МИНИСТЕРСТВО ОБРАЗОВАНИЯ И НАУКИ
КЫРГЫЗСКОЙ РЕСПУБЛИКИ
ОШСКИЙГОСУДАРСТВЕННЫЙ УНИВЕРСИТЕТ
МЕЖДУНАРОДНЫЙ МЕДИЦИНСКИЙ ФАКУЛЬТЕТ

Кафедра «Естественных наук и математика»

РАССМОТРЕНО
на заседании кафедры протокол № 10
от «5» 09 2023 года

Зав. кафедрой _____ А.Ы.Курбаналиев

УТВЕРЖДАЮ
Председатель УМС ММФ,
к.э.н., доцент _____ Базиева А.М.
"05" 09 2023 г.

ФОНД ТЕСТОВЫХ ЗАДАНИЙ

для итогового контроля по дисциплине «Клиническая биохимия»
на 2023-2024учебный год
Направление: 560001 – лечебное дело (GM)
курс –2, семестр – III

Наименование дисциплины	Всего	Кредит	Аудиторные занятия(60 ч)		СРС
			Лекции	Практические	
Клиническая биохимия	**90 ч**	**3 кр**	**18ч**	**27 ч**	60ч
Кол-во тестовых вопросов	**230**				

Составитель:
Молдобаева А.О. _____
Марс к. Т. _____

Эксперт-тестолог: _____ **Тешебаева У.Т.**

г. Ош - 2023г.

Выписка из протокола № 10
Заседания кафедры Естественных наук и математика
Международного медицинского факультета Ошского государственного университета

от « 06 » 06 2023 г.

Всего членов: 17

Присутствовали: 15

Отсутствовали: 2

ПОВЕСТКА ДНЯ:

1. **Утверждение экзаменационных тестовых вопросов по дисциплинам кафедры за II семестр 2022-2023 учебного года**

Слушали: зав. кафедрой Курбаналиев А.Ы., который ознакомила присутствующих количеством, структурой и содержанием экзаменационных тестовых вопросов за весенний семестр текущего учебного года.

Подробно остановился на каждый предмет по каждой специальности отдельно:

1.1. Об утверждении экзаменационных тестов по общая биохимии:

Сетка часов по учебному плану:

Наименование дисциплины	Всего	Ауд. зан.	Аудиторные занятия		СРС	Отчетность	
			Лекции	Практи-ческие			
Общая биохимии	120 ч (4кр)	60 ч	24 ч	36 ч	60 ч	2 сем.	Экзамен
Количество экзаменационных тестов			(в т.ч. в формате TF) **300**				

Выступила: Тешебаева У.Т., которые единогласно поддержали количество, структуру и содержание экзаменационных тестовых вопросов по биохимии.

Решили:

1. Утвердить экзаменационных тестовых вопросов по дисциплинам кафедры за весений семестр 2022-2023 учебного года;

Поставновили:

1. Принять к сведению выступление зав. Кафедрой Курбаналиев А.Ы.
2. Рекомендовать обращение кафедры на рассмотрения УМС факультета.
3. Ходатайствовать перед Учебно-методическим Советом факультета об утверждении экзаменационных тестовых вопросов по дисциплинам за весений семестр 2022-2023 учебного года.

Председатель _____ **А.Ы. Курбаналиев**

Секретарь: _____ **Дилмурат к. Кызбурак**

ЭКСПЕРТНОЕ ЗАКЛЮЧЕНИЕ БАНКА ТЕСТОВЫХ ЗАДАНИЙ

кафедры «Естественных наук и математики»

от «28» май 2023 г.

на разработанные тестовые задания по дисциплине
«Biochemistry»
наименование дисциплины

к. х. н., доцент Тешебаева Ч. Р.

/указать должность, ученую степень, Ф.И.О. автора (авторов)/

Тестовые задания проверены членом экспертной группы тестологов

доцент, к. ф. н. Базиева А. М.

/указать должность, ученую степень, Ф.И.О./

Направления проведения оценки структуры и содержания тестового задания

№	Направление экспертизы	Оценка экспертов	
1	Соответствие задания программам и стандартам обучения	Соответствует	Не соответствует
		✓	
2	Включение в тесты только наиболее важных, базовых знаний	Соответствует	Не соответствует
		✓	
3	Ясность смысла тестовой ситуации и представления ТЗ	ясно	Не ясно
		✓	
4	Правильность ответа на вопрос ТЗ	Соответствует	Не соответствует
		✓	
5	Значимость содержания тестового задания (0-сомнительный, 1-допустимый, 2-важный, 3-существенный)	3 балл(ов)	
6	Соответствие необходимое число заданий по каждому разделу дисциплины исходя из его важности и числа часов, отведенных на его изучение в программе.	Соответствует	Не соответствует
		✓	

Членом экспертной группы выявлены следующие недостатки в тестовом задании грамматические ошибки в анг. вопросе

Членом экспертной группы внесены следующие исправления (корректировки) в тестовое задание грам. ошибки исправлены

На основании представления тестовых заданий автором (авторами) и проведенной проверки сделала следующее заключение:

1) Содержание тестовых заданий **соответствует (не соответствует)** содержанию УМКД *(нужное подчеркнуть)*

2) Представленные тестовые задания в следующем объеме 300 вопросов: **соответствуют (не соответствуют)** требованиям, предъявляемым к количеству, уровням сложности и формам заданий для составления тестов. *(нужное подчеркнуть)*

Тестолог Базиева А. М. _____ / 06.06.23
подпись дата

Ознакомлен зав. кафедрой Кубанычбек А. _____ / 05.06.23
подпись дата

Metabolism of lipids

1. This molecule acts as molecular chaperones to assist the folding of proteins

a) Vitamins
b) Carbohydrates
c) Amides
d) Lipids

2. Which of these is not a lipid?

a) Fats
b) Oils
c) Proteins
d) Waxes

3. The abundantly distributed enzyme in germinating seeds and adipocytes is

a) Lipase
b) Proteases
c) Cellulase
d) Nuclease

4. Beta-oxidation of fatty acids occurs in

a) Peroxisome
b) Peroxisome and Mitochondria
c) Mitochondria
d) Peroxisome, Mitochindria and ER

5. An example of _____ is Carnauba wax

a) Soft wax
b) Liquid wax
c) Hard wax
d) Archaebacterial wax

6. In fats, the number of OH groups can be expressed as

a) Reichert-Meissil number
b) Polenske number
c) Iodine number
d) Acetyl number

7. Rancidity of lipids of lipid-rich foodstuff is because of

a) Reduction of fatty acids
b) Hydrogenation of unsaturated fatty acids
c) Dehydrogenation of saturated fatty acids
d) Oxidation of fatty acids

8. **The acetyl CoA is produced in the mitochondria and must be transported into cytosol for synthesis of fatty acid. Which of the following is true regarding its transport?**

a) Acetyl CoA is diffused from mitochondrial membrane
b) acetyl CoA is transported by its specific transporter protein
c) acetyl CoA is converted into pyruvate, enters into cytosol and acetyl CoA is regenerated
d) acetyl CoA is converted into citrate, enters into cytosol and acetyl CoA is regenerated

9. Which is the largest and which is the smallest of the lipoprotein family?

a) VLDL and Lp (a)
b) Chylomicrons and HDL
c) VLDL and HDL
d) VLDL and Lp (a)

10. Low-density lipoproteins (LDL) are the principle transport vehicles for _____ in the blood.

a) Glucose
b) Triglycerides
c) Cholesterol
d) amino acids

11. What are the most active organs in the animal body that can synthesize triacylglycerol?

a) Liver and intestines b) Kidney and intestines
c) Gall bladder and kidneys d) Pancreas and intestines

12. What is the precursor for fatty acid synthesis

a) Acetyl CoA b) propionyl CoA
c) Succinyl CoA d) Acetoacetyl CoA

13. The conversion of acetyl CoA to malonyl CoA is the rate limiting step in fatty acid synthesis. Which of the following enzyme catalyzes the above mentioned reaction?

a) Acetyl CoA carboxylase c) Malonyl CoA synthetase
b) Acetyl CoA decarboxylase d) Malonyl CoA synthase

14. Which of the following is the best marker for the diagnosis of Acute pancreatitis?

a) Lactase b) Amylase
c) Cholesteryl esterse d) γ-glytamyltrans peptidase

15. A gall stone the blocked the upper part of the bile duct would cause an-

a) Incomplete lipid digestion and absorption b) Increased recycled of bile salts
c) Increased excretion of bile salts d) decreased excretion of fats in the feces

16**. Phospholipids are:**

a) simple lipids b) derived lipids
c) Complex lipids d) None

17**. Which of the following is monoenolic acid**:

a) arachidonic acid b) linoleic acid
c) Oleic acid d) linolenic acid

18. **Which of the following fatty acid has maximum number of carbon atoms:**

a) Oleic acid b) linolenic acid
c) Cervonic acids d) α-linoleic acid

19. **Which fatty acid is not synthesized by man:**

a) Linolenic acid b) linolenic acid
c) Cervonic acids d) α-linoleic acid

20**. Which of the following is a cardio protective fatty acid:**

a) Palmitic acid b) Stearic acid
c) Oleic acid d) Omega-3 fatty acids

21. **Which of following reaction is due to lipid peroxidation-**

a) saponification b) Hydrogenation
c) soap formation d) Rancidity

22. Hydrogenation of fatty acid is:

a) Hydrolysis by Alkali b) Auto- oxidation of PUFA
c) Addition of hydrogen to unsaturated fatty acid
d) Addition of hydrogen to saturated fatty acid

23. **Autooxidation is seen in-**

a) Cholesterol b) Arachidonic acid
c) Stearic acid d) Palmitic acid

24. What will you to stop chyluria in diet?

a) Small chain FA b) Medium chain FA
c) Long chain FA d) Omega-3 unsaturated FA

β-oxidation of fatty acids

25. Free fatty acid produced in adipose tissue is transported by-

a) Globin b) Albumin
c) Ceruloplasmin d) None

26. Major metabolism of saturated fatty acids in the mitochondria is called as-

a) β-oxidation b) α-oxidation
c) ω-oxidation d) None of the above

27. Long chain fatty acid is transported into inner mitochondria is called as-

a) Acyl carrier protein b) Acyl carnitine
c) simple diffusion d) energy mediated

28. In beta oxidation of fatty acids carnitine is required for-

a) conversion of chain fatty acids to long chain fatty acids
b) transport of long chain fatty acid to mitochondrial inner layer
c) transport of long chain fatty acid to cytoplasm
d) conversion of long chain fatty acids to short chain fatty acids

29. ATP yield in stearic acid oxidation-

a) 146 ATP b) 142 ATP
c) 129 ATP d) 139 ATP

30. Oxidation of palmitic acid forms how many ATP molecules-

a) 94 ATP b) 108 ATP
c) 122 ATP d) none

31. In well fed state, the carnitine palmitate acyl transferase on the outer mitochondrial membrane is most potently inhibited by-

a) Glucose b) palmityol CoA
c) Malonyl CoA d) Acetyl CoA

32. Omega oxidation of fatty acids occur-

a) Endoplasmic reticulum b) Mitochondria
c) cytosol d) None

33. α-oxidation occurs in –

a) Mitochondria b) Peroxidase
c) Cytosol d) Golgi apparatus

34. β-oxidation of very long chain fatty acids occurs-

a) Endoplasmic reticulum b) Peroxisomes
c) lysosome d) Golgi apparatus

35. In Zellweger syndrome, there is-

a) Accumulation of long chain fatty acids b) Accumulation of short chain fatty acids

c) Accumulation of verylong chain fatty acids d) Accumulation of medium chain fatty acids

36. β-oxidation in peroxisome is differentiated from that occurring in mitochondria by -

a) Acetyl CoA b) H_2O_2 formed
c) different enzymes are found in different sites d) NADH is required

37. Fatty acid metabolism gives-

a) acetyl-CoA b) Malonyl CoA
c) Ketone bodies d) Cholesterol

Ketone bodies

38. Ketone bodies are formed in the:

a) Liver b) Pancreas
c) Kidneys d) Lungs

39. Ketone bodies utilized by conversion of:

a) Acetoacetate to acetacetyl CoA b) Series of changes leads to pyruvate
c) Alphaketo glutaric acid d) succinyl CoA

40. Insulin inhibits ketogenesis by all except:

a) Decreased acetyl-CoA b) Increased β-oxidation
c) Decreased lipolysis d) Decreased fatty acid

41. In a person fasting overnight wih carnitine deficiency, following chemicals increase in quantity in blood:

a) Glucose b) Fatty acids
c) Amino acids d) Ketone bodies

42. A destitute woman is admitted to the hospital with altered sensorium and dehydration; urine analysis shows mild proteinuria and sugar; what other test would be desirable:

a) Fouchet b) Pothera
c) Hays d) Benedicts

43. Which of the following organs do not utilize ketone bodies?

a) Brain, RBC c) Muscle, heart
b) RBC, liver d) Heart, brain

44. All the following statements correctly describe ketone bodies, except:

a) They may result from starvation
b) They are present at high levels in uncontrolled diabetes
c) They include—OH β-butyrate and acetone
d) They are utilized by the liver during long term starvation

45. Which of the following organs do not utilize ketone bodies?

c) Brain, RBC c) Muscle, heart
d) RBC, liver d) Heart, brain

46. The immediate precursor in the formation of acetoacetate from acetyl CoA in the liver is:

a) Mevalonate c) Acetoacetyl CoA

b) HMG CoA d) 3-hydroxy-butyryl CoA

47. In a well fed state, acetyl CoA obtained from diet least used in the synthesis of:

a) Palmotoyl CoA c) Acetoacetate
b) Citrate d) Oxalosussinate

48. Common enzyme in cholesterol and Ketone body metabolism:

a) HMG CoA reductase c) HMG CoA synthase
b) HMG CoA lyase d) Thiolase

Fatty acid synthesis

49. 1st acetyl droup donor in fatty acid synthesis is –

a) Malonyl CoA c) Palmitate
b) Acetyl CoA d) Citrate

50. The end product of cytosol fatty acid synthetase in humans is-

a) Oleic acid c) arachidonic acid
b) Palmitic acid d) linoleic acid

51. Important intermediate product of biosynthesis of fatty acid is-

a) Cholesterol c) Malonyl CoA
b) Acetyl CoA d) Thioesterases

52. The fist step in fatty acid synthesis involves-

a) Acetyl CoA carboxylase c) β-Hydroxy CoA dehydrogenase
b) Acetyl CoA dehydrogenase d) Pyruvate kinase

53. Rate limiting step in fatty acid synthesis is-

a) Production of acetyl CoA c) Prodution of oxaloacetate
b) Production of malonyl-CoA d) Production of citrate

54. Rate controlling enzyme of fatty acid synthesis-

a) Thiosterase c) Transacetylase
b) Acetyl CoA carboxylase d) ketacyl synthase

55. Acetyl CoA carboxylase is activated by-

a) Malonyl CoA c) Citrate
b) Palmitoyl CoA d) Acetoacetate

56. Allosteric inhibitor of fatty acid synthehase is-

c) Citrate c) Long chain acyl CoA
d) ATP d) NAD

57. NADPH is required for:

a) Gluconeogenesis c) Glycolysis
b) Fatty acids synthesis d) Glycogenolysis

58. The most important sourse of reducing equivalents for fatty acid synthesis in the liver is-

a) Glycolysis c) TCA cycle

b) Uronic acid pathway d) HMP pathway

59. Citrate used in fatty acid synthesis uses which enzyme-

a) Citrate synthase c) ATP citrate lyase
b) Aconitase d) Malic enzyme

60. Lipogenesis in liver is stimulated by-

a) Glucagon c) Insulin
b) Thyroxine d) Epinerphine

61. Multienzyme complex in humans-

a) Fatty acid synthetase c) Malonyl CoA carboxylase
b) Carbomoyl phoshphate synthease d) Adenosine phosphoribosyl transferase

62. Which of the following is not a component fatty acid synthase complex-

a) Ketacyl synthase c) Acetyl transacylase
b) Acetyl-CoA carboxylase d) Enoyl reductase

63. Saturated fatty acids containing up to 16 carbon atoms assembled in-

a) Mitochondria c) Cytoplasm
b) Rough endoplasmic reticulum d) Smooth endoplasmic reticulum

64. In which organelle (s) of hepatocyte, the elongation of long chain fatty acid takes place-

a) Endoplasmic reticulum c) Golgi body
b) Mitochondria d) Lysosomes

65. Which protein is present in the chylomicrons?

a) myoglobin b) apolipoprotein
c) apoferritin d) actin

66. Which enzymes are majorly used for digestion of lipids?

a) salivary enzymes b) gastric enzyme
c) pancreatic enzyme d) none of the above

67. What products are obtained from the hydrolysis of cholesterol ester?

a) cholesterol and proteins b) cholesterol and fatty acids
c) cholesterols and ester d) cholesterol and phospholipids

68. Which of the following dietary modifications have minimum hypocholesterolemic action?

a) Inclusion of fresh fruits and vegetables in diet
b) dietary cholesterol intake less than 300 mg/day
c) Intake of whole wheat bran
d) Consuming fish as the only nonvegetarian food

69. An obese person may have all following all the following biochemical abnormalities, except:

a) Increased glucose tolerance b) Hypertriglyceridemia
c) Chronic respiratory acidosis d) High plasma insulin levels

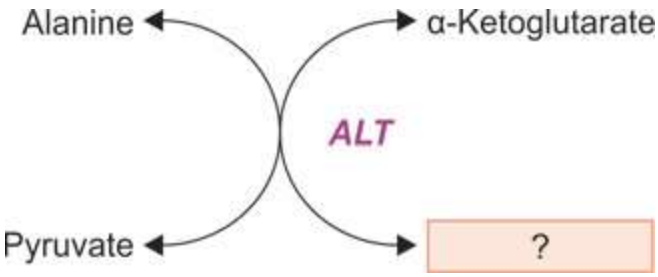
70. **Secondary hyperlipidemia occurs in all the following conditions, except:**

a) Hypothyrodism b) Alcoholism

c) Chronic pancreatitis
d) Nephrotic syndrome

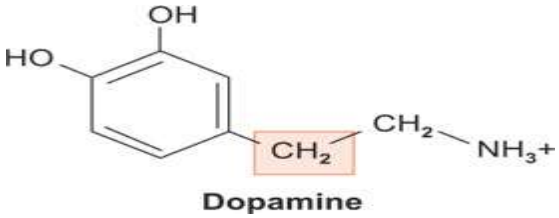
GENERAL AMINO ACID METABOLISM

1. **In the reaction, what is product formed?**



a) Glutamate
b) Glutamine
c) Oxaloacetate
d) Aspartate

2. **This compound is derived from which amino acid?**



Dopamine

a) Tyrosine
b) Histidine
c) Tryptophan
d) Leucine

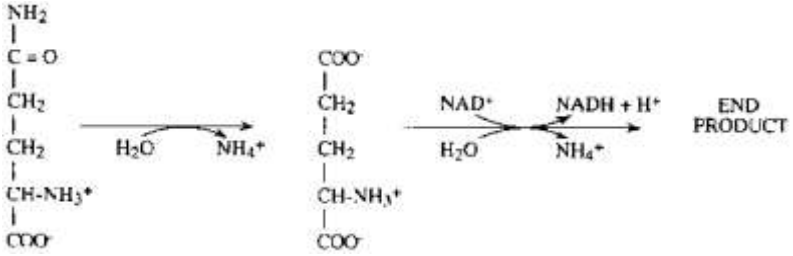
3. The amino acid which serves as a carrier of ammonia from skeletal muscle to liver is:

a) Alanine
b) Methionine
c) Arginine
d) Glutamine

4. Glutamine in blood acts as:

a) NH_3 transporter
b) Toxic element
c) Stored energy
d)Abnormal metabolite

5. The second and final enzymatic step in the reaction pathway shown is most correctly described as:



a) Amination
b) Aminotrasfer
c) Transamination
d) Oxidative deamination

6. **In which of the following condition there is increased level of ammonia in blood?**

a) ornithine transcarbamoylase deficiency b) Galactocemia

c) Histidinemia d) Phenyl ketonuria

7. Enzyme involved in nonoxidative deamination is:

a) L-amino acid oxidase b) Glutamate dehydrogenase

c) Glutaminase d) Amino acid dehydrases

8. **Which of the amino acid produces a vasodilator on decarboxylation?**

a) Glutamin acid b) Histidine

c) Ornithine d) Cysteine

9. Accumulation of trytophan in blood is known as

a) Pompe's disease b) Wilson's disease

c) Wolman's disease d) Hartnup's disease

10. Xanthoproteic test is positive in proteins containing

a) Sulphur amino acids b) α-Amino acids

c) Aromatic amino acids d) Aliphatic amino acids

INDIVIDUAL AMINO ACID METABOLISM

11. In phenylketonuria the main aim of fist line there of is:

a). Replacement of the defective enzyme

b) Replacement of the deficient enzyme

c) Limiting the substrate for deficient enzyme

d). Giving the missing amino acid by diet

12. Which of the following would not act as source of glycine by transamination?

a) Alanine c) Glytamate

b) Aspartate d) Glyxylate

13. Cysteine is abundantly found in:

a) Keratin c) creatine

b) Chondroitin sulfate d) Spermine

14. **N-acetyl-cysteine replenishes**:

a) Glutathione c) Glutamate

b) Glycine d) CABA

15. Nitric Oxide synthesized from?

a) Arginine c) Alanine

b) Citrulline d) Cysteine

16. Branched chain ketoacid decarboxylation is defective in:

a) Maple Syrup urine disease c) Alkaptonuria

b) Hartnup disease d) GMI Gangliosidosis

17. Mousy body odor is due to:

a) Phenylalanine c) Phenylbytazone

b) Phenyl acetate d) Phenylacetylglutamine

18. The amino acid that can be converted into a vitamin:

a) Clycine c) Phenylalanine
b) Tryptophan d) Lysine

19. Guanidoacetic acid is formed in…….from …….

a) Kidney; Arginine + Glycine c) Liver; Methionine + Glycine
b) Liver; Cysteine + Arginine d) Muscle; Citrulline + Aspartate

20. Nitric oxide synthesized from?

a) Arginine c) Alanine
b) Citrilline d) Cysteine

21. Histidine load test is used for:

a) Folate Deficiency c) Histamine
b) Histidine Deficiency d) Serotonine

22. Cysteine is abundantly found in:

a) Keratin c) Creature
b) Chondroitin sulfate d) Spermine

23. N-acetyl-cysteine replenishes:

a) Glutathione c) Glutamate
b) Glycine d) GABA

24. During the formation of hydroxyl proline and hydroxyl lysine? The essential factors required is are:

a) Pyridoxal phosphate c) Thiamine pyrophosphate
b) Ascorbic acid d) Biotin

25. In the carbon metabolism, Serine loses which carbon atom?

a) Alpha c) Gamma
b) Beta d) Delta

26. In mammalian tissues serine can be a biosynthetic precursor of

a) Methionine b) Glycine
c) Tryptophan d) Phenylalanine

27. Non essential amino acids

a) Are not components of tissue proteins
b) May be synthesized in the body from essential amino acids
c) Have no role in the metabolism
d) May be synthesized in the body in diseased states

28. **Which of the following is a tripeptide?**

a) Anserine b) Oxytocin
c) Glutathione d) Kallidin

29. **An example of metalloprotein is**

a) Casein b) Ceruloplasmin
c) Gelatin d) Salmine

30. **Cysteine has the formula:**

a) CH_3SH
b) $H_2N—CH_2—COOH$
c) $HS—CH2—CH(NH_2)—COOH$
d) $S—CH_2—CH(NH_2)—COOH$ | $S—CH_2—CH(NH_2)—COOH$

31. A dietary deficiency of tryptophan and nicotinate leads to

a) Beri Beri
b) Xerophthalmia
c) Anemia
d) Pellegra

32. Histidine is degraded to α-ketoglutarate and is described as a:

a) gluco amino acid
b) glucogenic amino acid
c) ketogenic amino acid
d) keto-gluco amino acid

33. Which of the following amino acids is considered as both ketogenic and glucogenic?

a) Valine
b)Tryptophan
c) alanin
d) Lysine

34. A person with phenylketonuria cannot convert

a) phenylalanine to tyrosine
b) phenol into ketones
c) phenylalanine to isoleucine
d) phenylalanine to lysine

35. Oxidative deamination is the conversion of an amino

a) group from an amino acid to a keto acid
b) acid to a keto acid plus ammonia
c) acid to a carboxylic acid plus ammonia
d) group from an amino acid to a carboxylic acid

36. An example of a transamination process is

a) glutamate = hexanoic acid + NH_3
b) aspartate + hexanoic acid = glutamate + oxaloacetate
c) aspartate + α ketoglutarate = glutamate + oxaloacetate
d) glutamate = α-ketoglutarate + NH_3

37. Transamination is the process where

a) carboxyl group is transferred from amino acid
b) α-amino group is removed from the amino acid
c) polymerisation of amino acid takes place
d) glutamate = α-ketoglutarate + NH_3

38. A person with phenylketonuria is advised not to consume which of the following products?

a) Glycine containing foods
b) Glucose
c) Fat containing food
d) Aspartame

39. Tyrosine is degraded to acetoacetyl CoA and fumarate and is described as a

a) glucogenic amino acid
b) ketogenic and glucogenic amino acid
c) ketogenic amino acid
d) keto-gluco amino acid

40. Transaminase enzymes are present in

a) liver
b) intestine
c) pancreas
d) kidney

41. An example of the oxidative deamination is

a) glutamate = hexanoic acid + NH_3
b) aspartate + α-ketoglutarate = glutamate + oxaloacetate
c) glutamate = α-ketoglutarate + NH_3
d) aspartate + hexanoic acid = glutamate + Oxaloacetate

42. In the normal breakdown of phenylalanine, it is initially degraded to

a) fumarate
b) lysine
c) tyrosine
d) phenylpuruvate

43. A ketogenic amino acid is one which degrades to

a) keto-sugars
b) either acetyl CoA or acetoacetyl CoA
c) pyruvate or citric acid cycle intermediates
d) multiple intermediates including pyruvate or citric acid cycle intermediates and acetyl CoA or acetoacetyl CoA

44. A person suffering from phenylketonuria on consumption food containing high phenylalanine may lead to the accumulation of

a) phenylalanine
b) tyrosine
c) phenylpyruvate
d) isoleucine

45. The nitrogen atoms of urea produced in the urea cycle are derived from

a) nitrate
b) nitrite
c) ammonia and aspartic acid
d) ammonia

46. Which of the following is used as carbon atom source while producing urea in the urea cycle?

a) Arginine
b) Carbon dioxide
c) Aspartic acid
d) Glucose

47. Which of the following amino acids is a precursor to cysteine?

a) Threonine
b) Phenylalanine
c) Methionine
d) Lysine

48. **Non-essential amino acids can be synthesized by:**

a) Decarboxylation of amino acids
b) Oxidative deamination of amino acids
c) Non-oxidative deamination
d) Transamination

49. Coenzyme for transamination is:

a) Thiamine pyrophosphate
b) FAD
c) Pyridoxal phosphate
d) Cyanocobalamin

50. If the amino group and a carboxylic group of the amino acid are attached to same carbon atom, the amino acid is called as

a) Alpha
b) Beta
c) Gamma
d) Epsilon

51. **Histidine is degraded to α-ketoglutarate and is described as a**

a) gluco amino acid
b) ketogenic amino acid
c) glucogenic amino acids
d) keto-gluco amino acid

52. Oxidative deamination is the conversion of an amino

a) group from an amino acid to a keto acid b) acid to a carboxylic acid plus ammonia
c) acid to a keto acid plus ammonia d) group from an amino acid to a carboxylic acid

53. An example of a transamination process is

a) glutamate = hexanoic acid + NH_3
b) aspartate + hexanoic acid = glutamate + oxaloacetate
c) aspartate + α ketoglutarate = glutamate + oxaloacetate
d) glutamate = α-ketoglutarate + NH_3

54. Transamination is the process where

a) carboxyl group is transferred from amino acid
b) α-amino group is removed from the amino acid
c) polymerisation of amino acid takes place
d) none of the above

55. The most toxic compounds is

a) tyrosine b) phenylpyruvate
c) lysine d) phenylalanine

56. A person with phenylketonuria is advised not to consume which of the following products?

a) Glycine containing foods b) Fat containing food
d) Glucose d) Aspartame

57. Tyrosine is degraded to acetoacetyl CoA and fumarate and is described as a

a) glucogenic amino acid b) ketogenic amino acid
c) ketogenic and glucogenic amino acid d) keto-gluco amino acid

58. A person with phenylketonuria will convert

a) phenylalanine to phenylpyruvate b) phenylalanine to isoleucine
c) phenylpyruvate to phenylalanine d) tyrosine to phenylalanine

59. An example of the oxidative deamination is

a) glutamate = hexanoic acid + NH_3
b) aspartate + α-ketoglutarate = glutamate + oxaloacetate
c) glutamate = α-ketoglutarate + NH_3
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a) acid to a carboxylic acid plus ammonia b) group from an amino acid to a keto acid
g) acid to a keto acid plus ammonia d) group from an amino acid to a carboxylic acid

62. A person suffering from phenylketonuria on consumption food containing high phenylalanine may lead to the accumulation of

a) phenylalanine b) phenylpyruvate
c) tyrosine d) isoleucine

63. Which one of the following statements concerning a one-week-old male infant with undetected classic phenylketonuria is correct?

a) Tyrosine is a non-essential amino acid for the infant
b) High levels of phenylpyruvate appear in the urine
c) A diet devoid of phenylalanine should be initiated immediately
d) Therapy must begin within the first year of life

64. The phenylalanine metabolism is blocked in the metabolic disease phenylketonuria. Which of the following product is formed during the normal metabolism of phenylalanine by phenylalanine hydroxylase?

a) Tyrosine
b) Phenylacetate
c) Phenylpyruvate
d) Phenyl lactate

65. Which of the following amino acids have an important role in the transport of amino groups from peripheral tissues to the liver?

a) Serine
b) Glutamine
c) Methionine
d) Arginine

66. The conversion of serine to glycine is catalyzed by an enzyme serine hydroxymethyltransferase. The co-substrate required for this reaction is:

a) Biotin
b) Tetrahydrobiopterin
c) Pyridoxal Phosphate
d) Tetrahydrofolate

67. All the amino acid contribute carbon atoms to the one-carbon pool, expert:

a) tryptophan
b) Histudine
c) Valine
d) Serine

68. The major donor of carbon atoms to the one-carbon pool is:

a) Serine
b) Threonine
c) Tyrosine
d) Proline

69. Succinyl-CoA is formed from following, expert:

a) Valine
b) Propionyl -CoA
c) Isoleucine
d) Aspartate

70. Which amino acid is oxidatively deaminated in liver?

a) Aspartate
b) Valine
c) Alanine
d) Glutamic acid

71. During urea cycle, the two nitrogen atoms are derived from:

a) ammonia and arginine
b) both from ammonia
c) ammonia and aspartic acid
d) ammonia and ornithine

72. Ammonia is trapped in brain by:

a) Glutamine synthetase reaction
b) urea synthesis cycle
c) Clutaminase reaction
d) Glutamate dehydrogenase reaction

73. Pyridoxal phosphate is the coenzymes of which reactions?

a) Transamination reactions
b) L-amino acid oxidase
c) Glutamate dehydrogenase
d) Formimino glutamic acid to glutamate

74. In the body, glycine is used for synthesis of all the following substances, expert:

a) purine ring
c) Glutamine

b) Glutatione
d) Creatine

75. Creatine is synthesized from the following amino acids, expert:

a) Arginine
b) Aspartic acid
c) Glycine
d) Methionine

76. The sources of oxalic acid in urine are:

a) Ornitine and Citrulline
b) Oxalosuccinat and formic acid
c) Oxaloacetate and aspartic acid
d) Ascorbic acid and glycine

77. Acetyl choline is derived from which amino acid?

a) Tyrosine
b) Tryptophan
c) Glutamic acid
d) Serine

78. All the following are substrates for transmethylation reactions, expert:

a) Guanido acetic acid
b) Choline
c) Nor epinephrine
d) N-acetyl serotonine

79. Name the defective enzyme in cystathionuria:

a) Cystathionase
b) Homogentisic acid oxidase
c) phenyl alanine hydroxylase
d) Para hydroxyl phenyl pyruvateoxidase

80. Urine of a 12 years old boy gave a positive cyanide nitroprusside test. He had renal stones. He is likely to have:

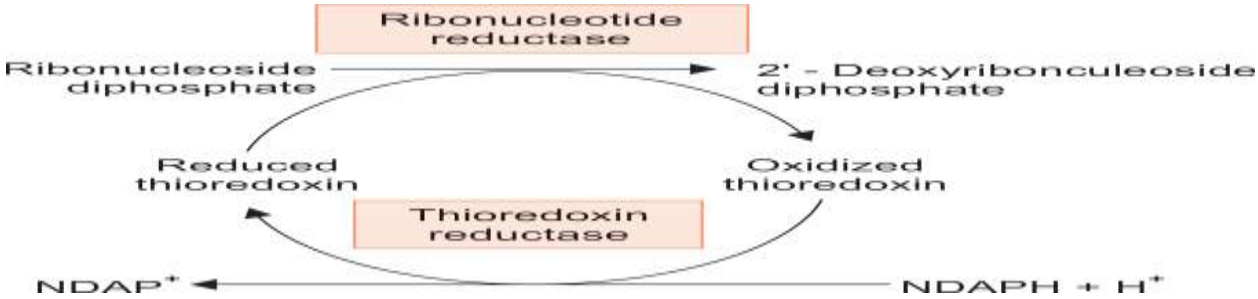
a) Homocystinuria
b) Hartnup disease
c) Cystinosis
d) Renal glycosuria

Metabolism of Purines and Pyrimidines

1. End product of purine metabolism in non-primate mammals is:

a). Uric acid
c). Urea
b). Ammonia
d). Allantoin

2. Deoxyribonucleic acid is formed from:



a). Ribonuclease
c). Ribonucleotide diphosphate
b). Ribonucleotide monophosphate
d). Rubonucleotide triphosphate

3. What is involved in formation of d-TMP from d-UMP?

a). N^5, N^{10}-methylene tetrahydrofolate
c). N^5 formylfolate
b). From iminofolate
d). Dihydrofolate

4. Inosinic acid is biological precursor:

a). Uracil and thymine
b). Purines and thymine
c). Adenylic acid and guanylic acid
d). Orotic acid and uridylic acid

5. False regarding gout is:

a). Due to increased metabolism of pyrimidines
b). Due to increased metabolism of purines
c). Uric acid levels may not be elevated
d). Has a predilection for the great toe

6. The enzyme deficient in Lesch-Nyhan syndrome is:

a). GTRT
b). Glutaminase
c). Transcarboxylase
d). HGPRTase

7. A 10-year-old child presents with history of rashes self mutilation family history positive which of the following investigations do you think may be suggestive of valuable for diagnosis:

a). Lead
b). Alkaline phosphatase
c). L D H
d). Uric acid

8. A ten-year-old child with aggressive behavior and poor concentration is brought with presenting complaints of joint pain and reduced urinary output. Mother gives history of self-mutilate his finger. Which of the following enzymes is likely to be deficient in this child:

a). HGPRTase
b). Adenosine deaminase
c). APRTase
d). Acid maltase

9. A patient with increased Hypoxanthine and Xanthine in blood with hypouricemia which enzyme is deficient?

a). HGPRTase
b). Xanthine oxidase
c). Adenosine deaminase
d). APRtase

10. Choose the incorrect statement. Lesch-Nyhan Syndrome:

a). Affects young boys
b). Presents with gouty arthritis
c). The enzyme defect enhances the reutilizationof purine bases
d). Bizarre behavior of self-mutilation

11. Hyperuricemia is not found in:

a). Cancer
b). Psoriasis
c). Von Gierke's disease
d). Xanthinuria

Metabolism of Purines and Pyrimidines

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a). Uric acid
b). Ammonia
c). Urea
d). Allantoin

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a). Ribonuclease
b). Ribonucleotide monophosphate
c). Ribonucleotide diphosphate
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b). Due to increased metabolism of purines
c). Uric acid levels may not be elevated
d). Has a predilection for the great toe

16. Hyperuricemia is not found in:

a). Cancer
b). Psoriasis
c). Von Gierke's disease
d). Xanthinuria

17. Pyrimidine biosynthesis begins with the formation from glutamine, ATP and CO2, of

a) Carbamoyl aspartate
b) Orotate
c) Carbamoyl phosphate
d) Dihydroorotate

18. The two nitrogen of the pyrimidine ring are contributed by

a) Ammonia and glycine
b) Asparate and carbamoyl phosphate
c) Glutamine and ammonia
d) Aspartate and ammonia

19. A substrate for enzymes of pyrimidine nucleotide biosynthesis is

a) Allopurinol
b) Tetracylin
c) Chloramphenicol
d) Puromycin

20. Conversion of inosine monophosphate to xanthine monophosphate is catalysed by

a) IMP dehydrogenase
b) Formyl transferase
c) Xanthine-guanine phosphoribosyl transferase
d)Adenine phosphoribosyl transferase

Plasma proteins

1. Hemophilia A is to the deficiency of clotting factor

a) X;
c**)** VIII;
b) V;
d) II;

2. Plasma albumin performs the following functions:

a) Osmotic;
c) Nutritive;
b) Transport;
d) All of them;

3. The immunoglobulin present in most abundant guantity;

a) IgG**;**
c) IgM;
a) IgA;
d) IgE;

4. Name the immunoglobulin involved in body allergic reactions:

a) IgA;
c) IgD;
b) IgE;
d) IgM;

5. The following anticoagulant binds with Ca^{2+} and prevents blood clotting:

a) Heparin; b**)** Oxalate; c) protein; d) all of them.

6. Normal level of albumin in blood is:

a) 1.5 – 2.5 mg/dL
b) 2.5 – 3.5 mg/dL
c) 2.5 – 3.5 mg/dL
d) 3.5 – 5.0 mg/dL

7. Hypoalbuminemia is seen in all the following conditions, expert:

a. Cirrhosis of liver
b. Hephrotic syndrome
c) Malnutrition
d) acute infections

8. Hemopexin carries:

a. Free hemoglobin
b. Free bilirubin
c) free heme
d) free iron

9. All the following are acute phase reastant proteins, except:

a) C-reactive protein CRP)
b) HDL
c) ceruloplasmin
d) Haptoglobin

10. Polymorphism is exhibited by all the following proteins, expert:

a) Haptoglobin
b) Transferrin
c) albumin
d) ceruloplasmin

11. Wilson's hepatolenticular degeneration is characterized by:

a. ceruloplasmin level in blood is increased
b) copper accumulated in liver to produce cirrhosis
c) coppr is deposited in skin to produce bronze color
d) autosomal dominant inheritance

12. All are true with regard to alpha-1 antitrypsin (AAT), expert:

a. it is a protease inhibitor
b. in shows polymorphism
c) deficiency leads to emphysema in lungs
d) deficiency is associated with Edema

13. Albumin level in blood is estimated by:

a. Jaffe's picric acid reaction
b) Bromo cresol green reaction
c) diacetyl monoxine method
d) Chromatography

14. Which reaction takes place exclusively in liver:

a. Cluconeogenesis
b. Clycolysis
c) Clycogen sunthesis
d) Albimun synthesis

15. In blood, allarebound with albumin, expert:

a. Non-esterified fatty acids
b. Bilirubin
c) Iron
d) salicylate

16. Electrophoretic separation of proteins is of diagnostic value in all conditions, expert:

a. Hephrotic syndrome
b. Multiple myeloma
c) alpha-1 antitrypsin deficiency
d) acquired immunodeficiency syndrome

17. Edema due to hypoproteinemia may be seen in all the following clinical conditions, expert:

a) Rheumatoid arthritis
b) Cirrhosis liver
c) Malnutrition
d) Nephrotic syndrome

18. Heme biosynthesis do not occur in:

a) Osteocyte
b) Liver
c) RBC
d) Erythroid cells of bone marrow

19. **In lead poisoning which of the following is seen in urine:**

a) delta ALA
b) uroporphyrin
c) coproporphyrin
d) protoporphyrin

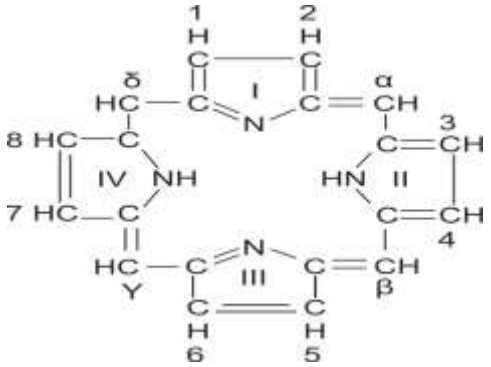
20. In HbS, Clutamic acid replaced by valine. What will be its electrophoretic mobility?

a) Incresed
b) Decreased
c) No change
d) Depends on level of concentration of HbS

21. Which of the following porpyrias does not present with photosensitryvity:

a) urophophyrin decarboxylase
b) HMG synthase
c) protophophrinogen oxidase
d) Coproproporphyrinogen oxidase

22. Identy the structure given below?



a) Porphyrin
b) Heme
c) Chlorophyll
d) Pyrrole

23. A 10-year-old boy present with increased serum bilirubin, increased bilirubin in urine and no urobilinogen. Diagnosis is:

a) Gilbert Syndrome
b) Hemolytic jaundice
c) Viral hepatitis
d) Obstructive jaundice

24. Which Vitamin is required for carboxylation of clotting factors?

a) Vitamin A
b) Vitamin D
c) Vitamin E
d) Vitamin K

25. Electrophoretic separation of proteins is of diagnostic value in all conditions, except:

a) Nephrotic syndrome
b) Multiple myeloma
c) Alpha-1 antitrypsin deficiency
d) Acquired immunodeficiency syndrome

26. Normal level of albumin in blood is:

a) 1,5-2,5 md/dl
b) 2,5-3,5 md/dl
c) 2,5-3,5 g/dl
d) 3,5-5 g/dl

27. Wilson's hepatolenticular degeneration is characterized by:

a) Ceruloplasmin level in blood is increased
b) Copper is accumulated in liver to produce cirrhosis
c) Copper is deposited in skin to produce bronze color
d) Autosomal dominant interitance

28. One of the plasma proteins listed below is not a transport protein (carrier protein):

a) Transferrin
b) Haptoglobin
c) Albumin
d) alpha-1-antitrypsin

29. The protein present in highest concentration in plasma is:

a) Fibrinogen
b) Albumin
c) Gamma globulins
d) Alpha globulins

30. Which of the following is not transported by albumin?

a) Calcium
b) Sodium
c) Copper
d) Aspirin

Liver and gastric function test

1. **All enzymes are elevated in obstructive liver disease, expert:**
   a) Gamma-glutamyltransferase (GGT)
   b)5-nucleotidase (NTP)
   c) Alkaline phosphatase (ALP)
   d) Lactate dehydrogenase (LDH)

2. **All are features of obstructive jaundice, expert:**
   a) Increased level of conjugated bilirubin in blood
   b) Clay colored stools
   c) Present of bile salts in urine
   d) Increased excretion of urobilinogen in urine

3. **A patient with infective hepatits is likely to have all the flowing, expert:**
   a) Hyperbilirubinemia
   b) Bilirubinemia
   c) Absence of bile salts in urine
   d) Elevated AST

4. **An increase in serum unconjugated bilirubin occurs in:**
   a) Hemolytic jaundice
   b) Obstructive jaundice
   c) Defect in intestinal absorption
   d) Glomerulonephritis

5. **Conjugated hyperbilibinemia with raised alkaline phosphatase levels are characteristic of:**
   a) Hemolytic jaundice
   b) Obstructive jaundice
   c) Viral hepatits
   d) Physiological jaundice

6. **Which of the following is the nonfunctional plasma enzymes increased in alcoholic subjects?**
   a) Alkaline phosphatase
   b)Acid Phosphatase
   c) Lactate dehydrogenase
   d) Gamma-glutamyltransferase

7. **Hypoacidity is found in all the following conditions, except:**
   a) Pernicious anemia
   b) Carcinoma of stomach
   c) Insulinoma
   d) Atrophic gastritis

8. **All the following biochemical parameters are indices of liver function, except:**
   a) Bilirubin
   b) Cholesterol
   c) Albumin
   d) Creatinine

9. **A patient with infective hepatitis is likely to have all the following findings, except:**
   a) Hyperbilirubinemia
   b) Bilirubinuria
   c) Absence of bile salts in urine
   d) Evevated AST

10. **Which enzyme test is more specific for parenchymal (hepatocellular) liver disease?**
   a) Acid phosphatase
   b) Alainine aminotransferase (ALT)
   c) Lactate dehydrogenase (LDH)
   d) Amylase

11. **Which hormone has no effect on gastric acid secretion?**
   a) Cholecystokinin
   b) Secretin
   c) Gastrin
   d) Somatomedin

12. **Which of the following tests is not indicated in a patient with generalized edema?**
   a) Liver function test
   b) Renal function test
   c) Thyroid function test
   d) Pancreatic function test

13. **Which of the following biochemical findings does not agree with acute hepatic failure?**
   a) Respiratory alkalosis
   b) Hyperammonemia
   c) Lactic acidosis
   d) Uremia

14. **The laboratory data that is against a diagnosis of obstructive jaundice is:**
   a) High alkaline phosphatase level
   b) Increased excretion of urobilinogen in urine
   c) Elevated serum cholesterol level
   d) Direct positive van den Bergh reaction

15. **Disease of the _____ is a common cause of obstructive jaundice.**
   a) Pancreas
   b) Gallbladder
   c) Heart
   d) Liver

16. **_____ is responsible for the yellow coloring in jaundice.**
   a) Urobilinogen
   b) Carotene
   c) Bilirubin
   d) AST

17. **_____ is a group of enzymes found mainly in bone, liver, intestines, and placenta.**
   a) AST
   b) ALT
   c) SGPT
   d) ALP

18. **_____ transports unconjugated bilirubin to the liver.**
   a) Globulin
   b) Albumin
   c) AST
   d) ALP

19. **Jaundice caused by an obstructive pathology of the biliary tree, is known as _____ _____.**
   a) Prehepatic
   b) Post hepatic

c) Hepatic d) Splenohepatic

20. **Highest elevations with AST is seen in viral _____.**
a) Hepatitis b) Meningitis
c) Influenza d) Pneumonia

Biochemistry of kidney

1. **The amino acid producing ammonia in kidney is**
a) Glutamine b) Alanine
c) Methionine d) Glycine

2. **Kidney is an excretory organ. It also performs another function of releasing the hormones. What are there hormones?**
a) Renin c) calcicitrol
b) Erythropoietin d) all of these

3. **Which of the following components of blood does not enter the nephron?**
a) Ions c) glucose
b) Plasma proteins d) urea

4. **The process that pushes out water and dissolved materials from in the glomerulus is**
a) Dialysis c) ultrafiltration
b) Secretion d) not dialysis

5. Which of the following parts of nephron is least permeable to water?

a) Proximal tubule c) collecting duct
b) Ascending limps of loop of Nenle d) descending limps of loop of Nenle

6. Chronic kidney disease increase the risk of

a) Heart attacks and strokes b) skin troubles
b) Malaria d) diabetes and eye problems

7. Diuresis is the condition which
a) the excretory volumes of urine increases b) the kidney fait to exrete urine
c) the water balance of the body is disturbed d) the excretory volumes of urine decreases

8. In the presence of vasopressin, the greatest fraction filtrated water is absorbed in
a) Loop of Henle b) collecting tubule
c) proximal convoluted tubule d) distal convoluted tubule

9. Podocytes are the cells present in
a) cortex of nephron b) unner wall of Bowman's capsule
c) outer wal of Bowman's capsule d) wall of glomerular capillaries

10. Fluid within the loop of Henle is most concentrated in

a) ascending limbo
c) descending limb
c) Hairpin bend
d) Bend between the ascending limb and the distal tubule

11. Surgical removal of both the kidneys would result in death because

a) water will accumulate in blood
c) glucose will be lost from the body
b) immune response will be suppressed
d) urea will not be excreted

12. All the following statements are true of the H+ secreted into the lumen of the distal nephron except:

a) can combine with NH_4^+
b) can combine with HCO_3
c) can combine with HPO
d) can remains as free H

13. Amino acids are almost completely reabsorbed from the glomerular filtrate via active transport in the:

a) Proximal tubule
b) loop of Henle
c) Dustal tubule
d) collecting duct

14. Ammonia is an affective important urinary buffer for which of the following reasons:

a) its production in the kidney decrease during chronic acidosis
b) the walls of the renal tubules are impermeable to NH_3
c) the walls of the renal tubules are impermeable to NH_4
d) its acid base reaction has a low pK_a

15. An increase in the concentration of plasma potassium causes increase in

a) release of renin
b) secretion of aldosterone
c) secretion of ADH
d) release of natriuretic hormone

16. Which indicates an abnormal renal function?

a) blood urea 30 mg/dl
b) GFR = 125 ml/min
c) Serum creatinine 8 mg/dl
d) Urine pH = 6.8

17. Which substance is not normally present in urine?

a) Creatinine
b) Albumin
c) Myoglobin
d) Uric acid

18. Excretion of which substance is not under control of hormones?

a) Calcium
b) Potassium
c) Bicarbonate
d) Sodium

19. The solute in highest concentration in urine is:

a) Sodium
b) Chloride
c) Creatinine
d) Urea

20. The level of creatinine in urine is influenced by:

a) Protein content of diet
c) Muscle mass
b) Rate of cellular turn over
d) Patency of urinary tract

Glomerular Function of Kidney

22. **The following are the endocrine function of the kidney, except:**

a) Erythropoietin secretion
b) Synthesis of Prostaglandins
c) Synthesis of Vit D3
d) Synthesis of Angiotensin

23. **Normally, proteins with a molecular weight higher than 65kda are retained in the plasma, Some small size protein is filtered through the kidney by which of the following mechanism:**

a) Protein channels
b) Cotransport with Na^+
c) Endocytosis
d) None of the above

24. The rate of filtration in the kidney depends on

a) Glomerular Permeability
b) Oncotic pressure
c) Capillary hydrostatic pressure
d) All of the above

25. Which of the following factor increases the glomerular filtration rate (GFR)?

a) Antidiuretic hormone
b) Nitric oxide
c) Arterial Natriuretic peptide
d) Dopamine

26. Under the normal condition, the glomerular filtrate in the Bowmans capsule of nephron consists of the following EXCEPT:

a) Major electrolytes such as sodium, chloride, potassium, bicarbonate
b) Metabolic waste products such as urea, creatinine
c) Amino Acids, Glucose, Organic Acids
d) Proteins such as albumin and globulin

27. The glomerular filtration rate is the rate at which fluid is filtered into Bowman's capsule and it is expressed in ml/min or liter/day. The GFR for healthy adults is 180 L/day which is quivalent to approximately

a) 90 ml/min
b) 120 ml/min
c) 150 ml/min
c) 180 ml/min

28. The glomerular filtration rate is determined by the balance of hydrostatic and colloidal osmotic pressure. Which of the following promote the glomerular filtration?

a) hydrostatic pressure of glomerular capillary
b) oncotic pressure of the glomerular capillary
c) hydrostatic pressure of Bowman's capsule
d) Oncotic pressure of Bowman's capsule

29. Increase in glomerular hydrostatic pressure and GFR is determined by

a) Increased arterial pressure
b) Decreased afferent arterial resistance
c) The moderate increase in efferent arterial resistance
d) All of the above

30. Which of the following hormones or autocoids increases the glomerular filtration rate by decreasing vascular resistance

a) Norepinephrine
b) Endothelin
c) Prostaglandin
d) Epinephrine

31. The Renal Plasma flow is best measured by….

a) Inulin Clearance Test
b) GFR estimation
c) Para-amino hippuric acid Test
d) Creatinine Clearance

32. Creatinine Clearance

a) Is a sensitive marker for urolithiasis
b) Is a sensitive marker of tubular function
c) Is a sensitive marker of glomerular function
d) Is a sensitive marker for measurement of skeletal muscle mass

33. Presence of myoglobin in urine signifies

a) Overload proteinuria
b) Tubular proteinuria
c) Glomerular proteinuria
d) Postrenal proteinuria

34. The blood flow through the kidney is autoregulated with a myogenic response and tubuloglomerular feedback mechanism. The following statement is false regarding tubuloglomerular feedback:

a) Increased mean arterial pressure lead to an increase in renal blood flow and GFR
b) Increase delivery of sodium ion in macula densa increases in renal blood flow and GFR
c) Decrease delivery of sodium ion in macula densa increases renal blow flow and GFR
d) All of the above

35. The stimulation of sympathetic neurons to the kidney causes the vasoconstriction of arterioles and has a greater effect on afferent arterioles. Which of the following are not the consequences of sympathetic neuron activation?

a) Decreased renal plasma flow and GFR
b) Decreased Plasma oncotic pressure
c) Decreased the hydrostatic pressure of glomerular capillaries
d) Increased Filtration fraction

37. The release of angiotensin causes constriction of afferent arterioles and has a greater effect on efferent arterioles. Which of the following is not the consequence of angiotensin release?

a) Increased renal plasma flow
b) Increased Glomerular filtration rate
c) Increased Filtration fraction
d) Increased plasma oncotic pressure

38. Which of the following statement is true regarding renal plasma flow?

a) The renal blood flow is approximately 25% of cardiac output
b) Vasoconstriction of renal arterioles lead to a decrease in renal blood flow
c) Vasodilatation of renal arterioles lead to an increase in renal blood flow
d) All of the above

Electrolyte and water balance

1. **The presence of 2 extra pairs of electrons on the oxygen in water molecule results in-**
   a) Maks water a non-polar solvent
   b) Forms covalent bonds in the ice
   c) electronegative charge on the water molecule
   d) Electropositive charge on water molecule

2. **The buffering capacity of a buffer is maximum at pit equal to-**
   a) 0.5 pKa
   b) pKa
   c) pKa+1
   d) 2pKa

3. **A buffer that is most effective at pit of about 4-5 is-**
   a) Acetate buffer
   b) Bicarbonate buffer
   c) phosphate buffer
   d) Tris buffer

4. **All the following hormones affect fluid and electrolyte balance, except:**
   a) Aldosterone
   b) Anti-diuretic hormone
   c) Cortisone
   d) Thyroxine

5. **The intercellular cation present in maximum concentration is:**
   a) Potassium
   b) Magnesium
   c) Sodium
   d) Calcium

6. **The most predominant anion in the extracellular fluids**
   a) Cl^-
   b) HCO^-_3
   c) HPO^{2-}_3
   d) Protein

7. **Name the amino acid from ammonia is cells derived in the renal tubular which is finally which excreted as NH^+_4**
   a) Asparagines
   b) Glutamine
   c) Glutamate
   d) Aspartate
   c)

8. **The only route through which H+ ions are eliminated from the body**
   a) Lungs
   b) Stomach
   c) kidneys
   d) none of them

10. **Bone serves as a mineral reserve for which two ions?**
    a) sodium and potassium
    b) chloride and bicarbonate
    c) calcium and phosphate
    d) calcium and bicarbonate

11. **Electrolytes are lost mostly through _____.**
    a) renal function
    b) feces
    c) sweating
    d) respiration

12. **All the following conditions produce isotonic expansion of extracellular fluid volume, except:**

a) Congestive cardiac failure
b) Infusion with normal saline
c) Hyperaldosteronism
d) Pulmonary edema

13. The major cation in intracellular fluid is _____.

a) Sodium
b) potassium
c) Chloride
d) bicarbonate

14. The incorrect statement regarding osmolality of ECF is:

a) Mainly contributed by proteins
b) regulated by kidney
c) dependent on sodium level
d) sensed by thist center

15. When there is of deficiency of ADH (anti-diuretic hormone):

a) ECF volume expands;
b) plasma osmolarity increases
c) sodium depletion occurs
d) Thirst sensation is suppressed

16. Hypotonic expansion of extracellular fluid occurs:

a) Hyperaldosteronism
b) Inappropriate secretion of ADH
c) Cushin's syndrome
d) Intravenous with normal saline

17. From pairs of diseases and associated abnormalities, pick out the mismatched pair:

a) Maple syrup urine disease and metabolic acidosis
b) Connis syndrome and metabolic alkalosis
c) SIADH and hypertonic expansion
d) Waldenstrom's macroglobulnemia and hyperviscosity

18. A patient with diarrhea may have all the following abnormalities, except:

a) Metabolic acidosis
b) Isotonic contraction of ECF
c) Hypertonic contraction of ECF
d) Urine with a high specific gravity

19. Which of the following has NO effect on ECF volume?

a) ADH
b) Aldosterone
c) Calcitriol
d) Renin

20. Which of the following causes hypokamia:

a) Hemolysis
b) Polycytemia
c) Leukemia
d) Alkalosis

21. **Vasopressin (ADH)**

a) Enhance facultative reabsorption of water
b) Decreases reabsorption of water
c) Increases excretion of calcium
d) Decreases excretion of calcium

22. **An important cause of water intoxication is**

a) Nephrogenic diabetes insipidus
b) Renal failure
c) Gastroenteritis
d) Fanconi syndrome

23. **Urine examination in secondary dehydration shows**

a) Ketonuria
b) Low specific gravity
c) High specific gravity
d) Albuminuria

24. **The element needed in quantities greater than 100 mg for human beings is**

a) Calcium
b) Zinc
c) Selenium
d) Cobalt

25. **The mineral present in the human body in larger amounts than any other cation is**

a) Sodium
b) Calcium
c) Potassium
d) Iron

26. **The physiologically active form of calcium is**

a) Protein bond
b) Ionised
c) Complexed with citrate
d) Complexed with carbonate

27. **Renal ricket is caused by renal tubular defect (usually inherited) which interferes with reabsorption of**

a) Calcium
b) Phosphorous
c) Sodium
d) Chloride

28. **After operative removal of the parathyroid glands resulting into hypoparathyroidism the concentration of the serum calcium may drop below**

a) 11 mg
b) 10 mg
c) 9 mg
d) 7 mg

29. One of the principal cations of soft tissue and body fluids is

a) Mg
b) S
c) Mn
d) Co

30. Hypernatremia may occur in

a) Diabetes insipidus
b) Diuretic medication
c) Heavy sweating
d) Kidney disease

31. Intestinal absorption of magnesium is increased in

a) Calcium deficient diet
b) High calcium diet
c) High oxalate diet
d) High phytate diet

32. Deficiency of magnesium may occur with

a) Alcoholism
b) Diabetes mellitus
c) Hypothyroidism
d) Advanced renal failure

33. A decrease in serum sodium may occur in

a) Adrenocortical insufficiency
b) Hypoparathyroidism
c) Hyperparathyroidism
d) Thyrotoxicosis

34. Potassium metabolism is regulated by the hormone:

a) Aldosterone
b) PTH
c) Somatostatin
d) Estrogen

35. An important cause of secondary dehydration is

a) Dysphagia
b) Oesophageal varices
c) Oesophageal varices
d) Gastroenteritis

36. The exclusive function of iron in the body is confined to the process of

a) Muscular contraction
b) Nerve excitation
c) Cellular respiration
d) Blood coagulation

37. Hypokalemia with an accompanying hypochloremic alkalosis may be observed in

a) Cushing's syndrome
b) Addison's disease
c) Hyptothyroidism
d) Malnutrition

38. Important buffer system of extracellular fluid is

a) Bicarbonate/carbonic acid
b) Disodium hydrogen phosphate/sodium dihydrogen phosphate
c) Plasma proteins
d) Organic Phosphate

39. The pH of body fluids is stabilized by buffer systems. The compound which will be the most effective buffer at physiologic pH is

a) Na_2HPO_4 pKa = 12.32
b) Na_2HPO_4 pKa = 7.21
c) NH_4OH pKa = 7.24
d) Citric acid pKa = 3.09

40. Oncotic pressure of plasma is due to

a) Proteins
b) Chloride
c) Sodium
d) All of these

Acid-base balance and pH

1. The substance which help to regulate the base balance in mos animals are called _____?

a) Chemicals
b) Buffers
c) Ions
d) Electrolytes

2. The carbonic acid bicarbonate ion system is important in buffering the blood of many _____?

a) Invertebrates
b) Vertebrates
c) Both a and b
d) None

3. A person was admitted in a coma. Analysis of the arterial blood gave the following values: PCO_2 16 mm Hg, HCO_3 - 5 mmol/l and pH 7.1. What is the underlying acid-base disorder?

a) Metabolic Acidosis
b) Metabolic Alkalosis
c) Respiratory Acidosis
d) Respiratory Alkalosis

4. In a man undergoing surgery, it was necessary to aspirate the contents of the upper gastrointestinal tract. After surgery, the following values were obtained from an arterial blood sample: pH 7.55, PCO2 52 mm Hg and HCO3 - 40 mmol/l. What is the underlying disorder?

a) Metabolic Acidosis
b) Metabolic Alkalosis
c) Respiratory Acidosis
d) Respiratory Alkalosis

5. A young woman is found comatose, having taken an unknown number of sleeping pills an unknown time before. An arterial blood sample yields the following values: pH – 6.90, HCO_3 - 13 meq/liter, $PaCO_2$ 68 mmHg. This patient's acid-base status is most accurately described as:

a) Uncompensated metabolic acidosis
b) uncompensated respiratory acidosis
c) simultaneous respiratory and metabolic acidosis

d) respiratory acidosis with partial renal compensation

6. A student is nervous for a big exam and is breathing rapidly, what do you expect out of the followings:

a) Metabolic Acidosis b) Metabolic Alkalosis
c) Respiratory Acidosis d) Respiratory Alkalosis

7. A 45- year-old female with renal failure, missed her dialysis and was feeling sick, what could be the reason?

a) Metabolic Acidosis b) Metabolic Alkalosis
c) Respiratory Acidosis d) Respiratory Alkalosis

8. An 80-year-old man had a bad cold. After two weeks he said, "It went in to my chest, I am feeling tightness in my chest, I am coughing, suffocated and unable to breathe!" What could be the possible reason?

a) Metabolic Acidosis b) Metabolic Alkalosis
c) Respiratory Acidosis d) Respiratory Alkalosis

9. A post operative surgical patient had a naso gastric tube in for three days. The nurse caring for the patient stated that there was much drainage from the tube that is why she felt so sick. What could be the reason?

a) Metabolic Acidosis b) Metabolic Alkalosis
c) Respiratory Acidosis d) Respiratory Alkalosis

10. The pH of the body fluids is stabilized by buffer systems. Which of the following compounds is the most effective buffer system at physiological pH?

a) Bicarbonate buffer b) Phosphate buffer
c) Protein buffer d) All of the above

11. Which of the following laboratory results below indicates compensated metabolic alkalosis?

a) Low p CO_2, normal bicarbonate and, high pH
b) Low p CO_2, low bicarbonate, low pH
c) High p CO_2, normal bicarbonate and, low p H
d) High pCO_2, high bicarbonate and High pH

12. The greatest buffering capacity at physiological p H would be provided by a protein rich in which of the following amino acids?

a) Lysine b) Histidine
c) Aspartic acid d) Leucine

13. Which of the following is most appropriate for a female suffering from Insulin dependent diabetes mellitus with a pH of 7.2, HCO_3-17 mmol/L and pCO_2-20 mm HG:

a) Metabolic Acidosis b) Metabolic Alkalosis
c) Respiratory Acidosis d) Respiratory Alkalosis

12. Causes of metabolic alkalosis include all the following except:

a) Mineralocorticoid deficiency b) Hypokalemia
c) Thiazide diuretic therapy d) Recurrent vomiting

14. Renal Glutaminase activity is increased in:

a) Metabolic acidosis b) Respiratory Acidosis
c) Both of the above d) None of the above

15. Causes of lactic acidosis include all except:

a) Acute Myocardial infarction b) Hypoxia
c) Circulatory failure d) Infections

16. Which out of the following conditions will not cause respiratory alkalosis?

a) Fever b) Anxiety
c) Laryngeal obstruction d) Salicylate toxicity

17. All are true about metabolic alkalosis, except one:

a) Associated with hyperkalemia
b) Associated with decreased ionic calcium concentration
c) Can be caused due to Primary hyperaldosteronism
d) Can be caused due to Renin secreting tumor

18. Choose the incorrect statement out of the followings

a) Deoxy hemoglobin is a weak base
b) Oxyhemoglobin is a relatively strong acid
c) The buffering capacity of hemoglobin is lesser than plasma protein
d) The buffering capacity of Hemoglobin is due to histidine residues

19. Carbonic anhydrase is present at all places, except:

a) Gastric parietal cells b) Red blood cells
c) Renal tubular cells d) Plasma

20. All are true for renal handling of acids in metabolic acidosis, except:

a) Hydrogen ion secretion is increased
b) Bicarbonate reabsorption is decreased
c) Urinary acidity is increased
d) Urinary ammonia is increased.

21. Choose the incorrect statement about anion gap out of the followings

a) In lactic acidosis anion gap is increased
b) Anion gap is decreased in Hypercalcemia
c) Anion gap is decreased in Lithium toxicity
d) Anion gap is decreased in ketoacidosis.

22. **What is the normal range of carbon dioxide (CO_2) in arterial blood?**

a) 35-45 b) 22-26 c) 7.35-7.45 d) Not listed

23. **What is the normal range of bicarbonate ion (HCO_3^-) in arterial blood?**

a) 35-45 b) 22-26 c) 7.35-7.45 d) Not listed

24. **If HCO_3- caused the acidosis or the alkalosis, it is what?**

a) Metabolic c) respiratory
b) Combined d) None

25. The only way the body can get rid of the huge acid load produced by metabolic reactions is to

a) increase the concentration of bicarbonate ions
b) breathe faster and more deeply
c) excrete hydrogen ions in the urine

d) increase the concentration of proteins in the plasma

26. The falling blood pH and a rising partial pressure of CO2 due to pneumonia or emphysema indicates

a) respiratory acidosis
b) respiratory alkalosis
c) metabolic acidosis
d) metabolic alkalosis

27. Hydrogen ions are normally eliminated from the body

a) by excretion in urine
b) via insensible perspiration
c) in expired air
d) via liver detoxification

28. Which of the following would serve to buffer H^+?

a) any strong acid
b) any weak acid
c) HCO_3^+
d) NaH_2PO_4

29. A blood pH of 7.1 is said to be:

a) neutral
b) alkaline
c) acidic
d) homeostatic

30. Ventilation increases and more carbon dioxide is removed from the blood:

a) pCO2 will increase
b) hydrogen ion concentration of the blood will decrease
c) blood pH will decrease
d) hydrogen ion concentration of the blood will decrease

31. If the pH of blood plasma becomes 7.49 due to ingested substances, ALL of the following would happen to compensate, EXCEPT:

a) respiration rate decreases
b) the kidney increases secretion of bicarbonate ions
c) tubule cells produce more ammonia from glutamate
d) the partial pressure of carbon dioxide in blood would begin to rise

32. To compensate for metabolic acidosis, the body will

a) excrete more bicarbonate ions
b) increase respiration rate
c) decrease respiration rate
d) excrete more monohydrogen phosphate ions

33. In a patient with severely compromised lung function, which is most likely to stimulate the respiratory center in the medulla?

a) low PaCO2
b) high PaCO2
c) low PaCO2
d) high PaO2

34. The maintenance of the proper pH of the body fluids may be the result of

a) the control of respiratory ventilation
b) the operation of the various buffer systems in the stomach
c) the active secretion of OHinto the filtrate by the kidney tubule cells
d) control of acids produced in the stomach

35. Receptors that detect changes in $PaCO_2$ are called:

a) chemoreceptors
b) nocireceptors
c) pH receptors
d) osmoreceptors

36. Hyperventilation (breathing in and out more air than normal) during a panic attack causes an increase in blood _____.

a) partial pressure of CO2 and H+
b) pH
c) H+
d) partial pressure of CO2