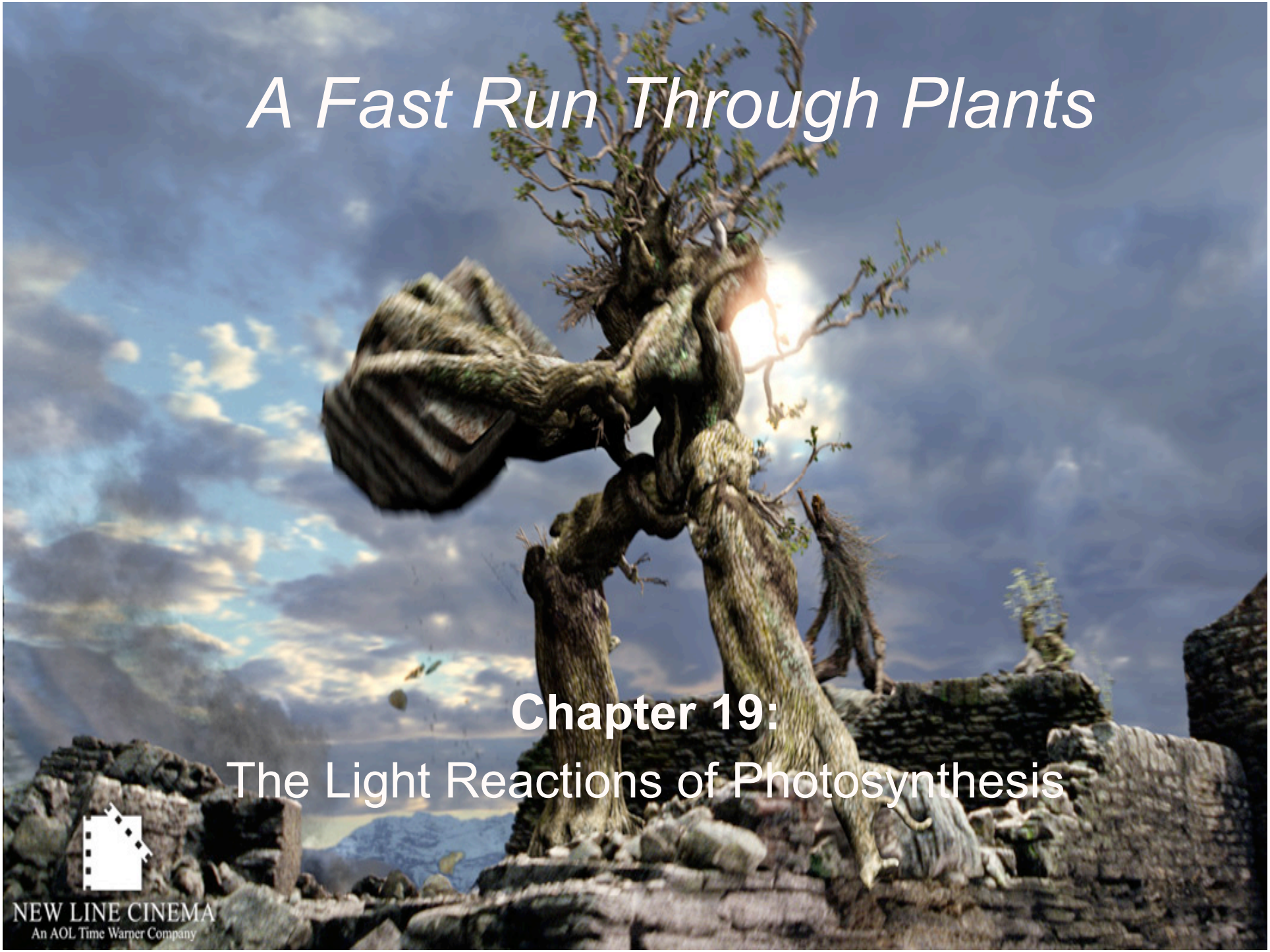
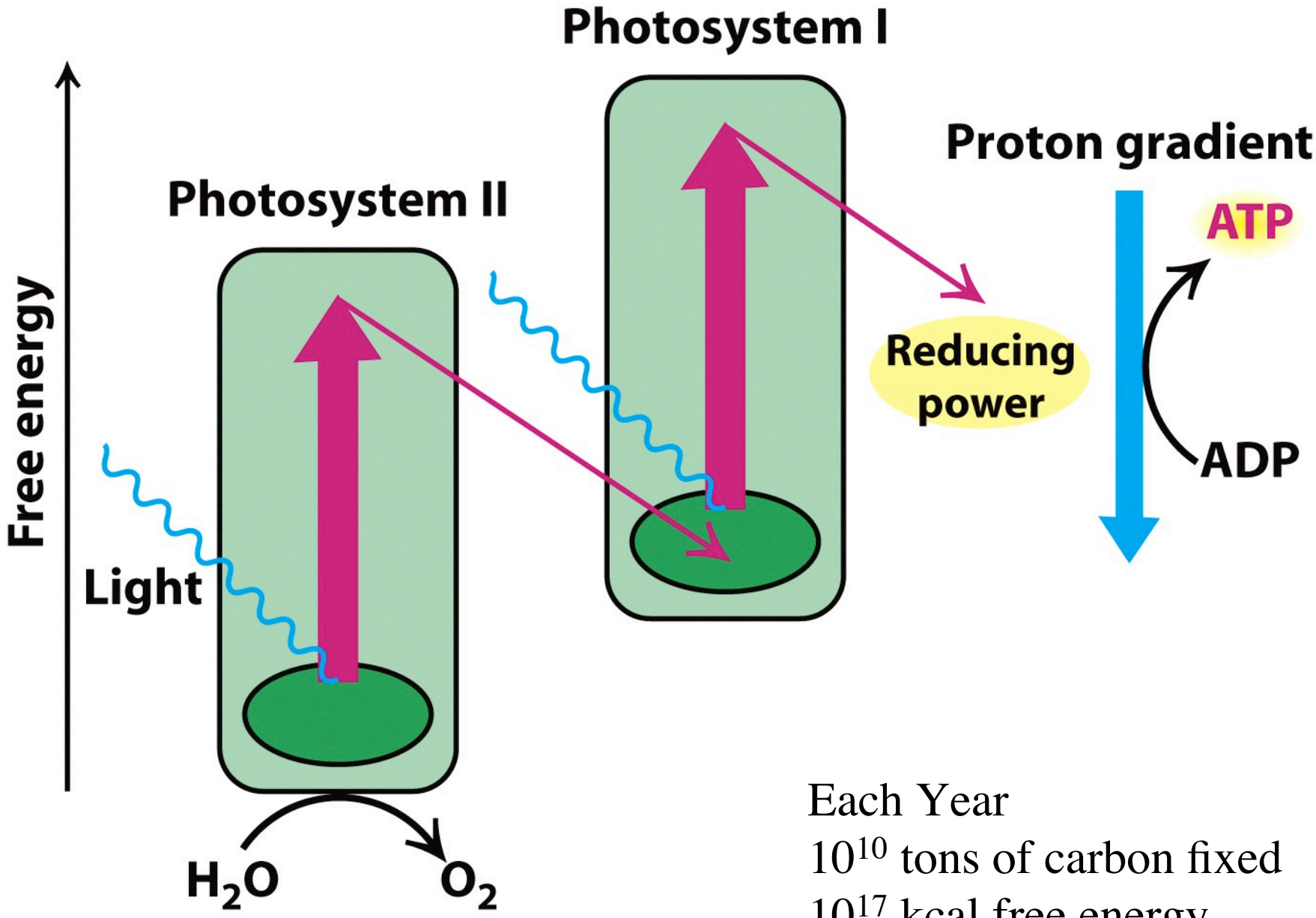

A Fast Run Through Plants
Chapter 19:
The Light Reactions of Photosynthesis
NEW LINE CINEMA
An AOL Time Warner Company



Each Year
10^{10} tons of carbon fixed
10^{17} kcal free energy

Chapter 19 Opener part 2
Biochemistry, Sixth Edition

The Light Reactions

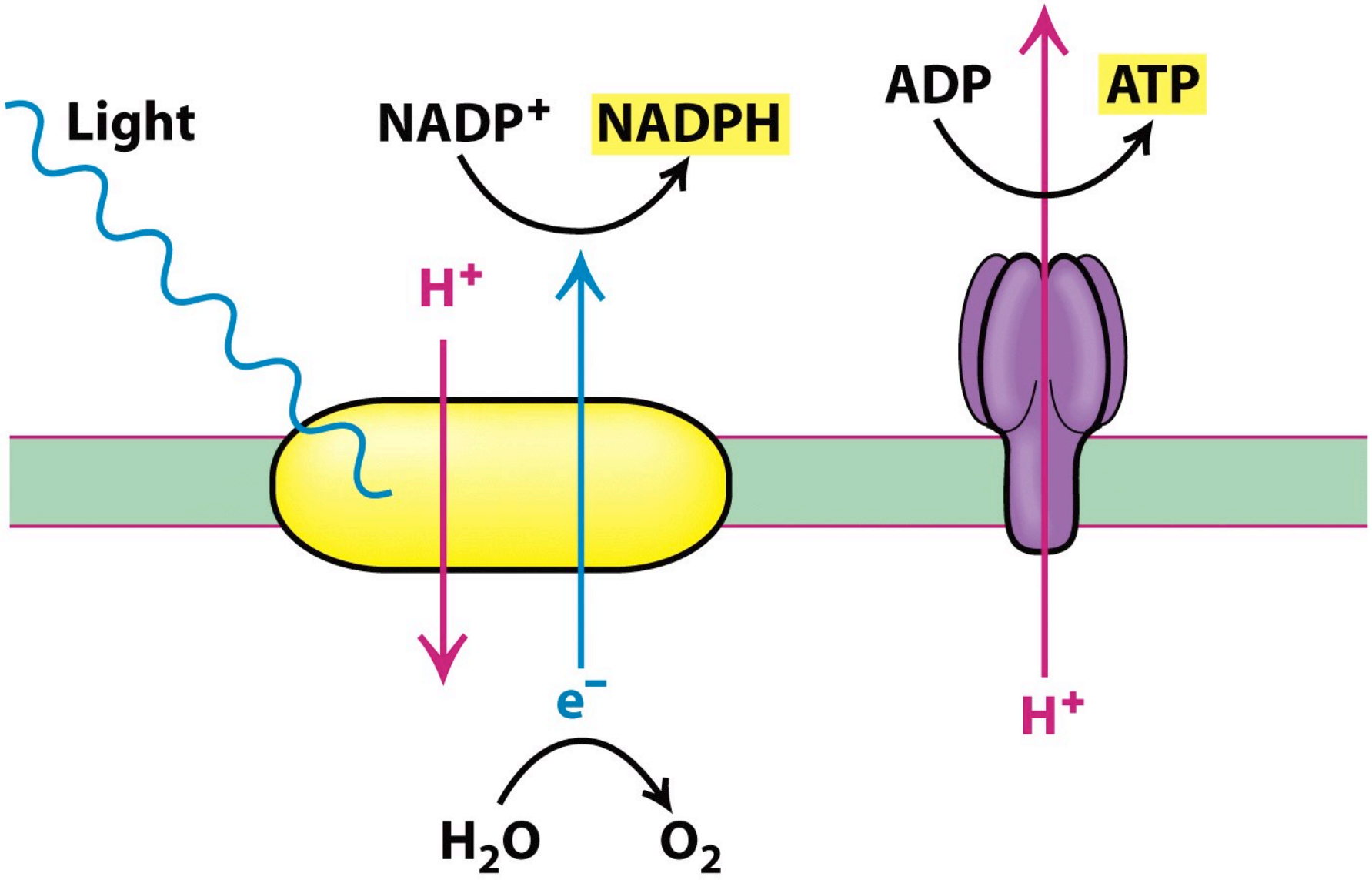


Figure 19-2
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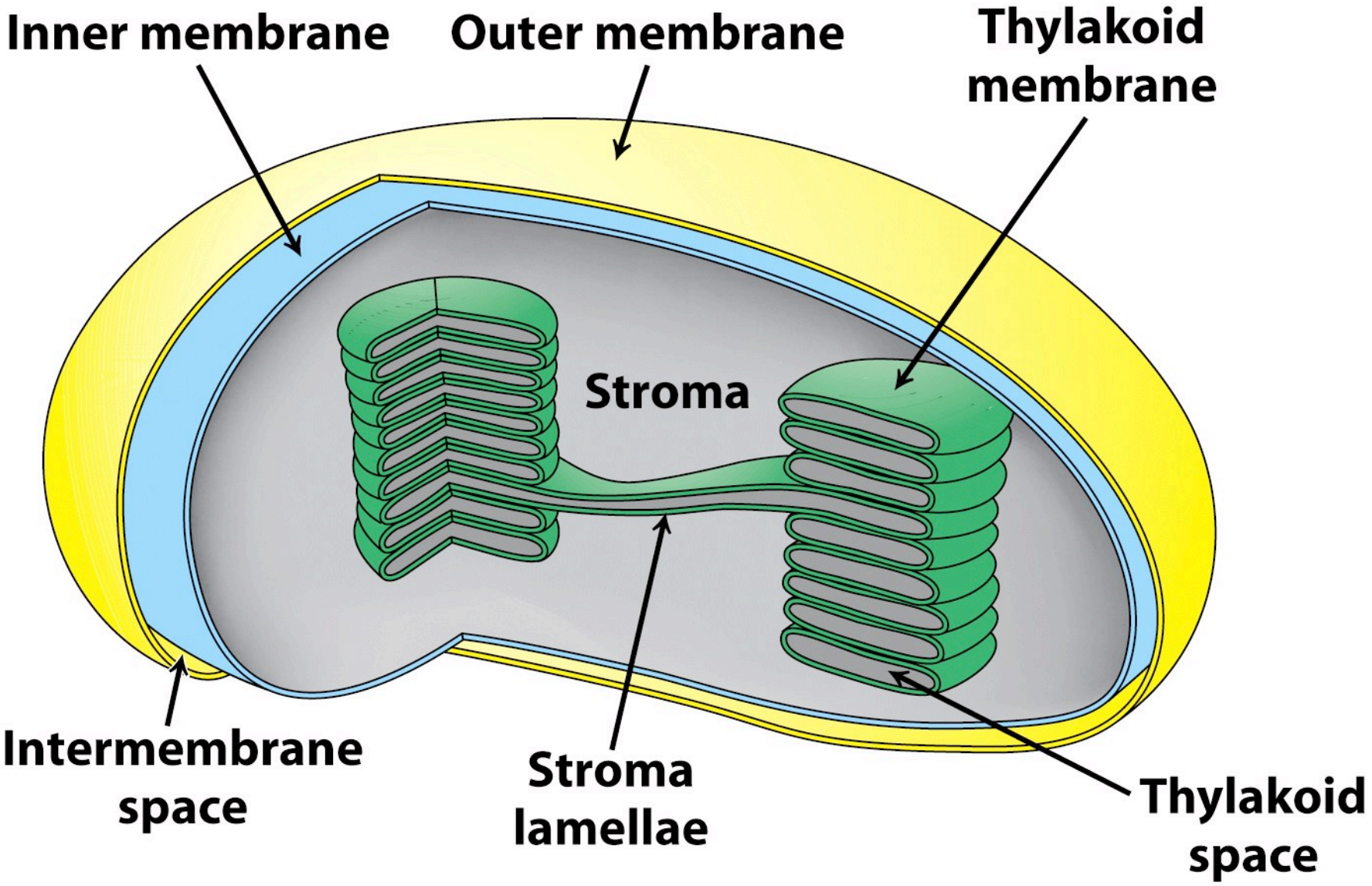

Figure 19-3
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Chlorophyll

ε=100,000 M^{-1} cm^{-1}

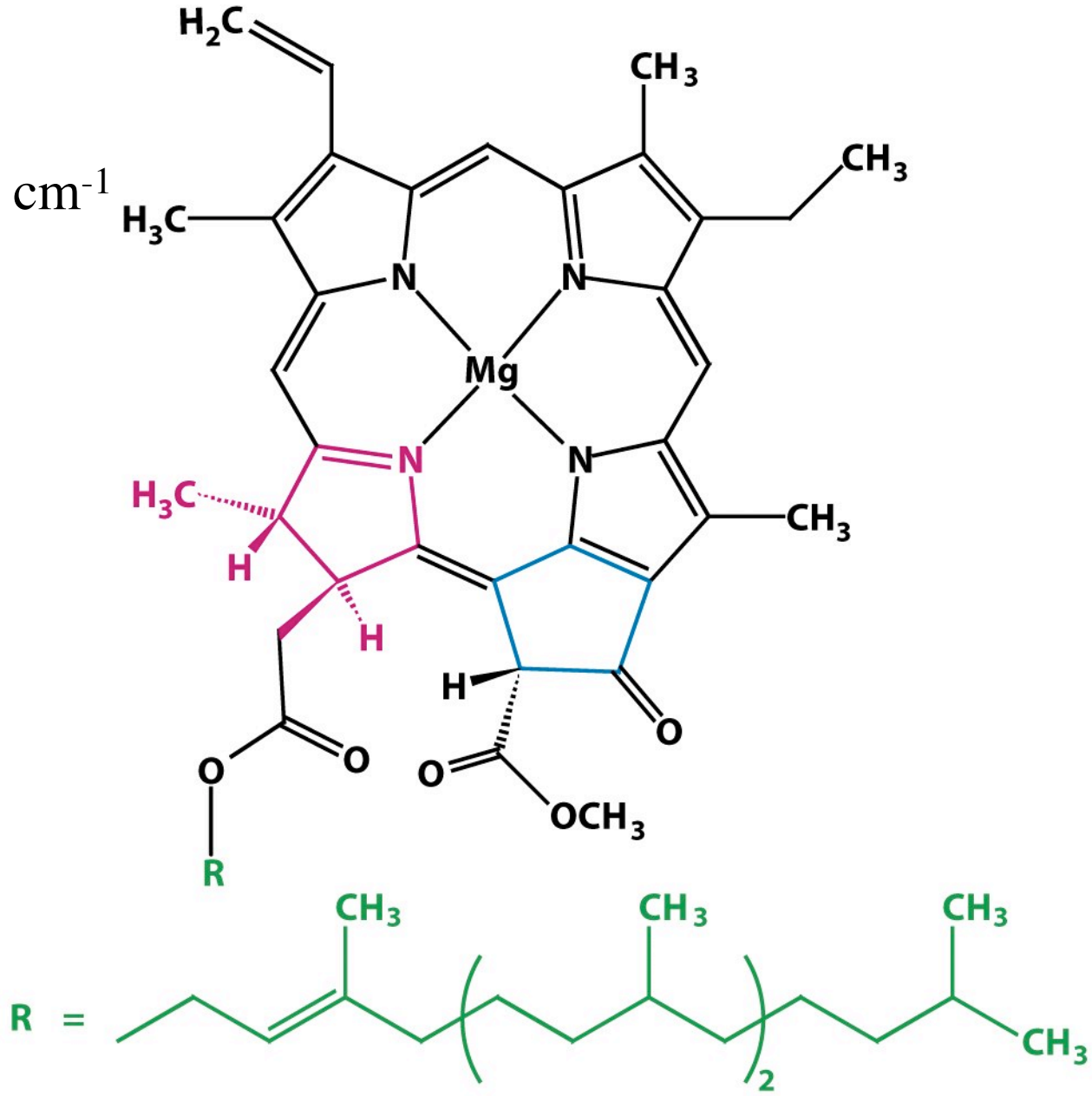

Figure 19-5
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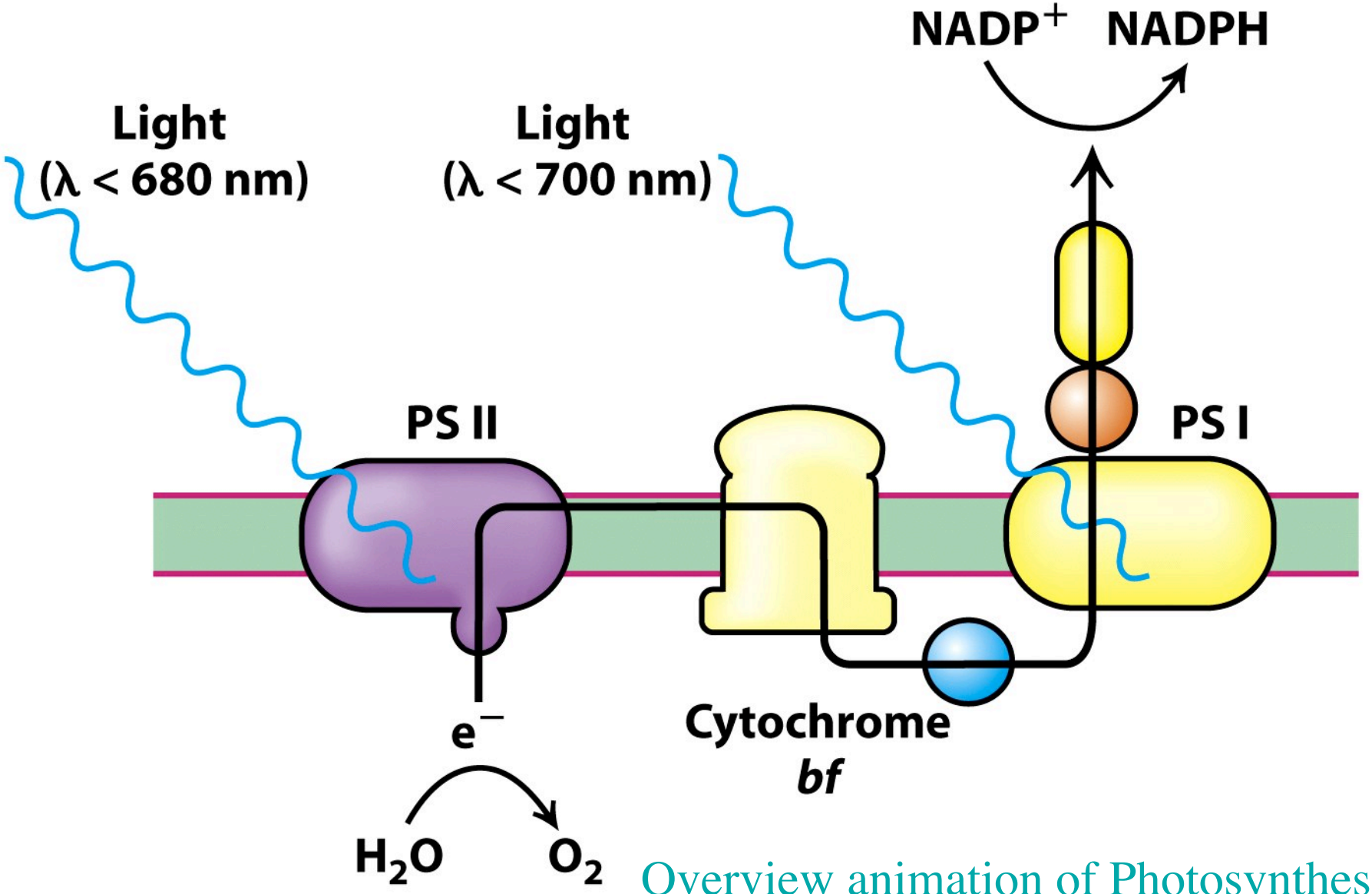
Two Chloroplast Photosystems



Overview animation of Photosynthesis

Figure 19-12
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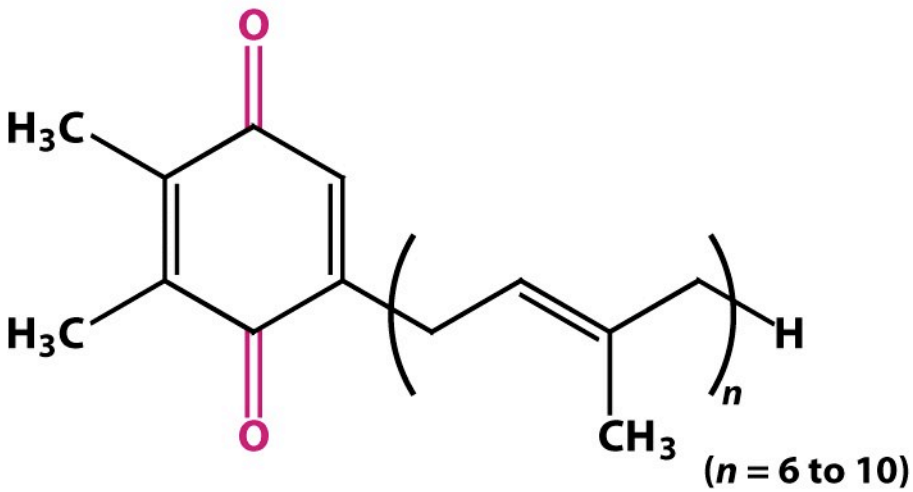
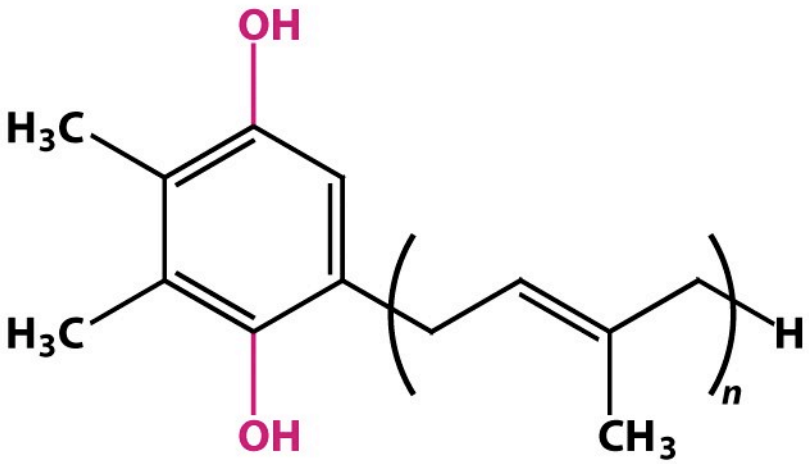


Plastoquinone
(oxidized form, Q)



Plastoquinol
(reduced form, QH_2)

Unnumbered figure pg 548
Biochemistry, Sixth Edition

PS II

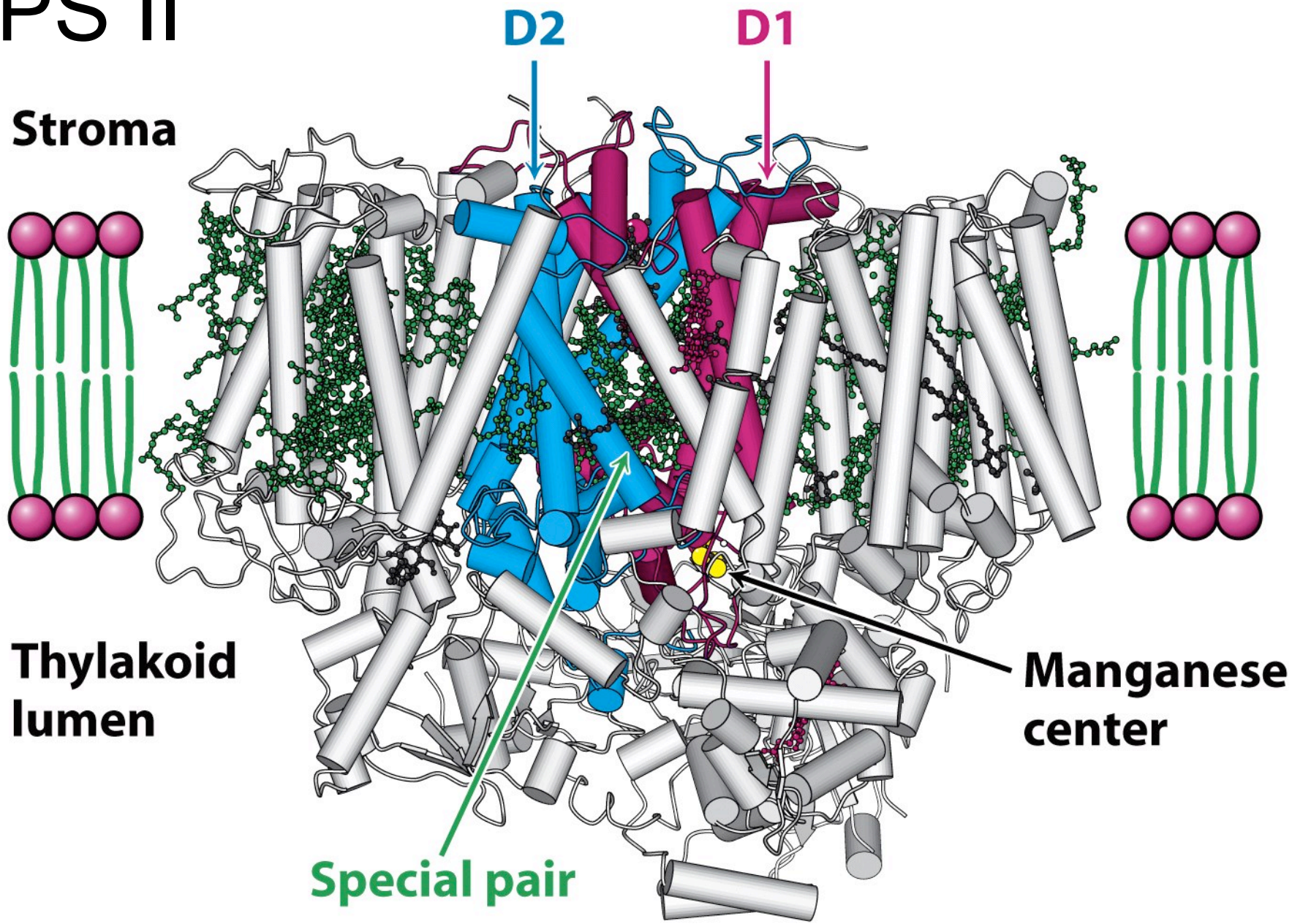
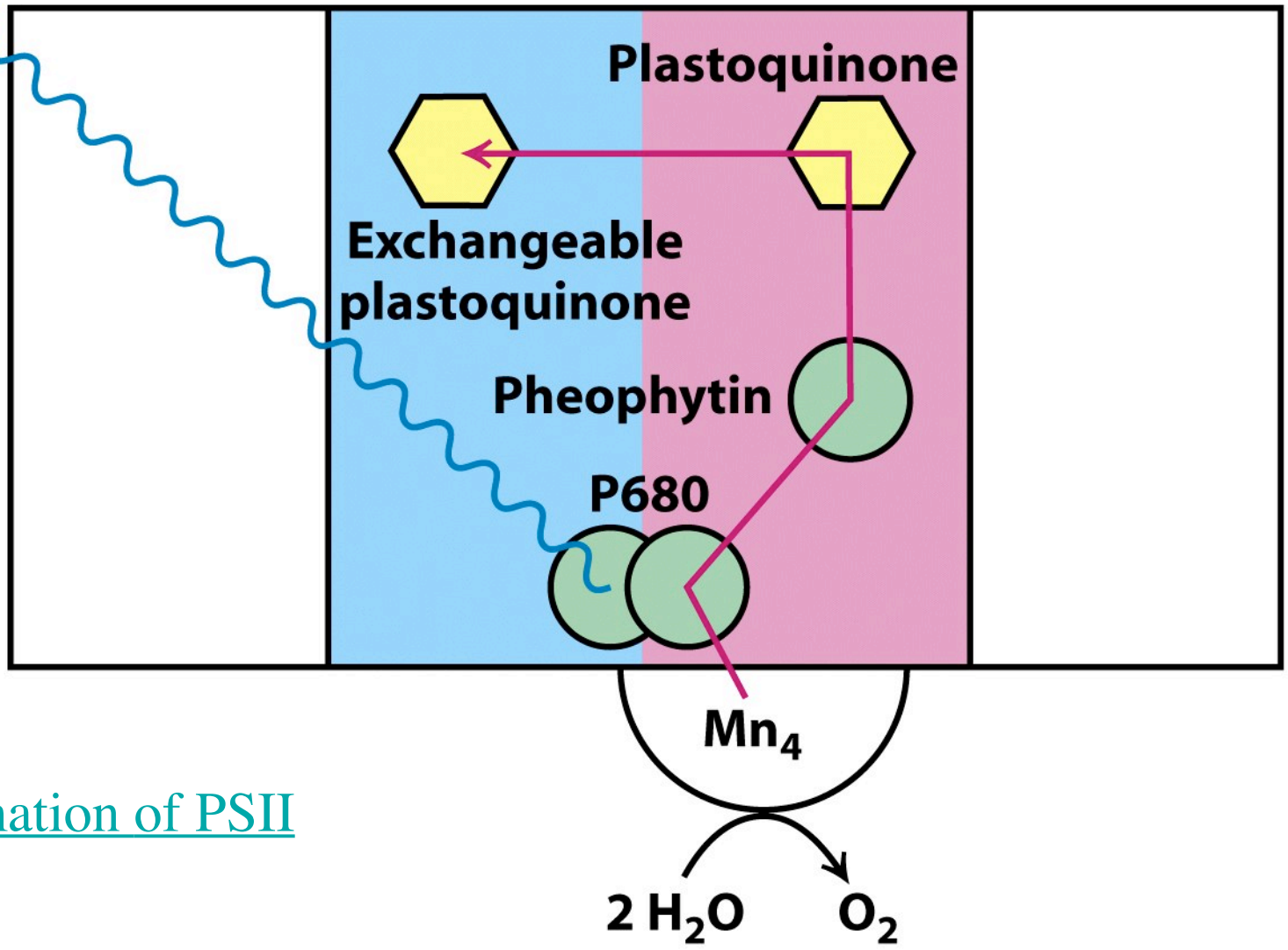


Figure 19-13
Biochemistry, Sixth Edition

Read this Tutorial of PSII

PS II



[See Animation of PSII]

Figure 19-14
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Oxidizing Water! Each photon "pulls off" an electron

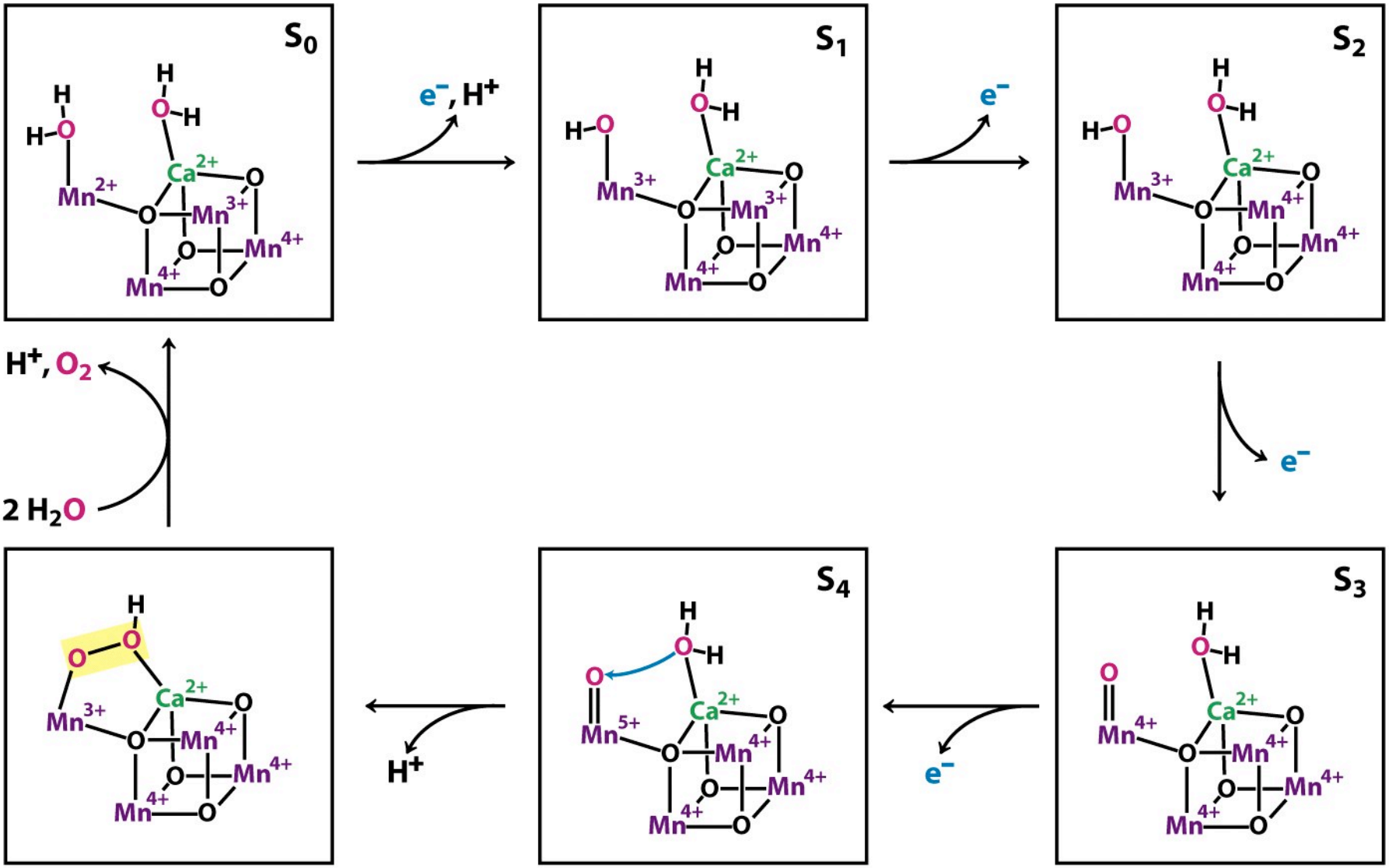

Figure 19-16
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PS II- generates H+ gradient too (Jagendorf,1966)

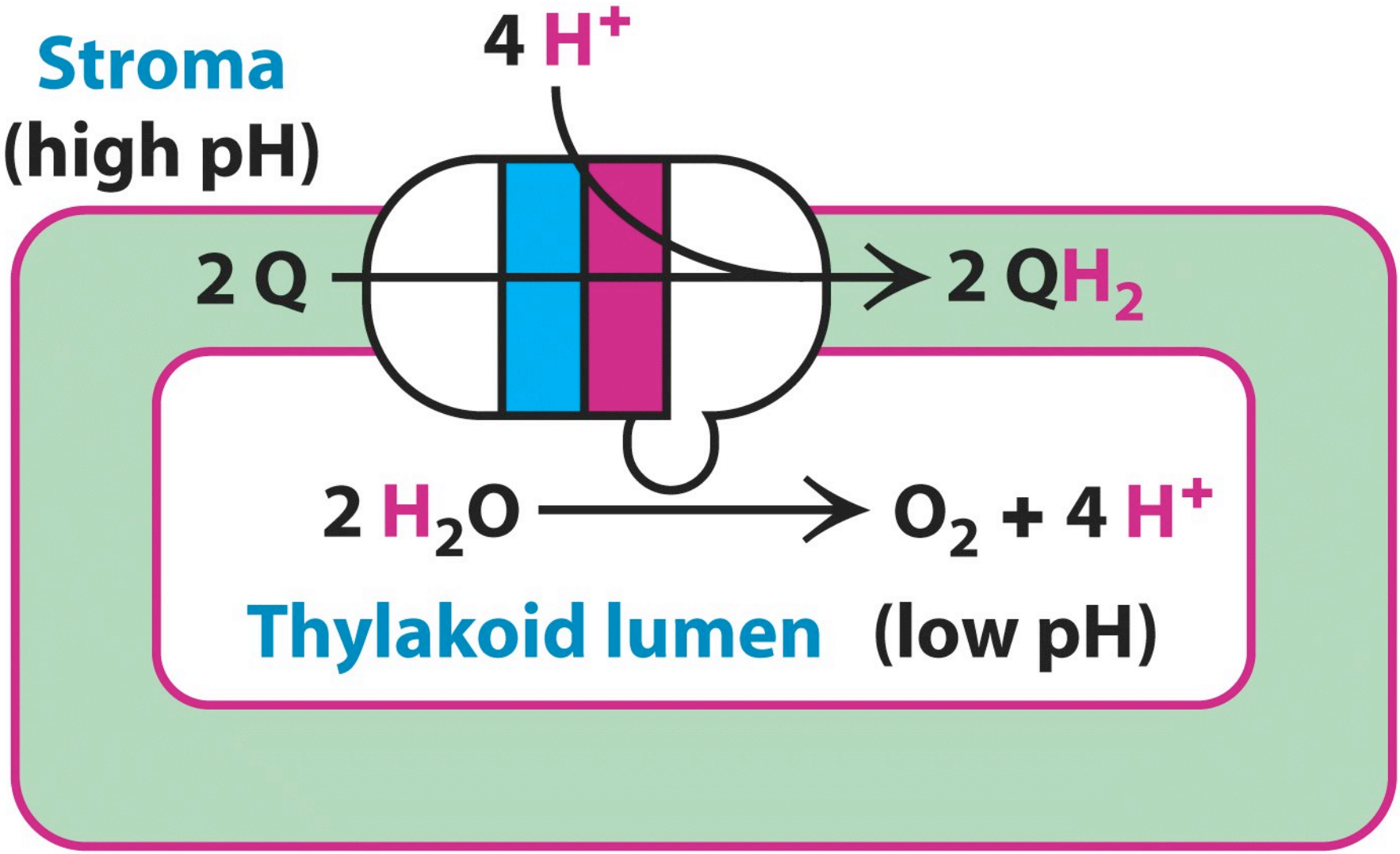

Figure 19-17
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Cyt bf complex: a lot like cyt.c-Q oxidoreductase

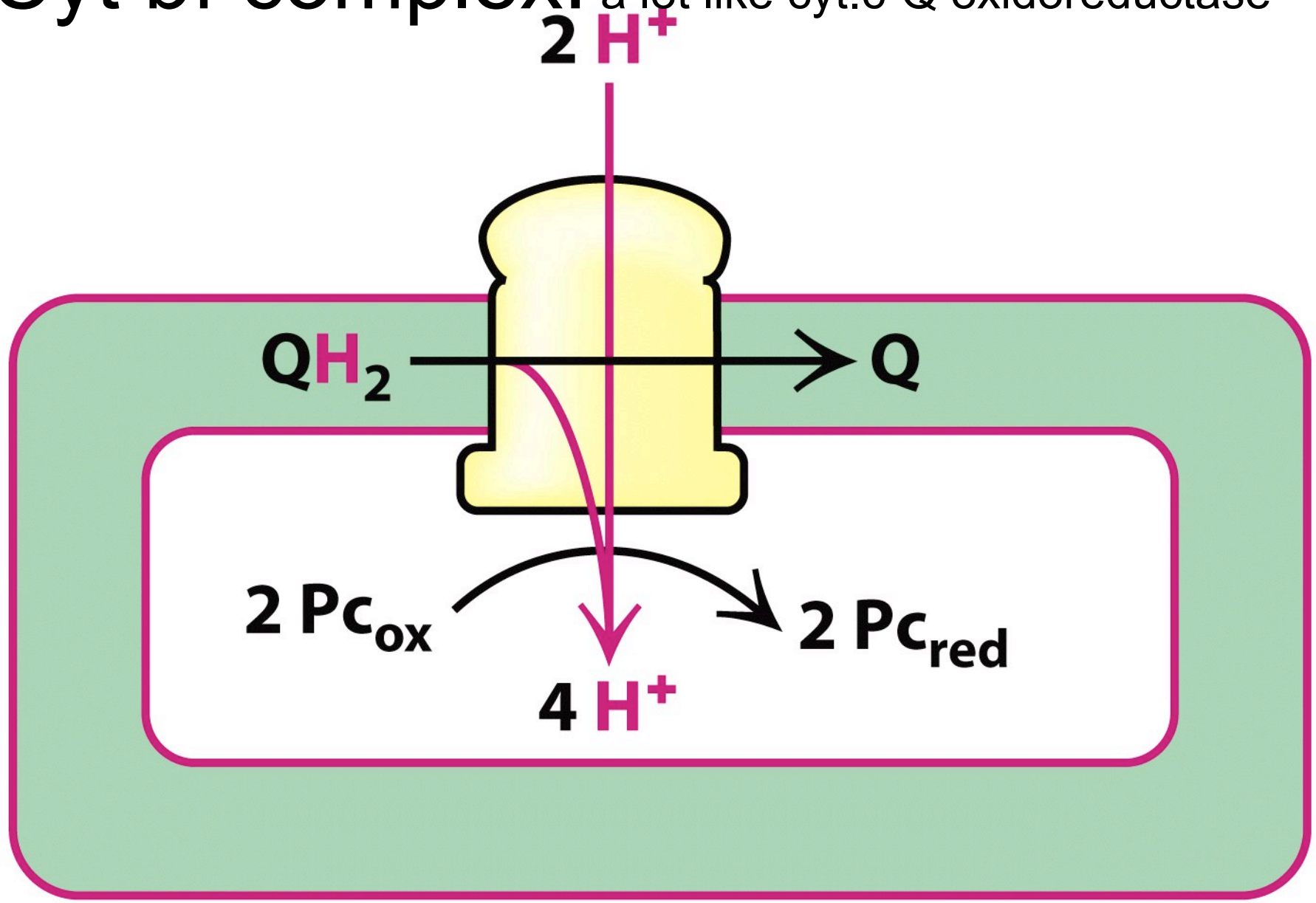

Figure 19-18
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PS I

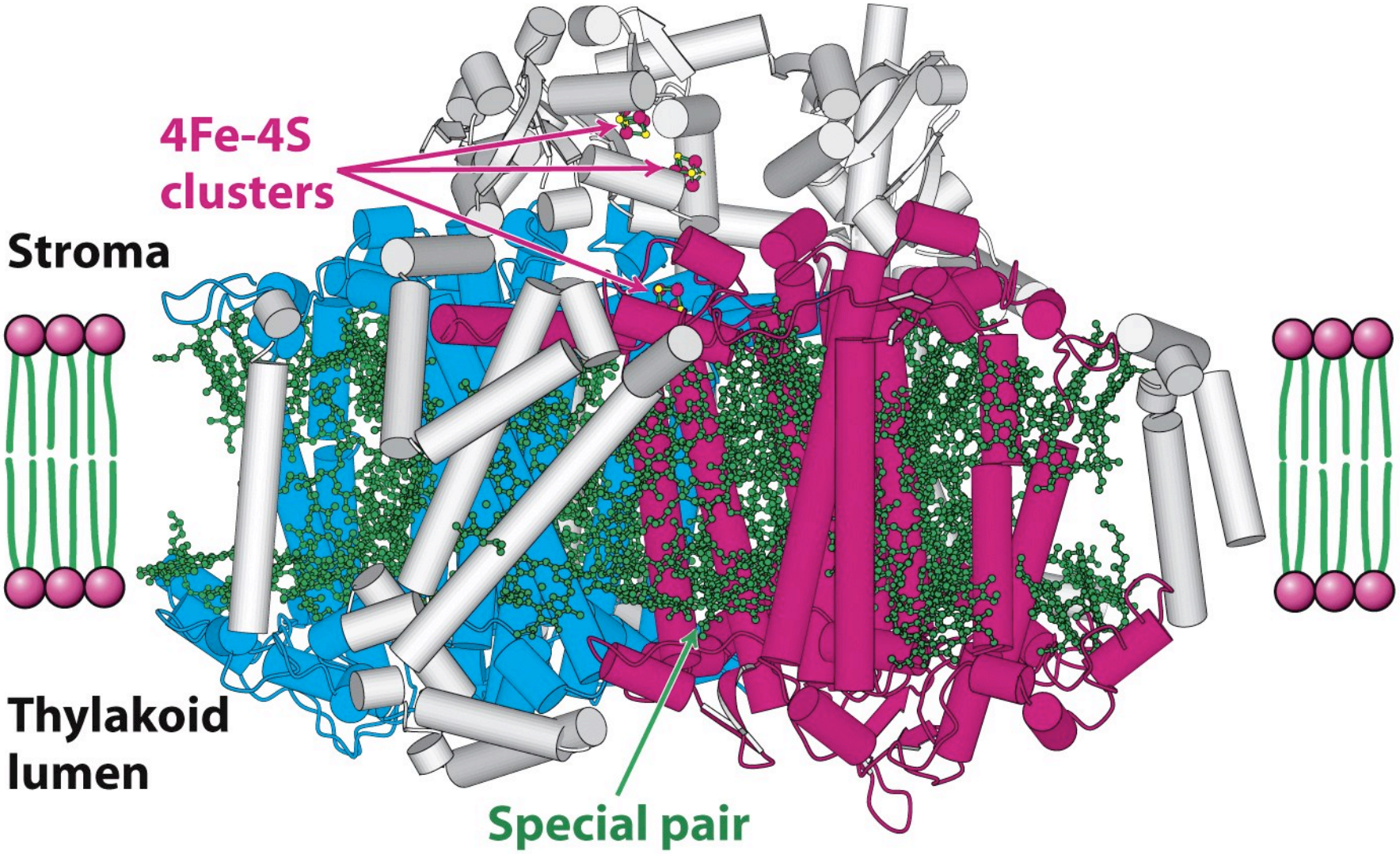

Figure 19-19
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Read this Tutorial of PSI

PS I

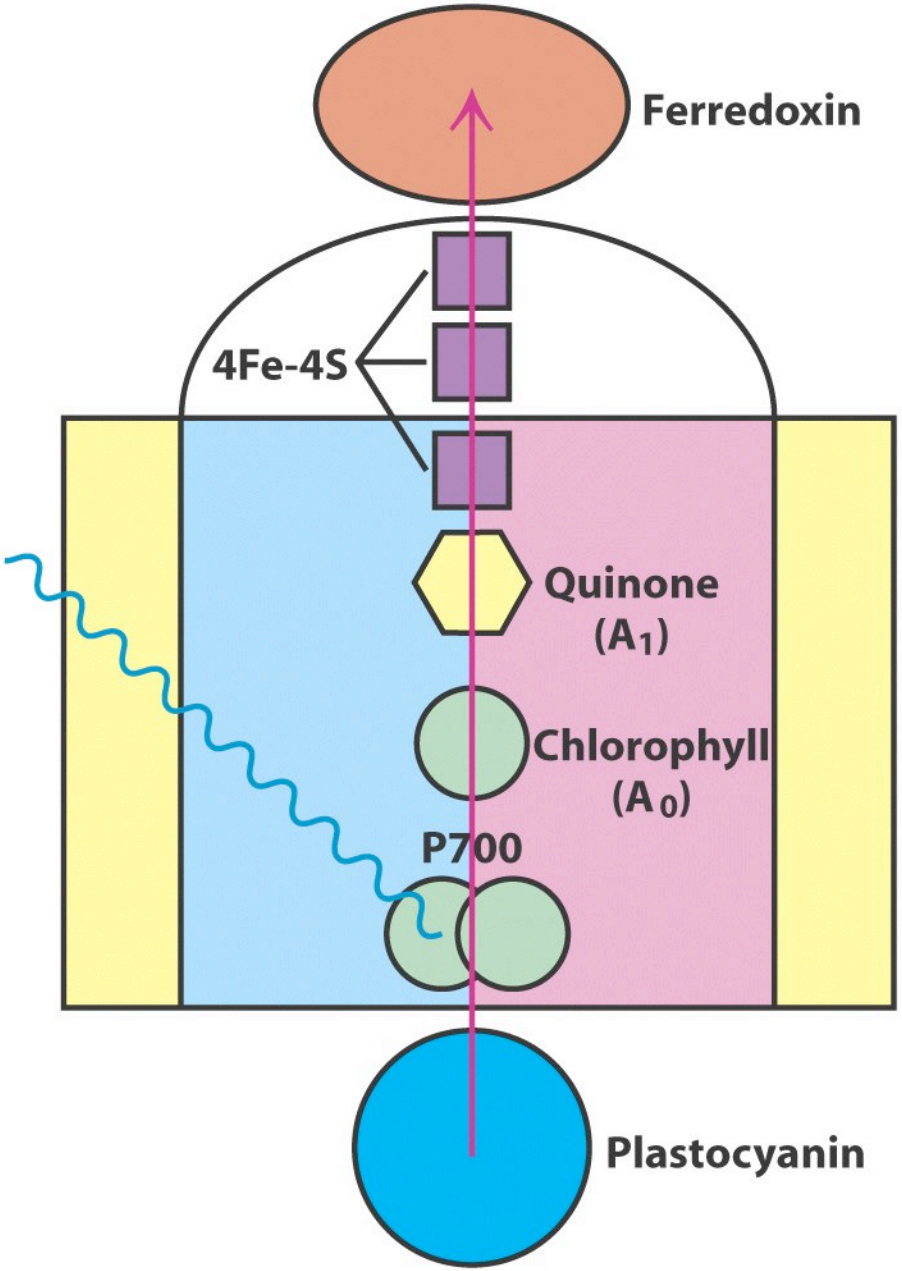

Figure 19-20
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Know the “Z” Scheme !

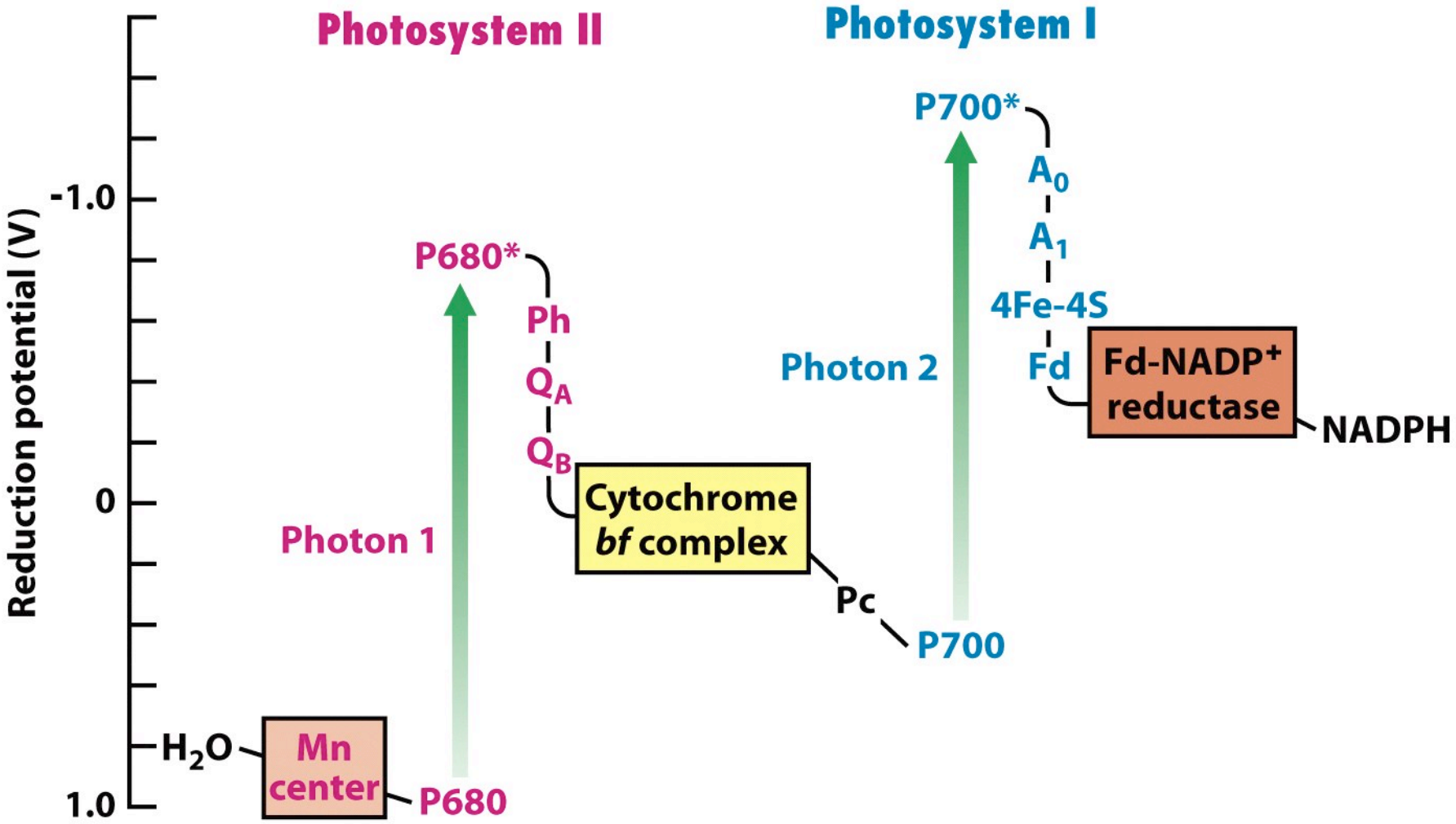

Figure 19-23
Biochemistry, Sixth Edition

Overview animation of Photosynthesis

ENERGETICS

In chloroplasts $\Delta pH = 3.5$

So, $\Delta G = -4.8$ kcal /mol H^+
and there are ~4 H^+/ ATP

$$\Delta G = 2.3\ RT\ (pH_{thylakoid} - pH_{stroma}) + F\Delta\Psi_{(out\ relative\ to\ in)}$$

Overall Photosynthesis gives:

8 photons = $1O_2$, 2 NADPH, 3 ATP
(a 700 nm photon has -40.9 kcal /mole potentially)

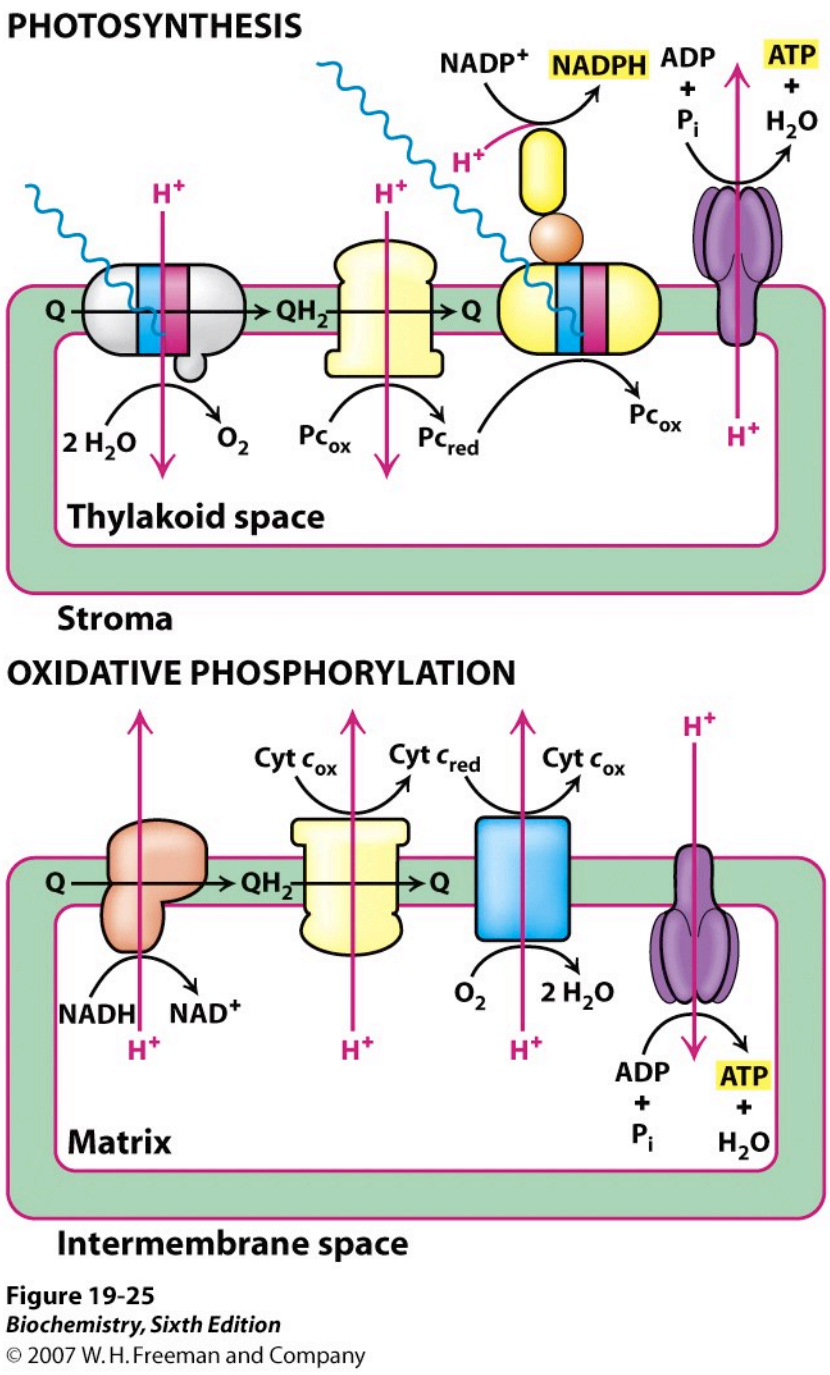

Figure 19-25
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Cyclic Photophosphorylation: for ATP, only when NADPH is high!

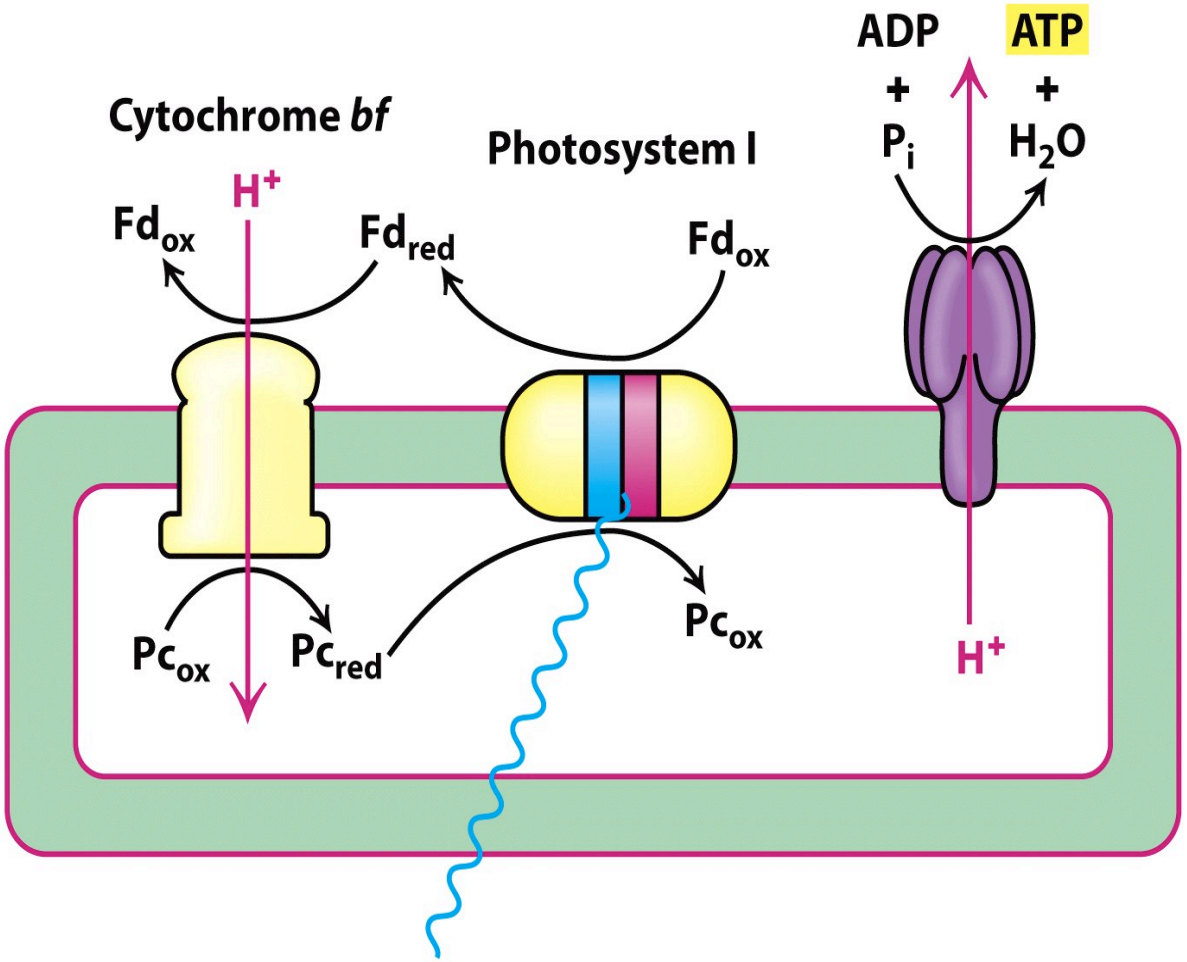

Figure 19-26a
Biochemistry, Sixth Edition

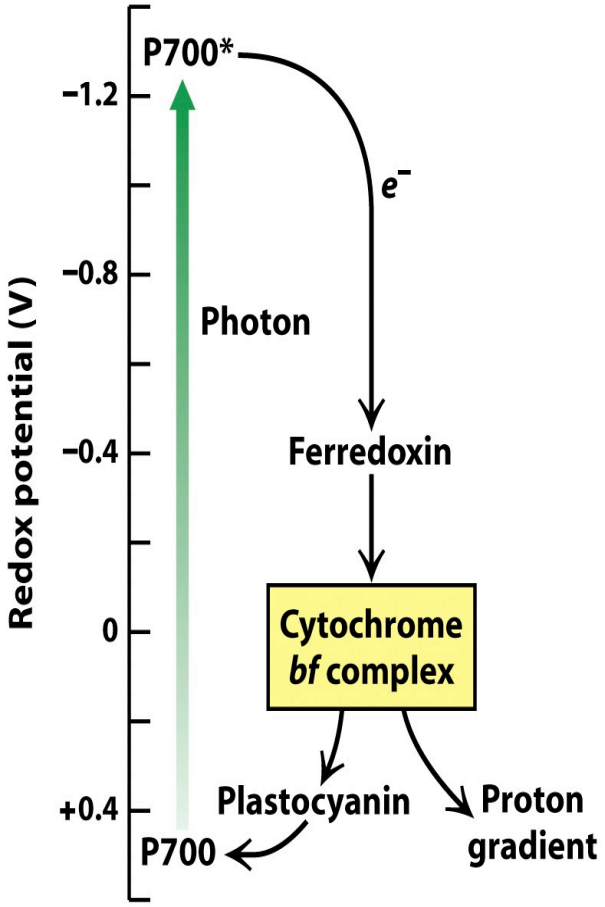

Figure 19-26b
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