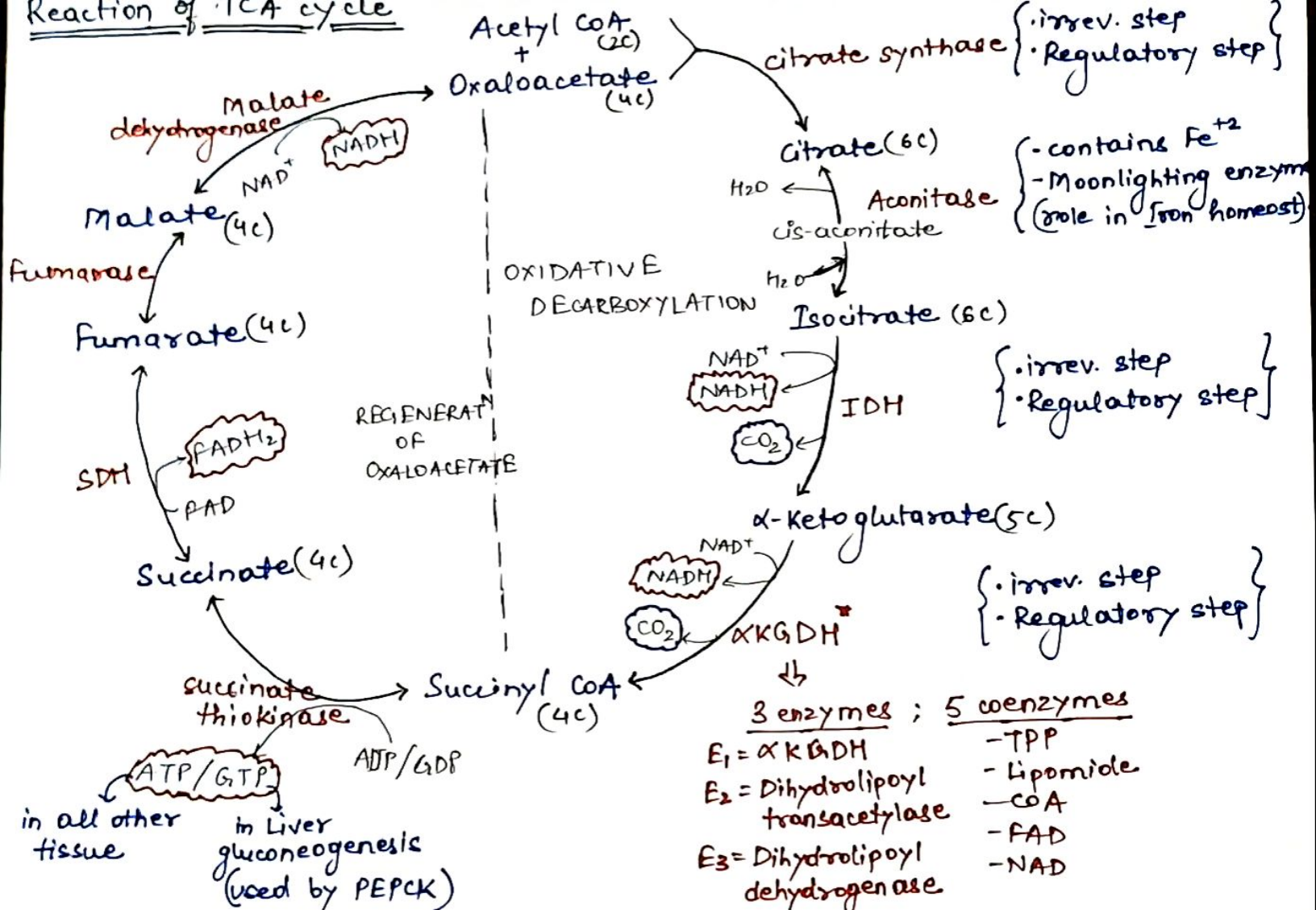
Reaction of TCA cycle



TCA cycle :-

* AKa Kreb's cycle / TCA (Tricarboxylic Acid) cycle / citric acid cycle

* Site :- Mitochondria

* All enzymes of TCA cycle are present in mitochondrial matrix
  except SDH :- inner mitoch. memb.
  (as a part of ETC complex II)

* Three irreversible steps in TCA cycle
  i) citrate synthase
  ii) IDH
  iii) αKGDH
  ] Regulation of TCA cycle → Inhibited by :- ATP, NADH, Succinyl CoA
  → Activated by :- ADP

* Mnemonic for TCA cycle :- Citrate Is Krebs Starting Substrate for Making OAA

ENERGETICS of TCA cycle :-

From 1 Acetyl CoA

- 3 × NADH = 3 × 2.5 ATP = 7.5 ATP] oxidative phosphorylation
- 1 × $FADH_2$ = 1 × 1.5 ATP = 1.5 ATP
- 1 × ATP = 1 ATP] SLP - Substrate level phosphorylation

10 ATP

From 2 Acetyl CoA = 2 × 10 ATP = **20 ATP**
(1 Glucose)

Revise energetics of Glycolysis & PDH

INHIBITORS OF TCA cycle :-

F A M

Revise inhibitors of Glycolysis & PDH

f :- Fluoroacetate ⊖→ Aconitase (Non-comp)

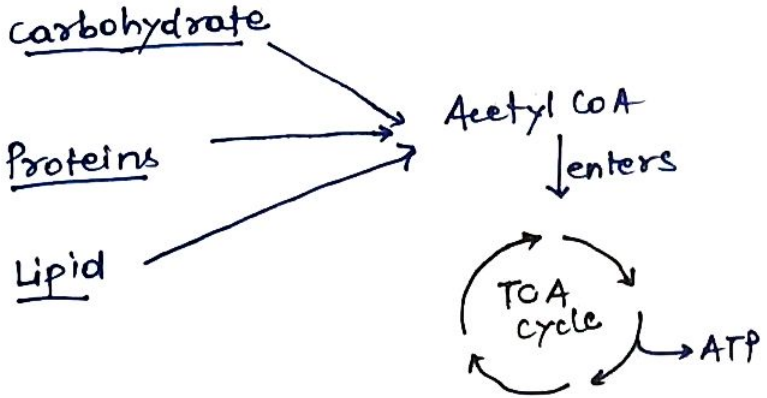
A :- Arsenite ⊖→ α-KGDH (Non-comp)

M :- Malonate ⊖→ SDH (Comp)

SIGNIFICANCE of TCA cycle :-

1. Is a final common oxidative pathway!
2. Is a amphibolic pathway!
3. Is a metabolic traffic circle!
4. Anaplerotic reactions in TCA cycle!

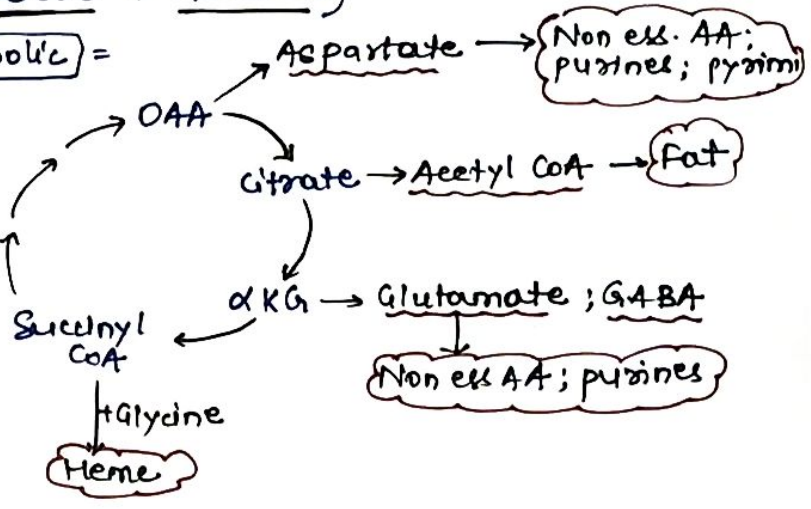
① TCA is final common oxidative pathway for different foodstuffs.



(2) TCA is an amphibolic pathway. (Catabolic + Anabolic)

Catabolic = Acetyl CoA → oxidised to → 2× CO_2

Anabolic =



(3) Dute to;

- TCA as a common oxidative pathway for carb; protein; Lipid
- TCA as anabolic & catabolic role
- Anapleurotic reactions in TCA

⇒ TCA acts as a metabolic traffic signal.

④ Anapleurotic reactions in TCA cycle

↳ Reactions concerned to "replenish or fill up" the intermediates of TCA cycle.