hydroxy Butyrate
- D. Glycerol

62. The storage Tri acyl Glycerol are hydrolysed by

- A. Pancreatic Lipase
- B. Lipoprotein Lipase
- C. Lysosomal Lipase
- D. Hormone sensitive Lipase