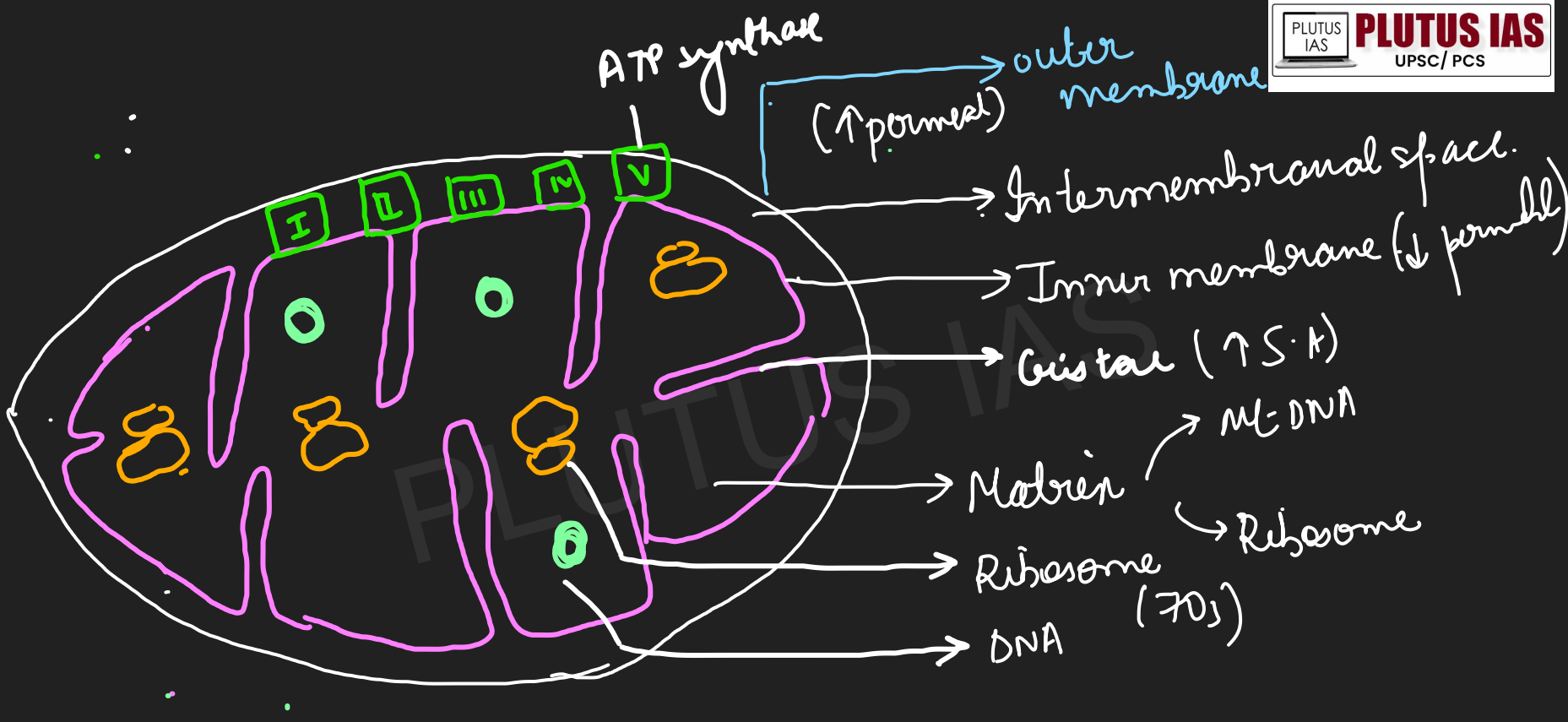
Mitochondria → C. Benda.

→ Power house of cell.

→ semi autonomous.

→ Double membrane Bound.

* Ultrast.
* Structure.
* function
* Endosymbiotic


ATP synthase
outer membrane
(↑ porous)
Intermembranal s/pace.
Inner membrane (↓ permbl)
Cristae (↑ S.A)
Matrix
ML-DNA
Ribosome
Ribosome (70S)
DNA
I
II
III
IV
V

① Envelop :→ [outer :- permeable → porins (free passage)
inner → less permeable :- Cardio lipin → lipid ↑↑.

Intermembranal space :- outer & inner b/w.
→ H^+H^+ (Protons ↑↑) → Transport chain

→ Inner membrane is folded into invagination → cristae.
inc the S.A

② Matrix :→
① Ribosome :→ 70s ribosome → protein synthesis.
② Mt DNA → Maternal DNA. uniparental.

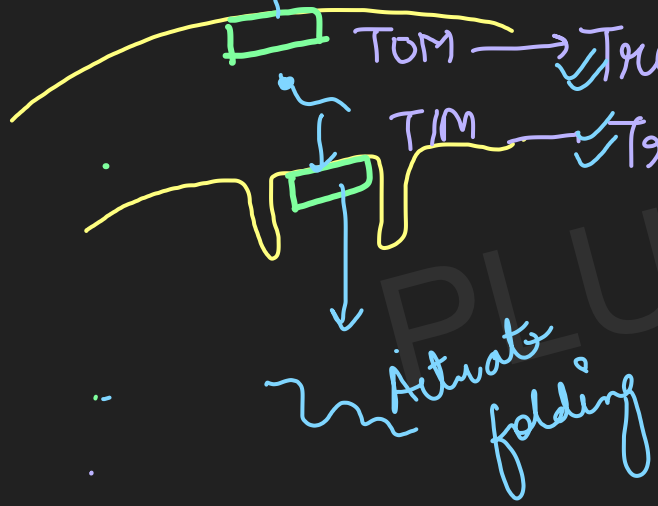
Functions

Membrane

(1) Protein Transport → mRNA → Prot

Mit

Protein



TOM → Translocator of outer Membrane

TIM → Translocator of inner Membrane.

Activate folding

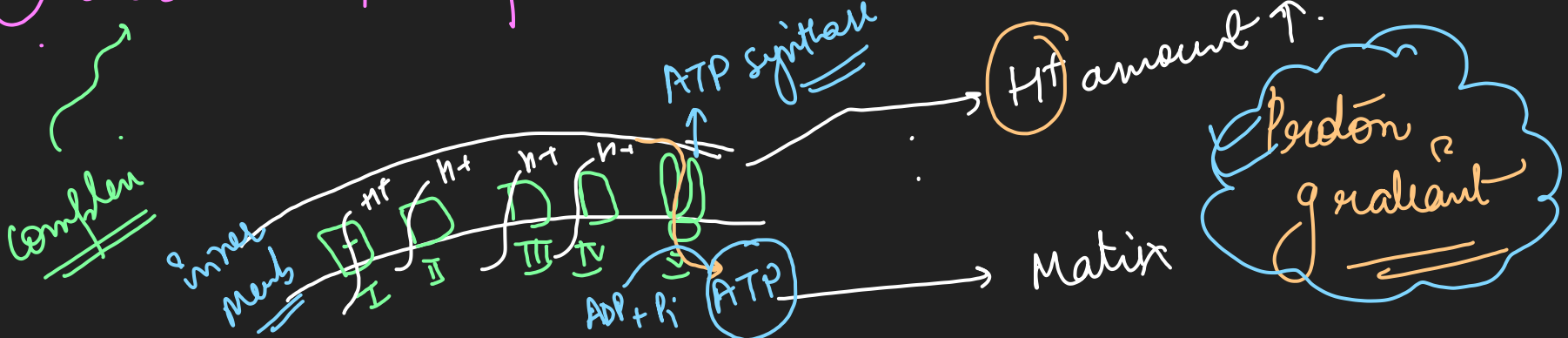
(2) Miscellaneous Transport

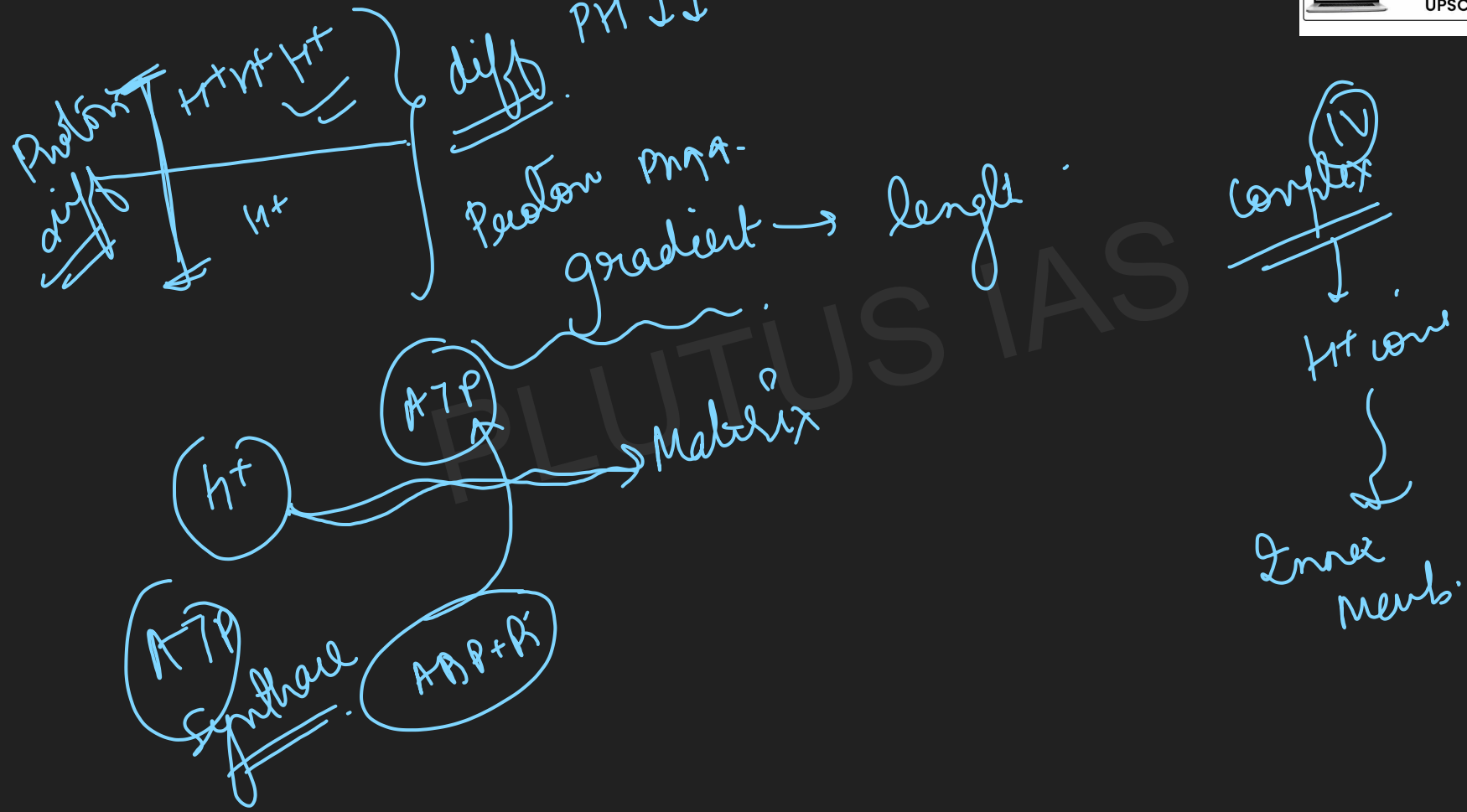
- Glucose
- Carbohydrate
- F.A (fatty acid)
- a.a

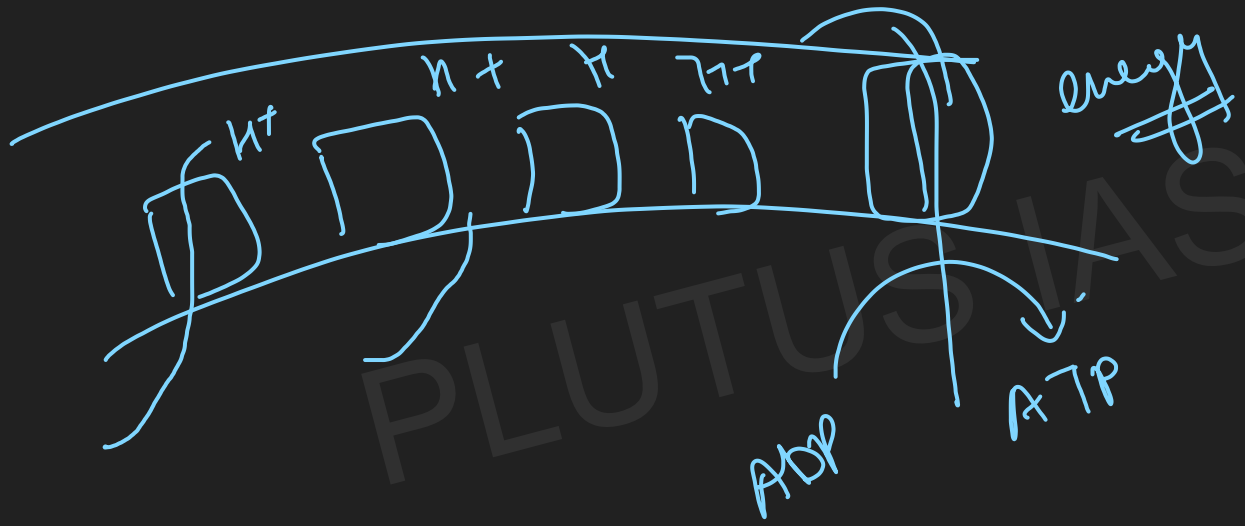
} Transport

(3) Electron Transport (oxidative phosphorylation)

Complex





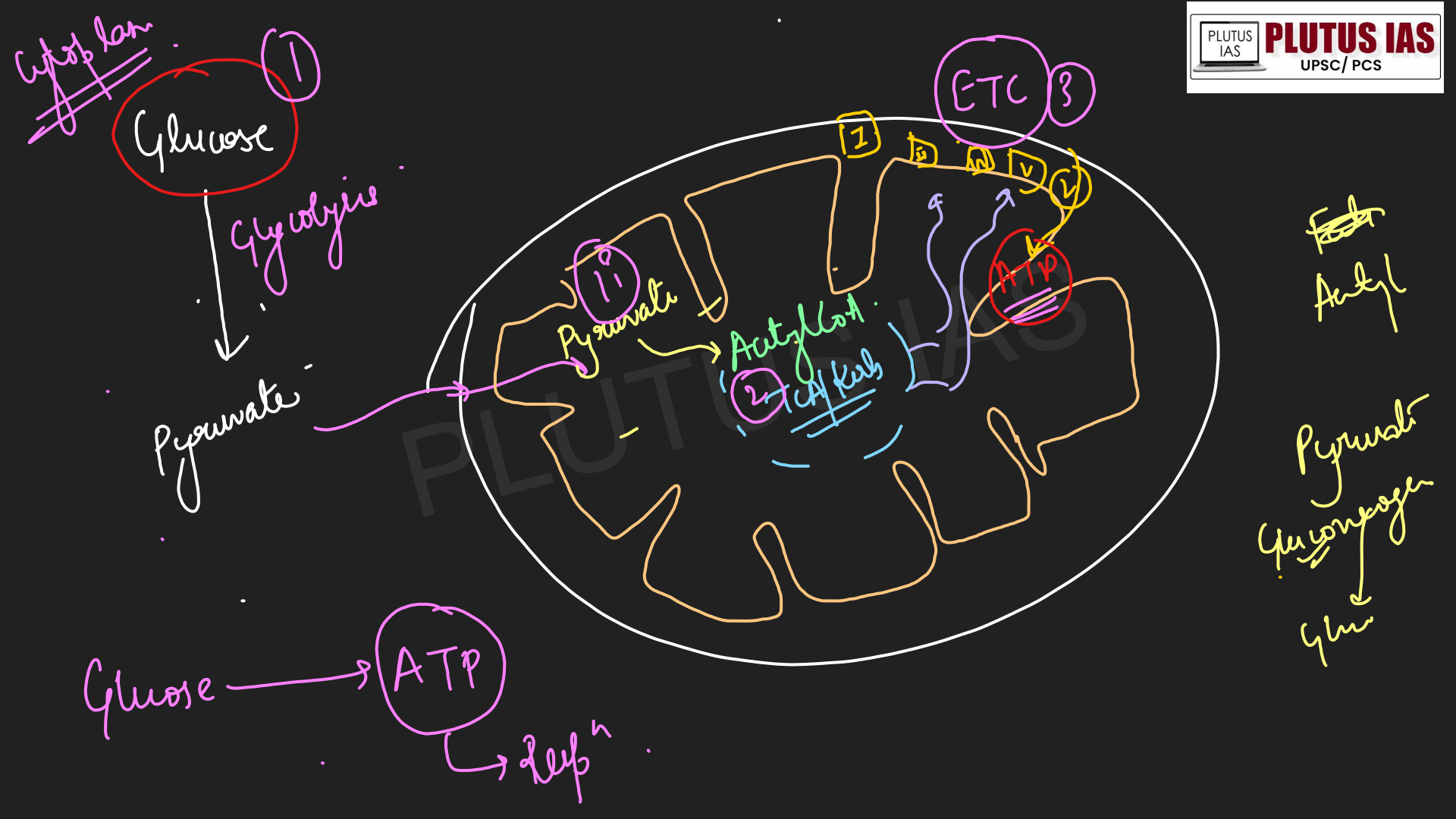


* Cellular Respiration → Breakdown of glucose.

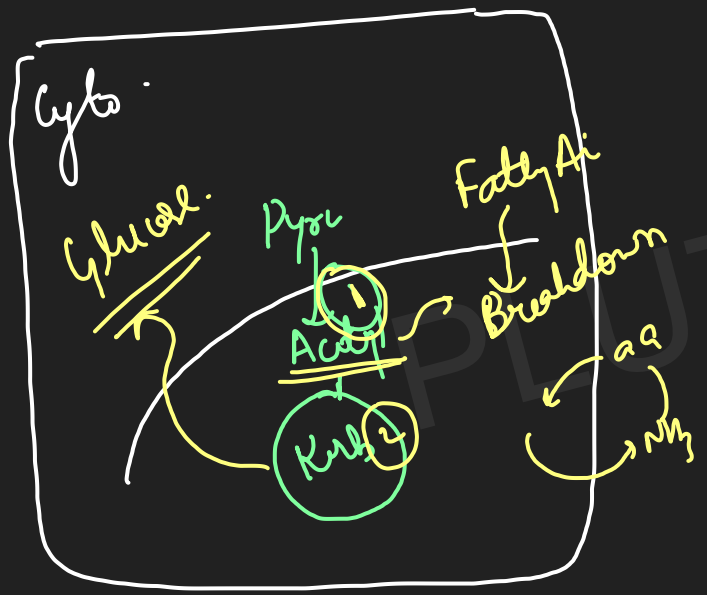
(aerobic) ✓
1. Glycolysis → Glucose → Pyruvate (Cytoplasm).
2. Kreb cycle → (Mt) Matrix → (1)
3. ETC. → Inner Membrane.
(Electron Transport chain)

Mt
Acetyl CoA

→ TCA → Tricarboxylic Acid



Mitochondrial Matrix



1. Conversion of Pyruvate to Acetyl CoA.
2. Kreb cycle / TCA cycle.
3. β-oxidation (Fatty Acid)
4. Urea cycle
5. Gluconeogenesis. {A, B, C / L / L / Glucose}

Role of Matrix

PCD → Programmed Cell Death

Cytc → enz → Matrix

leak

cytoplasm

Caspase activate

cell death → (PCD)

Endosymbiotic Theory

Symbiosis :→ mutual relationship

&

Endo → inside / inner

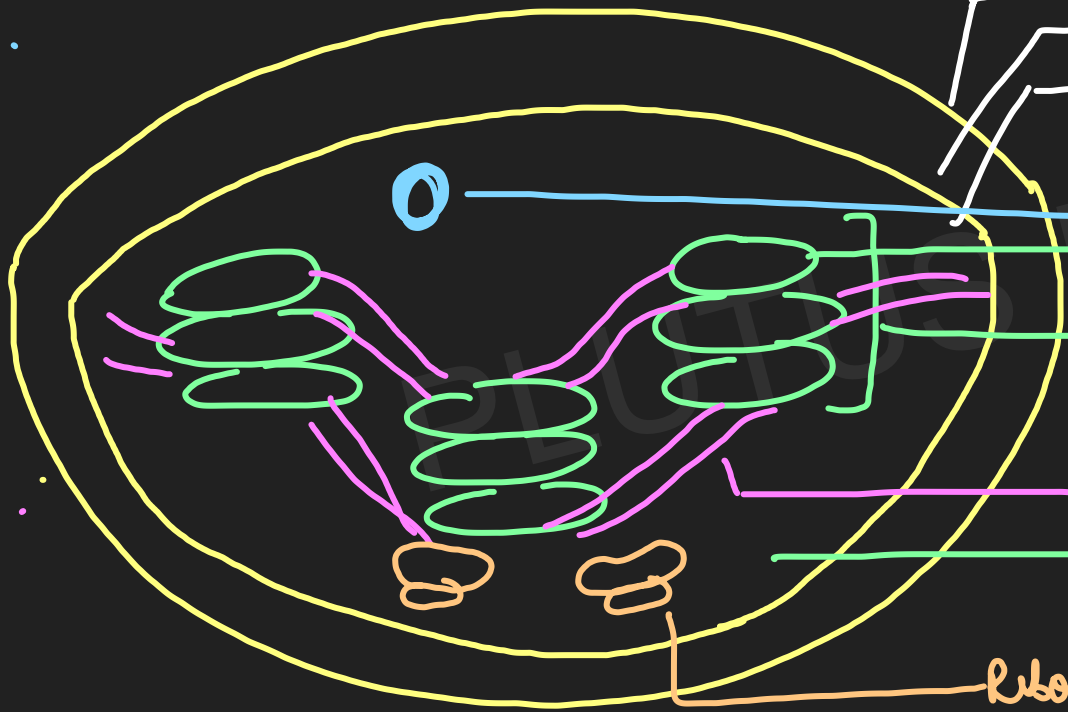
Evidences ✶

1. Self replicating → Binary fission
2. B.C → cell envelop { wall / Mem
   - Mly → outer & inner membrane.
3. Mt DNA → Circular.
4. Ribosome → 70s
5. Size → Prok Mly
6. Tetracycline, erythromycin → Inhibit protein synthesis in Prok ✶

Chloroplast-

Photosynthetic plastid

→ 5 µm diameter
→ double layered.
→ Granular stroma.
→ lamellar system
→ sac like str. → Thallakoid → stack → Grana.
→ Space. → Intermembranal
→ osmophilic globule :→ Plastoglobule
→ Chl DNA.



Outer Memb.
Intermembrane Space.
Inner Memb.
DNA.
Thallakoid
Grana.
Lamella.
Stroma.
↳ Granular stroma.
Ribosome.

Structure

→ **Envelop** :- Double envelop (50-80Å).
→ Intermembranal space.

→ **Stroma** :- → Most of the vol. of Chloroplast.
- DNA
- → Ribosome.

→ **Thallakoid** : → vesicle arranged as membrane network
→ pile → grana.

Plastoglobule : → osmophillic, lipid rich mol

Chloroplast DNA

cpDNA (pt DNA) (Plastome)

→ Genome size → 19 → 120 - 217 → Approx 250kb.

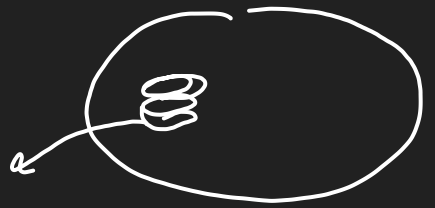
→ 100 genes → protein synthesis.

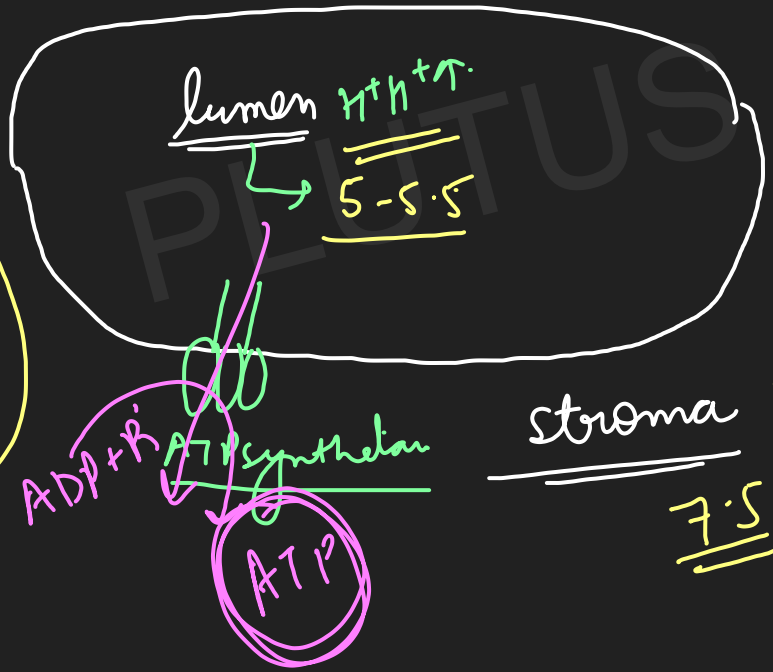
→ tRNA, rRNA, RNA polymerase.

Functions

Photophosphorylation

Thallakoid





stroma

7.5. Hdd.

Protons are Transported from lumen to stro

↓

Proton Gradi

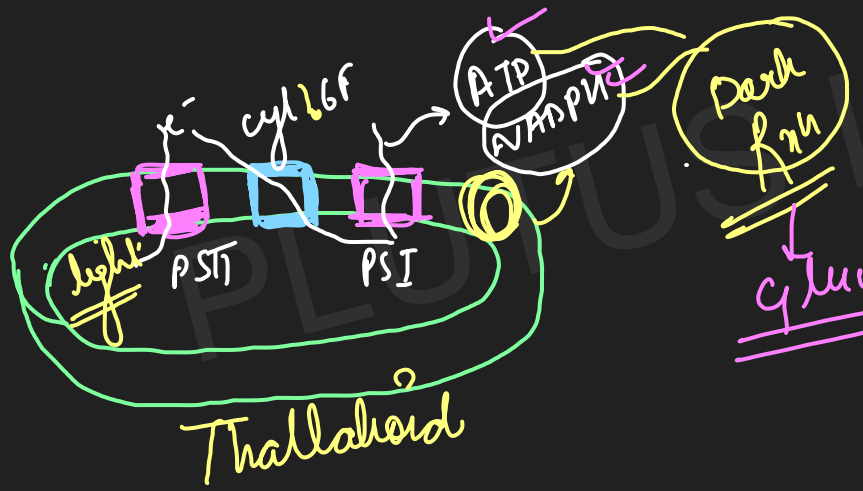
Photosynthesis → Chloroplast

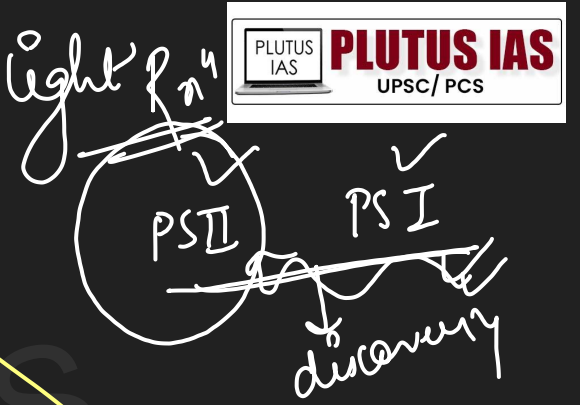
Glucose

2 step process

1. Light Reaction → Thallakoid → Membrane
   - PSI
   - PSII
   - Photosystem I
   - Photosystem II
2. Dark Reaction → Stroma

Energy utilize → Anabolic





Metabolic Process

Add. Assembly

Anabolic Reaction

Synthesis → product

Photosynthesis

$CO_2 + H_2O$ → $C_6H_{12}O_6$ (Glucose)

energy required

Catabolic Reaction

Cut → Mol → Breakdo

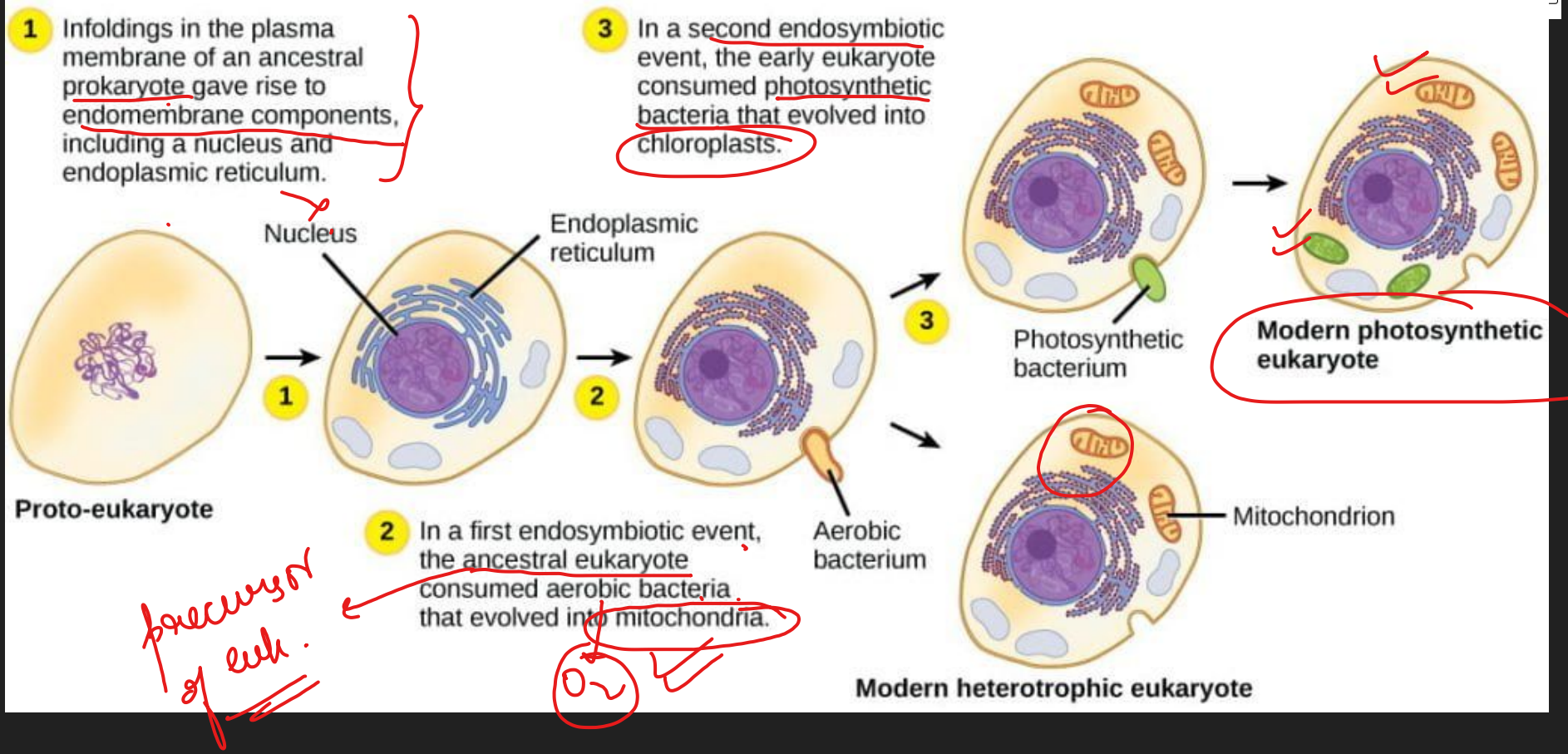
Breakdown of Product

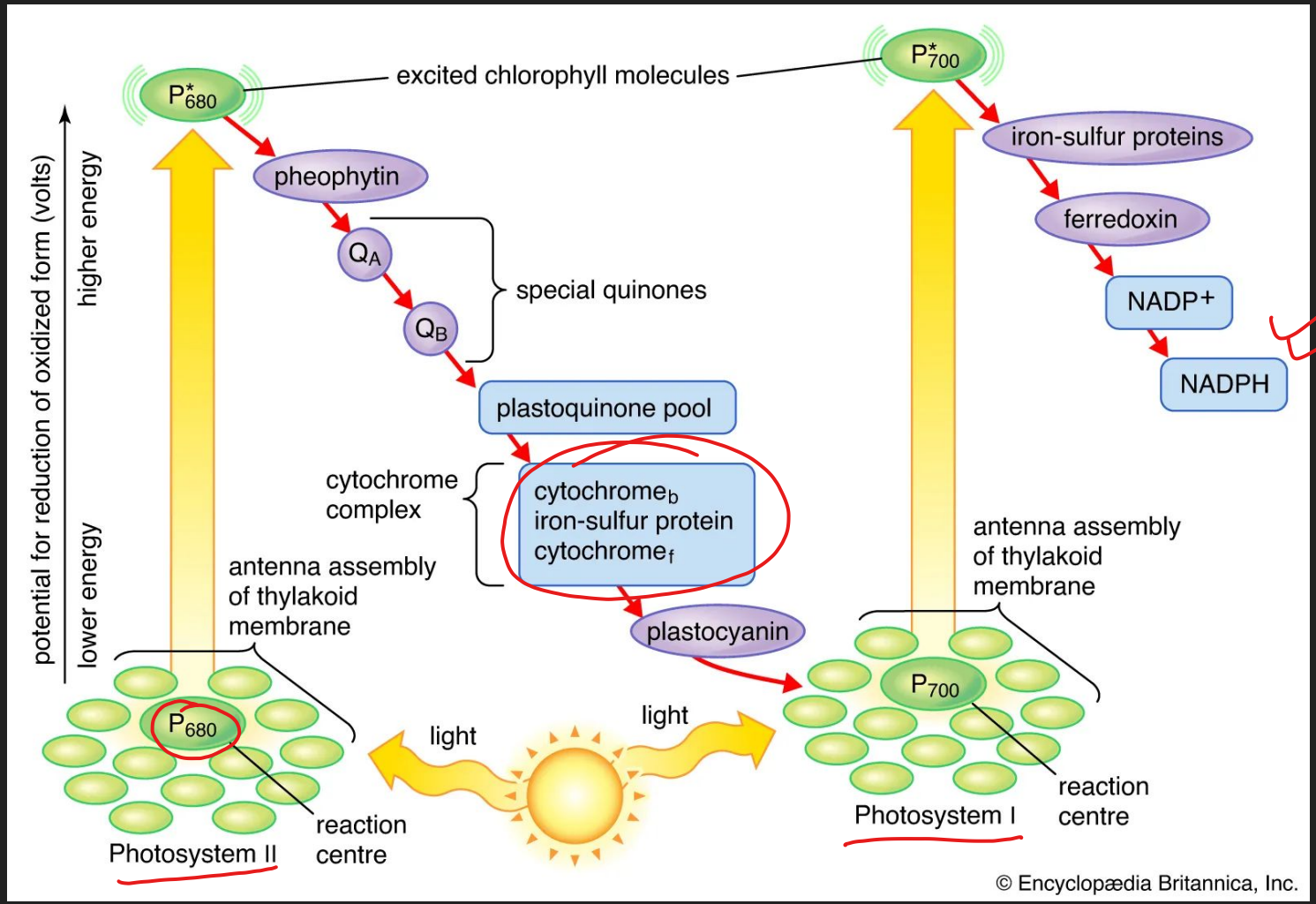
Glucose

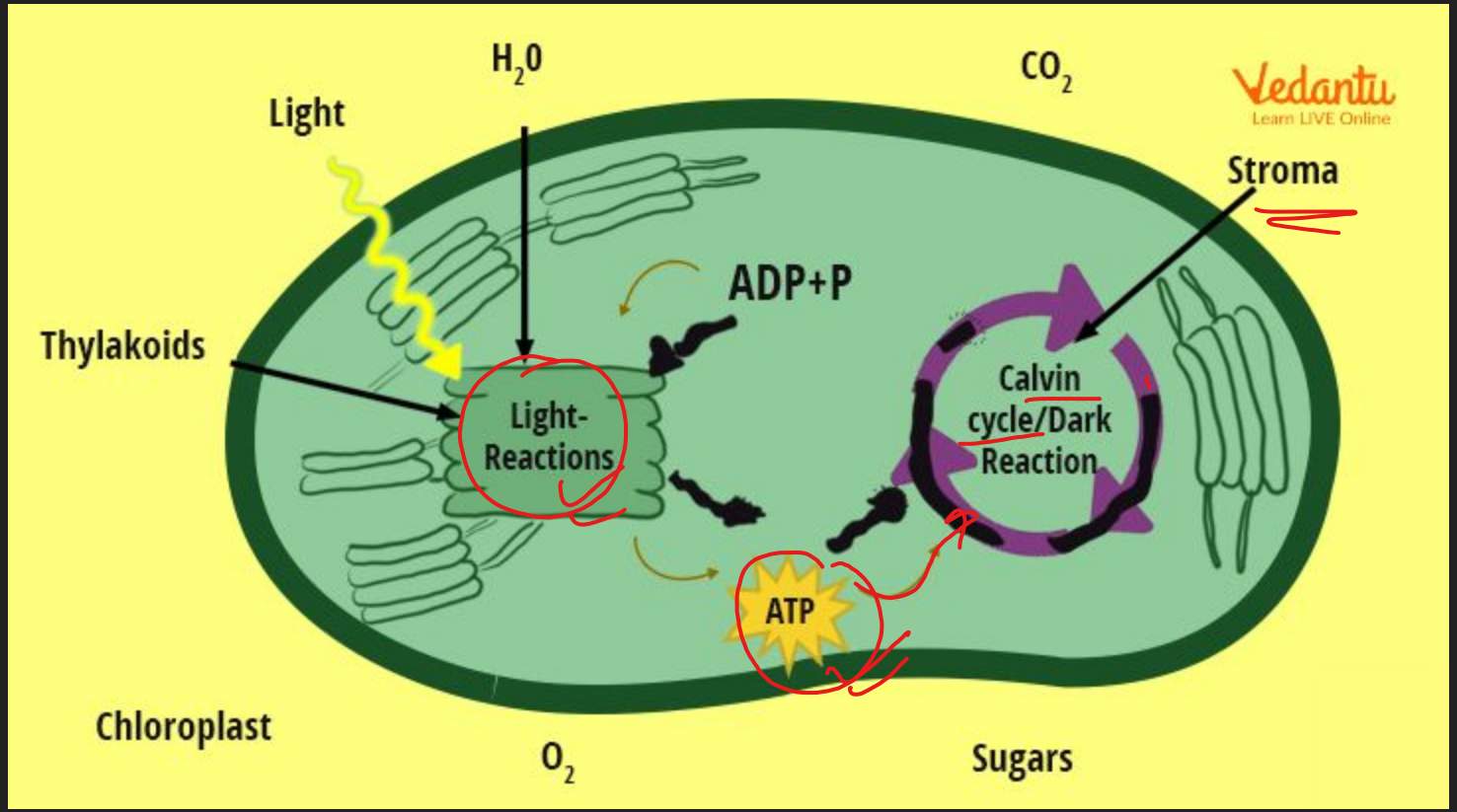
Respiration + energy

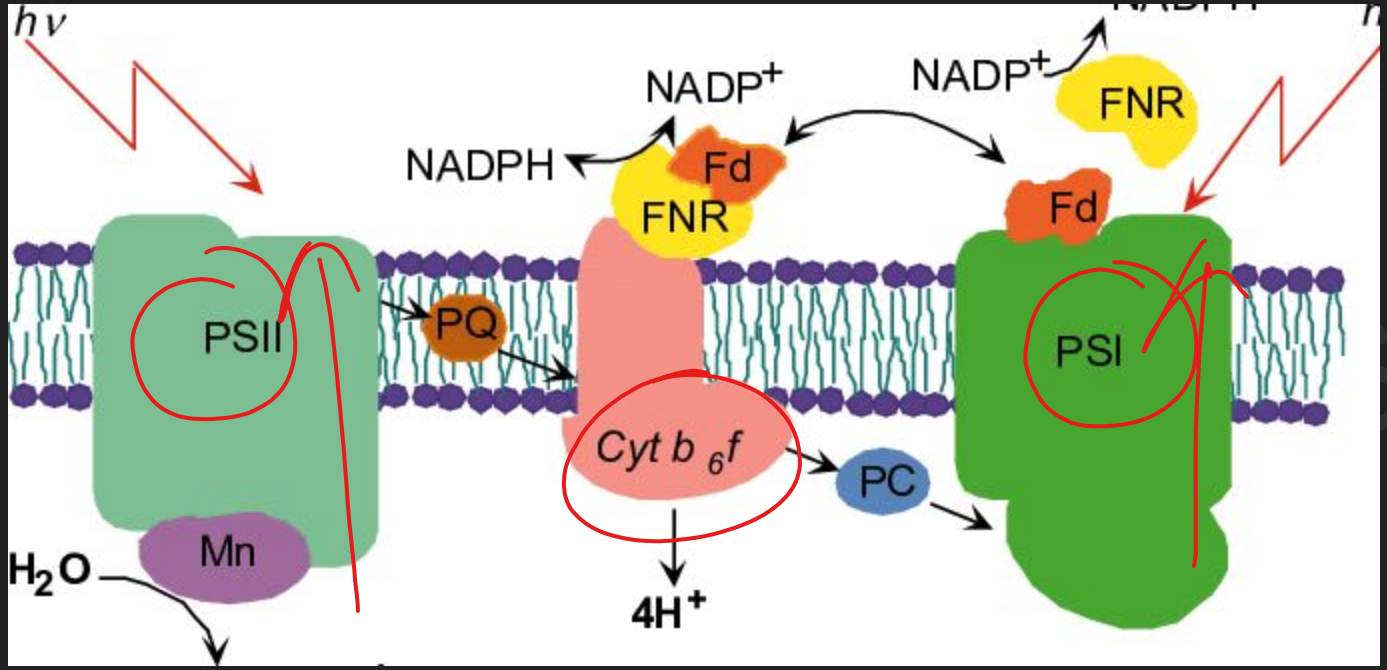
energy release

The ENDOSYMBIOTIC THEORY









Z-Scheme