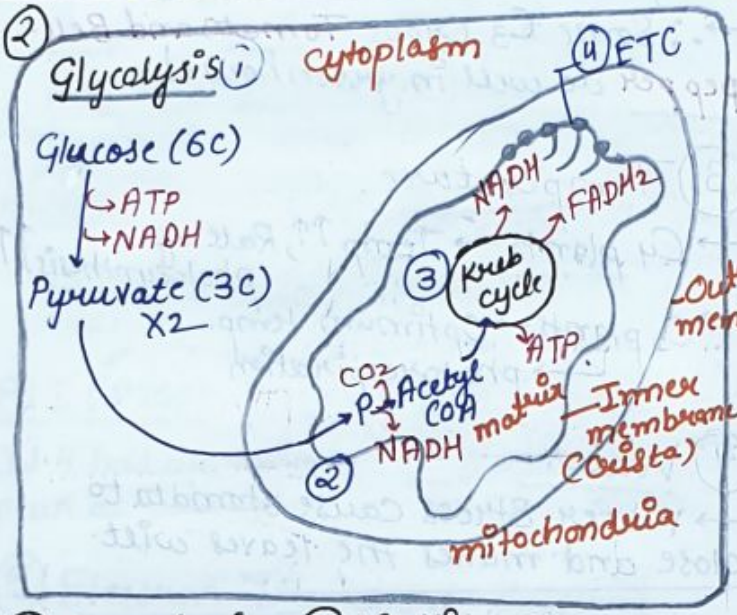
RESPIRATION IN PLANTS

① Cellular Respiration →

Aerobic: Glucose + O_2 → ATP + CO_2 ↑

Anaerobic: without O_2

② Glycolysis ① cytoplasm



① Glycolysis, ② Linking Step
④ ETC ③ Kreb's Cycle

③ Phosphorylation → addition of phosphate group. ADP + P → ATP.

Substrate level ④ phosphorylation	Oxidative phosphorylation
Glucose → (energy) ADP + P → ATP → 2X pyruvate	Glucose → NADH → ATP (etc.) → 2X pyruvate

⑤ Glycolysis → EMP Pathway

By Embden, Mayerhof and parnas.

Occur in Cytoplasm, common to all types of respiration

10 Step reaction.

Converts Glucose (6C) → (3C) Pyruvate X2

Glucose (6C)

Hexokinase (ATP → ADP)

Glucose-6-phosphate

↓

Fructose-6-phosphate

ATP → ADP

Fructose 1-6, Bisphosphate (Energy consuming)

→ Triose Phosphate (Glyceraldehyde-3-phosphate)

→ Triose phosphate (Dihydroxy acetone phosphate)

PGAL ⇌ DHAP

NAD → NADH X2

1,3, bisphosphoglyceric ā X2

ADP → ATP X2

3 phosphoglyceric ā X2

↓

2 phosphoglyceric ā X2

H_2O ←

PEP X2

ADP → ATP X2

pyruvate (3C) X2 (Energy releasing)

→ Results of Glycolysis →

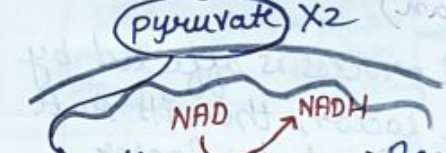
Energy Consumed → 2ATP

Energy Released → 4ATP + 2NADH

Net Energy → 2ATP, 2NADH

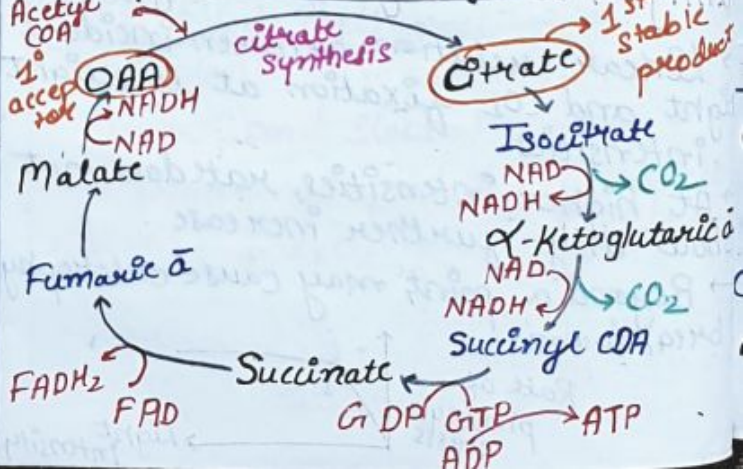
Oxidative phosphorylation → 2X(2X3) = 6ATP

⑥ Linking Step →



pyruvate Dehydrogenase.

⑦ Kreb's Cycle / Tricarboxylic Acid Cycle / Citric Acid Cycle →



Result →

Acetyl CoA → CO_2

3 NAD → 3 NADH → 3 X 3 = 9 ATP

1 FAD → 1 FADH → 1 X 2 = 2 ATP

1 GTP → 1 ATP → substrate level.

Net Gain = 12 ATP

(8) Total Calculations →

Glycolysis → 8 ATP

Linking step → 1 NADH X 2 = 6 ATP

Kreb Cycle → 12 ATP X 2 = 24 ATP

Net gain = 38 ATP

(9) Electron Transport Chain →

→ To release energy from NADH and $FADH_2$ to form ATP.

→ present in inner mitochondrial membrane.

→ Oxidative phosphorylation.

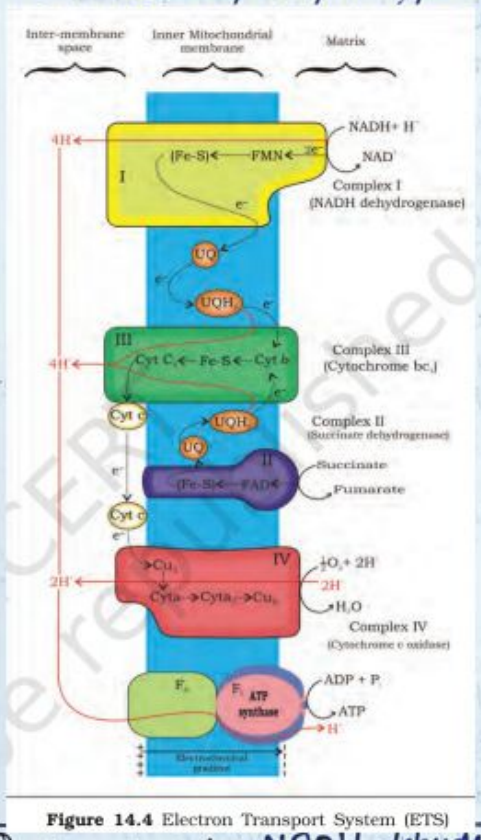


Figure 14.4 Electron Transport System (ETS)

DIAGRAM FROM NCERT

(10)

Complex 1 → NADH dehydrogenase.

Complex 2 → Succinate dehydrogenase.

Complex 3 → Cytochrome BC_1.

Complex 4 → Cytochrome C Oxidase.

Complex 5 → ATP synthase (F_0, F_1)

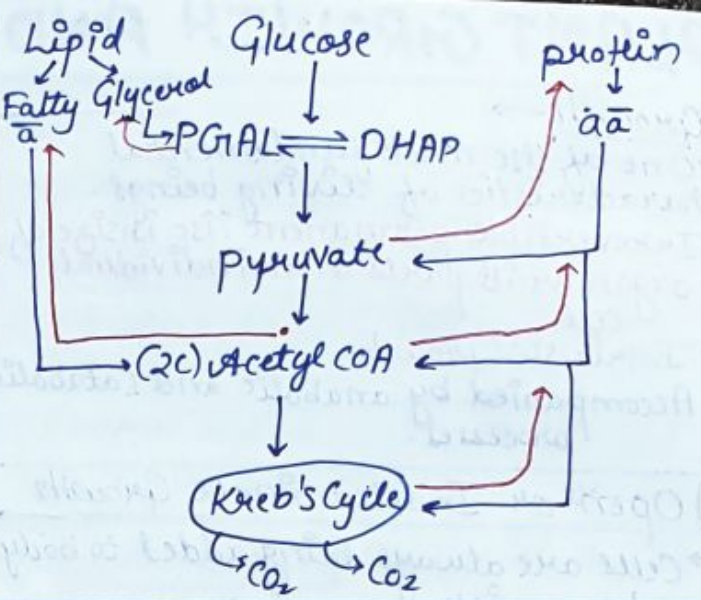
(11) Amphibolic Pathways.

eg → Respiration

Metabolism

Catabolism Anabolism

Amphibolic pathway → Both Catabolism and Anabolism.



(12) Respiratory Quotient →

$$\frac{CO_2 \text{ evolved}}{O_2 \text{ used}} = R.Q.$$

Carbohydrate = 1

Fat (Tripalmitin) = 0.7

protein = 0.9

(13) Fermentation →

→ Alcoholic fermentation

→ Lactic a fermentation

Glucose → 2 ATP

pyruvate

NADH → NAD → $C_2H_5OH + CO_2$

NADH NAD → Lactic a

Net product = 2 ATP

NEET SLAYER