

**Topic: Krebs Cycle**  
**Class: B.Sc Part –III (Hons.)**  
**Paper- V**  
**Group – A**

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## Regeneration of oxaloacetate

- The TCA cycle basically involves the oxidation of acetyl CoA to CO<sub>2</sub> with the simultaneous regeneration of oxaloacetate.
- There is no net consumption of oxaloacetate or any other intermediate in the cycle.

## Significance of Krebs cycle

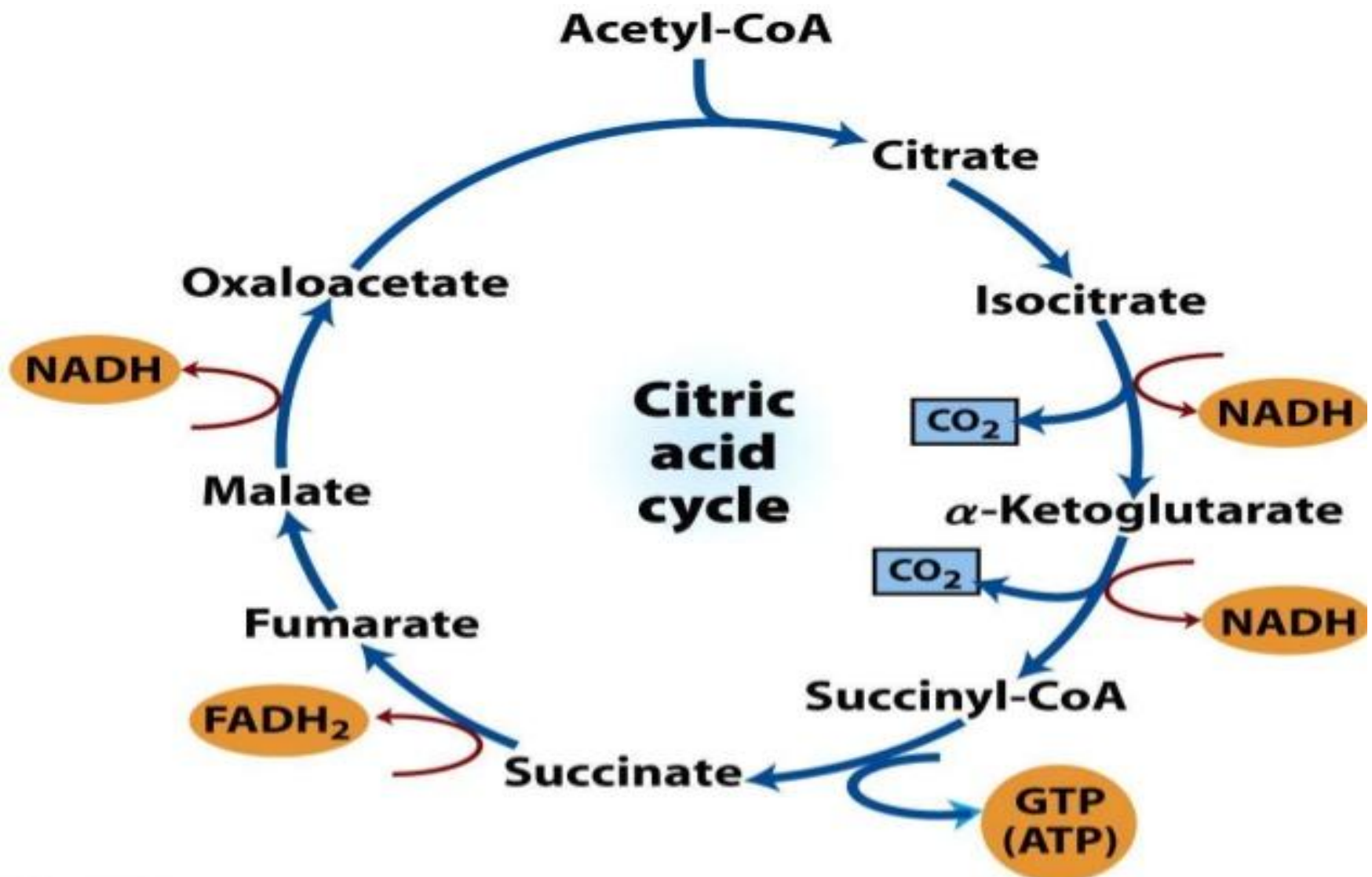
- Complete oxidation of acetyl CoA.
- ATP generation.
- Final common oxidative pathway.
- Integration of major metabolic pathways.
- Fat is burned on the wick of carbohydrates.
- Excess carbohydrates are converted as neutral fat
- No net synthesis of carbohydrates from fat.
- Carbon skeleton of amino acids finally enter the TCA cycle.

## Requirement of O<sub>2</sub> by TCA cycle

- There is no direct participation of O<sub>2</sub> in TCA cycle.
- Operates only under aerobic conditions.
- This is due to, NAD<sup>+</sup> & FAD required for the operation of the cycle can be regenerated in the respiratory chain only in presence of O<sub>2</sub>.
- Therefore, citric acid cycle is strictly aerobic.

## Energetics of TCA Cycle

- Oxidation of 3 NADH by ETC coupled with oxidative phosphorylation results in the synthesis of 9ATP.
- FADH<sub>2</sub> leads to the formation of 2ATP.
- One substrate level phosphorylation.
- Thus, a total of 12 ATP are produced from one acetyl CoA.



## Regulation of Krebs Cycle

1. Citrate synthase

2. Isocitrate dehydrogenase

3.  $\alpha$ -ketoglutarate dehydrogenase

- Citrate synthase is inhibited by ATP, NADH, acyl CoA & succinyl CoA.
- Isocitrate dehydrogenase is activated by ADP & inhibited by ATP and NADH
- $\alpha$ -ketoglutarate dehydrogenase is inhibited by succinyl CoA & NADH.
- Availability of ADP is very important for TCA cycle to proceed.

# Transamination

- Transamination is a process where an amino acid transfers its amino group to a keto group and itself gets converted to a keto acid.
- The formation of Alpha ketoglutarate & oxaloacetate occurs by this mechanism.