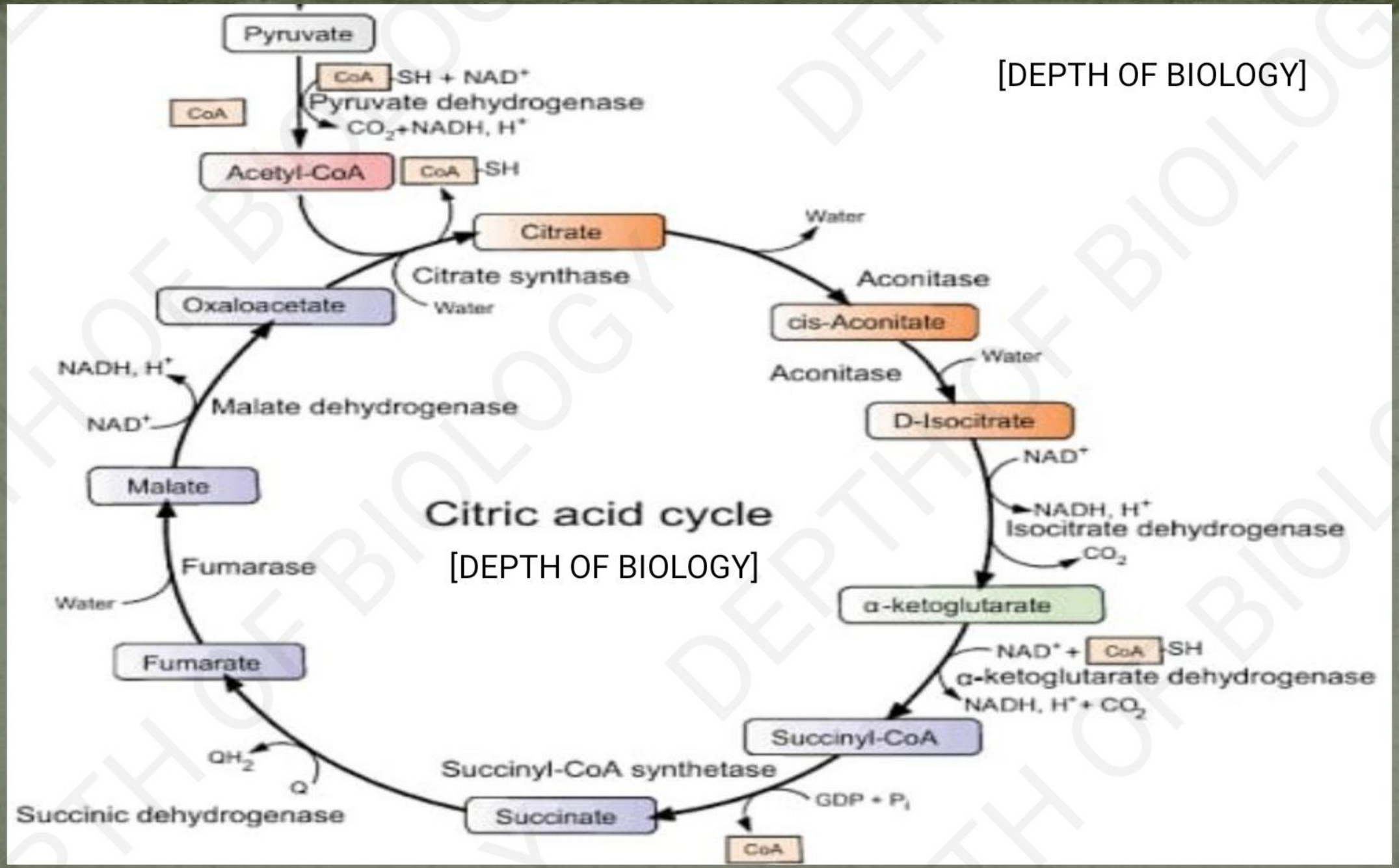
CITRIC ACID CYCLE

[DEPTH OF BIOLOGY]


[DEPTH OF BIOLOGY]
Pyruvate
CoA
SH + NAD+
Pyruvate dehydrogenase
CO2+NADH, H+
CoA
Acetyl-CoA
CoA
SH
Citrate
Water
Citrate synthase
Water
Aconitase
Oxaloacetate
cis-Aconitate
Water
Aconitase
NADH, H+
NAD+
Malate dehydrogenase
D-Isocitrate
NAD+
NADH, H+
Isocitrate dehydrogenase
CO2
Malate
Citric acid cycle
[DEPTH OF BIOLOGY]
Fumarase
Water
α-ketoglutarate
NAD+ + CoA SH
α-ketoglutarate dehydrogenase
NADH, H+ + CO2
Fumarate
Succinyl-CoA
QH2
Q
Succinyl-CoA synthetase
GDP + Pi
Succinic dehydrogenase
Succinate
CoA

- Acetyl Co-A is oxidised into CO_2 & H_2O
- Presence of mitochondria in matrix
- Takes place in aerobic condition only
- 65-70% ATP synthesised by kreb cycle
- It is common oxidised pathway for carbohydrates, dat & protein [DEPTH OF BIOLOGY]
- Amphibolic in nature
- It's intermediate are used in synthesis of amino acid, heme, glucose etc.

REGULATION OF CITRIC ACID CYCLE

[DEPTH OF BIOLOGY]

Substrate availability
Inhibition by accumulation
Allosteric feedback inhibition

- Citric synthase- inhibited by ATP, NADH acetyl Co-A, succinyl Co-A [DEPTH OF BIOLOGY]
- Isocitrate dehydrogenase- inhibited by ATP, NADH
- α-ketoglutarate dehydrogenase- inhibited by NADH, succinyl Co-A.

[DEPTH OF BIOLOGY]

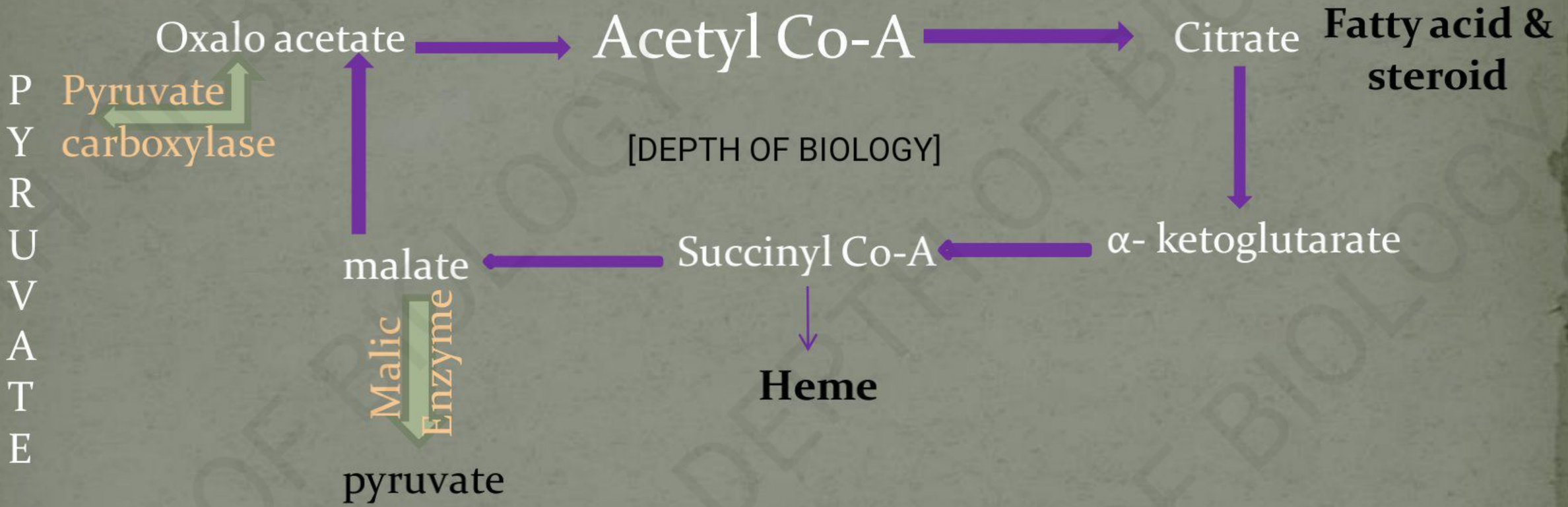
ENERGETICS

- 2 acetyl Co-A per cycle- 12 ATP form
- Isocitrate dehydrogenase (2NADH)- 6
- α-ketoglutarate dehydrogenase -6
- Succinate thiokinase (SLP)-2
- Succinate dehydrogenase (2FADH)-4
- Malate dehydrogenase (2NADH)-6

TOTAL- 24 ATP

Total ATP\mole of glucose under anaerobic condition- 2ATP

SIGNIFICANCE- Cycle is catabolic & anabolic in nature



•Transamination occurs in oxalo acetate & α-ketoglutarate to form aspartate and Glutamate respectively which are non essential amino acids purine, pyrimidine