



Biochemistry

Title = Integration

Lec no = 18

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وَقُلْ رَبِّ زِدْنِي عِلْمًا



INTERCONVERSION OF CARBOHYDRATES, FATS, AND PROTEINS

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بصير وبقوة (عشان هيبك اللي بيوكل كثير يتحول أكله (fat) عشانه (Pyruvate-DH is irreversible)

Conversion Of Carbohydrates To Fats

- ❖ This occurs after carbohydrate-rich meal
- ❖ Glycolysis yields:
 - DHAP → glycerol-3-P
 - pyruvate → acetyl- CoA : the starting material for the synthesis of long chain FA
- ❖ TAG are formed by condensation of glycerol-3-P & FA

Conversion Of Carbohydrates To Proteins

(intermediates of Krebs cycle and Pyruvate) (بيجوا منه ال (carbohydrates) عند هيريقه)

Carbohydrate

- ❖ Occurs mainly in liver
- ❖ Most of non-essential amino acids → products of glycolysis
 - 3-phosphoglycerate → serine
 - Pyruvate → alanine
 - Oxaloacetate → aspartate
 - α -ketoglutarate → glutamate
 - Serine \leftrightarrow glycine & cysteine

Conversion Of Proteins To Carbohydrates

بسر وسه ممكنه عن طريقه (glucogenic and its mix Amino Acids) يعني كلهم حرام (Ketogenic AA)

❖ Major source of blood glucose during fasting (> 18 hours)

❖ Deamination:

glucogenic amino acids → pyruvate/intermediates of TCA

❖ All metabolites will finally be converted to

oxaloacetate → PEP → glucose (gluconeogenesis)

Conversion Of Proteins To Fats

→ ممکنہ بس میں کثیر ہمار

- ❖ In animals on a high protein diet
- ❖ **Glucogenic** amino acids → pyruvate → DHAP → **Glycerol-3-P** → TAG
- ❖ **Glucogenic** amino acids → pyruvate → Acetyl CoA → **FA**
- ❖ **Acetyl CoA** may be also formed from **ketogenic amino acids**
- ❖ Serine (AA) → formation of phospholipids & glycolipids (Fats)

Conversion Of Fats To Carbohydrates

لنعمل بشكل أساسي من الممكن السبب أنه (Pyruvate-DH is completely irreversible)

كيفية كيف بصير؟ بصير عند طريقه (minor) عند طريقه

❖ Normal conditions → minor

جاي منه TAG

→ ❖ **Glycerol** → DHAP → glucose (gluconeogenesis)

→ ❖ Last 3 C of **odd chain** FA (rare in nature) → propionyl-CoA →

succinyl-CoA → TCA → Oxaloacetate → glucose

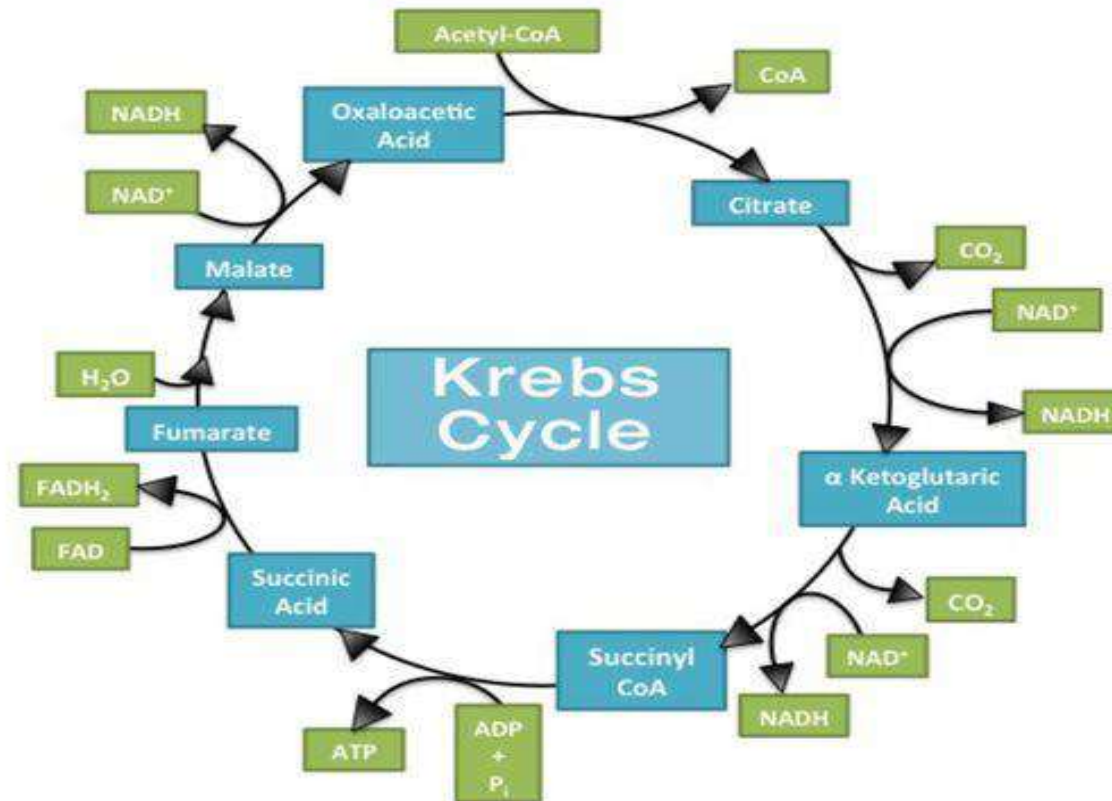
سؤال بالامتحان: علو ال (Reactions of Pyruvate dehydrogenase/Pyruvate Carboxylase):

- روح تنال عنهم بكرة / - في أسئلة متعلقة بال (irreversibility)

Conversion Of Fats To Carbohydrates

- ❖ There is no net conversion of acetyl CoA (b-oxidation of FA) to glucose:
 - **Oxidative decarboxylation of pyruvate to acetyl CoA is RREVERSIBLE**
 - There is no net conversion of acetyl CoA to oxaloacetate via TCA since one molecule of oxaloacetate is required to condense with acetyl CoA to start the cycle, and only one molecule of oxaloacetate is regenerated at the end of the cycle.

Conversion Of Fats To Carbohydrates



Conversion Of Fats To Proteins

بہت سے اہم

❖ **Minor physiologic importance .**

❖ **Glycerol + 3 C of odd chain FA ⇔ intermediates of glucose breakdown**

ممكن يتحولوا بعد صبيك الى

→ they are converted to **AA** ←

