BIOCHEMISTRY

*

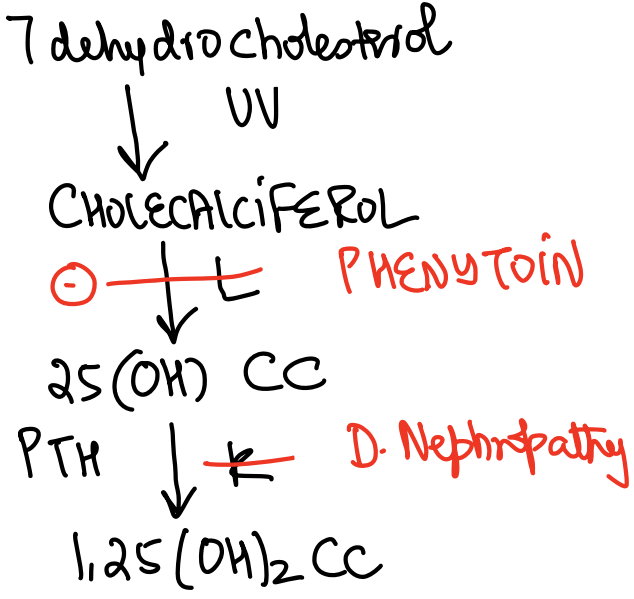
1. Which of the following will convert 25-OH D3 to 1,25-OH_2 D3?

a. UV light

b. Sunlight

c. PTH

d. Calcitonin ↓Ca



2. Neonate develops intractable vomiting on day 15 of life with recurrent
* episodes of seizures. Examination shows musty Odor from skin blond hair and blue iris. Which of the following is investigation of choice for this condition?

a. Guthrie test : SCREENING

b. Ferric chloride test

c. Tandem mass spectrophotometry

d. Dried heel pad blood

AR P.K.U : ch 12 #

phenylalanine hydroxylase ⊖

Phenyl Al ⊖ → Tyrosine → melanin ↓ diaper

* phenylacetate ↑ : Mousy odor
* phenyl lactate ↑ : neurotoxicity

Rx: High Tyrosine diet
low phenylalanine
(CASSAVA)

3. Substrate level phosphorylation is done which class enzyme?

a. Carboxylase

b. Kinase

c. Dehydrogenase

d. Hydroxylase

* Tx of Poy from ATP To substrate

GLUCOKINASE

HEXOKINASE

4. Patient is having macrocytic megaloblastic anaemia with hyper segmented neutrophils on microscopic examination of peripheral smear. CNS examination is normal. Work up shows normal methylmalonic acid level. This is seen in?

a. Folic acid deficiency

b. Vitamin B12 deficiency

c. Copper deficiency

d. Iodine deficiency

B12 ↓ FA ↓

Work up B12 ↓

1. S. Vit B12 ↓
2. Urine Methyl malonic acid levels ↑
3. Schilling Test

MENKE

S. CERULOPLASMIN: ↓

S. Cu ↓

neuro = babinski sign, areflexia dementia

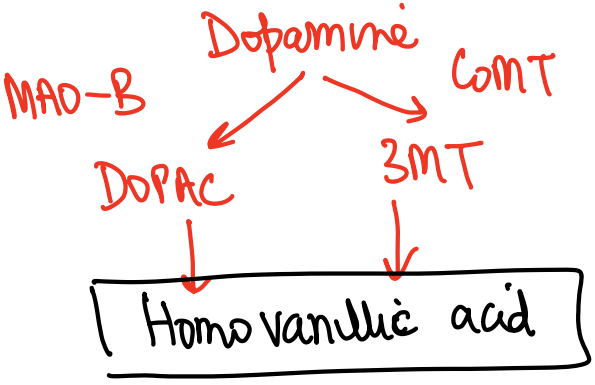
5. Major final end product of catecholamine dopamine is which of the following?

a. Vaniyl mandelic acid Epi/NE

b. Homo-vanillic acid

c. Metanephrine Epi/NE

d. Di-hydroxy-phenylacetic acid



COMT ⊖: TOLCAPONE

MAO-B ⊖: SAFINAMIDE

6. 4-year-old boy child is diagnosed with haemolytic anaemia. Peripheral Smear shows RBC inclusion in supravital staining. Which enzyme deficiency is likely?

a. Glucose 6 phosphatase ⟶ VON GIERKE : DOLL LIKE FACIES

b. Glucose 6 phosphate dehydrogenase HEINZ Bodies

c. Pyruvate decarboxylase

d. Phospho-phenol pyruvate carboxy kinase

CHLOROQUINE
Oxidative STRESS
⊖ ~~G6PD~~ ⊖
death: ATN

drugs: Cl: CHLOROQUINE
PRIMAQUINE
MEFLOQUINE
SULPHA DRUGS
☺ : ARTESUNATE

7. Child is noted to have corkscrew hair and perifollicular haemorrhages. This is seen in which of the following

a. Kwashiorkor

b. Vitamin K deficiency

c. Vitamin C deficiency

d. Porphyria

Collagen synthesis : plasma SCORBUTATE levels: ↓

8. Patient presents with diarrhoea, depression and diabetes mellitus. On examination erosive red-brown plaques are noticed around lips and lower abdomen. This is common presentation seen in

a. Farmer who is corn eater → niacin ↓ → diarrhea, dermatitis, dementia

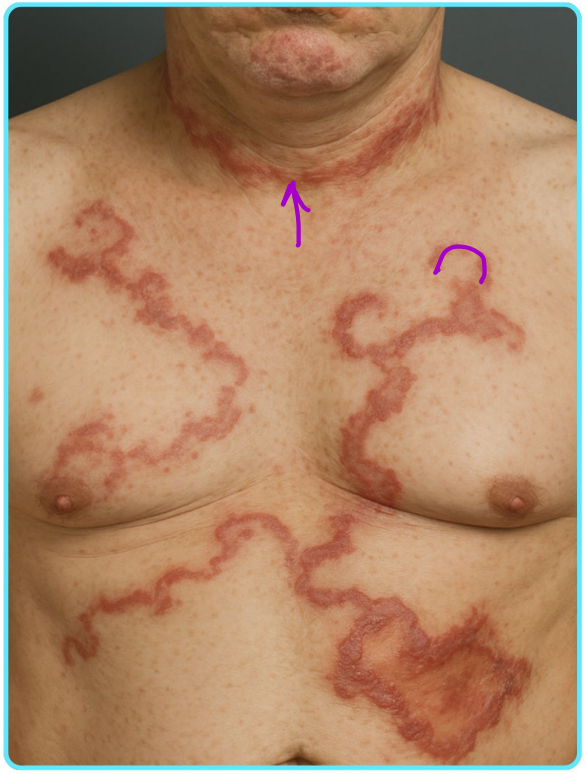
b. Patient with PNET

c. Athlete who is vegan — B12 ↓

d. Body builder consuming egg whites — biotin ↓

Pancreatic NET → GLUCAGONOMA → Diarrhea, DM, DVT, depression

GLUCAGONOMA → Necrolytic migratory erythema



DORSAL COLUMN #

9. Which Vitamin deficiency leads to loss of proprioception and vibration sense?

joint & position sense

a. Vitamin A

b. Vitamin D

c. Vitamin E : ANTIOXIDANT

d. Vitamin K

MYELIN

* vit B12 ↓
* vit E

10. Thiamine pyrophosphate is a cofactor for all of the following except?

a. Pyruvate dehydrogenase

b. Alpha ketoglutarate

c. Branched chain keto acid dehydrogenase

d. Trans aldolase TRANSKETOLASE

↓ B_1 = RBC Transketolase activity ↓ activity

↓ B_6 = RBC amino asparatase

↓ B_9 = urine FIGLU

↓ B_{12}: urine MMA levels ↑

B_2 ↓: RBC glutathione levels

CIRCUMCORNEAL + Vascularization

11. RBC glutathione reductase levels are used to asses deficiency of which of the following vitamin?

a. B2

b. B3

c. B9

d. B12

12. Form-imino-glutamic acid levels in urine is used for assessment of which of the following?

a. Vitamin A

b. Vitamin H – BIOTIN : egg yolk

c. Vitamin B9

d. Vitamin B12

13. Which of the following is not a component of creatinine?

a. Glycine

b. Arginine

c. Methionine

d. Glutamic acid

GAME : Mnemonic

: NO

glycine

1. collagen III → I
2. CREATININE

14. Which is correct about 22nd amino acid?

a. Pyrrlolysine coded by UAG

b. Pyrrolysine coded by UGA

c. Selenocysteine coded by UGA

d. Selenocysteine coded by UAG

21 AA

SELENA: U go away : 21

SELENA: CHARTS on fire U are gone!

15. Purely ketogenic amino acid is which of the following?

a. Leucine

b. Lysine

c. Aspartic acid

d. Histidine

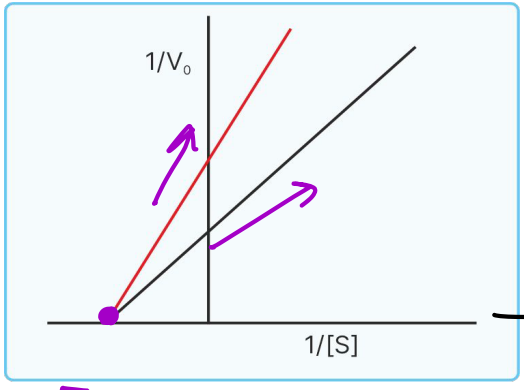
16. The red line in Lineweaver burk plot indicates which of the following

a. Competitive inhibition

b. Un-competitive inhibition

c. Non competitive inhibition

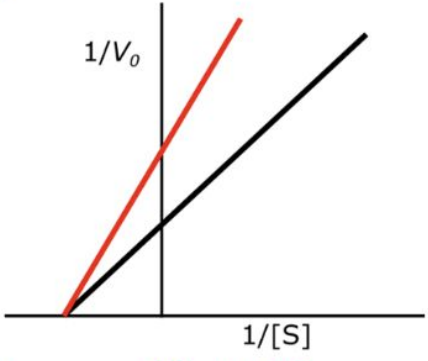
d. Feedback inhibition



NCI = divergent

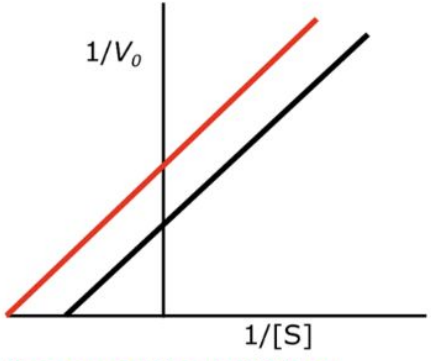
CI: Convergent

* km: ↑



Noncompetitive Inhibition

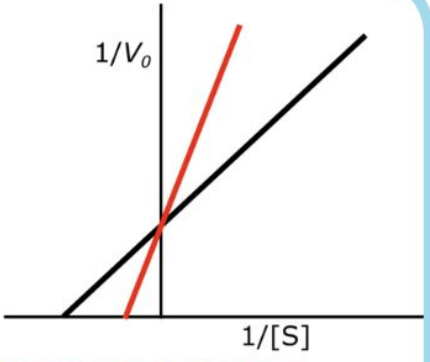
Decreased V_{max}= increased $1/V_{max}$



Uncompetitive Inhibition

Decrease K_m = increased $1/K_m$

Decreased V_{max}= increased $1/V_{max}$



Competitive Inhibition

Increase K_m = decreased $1/K_m$

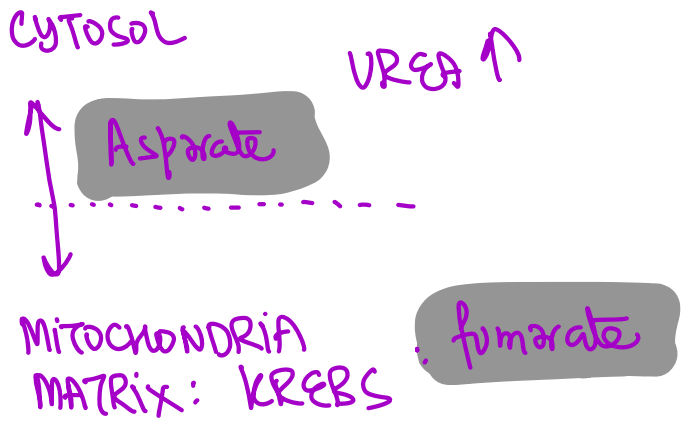
17. Urea bicycle is linked to TCA cycle via

a. Fumarate and aspartate

b. Fumarate and lactate

c. Fumarate and pyruvate

d. Fumarate with arginase



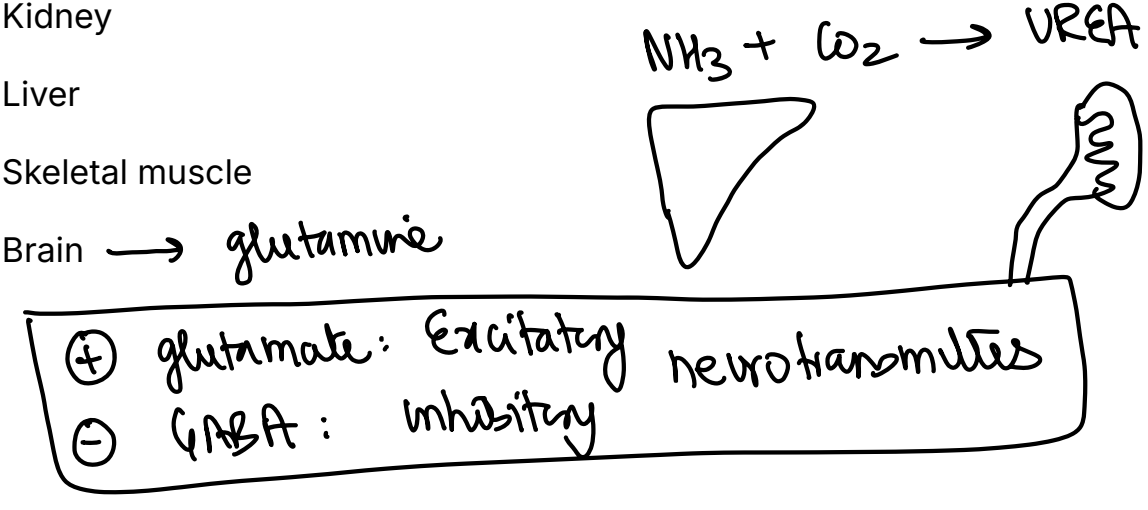
18. Oxidative deamination producing ammonia occurs in which organ?

a. Kidney

b. Liver

c. Skeletal muscle

d. Brain → glutamine



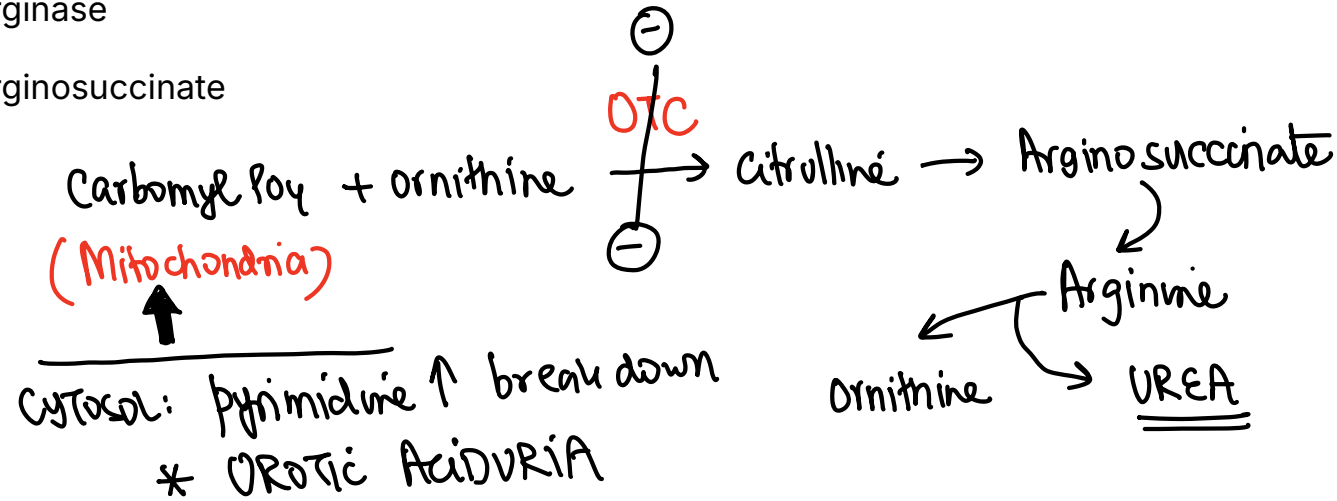
19. Most common urea cycle defect is which of the following?

a. Carbamoyl phosphate synthetase-1

b. Ornithine transcarbamoylase

c. Arginase

d. Arginosuccinate



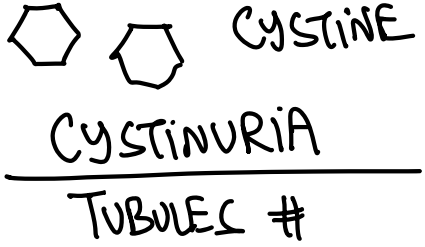
20. Patient presents with recurrent kidney stones. Urine microscopy shows hexagonal crystals. Which is the biochemical investigation to determine the type of kidney stone?

a. NCCT KUB
↳ STONES

b. Urine pH

c. Urine aminoaciduria screen

d. Urine Cyanide nitroprusside test



21. Which is correct dietary intervention for PKU?

a. High tyrosine diet

b. Low tyrosine diet

c. Complete elimination of phenylalanine in diet : MR

d. Add phenylalanine supplements in diet SEIZURES +

22. Which is correct diagnosis of Tall marfanoid habitus with kyphosis, hypopigmented -skin and high urinary cyanide nitroprusside test?

a. Alkaptonuria

b. Tyrosinemia

c. Homocystinuria

d. PKU

Homocystinuria

1. Tall person: Arm span > Height
2. Ectopia lentis: INFERO NASAL
3. Urine: Sodium nitroprusside Test (+)

a) black urine on exposure To AIR, Rx: Nitisone + vitamin C

b)

23. A 10-year-old boy with hepatosplenomegaly and bone pain shows "crumpled tissue paper" macrophages in bone marrow. Which enzyme is deficient?

a. α-Galactosidase A

b. β-Glucocerebrosidase

c. Ceramidase

d. Sphingomyelinas

* ANEMIA + SHM
* BMA = Macrophages: , B gluco C
* C = crushed Tissue paper

gaucher

24. A 1-year-old child has severe fasting hypoglycaemia, lactic acidosis and doll-like facies. Deficient enzyme?

a. Muscle phosphorylase

b. Glucose-6-phosphatase

c. Debranching enzyme

d. Glycogen synthase

glucose ↓

glucose 6 phosphatase ⊖

VON GIERKE disease

* glucagon sc fails To elevate blood sugar

25. 3-year-old with regression, hypotonia, and sulfatide accumulation has deficiency of:

a. Hexosaminidase A — Tay sach disease : Ashkenazi Jews

b. Ceramidase ← FARBER DISEASE

c. β-Galactosidase

d. Arylsulfatase A — Metachromatic leukodystrophy

26. An infant with developmental regression and cherry-red macula accumulates GM2 ganglioside. Enzyme deficiency?

a. Ceramidase

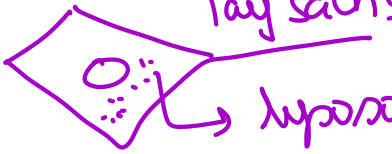
b. α-Galactosidase A

c. Hexosaminidase A

d. Sphingomyelinase

Niemann Pick: Regression + cherry red spot + HSM

Tay sachs



lysosomes

onion peel appn

onion peel

BV: malignant HTN

nerve: CIDP

bile duct: PSC

27. A floppy infant with cardiomegaly and macroglossia has deficiency of:

a. Acid maltase
b. Debranching enzyme
c. Muscle phosphorylase
d. Galactokinase

↳ HCM

POMPE

gene: GAA : ch 17

acid Maltase ↓

floppy baby + cardiomegaly

28. A child develops muscle cramps and red wine discoloration of urine after exercise. Defective enzyme?

MYOGLOBIN +

Mcardle

a. Aldolase A

b. Pyruvate kinase

c. Muscle phosphorylase

d. CPT-II

29. A newborn with lethargy and sweet-smelling urine has defect in:

a. Branched-chain α-ketoacid dehydrogenase BCAA

b. Hom gentisate oxidase AKU

c. Phenylalanine hydroxylase PKU

d. Tyrosinase

30. A child with musty odor, seizures and low IQ has deficiency of:

PKU

a. Dihydropteridine reductase

b. Tyrosinase → Oculocutaneous albinism

c. Homogentisate oxidase

d. Phenylalanine hydroxylase

DHR ⊕ : DHR ↓

31. A tall, thin child with infero-nasal lens dislocation and thrombosis likely lacks which of the following enzymes

a. Methionine synthase

b. Tyrosinase

c. Cystathionine β-synthase

d. Galactose-1-P uridyltransferase

HOMOCYSTINURIA

* CYSTATHIONE β synthase ⊖
* Tall, arm span > Ht
* Ectopic lentis: IN
* CAD ↑
* urine: Sodium nitroprusside Test

⇒ GALACTOSEMIA

32. A neonate with jaundice, vomiting and E. coli sepsis lacks:

a. Galactokinase

b. Galactose-1-phosphate uridyltransferase

c. Aldose reductase

d. UDP-galactose epimerase

GALT, chg gene

1. F.T.T
2. Jaundice
3. Sepsis gm ⊖
4. Hepatomegaly

*

33. A boy with self-mutilation and gouty arthritis lacks:

a. HGPRT

b. Adenosine deaminase

c. Xanthine oxidase

d. PRPP synthetase

XLR

* Hypoxanthine = Lesch Nyan Syn^N
  guanosine
  PRT

* URIC ACID ++

34. A baby with hepatosplenomegaly, neurodegeneration and cherry-red spot has deficiency of:

a. Hexosaminidase A

b. Arylsulfatase A

c. Ceramidase

d. Sphingomyelinase

Niemann Pick

35. A child with developmental delay, optic atrophy, and globoid cells has deficiency of:

KRABBE

a. Galactocerebrosidase

MLD

b. Arylsulfatase A

Tay sach

c. Hexosaminidase A

gaucher

d. β-Glucocerebrosidase

36. A child with coarse facies, hepatosplenomegaly and corneal clouding lacks:

a. Galactosidase

b. Ceramidase

c. α-L-iduronidase

d. Iduronate sulfatase

HURLER

~~HUNTER syndrome~~ : Cornea normal

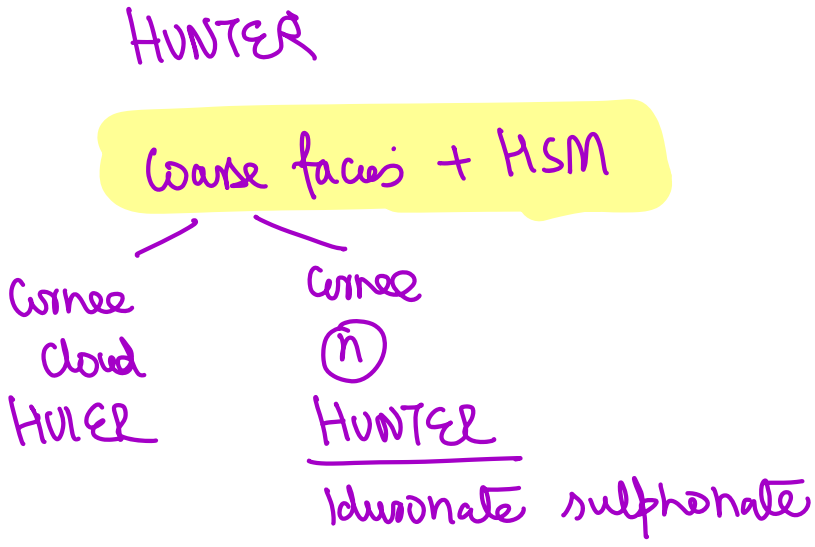
37. A 4-year-old boy presents with progressive developmental delay, hepatosplenomegaly, coarse facial features, and frequent ear infections. Unlike Hurler syndrome, his corneas are clear and parents report increasing aggressive behaviour. Deficiency of which enzyme is most likely?

a. Iduronate sulfatase

b. α-L-Iduronidase

c. Arylsulfatase A

d. β-Galactosidase



38. A nucleotide differs from a nucleoside by presence of which additional component?

a. Nitrogen base

b. Sugar

c. Phosphate group

d. Ribose

39. DNA replication in humans is described as semi-conservative because each new DNA contains:

a. Two old strands

b. Two new strands

c. One old and one new strand

d. Randomly mixed strands

40. The enzyme that unwinds the DNA double helix ahead of the replication fork is:

a. Ligase → join okazaki fragments

b. Helicase

c. Primase → synthesis RNA PRIMERS

d. Telomerase → ↑: malignancy

41. A researcher needs to synthesize a short RNA primer to start DNA replication. Which enzyme helps?

a. Primase

b. Ligase

c. Topoisomerase

d. Endonuclease

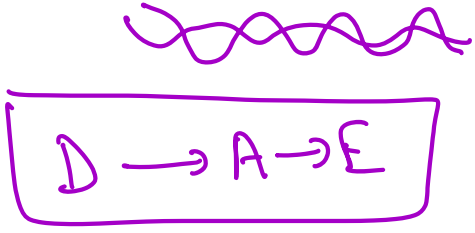
42. During PCR, the step in which DNA strands are separated by heating is known as:

a. Annealing

b. Extension

c. Denaturation

d. Amplification



43. During PCR, primers bind to the single-stranded DNA template during which step?

a. Extension

b. Annealing

c. Denaturation

d. Cooling

44. The enzyme responsible for adding nucleotides during mRNA synthesis is:

a. DNA polymerase

b. RNA polymerase

c. Reverse transcriptase

d. Ligase

DNA ⟶ m-RNA ⟶ PROTEINS

45. What is correct about composition of glycosaminoglycans?

a. Uronic acid plus amino sugars

b. Uronic acid and hyaluronic acid

c. Uronic acid and galactose

d. Uronic acid and glucose

GAG ↑: Tu ↓ myxedeme

↓

✓ URONIC ACID

✓ AMINO- SUGAR

46. Corneal transparency is maintained by which of the following

a. Type IV collagen

b. Type III collagen

c. Keratan sulfate

d. Dermatan sulfate

47. Which is the most abundant GAG?

a. Chondroitin → CARTILAGE

b. Keratan sulphate

c. Dermatan sulphate

d. Heparan sulfate

Chrondroitin is most abundant and is present in cartilage

48. Which of the following will inhibit GLUT-4?

a. Empagliflozin SGLT2i

b. Phloretin ····----→ TINY GLUTES-4

c. Phlorizin : SGLT1 : gut
SGLT2 : kidney

d. Inulin

RBS = n

49. 50-year-old patient is detected to have familial renal glycosuria. The defect is present at which of the following sites?

a. Duodenum

b. Pancreas

c. PCT

d. DCT

50. Which of the following is stimulated by exercise?

a. GLUT 1

b. GLUT 2

c. GLUT 3

d. GLUT 4 MUSCLE, Adipose Tissue

51. Pancreatic beta cells express which of the following

a. GLUT 1 RBC, Brain, placenta

b. GLUT 2 PANCREAS

c. GLUT 3

d. GLUT 4 muscle, adipose Tissues

GLUTS: SPERMS

52. Oil droplet cataract in galactosemia is due to accumulation of which of the following products

a. Galactokinase

b. Galactose 1-uridyl-transferase enzyme (-)

c. Galactitol

d. UDP-galactose

53. 1 month old child has vomiting episodes every time fruit juice or honey is given to him. Fructose restriction was advised and child showed weight gain. Which enzyme is deficient?

a. Aldolase A

b. Aldolase B

c. Fructokinase

d. Triose kinase

HEREDITARY
FRUCTOSE INTOLERANCE

54. PUFA is least in which of the following cooking oils

a. Safflower oil

b. Sunflower oil

c. Coconut oil

d. Rapeseed oil

55. Which test is done for diagnosis of lactose intolerance due to lactase deficiency in adults

a. Urine for reducing substances D.M +

b. Stool for reducing substances Osmotic diarrhea

c. Stool trypsinogen levels CF

d. Breath hydrogen test

56. Most dense lipoprotein with least TG content is

a. Chylomicrons

b. LDL

c. HDL

d. VLDL

LARGEST particle: TG ++: least dense

Max electrophoretic mobility

Apo-B-48

good C

57. Function of hormone sensitive lipase in adipocytes?

a. Lipolysis

b. Lipogenesis

c. Lipid conjugation

d. Lipid deconjugation

58. Alpha oxidation occurs at which of the following sites?

a. Mitochondria

b. Golgi complex

c. Peroxisomes

d. Endoplasmic reticulum

P α-oxidation = phytanic acid

β-oxidation = VLCFA

γ- oxidation = ER

* ZELLWEGER ⇒ ZERO lysosomes

* REFSUM ⇒ RP + P. NEURITIS + ataxia

α-oxidation in lysosomes ↑ phytanic Acid

59. Correct about hexokinase enzyme?

a. Induced by insulin

b. Mobilize glucose into liver cells

c. Located in liver endothelial cells

d. Feedback inhibition by glucose 6 phosphate

GLUCOKINASE

60. Which vacutainer is used for taking blood sample for glucose estimation:

a. Gray → NaF: ⊖ enolase ⊖ RBC consumption

b. Green

c. Purple → HbA1c

d. Red

CANCER

61. Which is correct about Warburg effect?

a. Aerobic glycolysis

b. Anaerobic glycolysis

c. Aerobic gluconeogenesis

d. Anaerobic gluconeogenesis

62. Phosphofructokinase 1 is rate limiting step in _____

a. Gluconeogenesis

b. Glycogenolysis

c. Embden meyerhof pathway HMP

d. Cori cycle

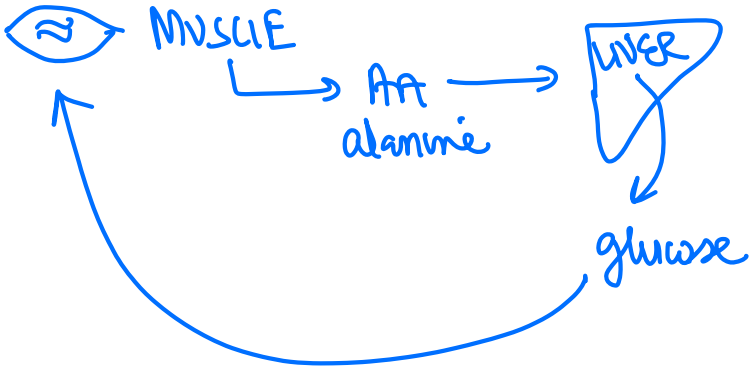
63. Which amino acid plays dominant role in Cahill cycle

a. Glycine

b. Alanine

c. Proline

d. Histidine



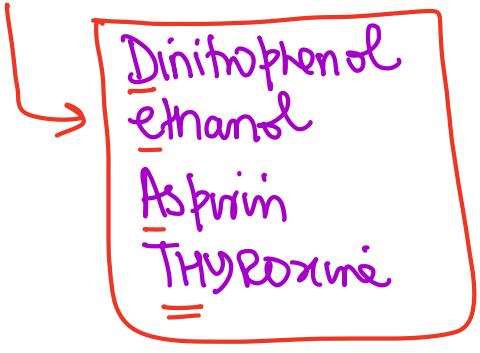
64. Which of the following is an uncoupling agent in electron transport chain?

a. Alcohol

b. Rotenone ⊖

c. Antimycin ⊖

d. Hydrogen sulfide ⊖



deeth!

65. Which is correct about yield of 1 molecule of NADH?

a. 1 ATP

b. 1.5 ATP

c. 2 ATP

d. 2.5 ATP

66. All of the following processes occur in both mitochondria and cytoplasm except?

HUG →

a. Heme synthesis

b. Urea synthesis

c. Gluconeogenesis

d. TCA cycle

67. _____ causes quenching of denatured DNA?

a. Slow cooling

b. Rapid cooling

c. Slow heating

d. Rapid heating

68. DNA helicase is defective in

a. Bloom syndrome

b. Ataxia telangiectasia

c. Frederich ataxia

d. Li Fraumeni syndrome

p53 ⊖ Blood cancer, brain cancer, breast cancer

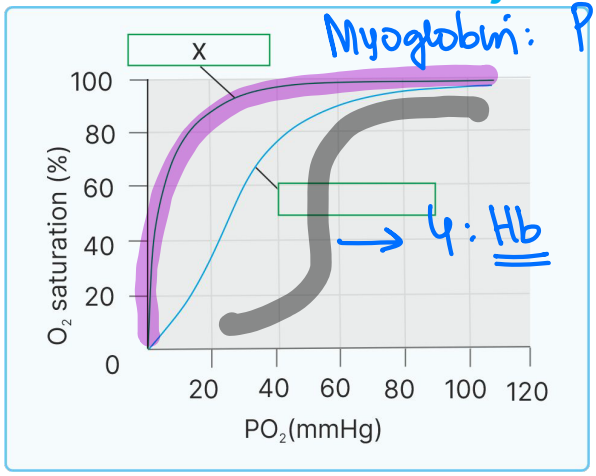
69. The following molecule will bind to how many molecules of oxygen

a. 1

b. 2

c. 3

d. 4



Myoglobin: PARABOLA

4: Hb

Rt

CADET

1. $\downarrow O_2$

2. Acidosis

3 2,3 DPG ↑

4. Temp ↑

70. What is the normal pCO2 value in blood gas analysis of venous blood?

+6 mm

a. 30-40 mm Hg

b. 35-45 mm Hg pCO_2: ABG

c. 41-51 mm Hg pCO_2: VBG

d. 50-60 mg mmHg

71. The first heme precursor synthesized in mitochondria during heme formation is:

a. Porphobilinogen

b. ALA

c. Uroporphyrinogen

d. Coproporphyrinogen

* glycine + succinyl CoA: ALA

Urine ALA levels: Lead poisoning

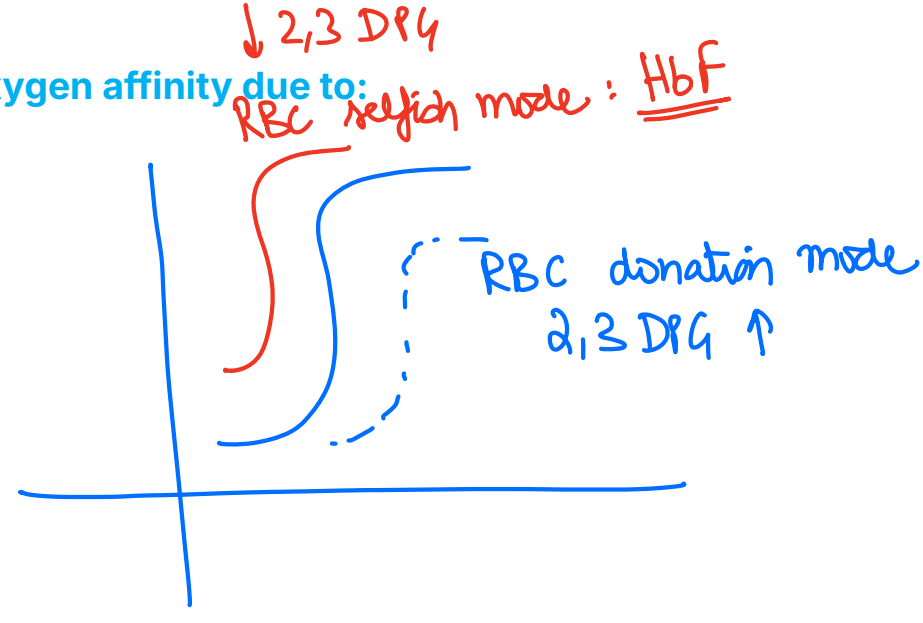
72. Fetal hemoglobin has higher oxygen affinity due to:

a. Stronger binding to 2,3-BPG

b. Weaker binding to 2,3-BPG

c. More β chains

d. Presence of δ chains



73. Which type of PCR quantifies DNA amplification in real time using fluorescent dyes?

a. Nested PCR

b. RT-PCR

c. qPCR

d. Multiplex PCR

74. PCR type that uses multiple primer sets to amplify different genes simultaneously is:

a. Nested PCR

b. Multiplex PCR

c. qPCR

d. Digital PCR

75. A highly specific PCR using two successive rounds of amplification to reduce false positives is:

a. Nested PCR

b. qPCR

c. Multiplex PCR

d. Hot-start PCR

THANK YOU