Past Papers

بسم الله الرحمن الرحيم

DOPAMINE
SCIENTIFIC TEAM

بحران

MID – Lecture 4 to 6

Metabolism

﴿ وَإِن تَتَوَلَّوْا يَسْتَبْدِلْ قَوْمًا غَيْرَكُمْ ثُمَّ لَا يَكُونُوا أَمْثَالَكُم ﴾

اللهم استعملنا ولا تستبدلنا

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First we will start with (47) past Qs

then there will be (9) test bank Qs

(all Qs will be by default past unless it is written to be test bank)

Q1: Which of the following is considered an inhibitor for both isocitrate dehydrogenase and α-ketoglutarate dehydrogenase?

A. ATP
B. NADH
C. ADP
D. Calcium
E. All are incorrect

Answer : B

Q2: Which of the following structures is activated by ADP?

a) Citrate synthase

b) Isocitrate dehydrogenase

c) α-ketoglutarate dehydrogenase

d) Succinate dehydrogenase

e) Both b and c

Answer : b

Q3: Which of the following enzymes in the citric acid cycle uses thiamine (vitamin B1) as a cofactor?

a) Citrate synthase

b) Isocitrate dehydrogenase

c) α-ketoglutarate dehydrogenase

d) Succinate dehydrogenase

e) none of the above

Answer : c

Q4: Which of the following enzymes catalyze decarboxylation reactions in the citric acid cycle?

a) Citrate synthase

b) Succinate dehydrogenase

c) Isocitrate dehydrogenase

d) α-ketoglutarate dehydrogenase

e) c + d

Answer : e

Q5: Which of the following enzymes in the citric acid cycle does not produce NADH?

a) Isocitrate dehydrogenase

b) α-ketoglutarate dehydrogenase

c) Malate dehydrogenase

d) Succinate dehydrogenase

e) Both a and c

Answer : d

Q6: What would be the ATP yield if fumarase was inhibited in the citric acid cycle?

a) 2.5 moles

b) 5 moles

c) 7.5 moles

d) 10 moles

e) 12.5 moles

Answer : c

Q7: What's unique about the conversion of succinate to fumarate in the TCA cycle?

a) Produces NADH

b) Utilizes an enzyme bound to the inner mitochondrial membrane

c) Occurs in the mitochondrial matrix

d) Produces ATP directly

e) produces Co2

Answer : b

Q8: What enzymes are responsible for the loss of CO_2 in the TCA cycle?

a) Citrate synthase

b) Isocitrate dehydrogenase

c) Alpha-ketoglutarate dehydrogenase

d) Succinate dehydrogenase

e) b+c

Answer : e

Q9: What is the total yield of NADH and $FADH_2$ in one turn of the TCA cycle?

a) 3 NADH and 1 $FADH_2$

b) 2 NADH and 1 $FADH_2$

c) 3 NADH and 2 $FADH_2$

d) 4 NADH and 1 $FADH_2$

e) 2 NADH and 2 $FADH_2$

Answer : a

Q10: which one of the following conditions decrease the oxidation of acetyl CoA by the Citric Acid Cycle:

a) a high availability of Calcium ions

b) a high acetyl CoA/CoA ratio

c) a low ATP/ADP ratio

d) a low NAD+/NADH ratio

e) 2 or more are correct

Answer : d

Q11: which of the following does not included in TCA cycle:

a) alpha ketoglutarate to succinyl coA

b) pyruvate to acetyl coA

c) succinate to fumarate

d) malate to oxaloacetate

e) isocitrate to alpha ketoglutarate

Answer : b

Q12: Which of the following intermediates in the TCA cycle contains 4 carbon atoms?

a) Isocitrate

b) Citrate

c) Fumarate

d) Alpha-ketoglutarate

e) pyruvate

Answer : c

Q13: one of these reaction needs H2O

a) fumarate to malate

b) malate to Oxaloacetate

c) Citrate to Isocitrate

d) Isocitrate to alpha-ketoglutarate

e) pyruvate to citrate

Answer : a

Q14: Oxidative decarboxylation:

a) do not occur in the TCA cycle.

b) involve loss of CO2 and the production of NAD.

c) involve loss of CO2 and the production of NADH.

d) involve gainof CO2 and the production of FADH2.

e) occur three times in the TCA cycle.

Answer : c

Q15: What are the effects of increased concentration of citrate?

a) Increases the inhibitory effect of ATP

b) Decreases the inhibitory effect of ATP

c) Increases the activity of ATP

d) Increases the activity of AMP

e) none of the following

Answer : a

Q16: All of the following co-factors are required for the α-ketoglutarate dehydrogenase complex in the citric acid cycle, except:

a) Lipoic acid

b) NAD+

c) TPP

d) FAD

e) All are required

Answer : e

Q17: The cofactor required by the enzyme that produces oxaloacetate from pyruvate is.

a) Coenzyme A.

b) Pantothenic Acid

c) Lipoic Acid

d) NADH

e) Biotin

Answer : e

Q18: CoA is a substrate for:

a) Succinate dehydrogenase.

b) Pyruvate Dehydrogenase and alpha-ketoglutarate.

c) Malate dehydrogenase.

d) Isocitrate Dehydrogenase.

e) Fumarase.

Answer : b

Q19: The reactive group of coenzyme A is

a) Phosphate

b) Carboxyl

c) Amino

d) Sulfhydryl

e) Aldehyde

Answer : d

Q20: High NADH/NAD+ ratio inhibits:

a) Fumarate hydratase

b) Isocitrate dehydrogenase

C) Malate dehydrogenase

d) Succinate dehydrogenase

e) Citrate isomerase.

Answer : b

Q21: Release of CoA from specific compounds in the mitochondrial matrix aids directly in:

a) Substrate level phosphorylation

b) Oxaloacetate production

c) Formation of NADH

d) Formation of FADH2

e) Release of CO2

Answer : a

Q22: Which of the following is TRUE considering TCA cycle?

a) If citrate is very high in concentration, TCA cycle will run less effectively

b) When oxidation occurs, an accompanying decarboxylation takes place

c) The overall ΔG is considered zero at physiological conditions

d) ADP is an allosteric activator for 2 of the three dehydrogenases included

e) All enzymes are allocated within the mitochondrial matrix

Answer : a

Q23: The reactions in which succinate is converted to oxaloacetate are, in order:

a. three successive oxidation reactions

b. an oxidation, a hydration, and an oxidation

c. an oxidation, a dehydration, and an oxidation

d. an oxidative decarboxylation, a dehydration, and a condensation

e. a condensation, a dehydration, and an oxidative decarboxylation

Answer : b

Q24: Release of CoA from specific compounds in the mitochondrial matrix aids directly in:

a) Substrate level phosphorylation

b) Oxaloacetate production

c) Formation of NADH

d) Formation of FADH2

e) Release of CO2

Answer : a

Q25: Consider the TCA cycle reaction that produces oxaloacetate has a ΔGo = 0.1 kCal/mol. (0.001) M of each compound is mixed & the reaction is allowed to come to equilibrium. Accordingly, which statement is CORRECT about the resulting concentration of niacin at equilibrium?

a) [NAD+] ≥ [NADH]

b) [NAD+] > [NADH]

c) [NAD+] < [NADH]

d) [NAD+] = [NADH]

e) Cannot be determined from the information provided

Answer : b

Q26: Which one of the following reaction would you expect to be exergonic?

a) Decarboxylation

b) Condensation

c) Transamination

d) Carboxylation

e) Phosphorylation

Answer : a

Q27: During oxidative decarboxylation of a-ketogluterate, the following happens:

a) Oxidation of an acetate group

b) Addition of Coenzyme A to a 2-carbon fragment

c) Oxidation of NADH

d) Removal of 2 CO2 molecules

e) Oxidation of 2 thiol groups by FAD

Answer : e

Q28: what do you expect from this reaction: (acetyl CoA + OAA)

a) Consume energy

b) Done and completed via citrate synthase

c) Inhibited by high concentration of OAA

d) It’s an oxidation decarboxylation reaction

e) It’s an oxidation reaction

Answer : B

Q29: Release of CoA from specific compounds in the mitochondrial matrix aids directly in:

a) Substrate level phosphorylation

b) Oxaloacetate production

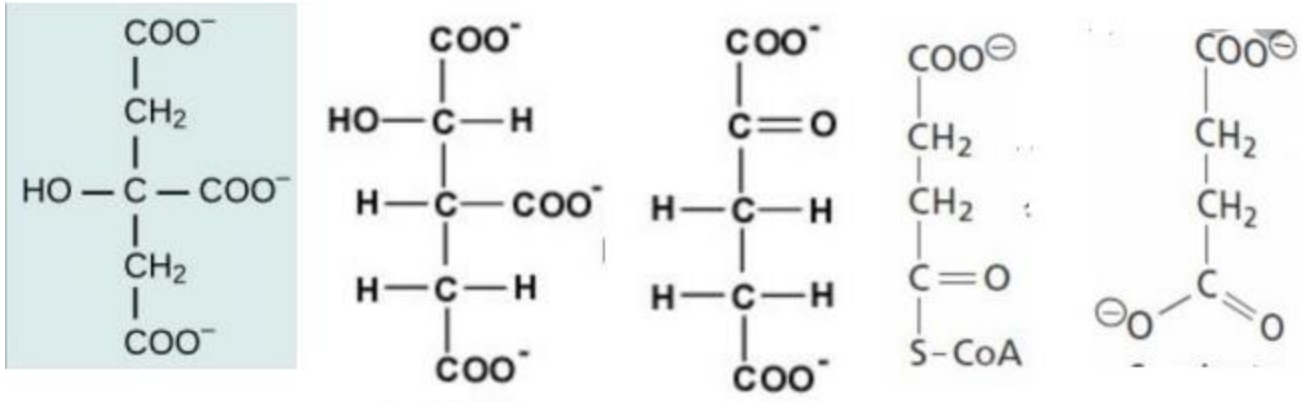
c) Formation of NADH

d) Formation of FADH2

e) Release of CO2

Answer : a

Q30: Regarding to these structures answer the three questions below



1.Which structure is regulated by ADP:

A-1 B-2 C-3 D-4 E-5

2.which converging between these structures gives produce substrate phosphorylation:

A)1-2 B) 2-3 C) 3-4 D) 4-5

3.Which structure gives FADH2 by enzyme dehydrogenase:

A-1 B-2 C-3 D-4 E-5

Answer : b, d, e

Q31: How many molecules of ATP produce in oxidation phosphorylation by using single Acetyl CoA?

a) 10

b) 36

c) 20

d) 5

e) 15

Answer : a

Q32: one of the following will activate pyruvate dehydrogenase (PDH) :

a) increase Ca+ concentration

b) Increase concentration of acetyl coA

c) Decrease concentration of pyruvate

d) Alanine

e) Citrate

Answer : a

Q33: In TCA cycle, oxidation decarboxylation reaction occurs in?

a) Succinate thiokinase

b) Malate dehydrogenase & alpha ketoglutarate dehydrogenase

c) isocitrate DH, alpha ketoglutarate dehydrogenase

d) Citrate synthase

e) Malate dehydrogenase & isocitrate DH

Answer : c

Q34: The conversion of pyruvate to Acetyl Co and CO2:

a) is a decarboxylation process

b) is activated when pyruvate dehydrogenase (PDH, El) of the pyruvate dehydrogenase complex is phosphorylated by PDH kinase in the presence of ATP

c) is reversible.

d) occurs in the cytosol

e) depends on the coenzyme biotin

Answer : a

Q35: The cofactor required by the enzyme that produces of oxaloacetate from pyruvate is:

a) Coenzyme A

b) Pantothenic Acid

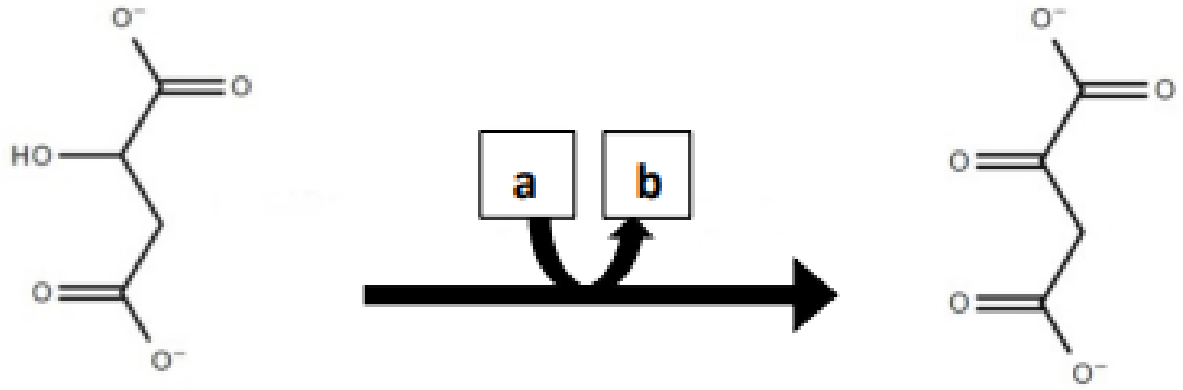
c) Biotin

d) NADH

e) Lipoic Acid

Answer : c

Q36: Based on your knowledge of the TCA cycle , which group of small molecules does best fit the boxes associated with the reaction shown?

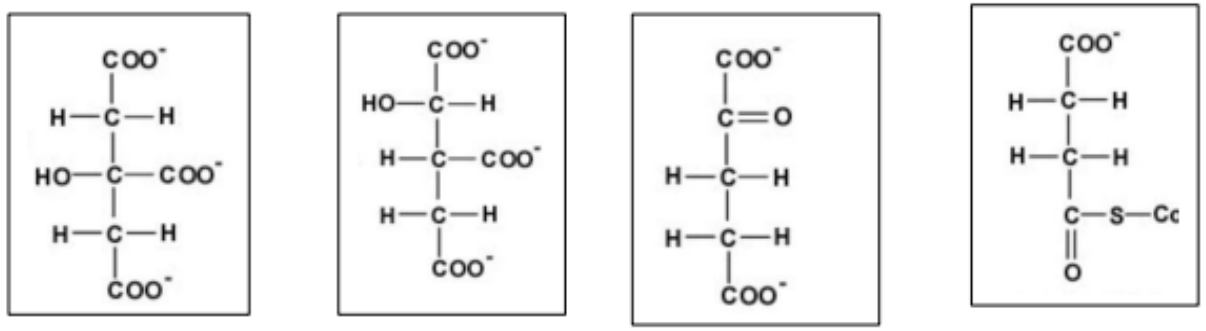


	a	b
A	ADP + $2P_i$	ATP
B	NAD^+	NADH
C	$NADP^+$	NADPH
D	FAD	$FADH_2$
E	All options are correct	☺

Answer : b

Q37: Choose the CORRECT statement based on the following structures of TCA cycle intermediates:

1 2 3 4



a) Conversion of compounds 1 to 2 is an oxidative decarboxylation reaction

b) Release f CoA from compound 4 accompanies the release of CO2

c) Compound 1 is oxidized but can't be reduced

d) Conversion of compounds 3 to 4 is the rate -limiting step of the cycle

e) The enzyme that catalyzes the conversion of compounds 2 to 3 is allosterically activated by ADP

Answer : e

Q38: If you knew that the conversion of oxaloacetate to malate has delta G note of +32 KJ/mol, which of the following is true:

a) it will move slower.

b) it will not happen in the cell.

c) It may occur in the cell with specific concentrations for the reactant and products.

d) It could happen if coupled with an endergonic reaction.

e) None of the above.

Answer : c

Q39: One of these is not an intermediate in Krebs cycle:

a) Citrate
b) Alpha ketoglutarate
c) Acetyl CoA
d) Fumarate
e) Oxaloacetate

Answer : c

Q40: Which of the following is the coenzyme for dihydrolipoyl transacetylase:

a) NAD + FAD

b) CoA + NAD

c) Lipoic acid

d) TPP

e) Lipoic acid + CoA

Answer : e

Q41: Which of the following is not a coenzyme of alpha ketoglutarate dehydrogenase?

a) NAD

b) FAD

c) Lipoic acid

d) ATP

e) TPP

Answer : d

Q42: one of the following will activate pyruvate dehydrogenase (PDH) :

a) increase Ca+ concentration

b) Increase concentration of acetyl coA

c) Decrease concentration of pyruvate

d) Alanine

e) Citrate

Answer : a

Q43: How many high-energy phosphate molecules are produced in the conversion of Citrate to Succinate?

a) 0

b) 3

c) 6

d) 7

e) 9

Answer : d

Q44: What is the maximal amount of ATP produced from the oxidation of isocitrate to alpha-ketoglutarate?

a) 0

b) 2

c) 3

d)4

e)8

Answer : c

Q45: What type of reaction is the conversion of alpha-ketoglutarate to succinyl-CoA in the Krebs cycle?

a) Exergonic

b) Endergonic

c) Isogenic

d) None of the above

e) 2 or more are correct

Answer : a

Q46: Which enzyme is located differently compared to the rest in the Krebs cycle enzymes?

a) Citrate synthase

b) Isocitrate dehydrogenase

c) α-Ketoglutarate dehydrogenase

d) Succinate dehydrogenase

e) fumarase

Answer : d

Q47: What can be concluded from studying the Krebs cycle?

a) Intermediates can be used solely for ATP production.

b) Fat cannot be synthesized from carbohydrates.

c) Intermediates can be used for multiple biosynthetic pathways.

d) The Krebs cycle only occurs in anaerobic conditions.

e) krebs cycle only is a process after glycogenesis

Answer : c

Q48: Putting an inhibitor of succinate dehydrogenase will cause a decrease in the concentration of:

a) citrate

b) pyruvate

c) isocitrate

d) fumarate

e) acetyl Co-A

Answer : d

Q49: The following is the sum of three steps in the citric acid cycle. A + B + FAD + H_2O → C + $FADH_2$ + NADH Choose the lettered answer that corresponds to the missing “A”, “B”, and “C” in the equation. Reactant A Reactant B Reactant C

a) Succinyl CoA GDP Succinate

b) Succinate NAD+ Oxaloacetate

c) Fumarate NAD+ Oxaloacetate

d) Succinate NAD+ Malate

e) Fumarate GTP Malate

Answer : B

Test bank Qs

Test bank Q

Q eht tceffa yltcerid ton ylekil tsom lliw snotiidnoc gniwollof eht fo hcihW:50
?xelpmoc esanegordyhed etaratulgotek-α eht fo ytivtica

A. Deficiency in thiamine (Vitamin B1)
B. Excessive accumulation of NADH
C. High levels of succinyl-CoA and ATP
D. Increased O2 in mitochondria
E. Increased availability of lipoic acid

Answer : D

Test bank Q

Q:51Which of the following is a critical step in the reaction mechanism of the α-ketoglutarate dehydrogenase complex?

A. Direct phosphorylation of succinate to produce ATP
B. Oxidation of $FADH_2$ to FAD to drive the reaction forward
C. Decarboxylation of α-ketoglutarate followed by transamination
D. Formation of a thioester bond in succinyl-CoA using Coenzyme A
E. Hydrolysis of NAD^+ to generate NADPH and CO_2

Answer : D

Test bank Q

Q:52Which of the following would most likely lead to a significant reduction in the activity of the α-ketoglutarate dehydrogenase complex in a cell?

A. a .Elevated levels of succinyl-CoA and ATP
B. Increased NADnotiartnecnoc noi muiclac hgih dna otiar HDAN/$^{+}$
C. Low levels of succinate and increased TPP
D. Decreased ADP levels and low lipoic acid availability
E. High oxaloacetate concentration and low FAD levels

Answer : A

Test bank Q

Q-α eht fo ytivtica ctiylatac lluf eht rof deriuqer si srotcafoc fo notianibmoc hcihW:53
?xelpmoc esanegordyhed etaratulgotek

A. a) NAD(PPT) etahpsohporyp enimaihT ,A emyzneoC ,ntioiB ,DAF ,$^{+}$
B. b) NADH, FADHPPT ,A emyzneoC ,dica ciopiL ,$_{2}$
C. c) NADPPT ,A emyzneoC ,dica ciopiL ,DAF ,$^{+}$
D. d) FAD, Biotin, Lipoic acid, ATP, Coenzyme
E. e) NADPH, FAD, Lipoic acid, Coenzyme A, Pyridoxal phosphate

Answer : C

Test bank Q

Q eht no evah gntisaf degnolorp seod tceffe tahW:54
?revil eht ni etatecaolaxo fo notiartnecnoc

a) It increases due to enhanced glycolysis.

b) It decreases due to its diversion to gluconeogenesis.

C) It remains stable as it is replenished

d) It decreases due to increased fatty acid oxidation

e) It increases because of decreased energy demand.

Answer : B

Test bank Q

Q nehw gntisaf gnirud AoC-lytecA ot sneppah tahW:55
?tneicffiusni era slevel etatecaolaxo

A. It is converted back to pyruvate.
B. It enters the Krebs Cycle directly.
C. It is diverted to ketogenesis.
D. It is stored as glycogen.
E. It is excreted by the kidneys.

Answer : C

Test bank Q

Q:56Pyruvate carboxylase requires which cofactor for its activity?

A. Thiamine
B. Biotin
C. Pyridoxine
D. Riboflavin
E. Cobalamin

Answer : B

Test bank Q

Q detaicossa yliramirp si yawhtap cilobatem hcihW:57 ?esalyxobrac etavuryp fo ytivtica eht htiw

A. Glycolysis
B. TCA cycle
C. Gluconeogenesis
D. Fatty acid oxidation
E. Urea cycle

Answer : C

Test bank Q

Q:58A 58-year-old man with a history of coronary artery disease suffers a myocardial infarction. After treatment with malonate, the medical team observes improvements in cardiac function. What is the likely mechanism behind this improvement?

A. Increased heart rate and contractility
B. Decreased ischemic damage and preserved myocardial cells
C. Enhanced fat metabolism in cardiac tissue
D. Promotion of angiogenesis in ischemic areas
E. Reduction of arterial plaque formation

Answer : B

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

Corrections from previous versions:

Versions	Question #	Before Correction	After Correction
V1 → V2			
V2 → V3			