

Photosynthesis: The Light Reactions

Igor Nikiforovski

What you'll need to know:

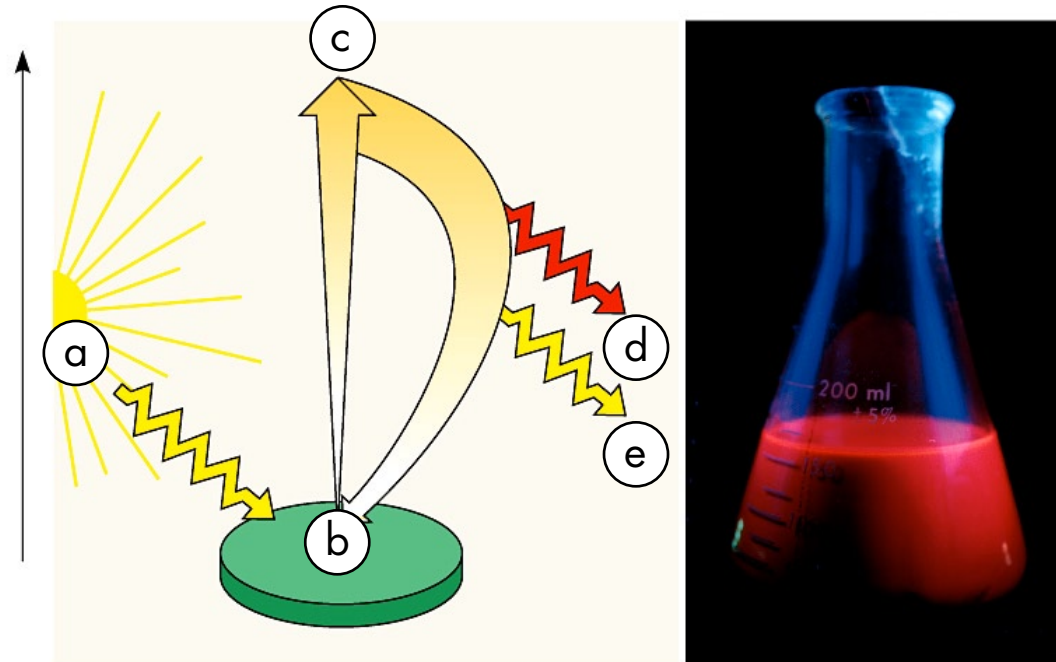
1 Photoexcitation

2 Photosystems

3 Noncyclic electron flow
+ chemiosmosis

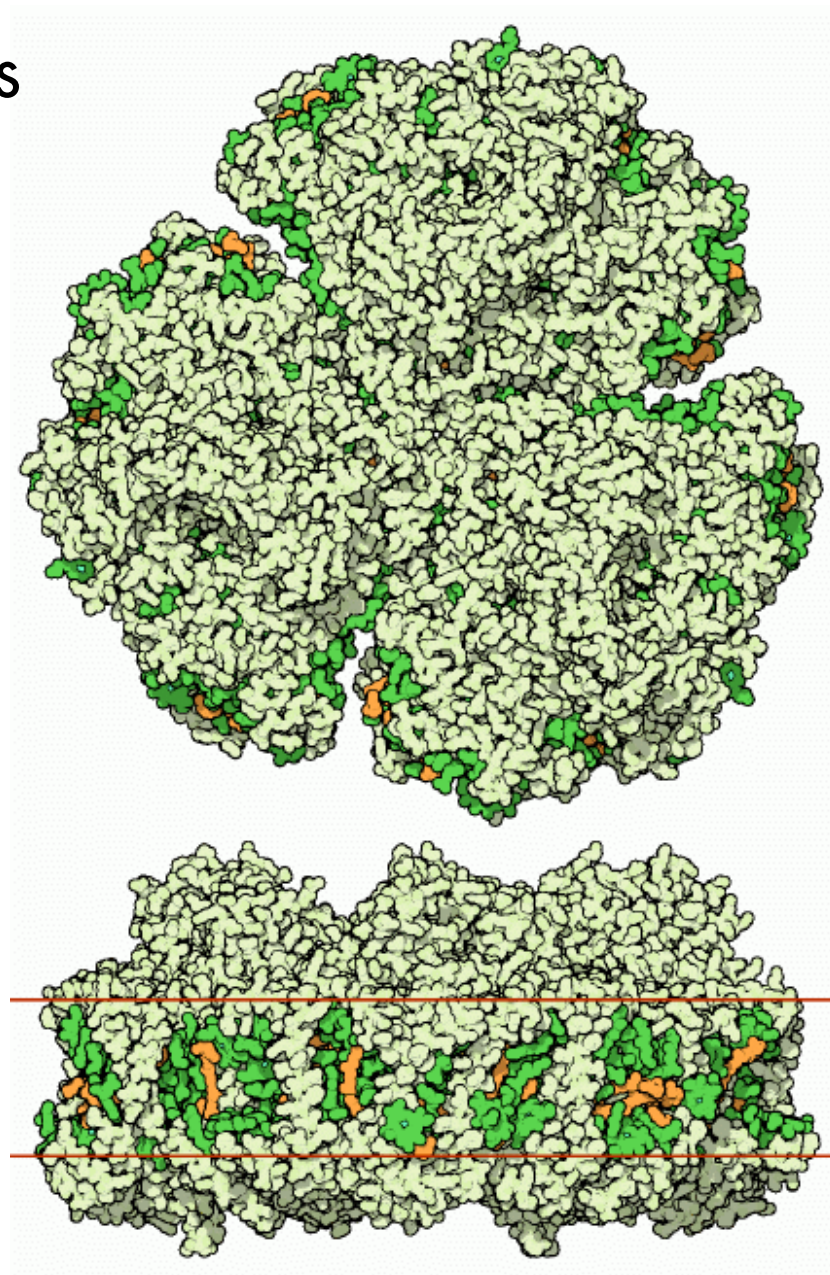
4 Cyclic electron flow

1 Photoexcitation



Copyright © Pearson Education, Inc., publishing as Benjamin Cummings.

2 Photosystems

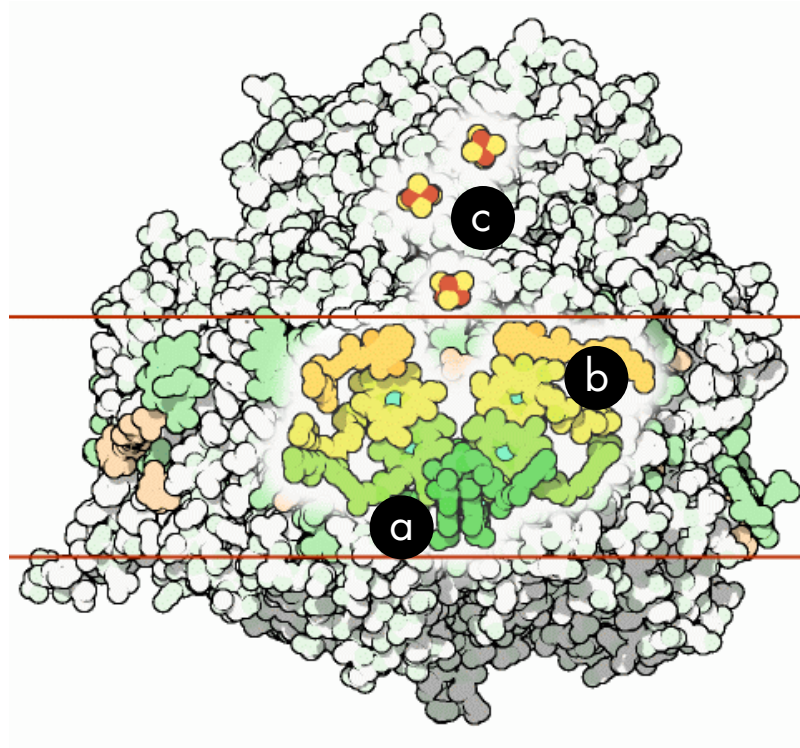


Photosystem I
(P700)

Photosystem II
(P680)

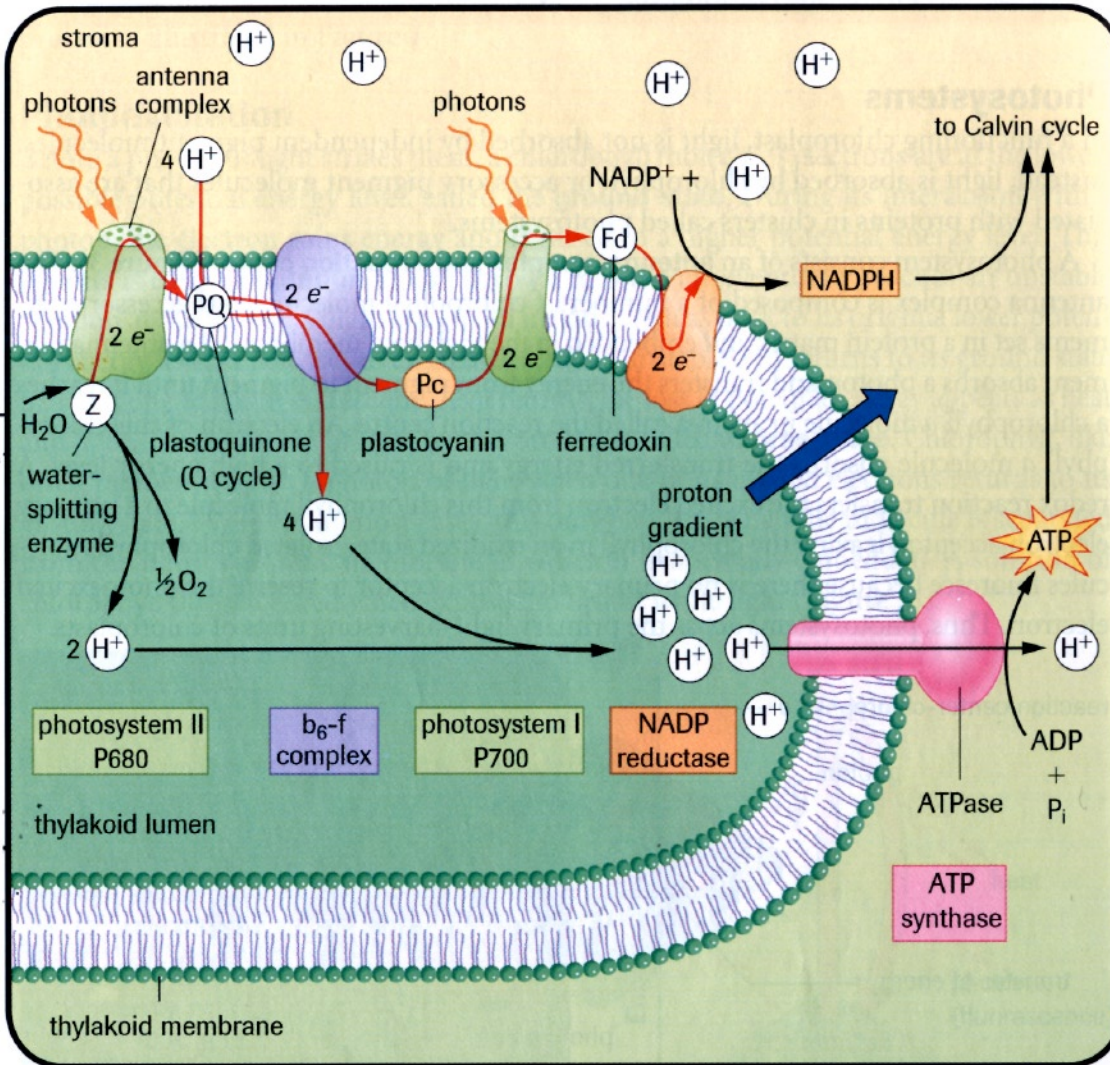
2 Photosystems

Photosystem I
(P700)



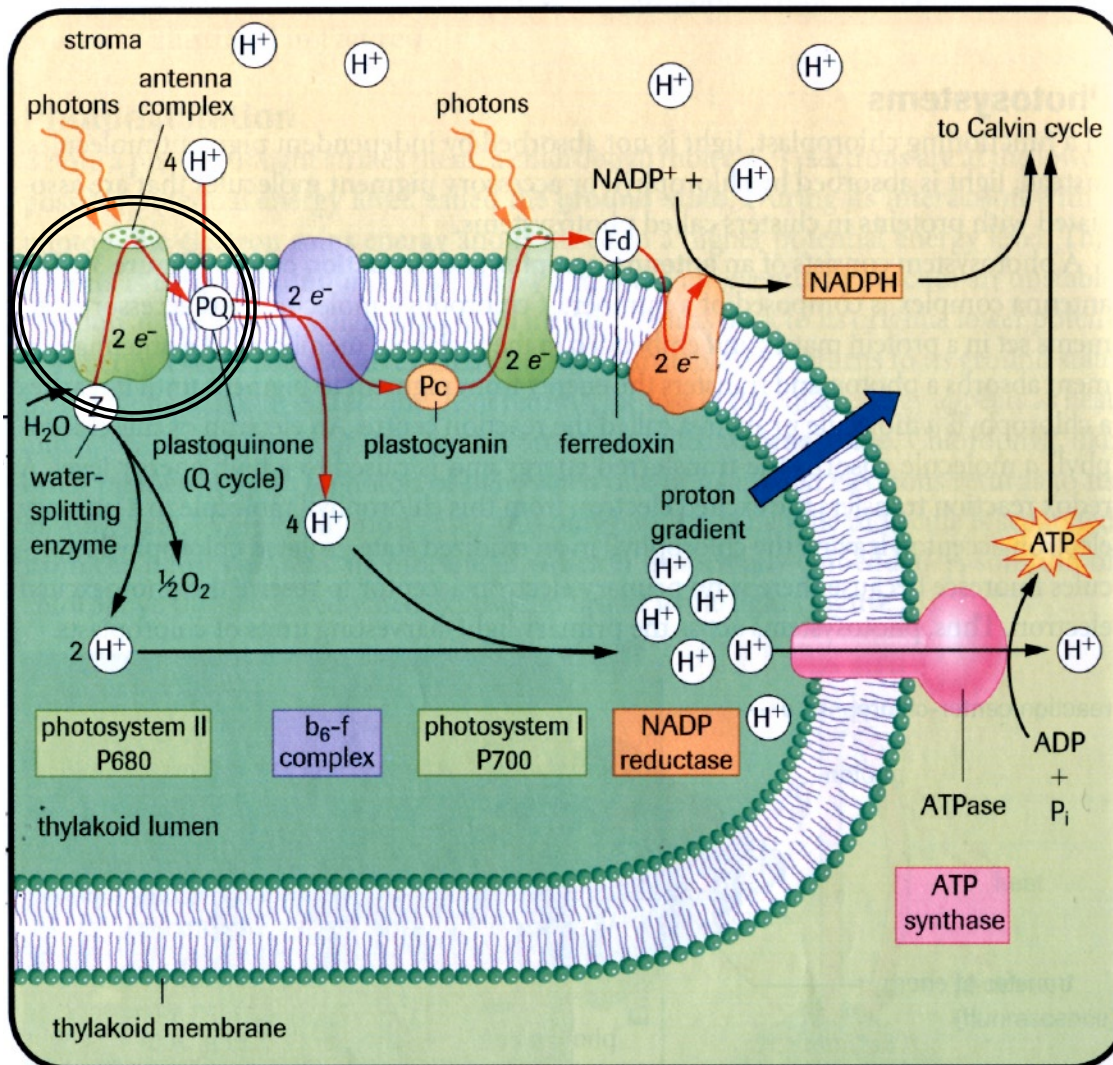
Photosystem II
(P680)

3 Noncyclic electron flow +chemiosmosis



- 1.
- 2.
- 3.
- 4.
- 5.

3 Noncyclic electron flow +chemiosmosis



1. Electrons excited by photons in photosystem II.

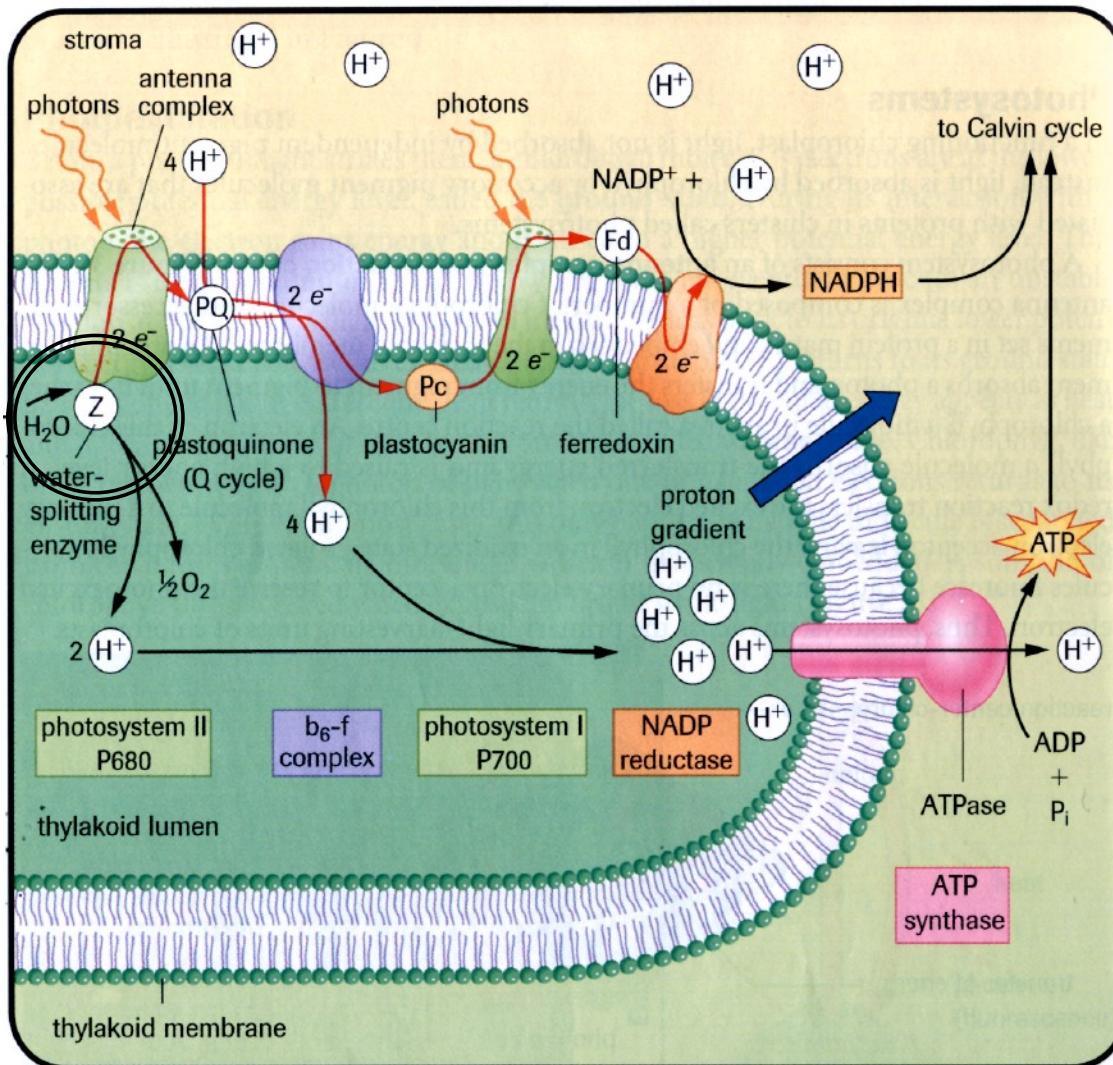
2.

3.

4.

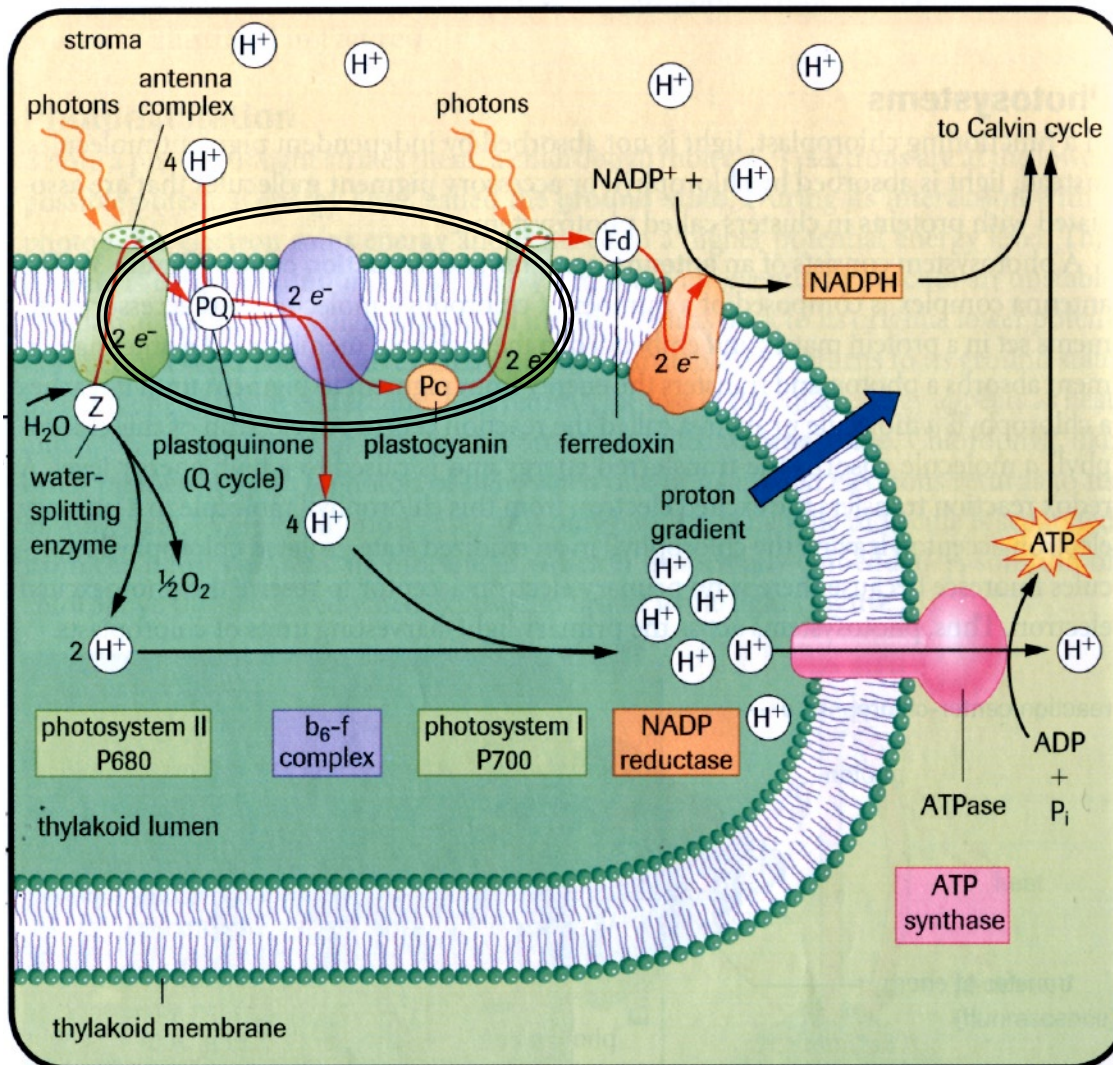
5.

3 Noncyclic electron flow +chemiosmosis



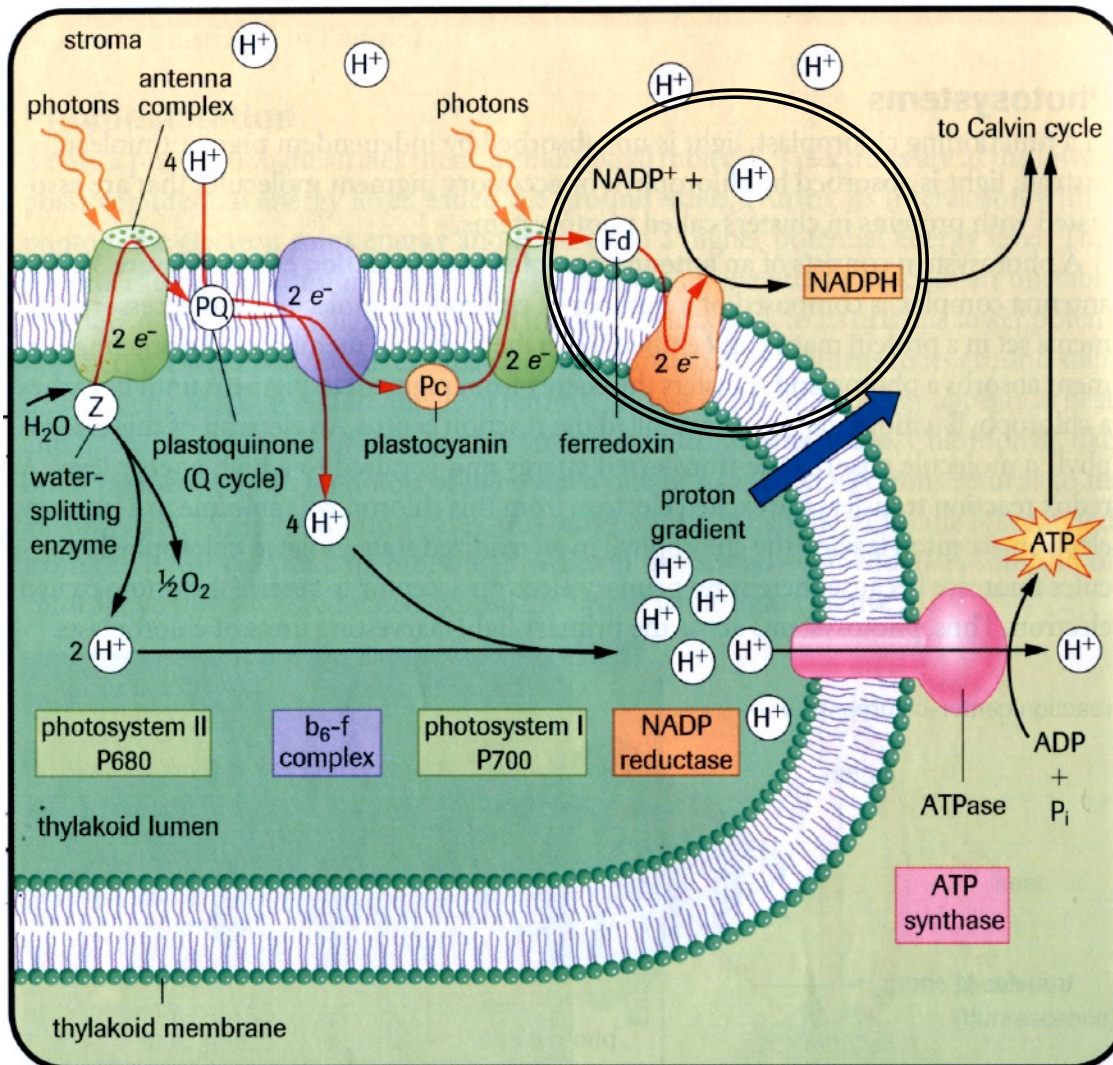
1. Electrons excited by photons in photosystem II.
2. Lost electrons replaced by ones from oxygen.
- 3.
- 4.
- 5.

3 Noncyclic electron flow +chemiosmosis



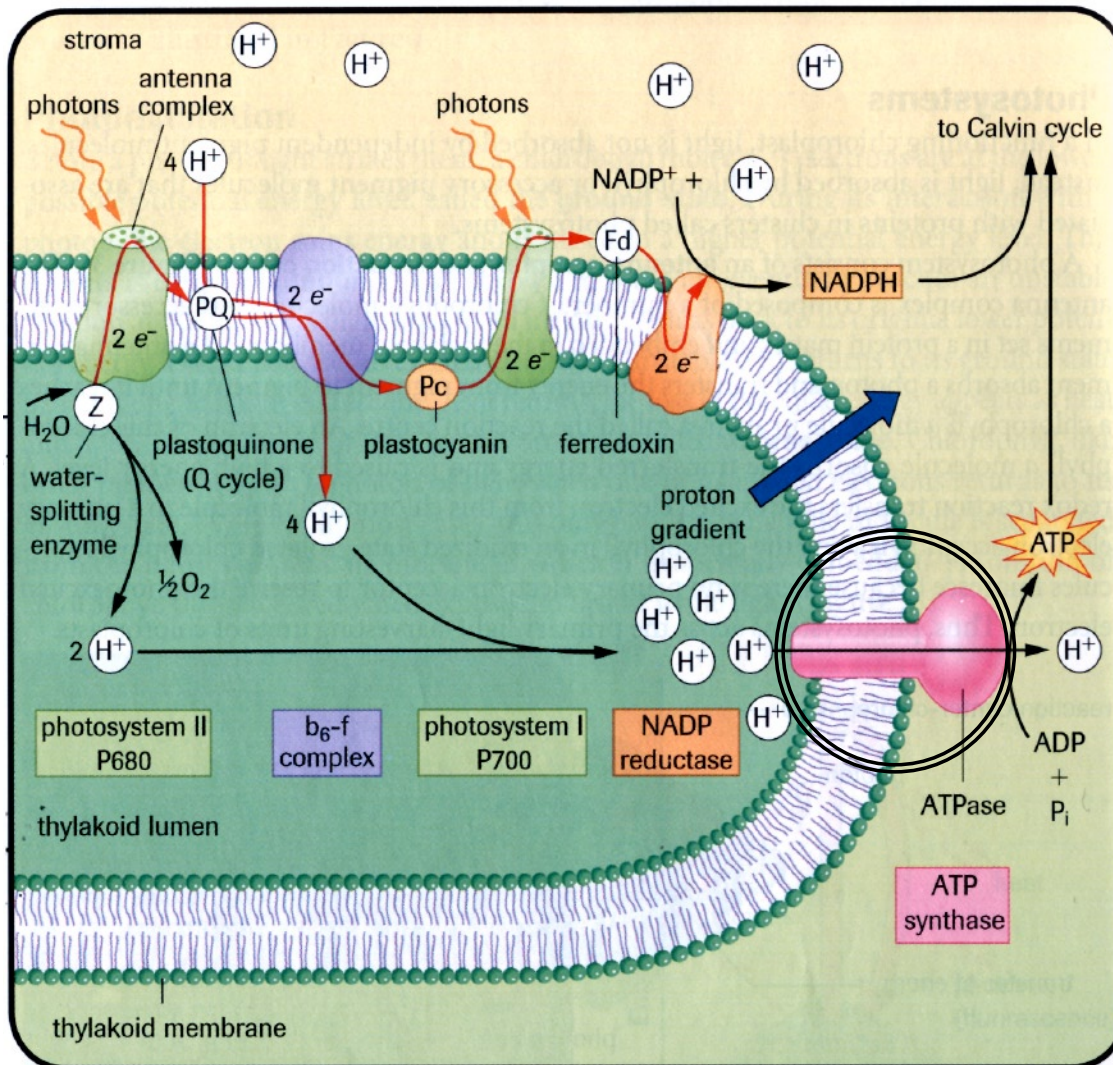
1. Electrons excited by photons in photosystem II.
2. Lost electrons replaced by ones from oxygen.
3. Electrons pass through Q Cycle, 4 protons pumped into lumen. Electrons reach photosystem I.
- 4.
- 5.

3 Noncyclic electron flow +chemiosmosis



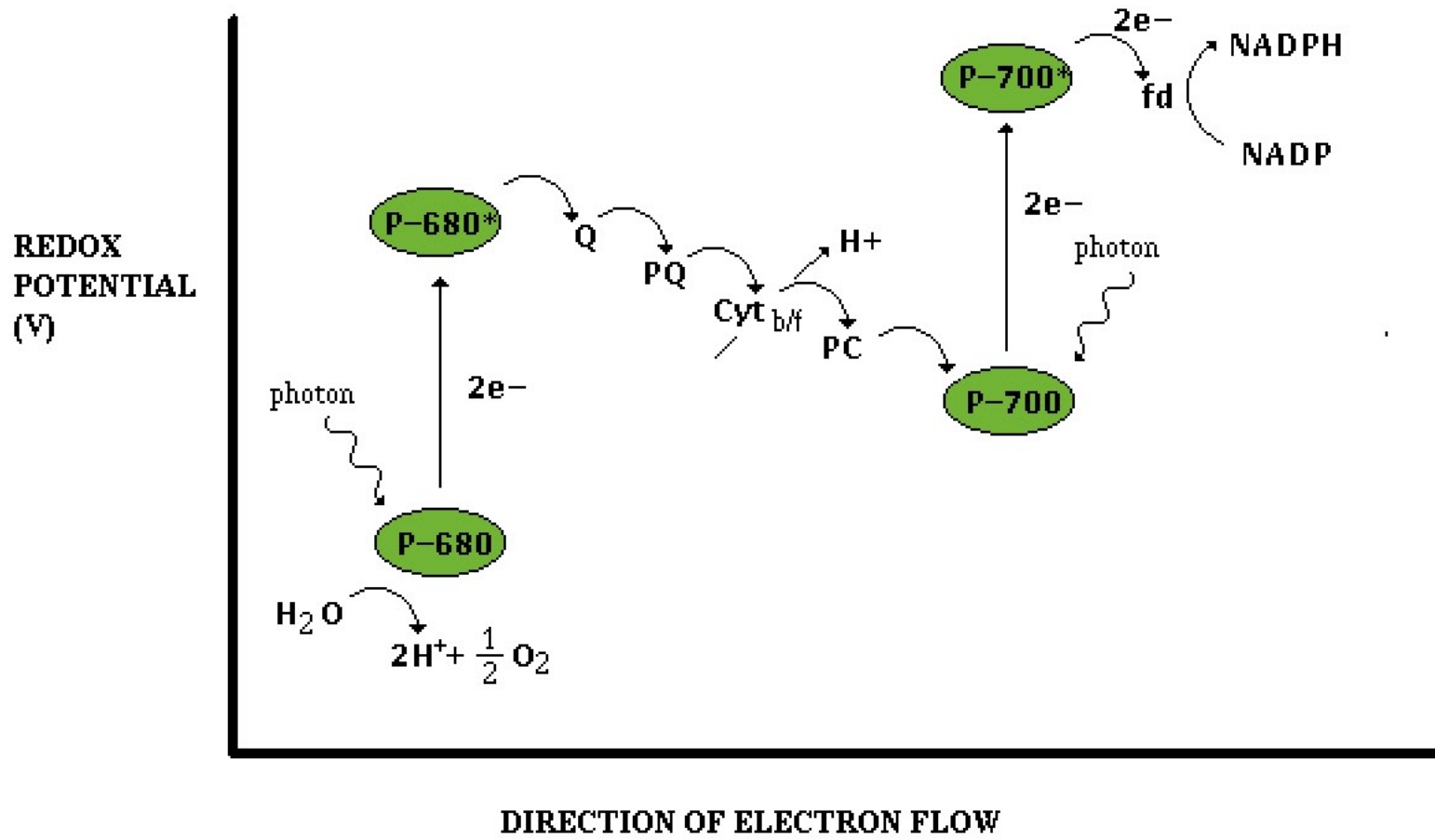
1. Electrons excited by photons in photosystem II.
2. Lost electrons replaced by ones from oxygen.
3. Electrons pass through Q Cycle, 4 protons pumped into lumen. Electrons reach photosystem I.
4. Electrons travel through ferredoxin to NADP reductase. $NADP^+$ is reduced to NADPH.
- 5.

3 Noncyclic electron flow +chemiosmosis

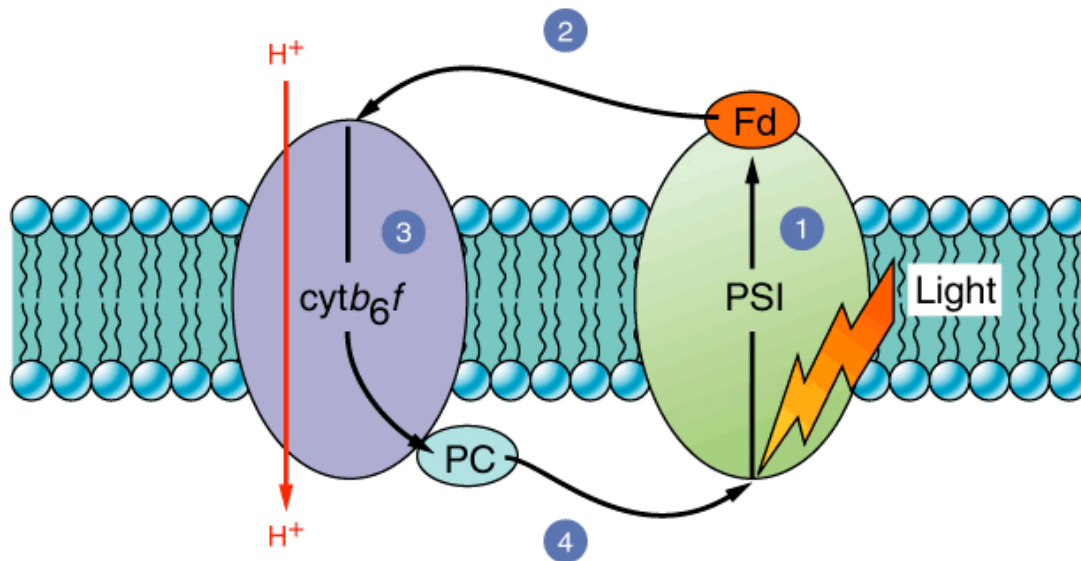


1. Electrons excited by photons in photosystem II.
2. Lost electrons replaced by ones from oxygen.
3. Electrons pass through Q Cycle, 4 protons pumped into lumen. Electrons reach photosystem I.
4. Electrons travel through ferredoxin to NADP reductase. NADP+ is reduced to NADPH.
5. Electrochemical gradient inside the lumen drives the generation of ATP.

3 Noncyclic electron flow +chemiosmosis



4 Cyclic electron flow



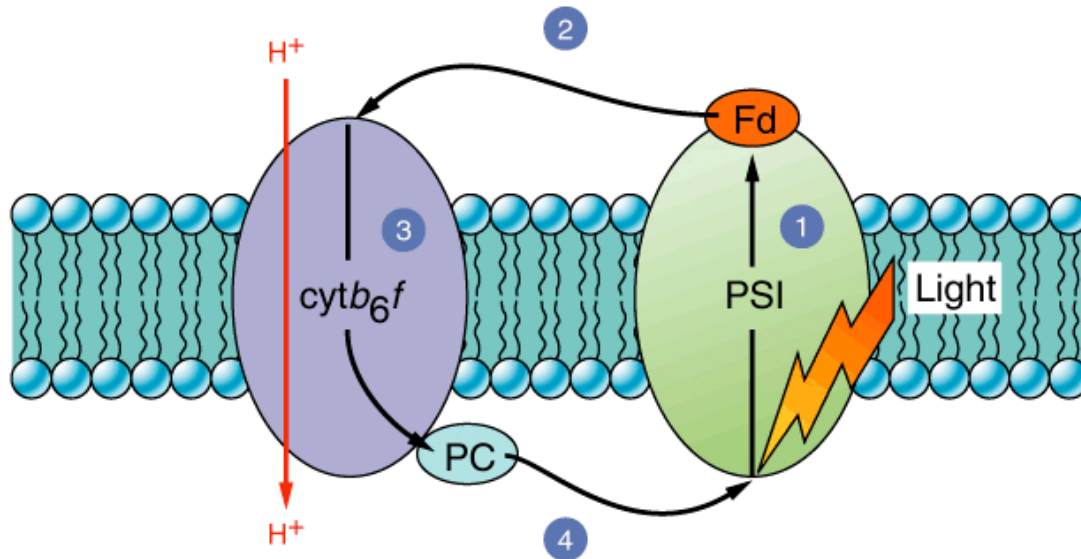
1. Electrons excited by photons in photosystem I.

2.

3.

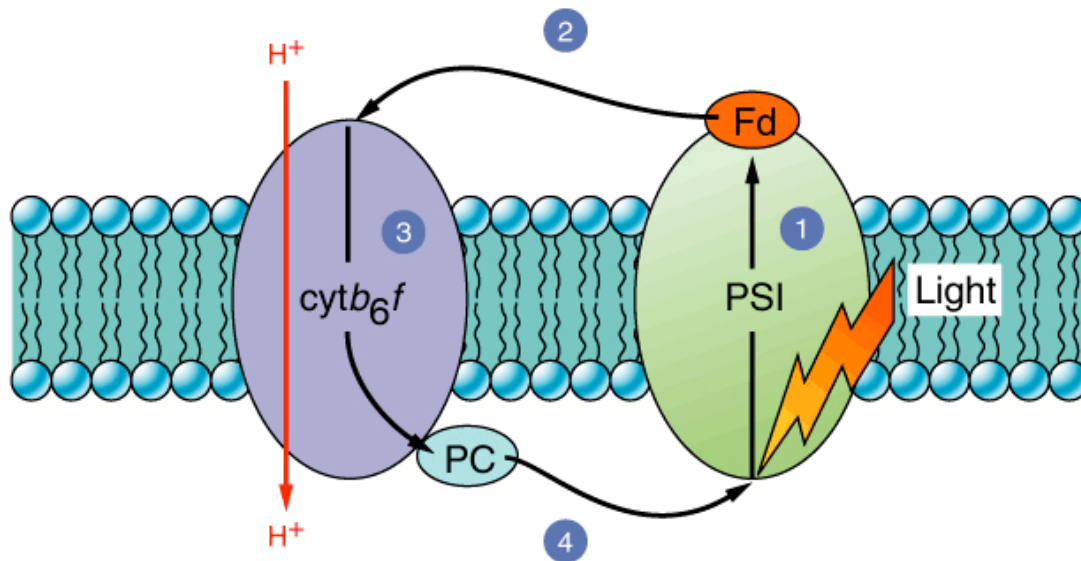
4.

4 Cyclic electron flow



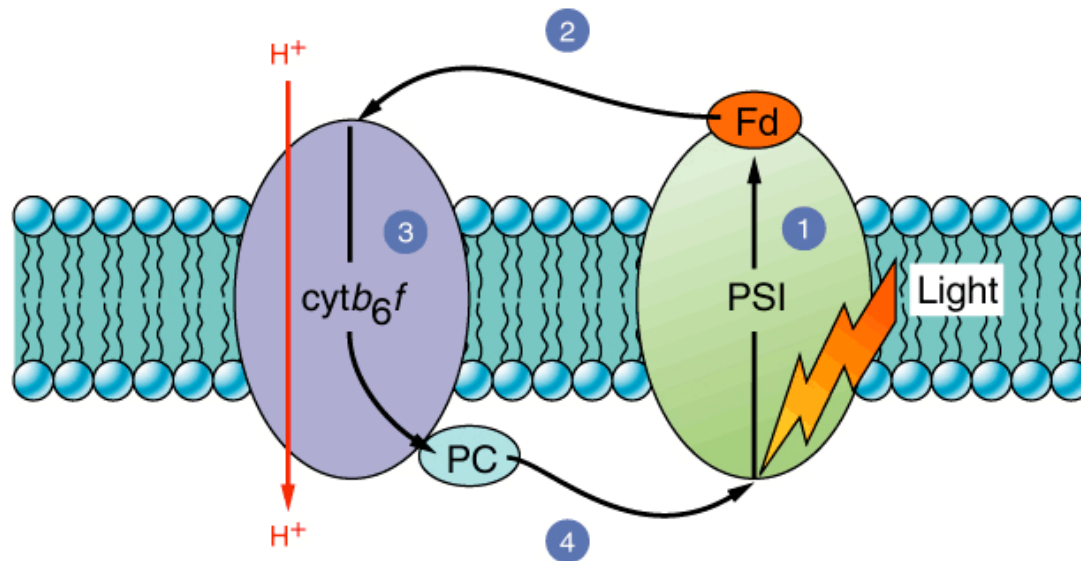
1. Electrons excited by photons in photosystem I.
2. Ferredoxin transports electrons to cytochrome b_6/f complex
- 3.
- 4.

4 Cyclic electron flow



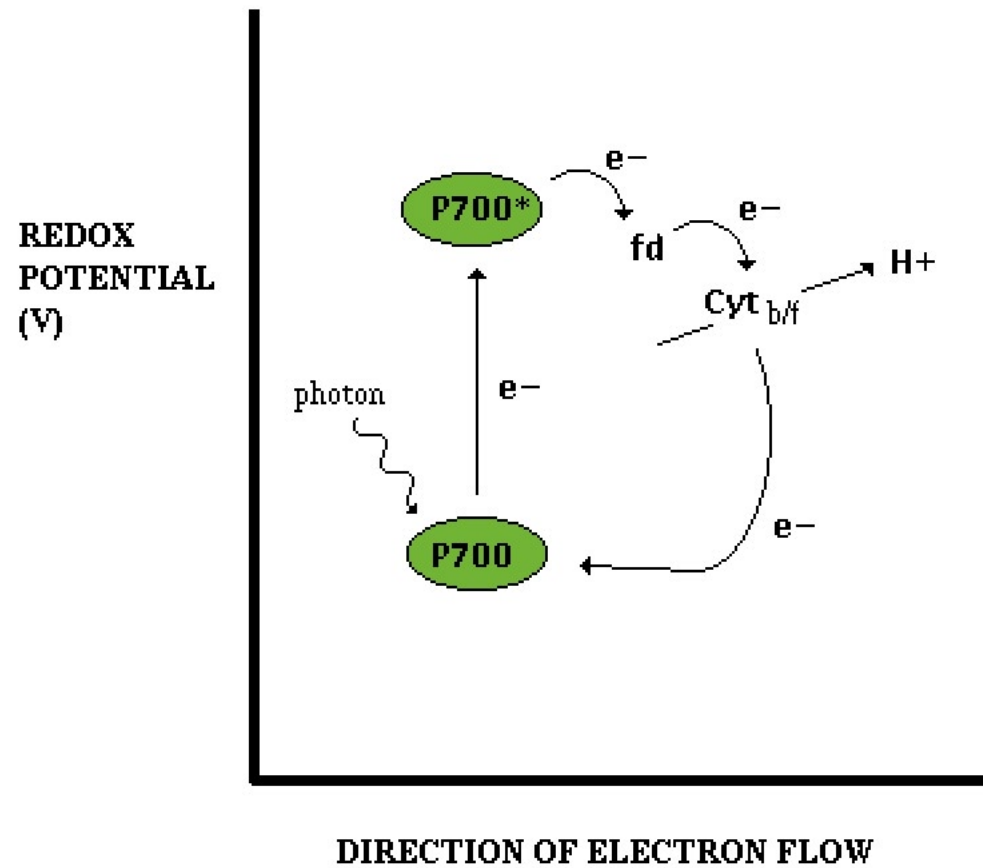
1. Electrons excited by photons in photosystem I.
2. Ferredoxin transports electrons to cytochrome b₆-f complex
3. Electrons pass through the Q cycle, sending 4 H⁺ ions to the lumen.
- 4.

4 Cyclic electron flow



1. Electrons excited by photons in photosystem I.
2. Ferredoxin transports electrons to cytochrome b_6 -f complex
3. Electrons pass through the Q cycle, sending 4 H^+ ions to the lumen.
4. Electrons are transported back to photosystem I via plastocyanin.

4 Cyclic electron flow



5

Pseudocyclic Photophosphorylation?



Fin.