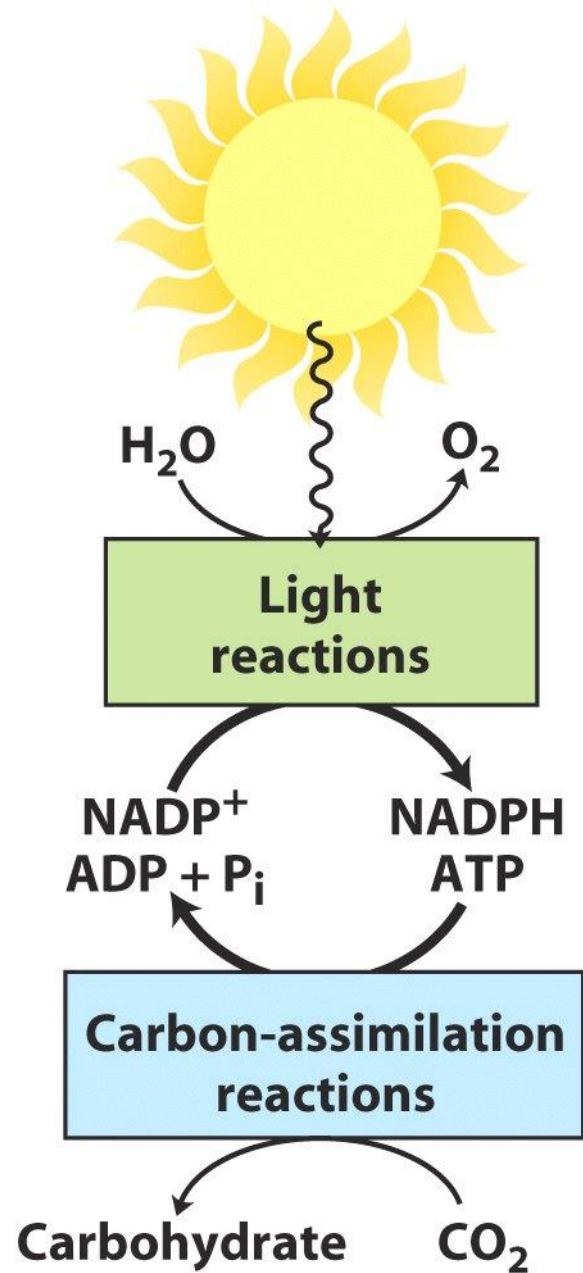
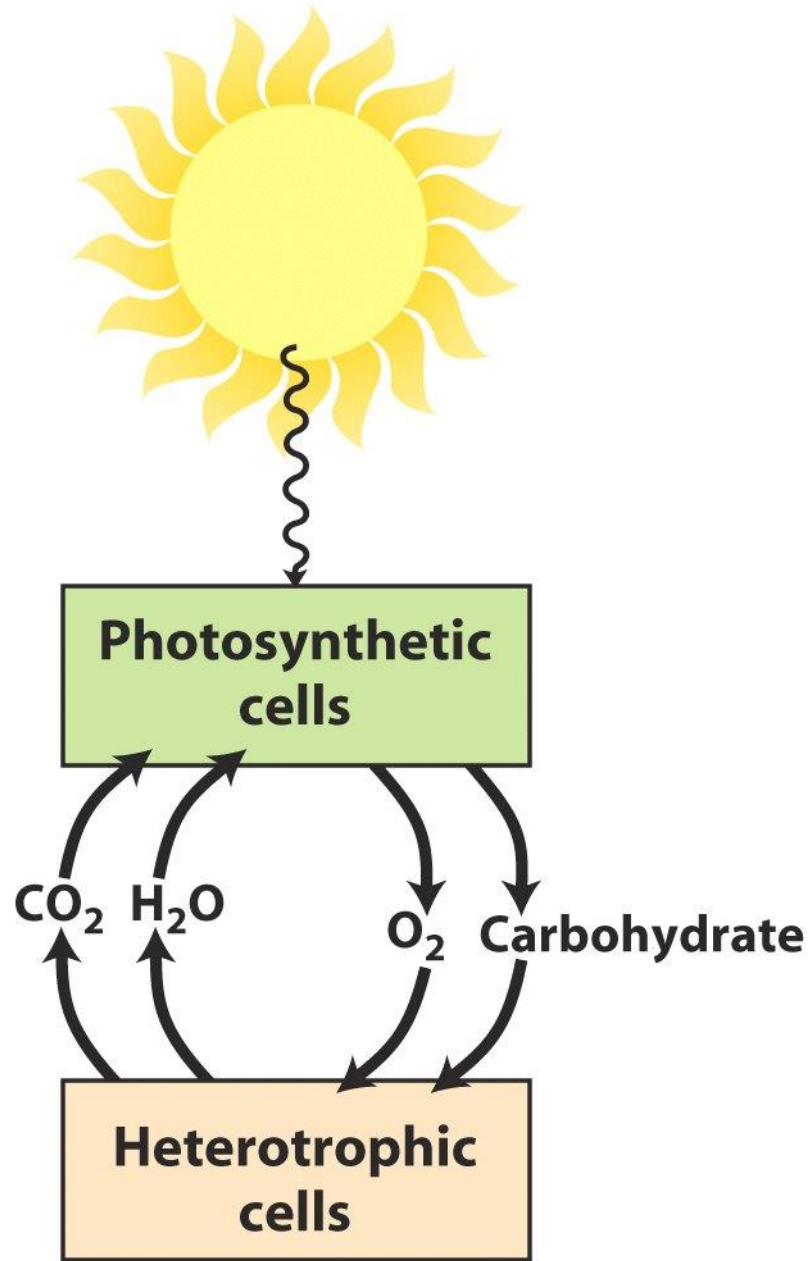


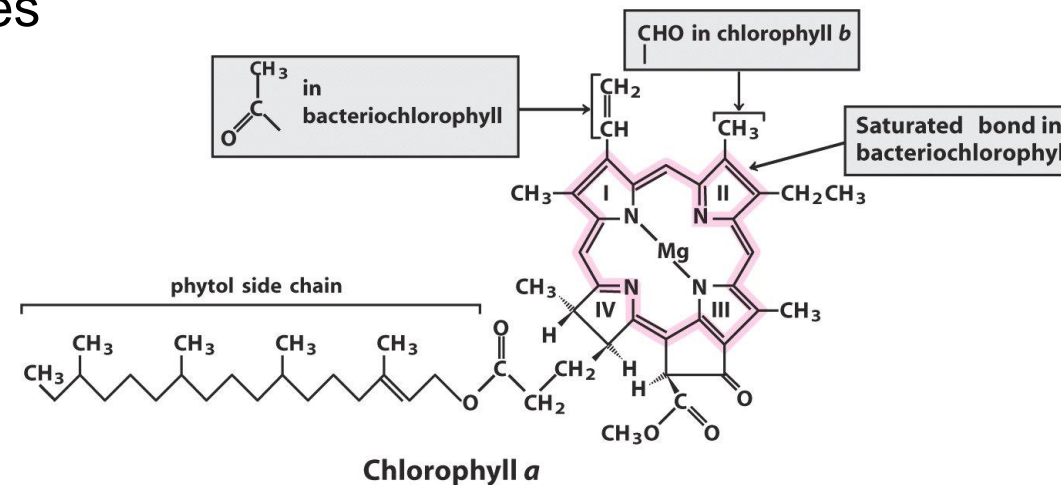
# Fotossíntese



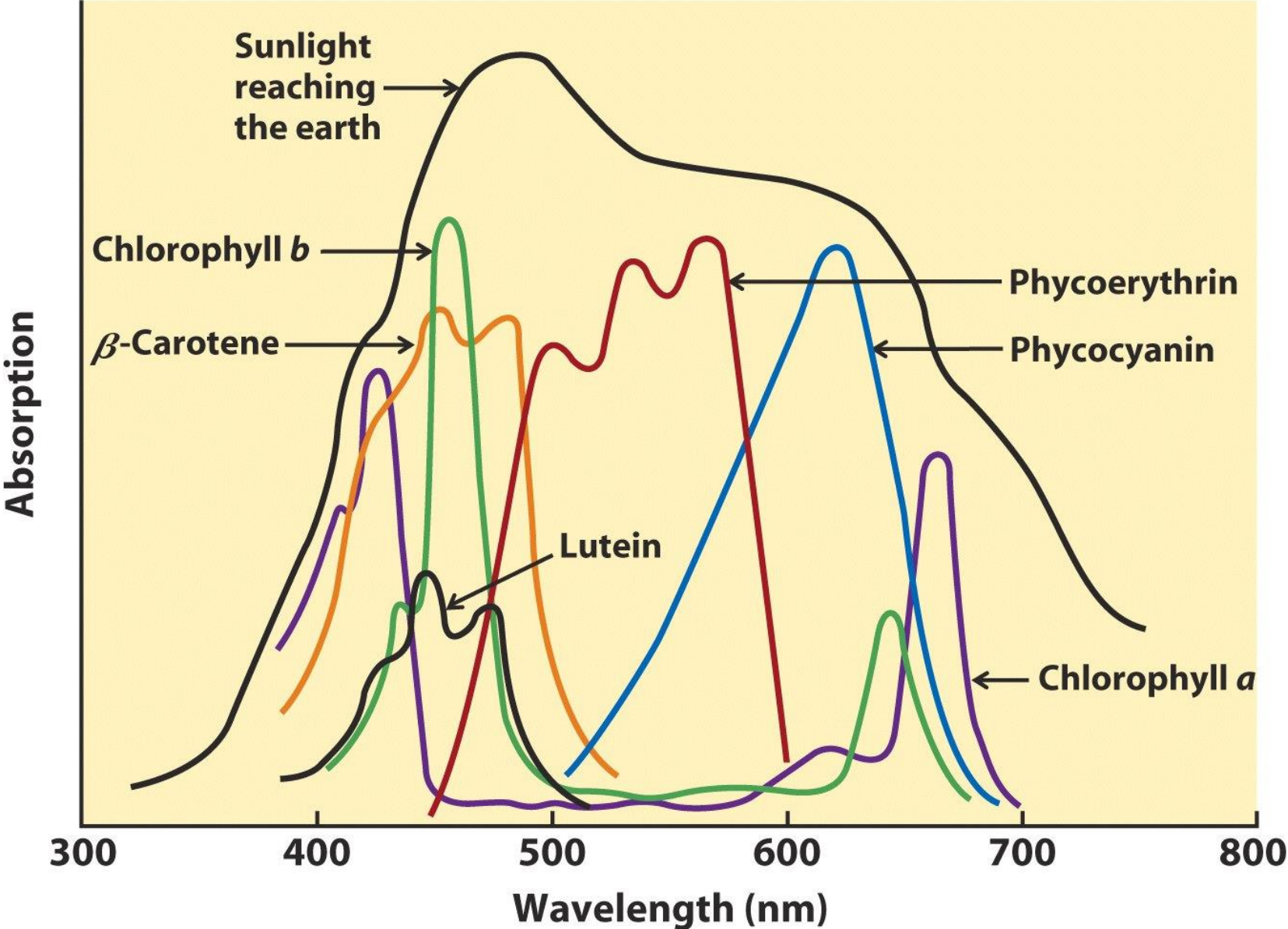


# Reações Dependentes de Luz

- Potencial redox da água =  $0,82\text{ V}$  → energia é necessária para doação de elétrons para NADPH ( $E^0 = -0,32$ )
- Energia vem da luz: absorção de fótons eleva o nível energético dos elétrons, levando-os a um estado excitado
- Luz é absorvida por pigmentos, clorofilas  
Protoporfirina  
Rica em duplas ligações

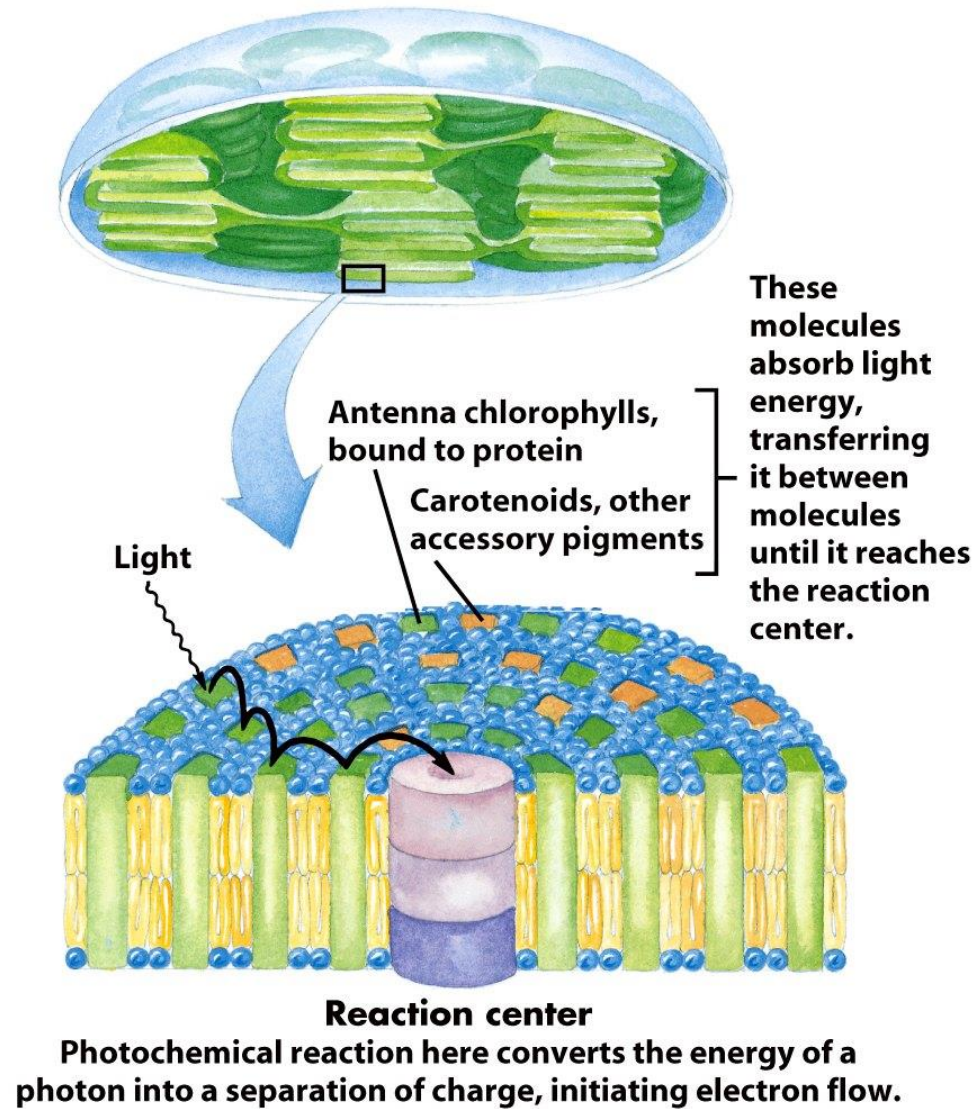


# Carotenóides Auxiliam na Captação de Luz

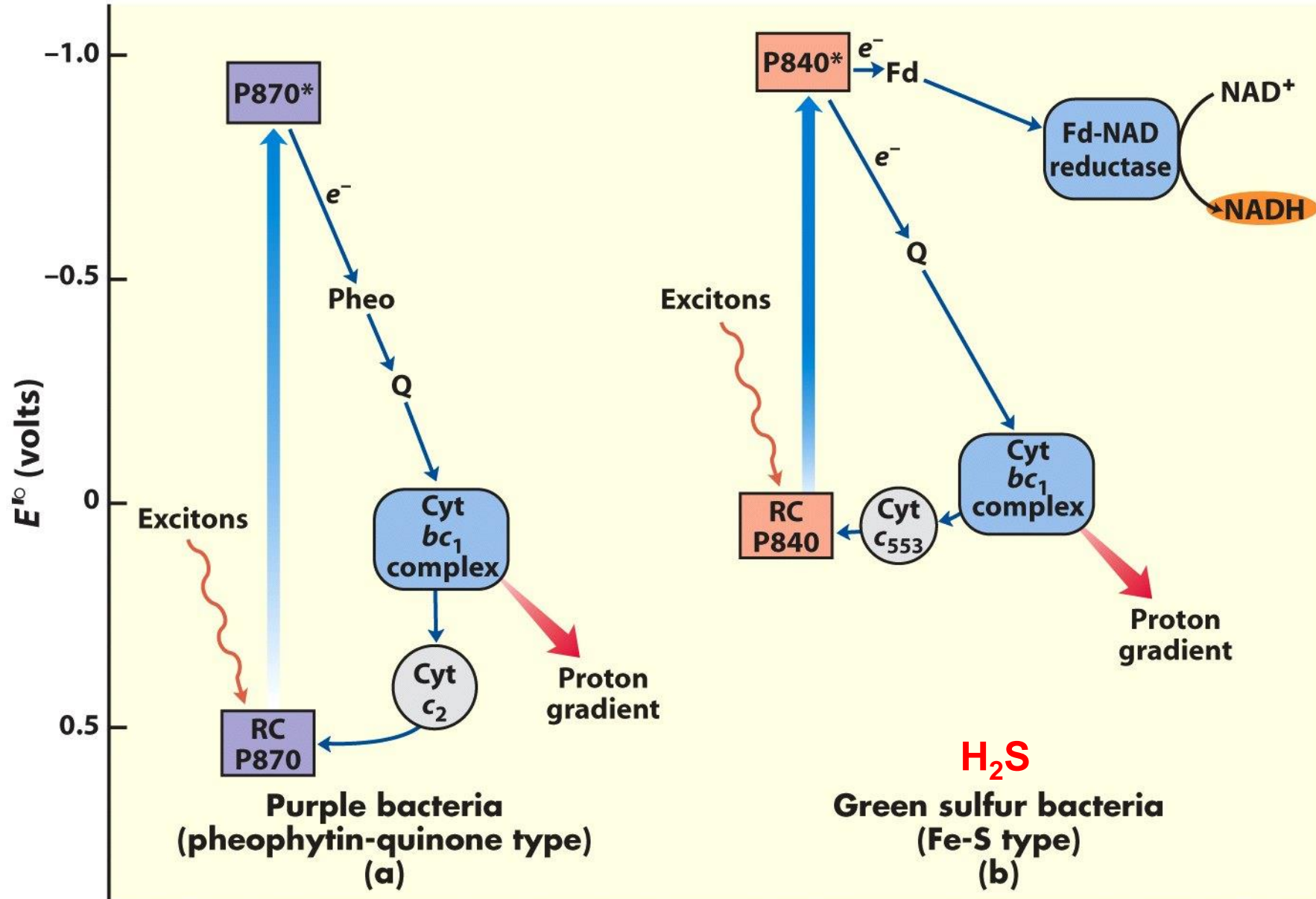




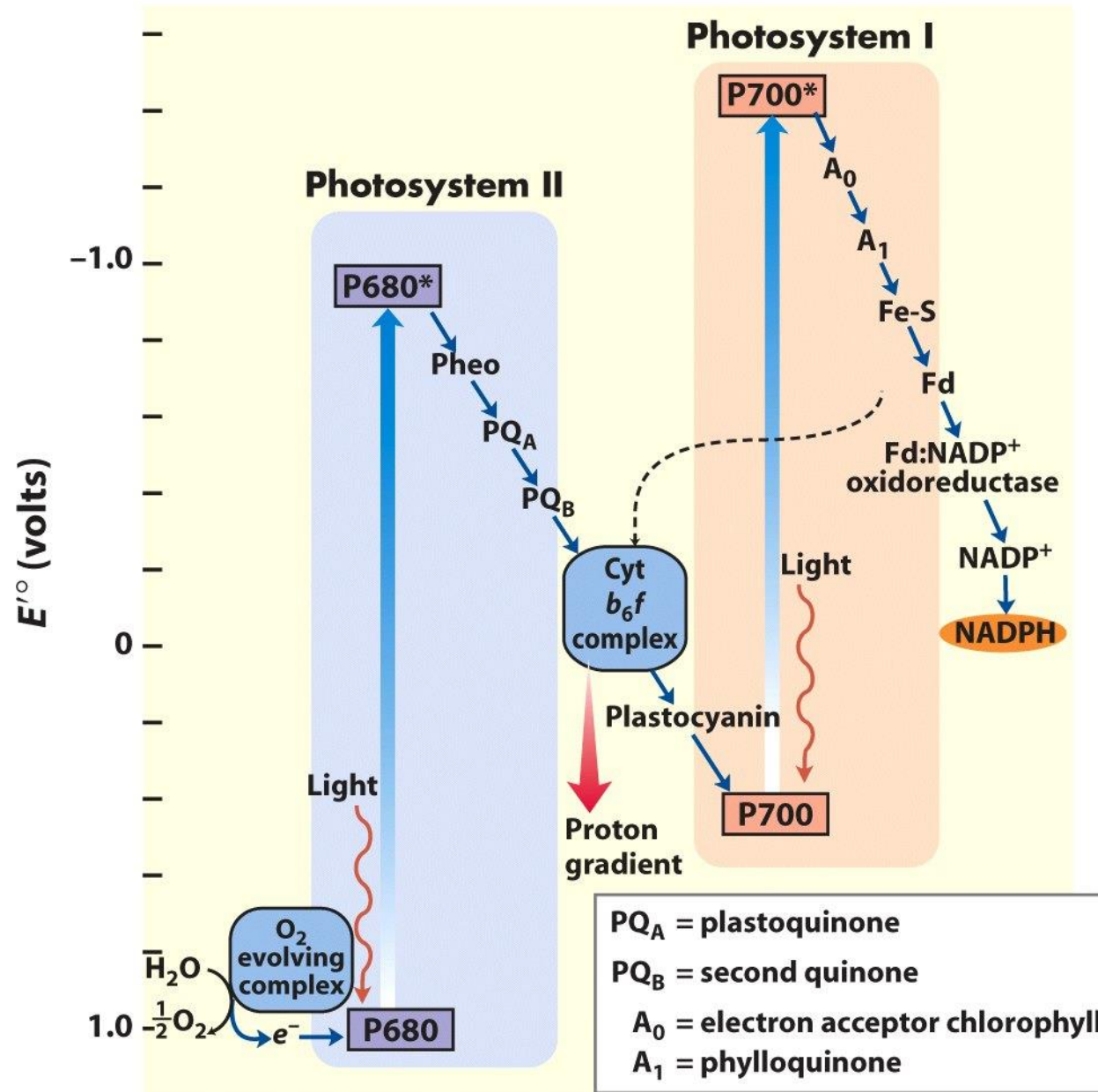
# Fotosistemas Organizam Pigmentos que Captam Luz

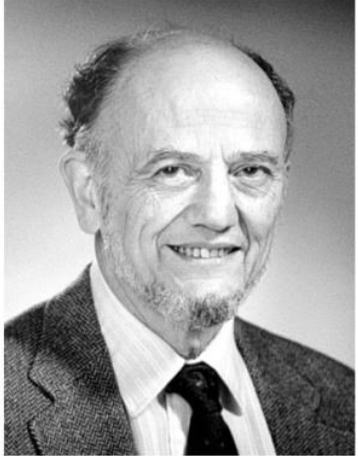
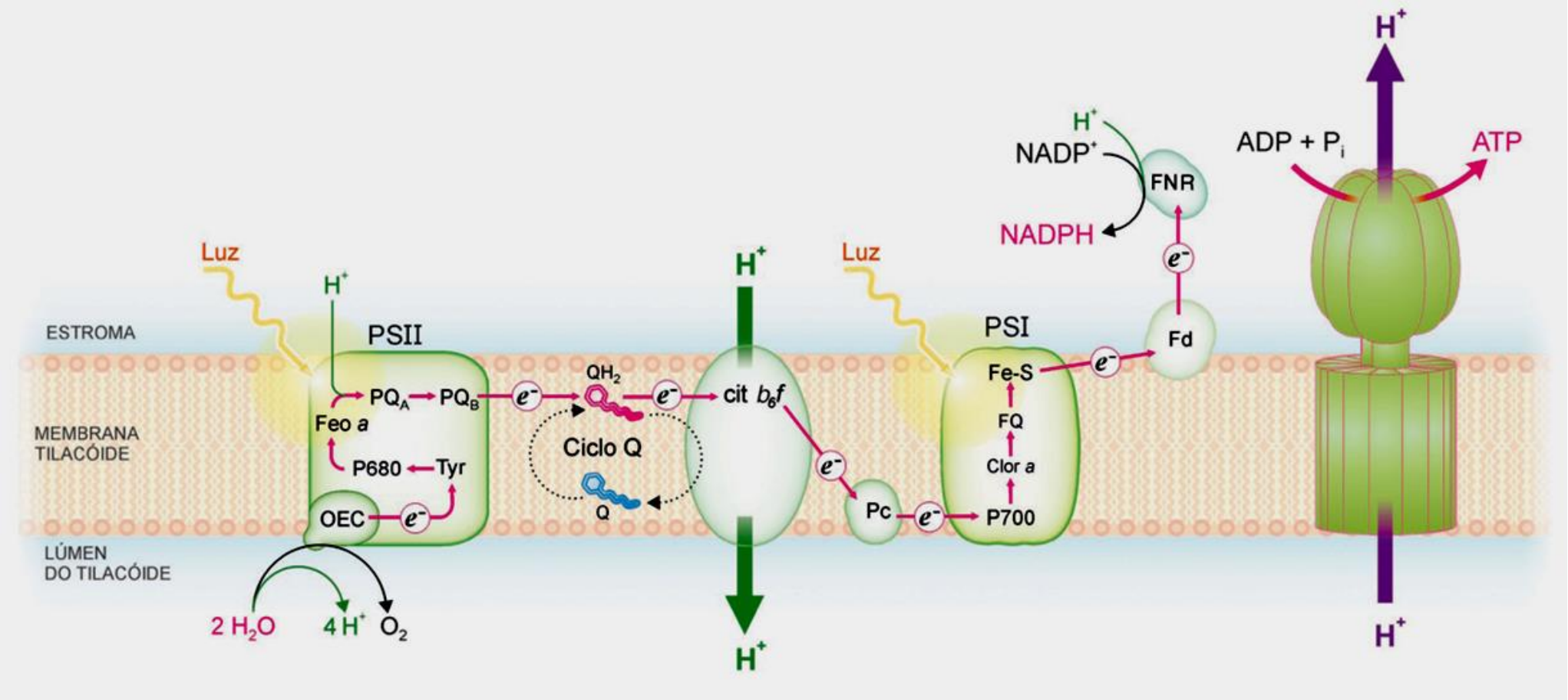


# Bactérias



# Cianobactérias, Algas e Plantas

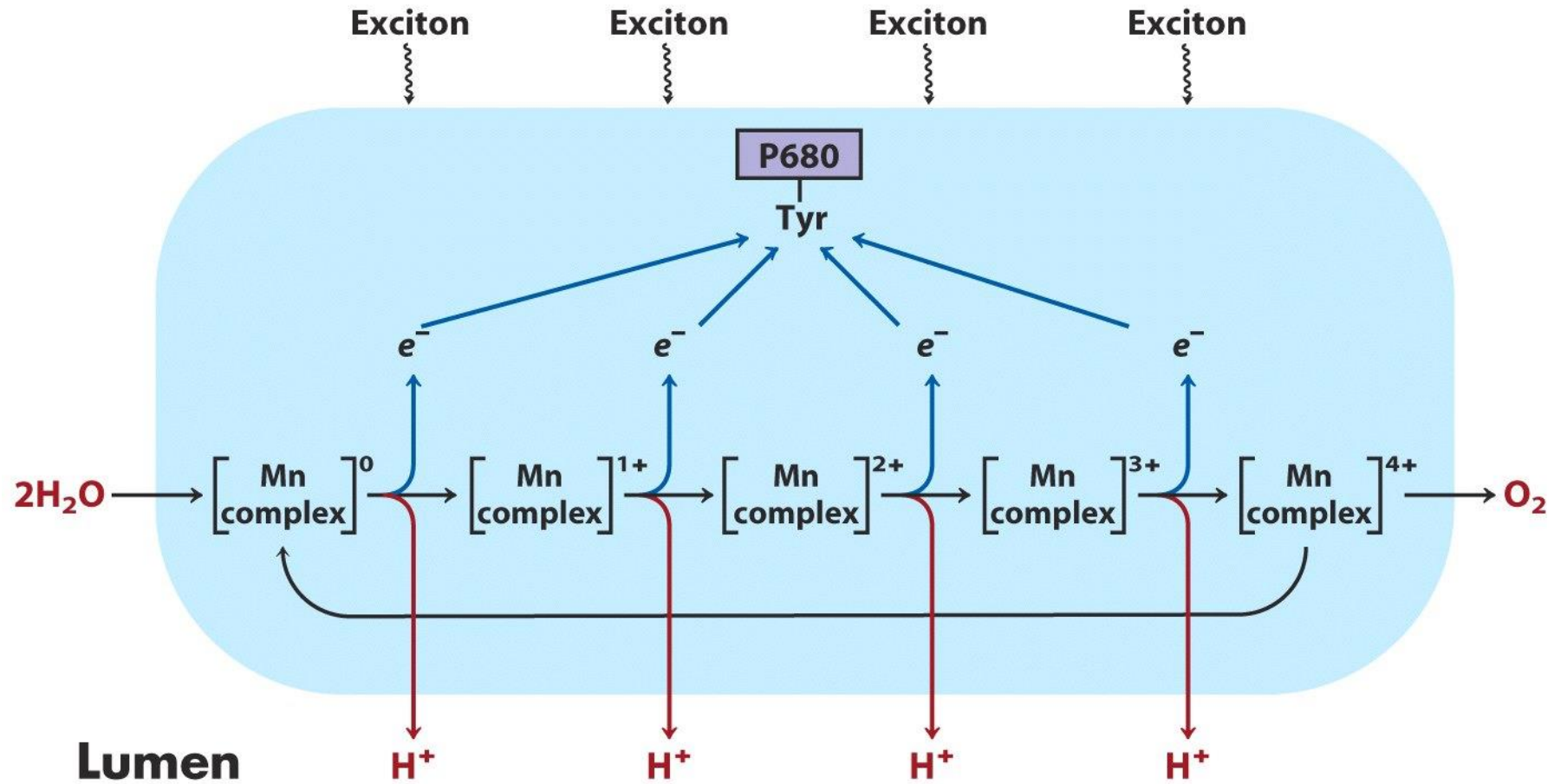


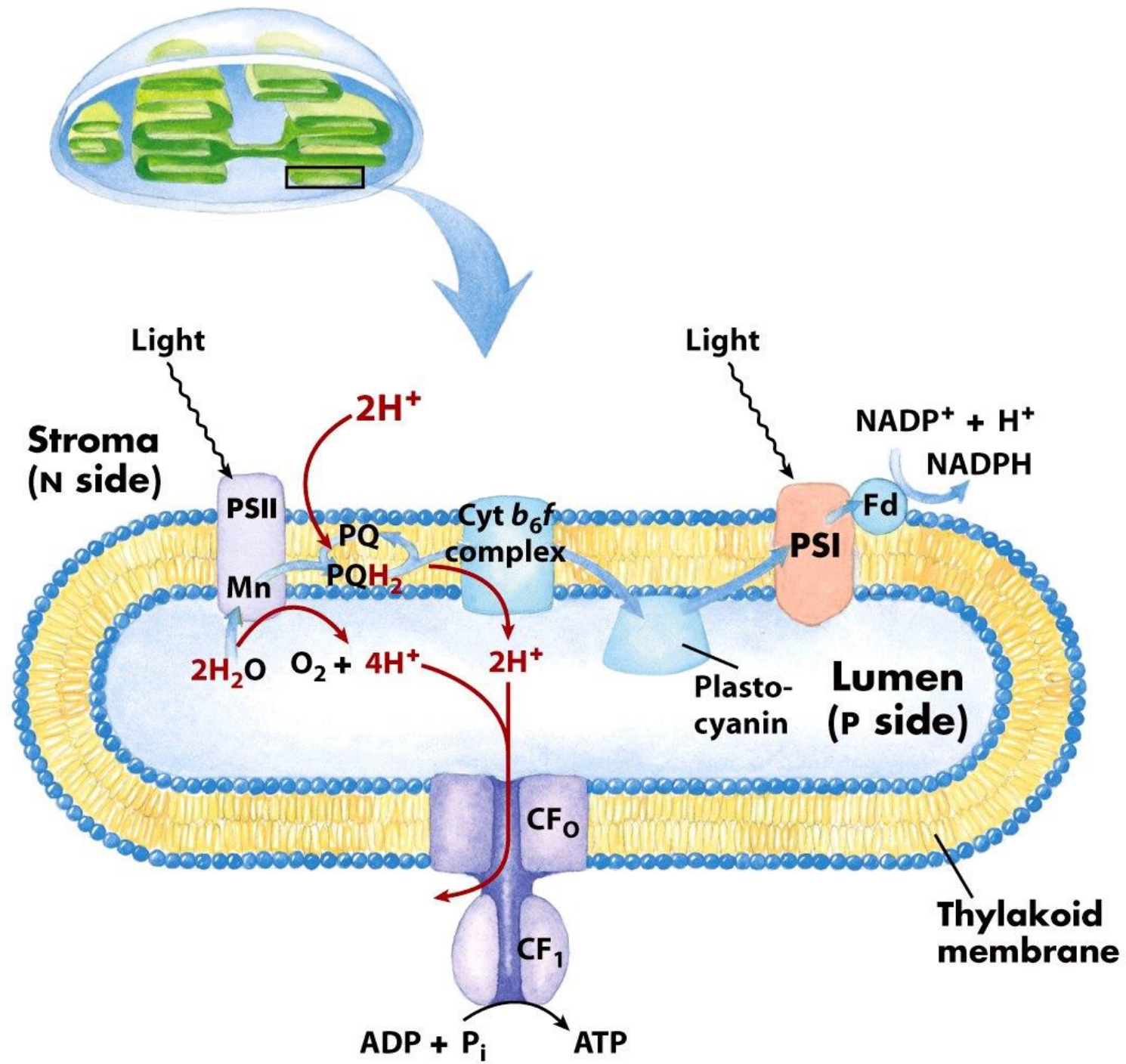


André Jagendorf

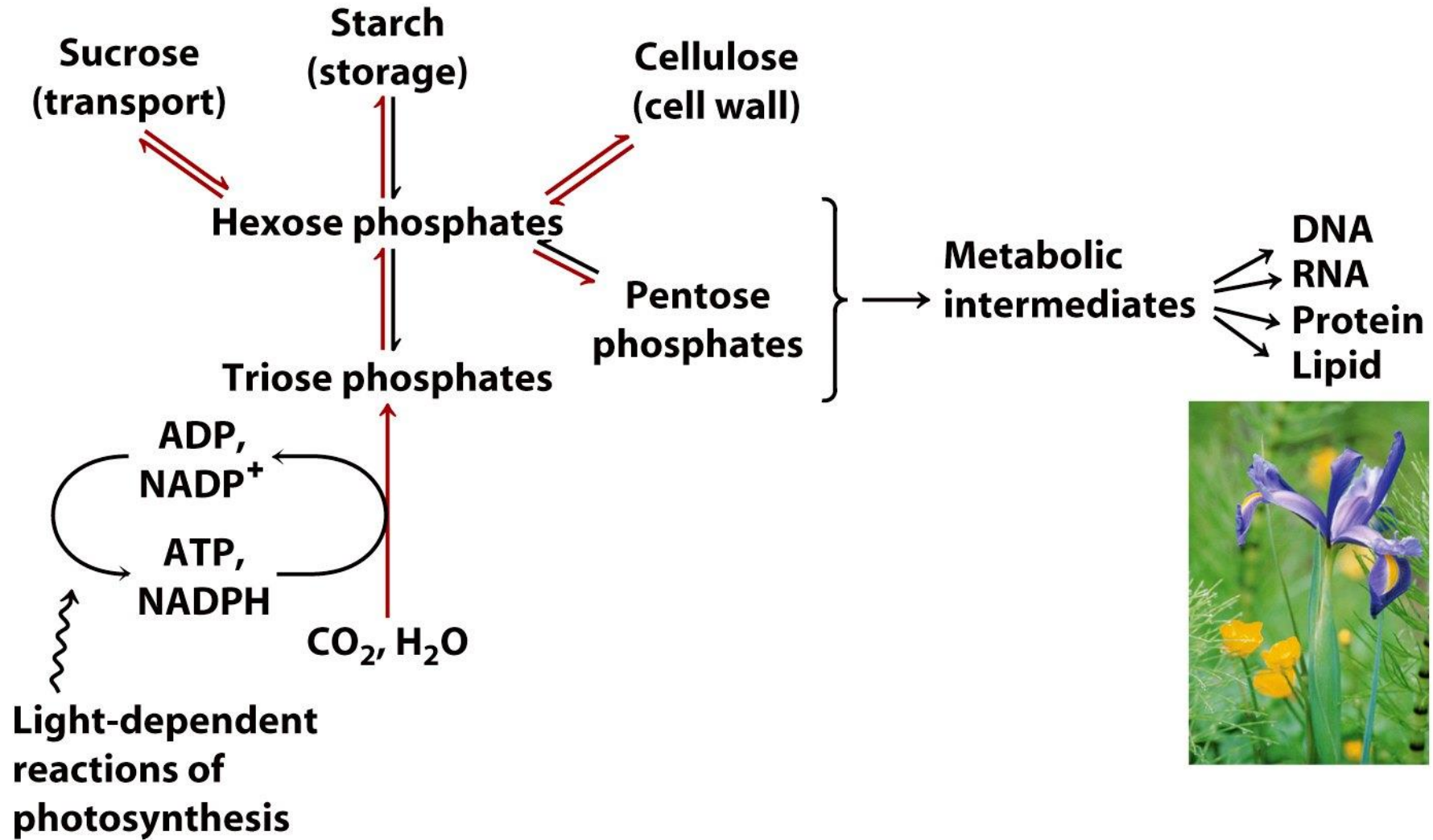


# Oxygen-Evolving Complex





# BiossÍntese de Carboidratos em Organismos que Fazem FotossÍntese



# Biossíntese de Carboidratos em Organismos que Fazem Fotossíntese

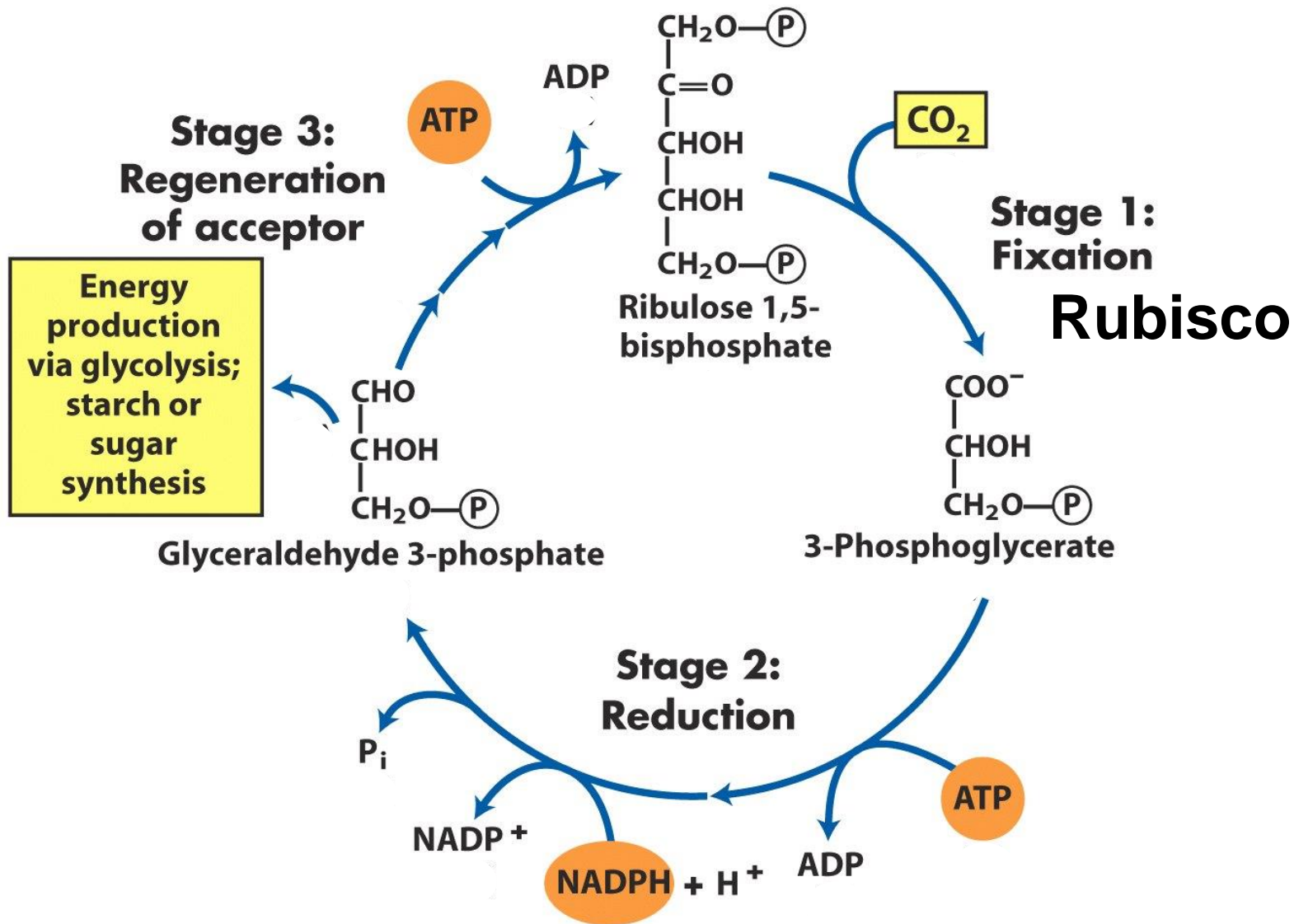
- Ocorre no estroma do cloroplasto
- Fixação de carbono: condensação de  $\text{CO}_2$  com pentose = 2 3-P glicerato
- 3 P glicerato é reduzido a trioses P
- Síntese de hexoses e reposição da pentose
- Rubisco: enzima mais abundante na terra



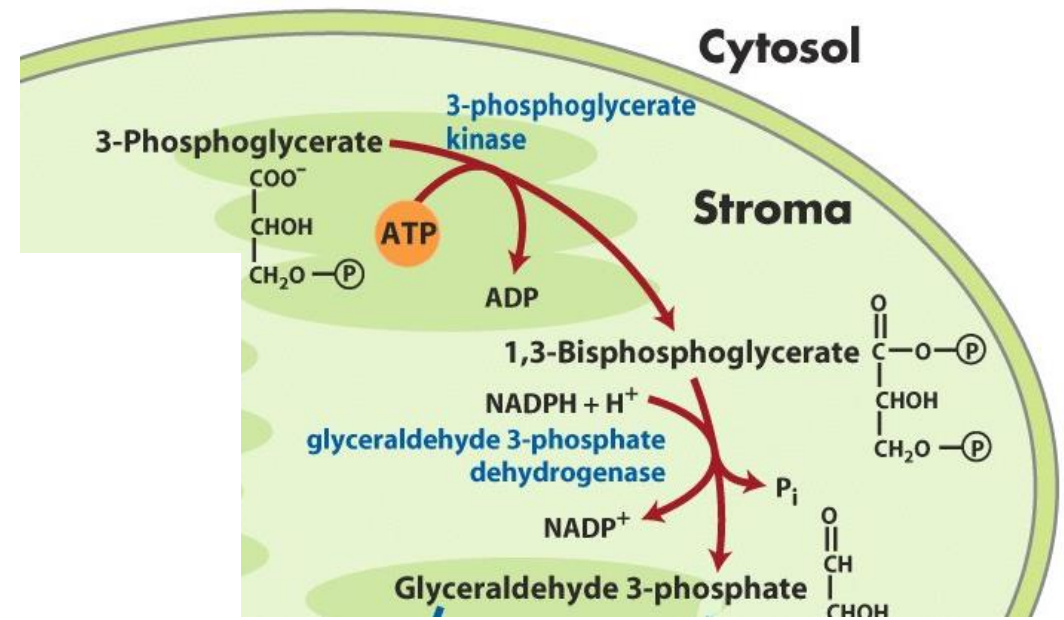
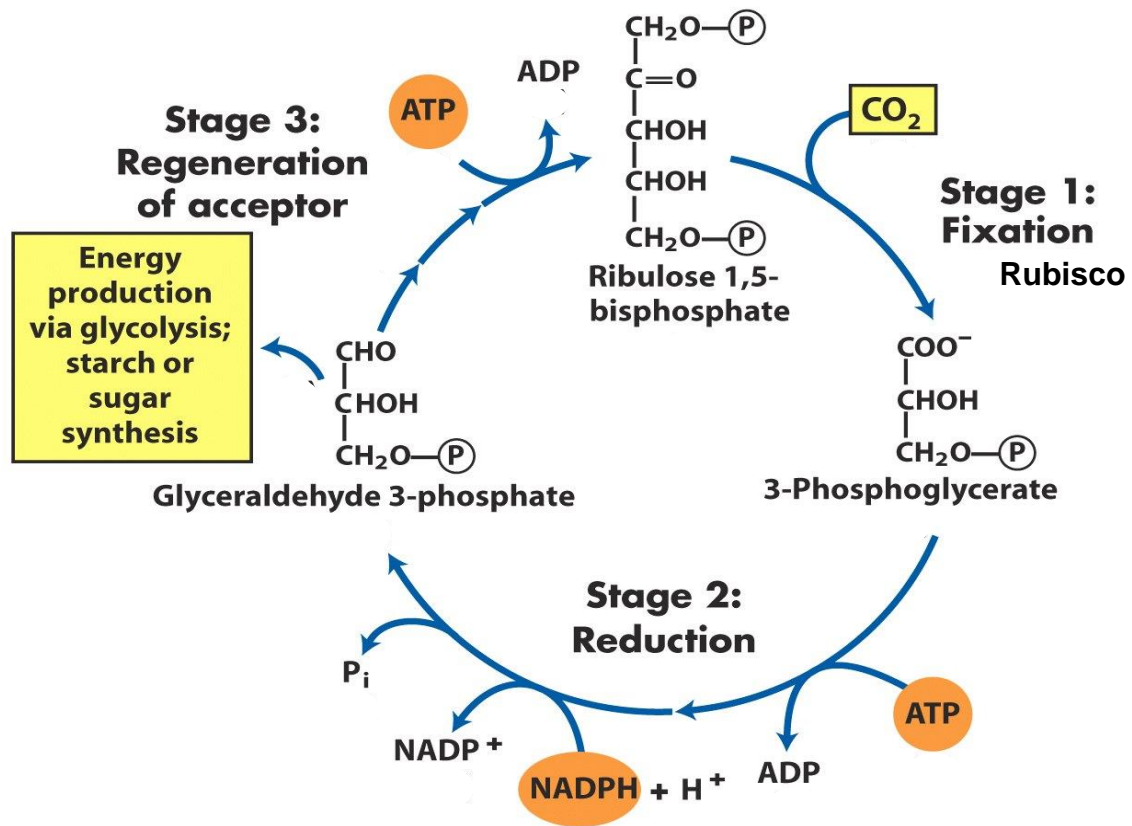
Melvin Calvin, 1911–1997



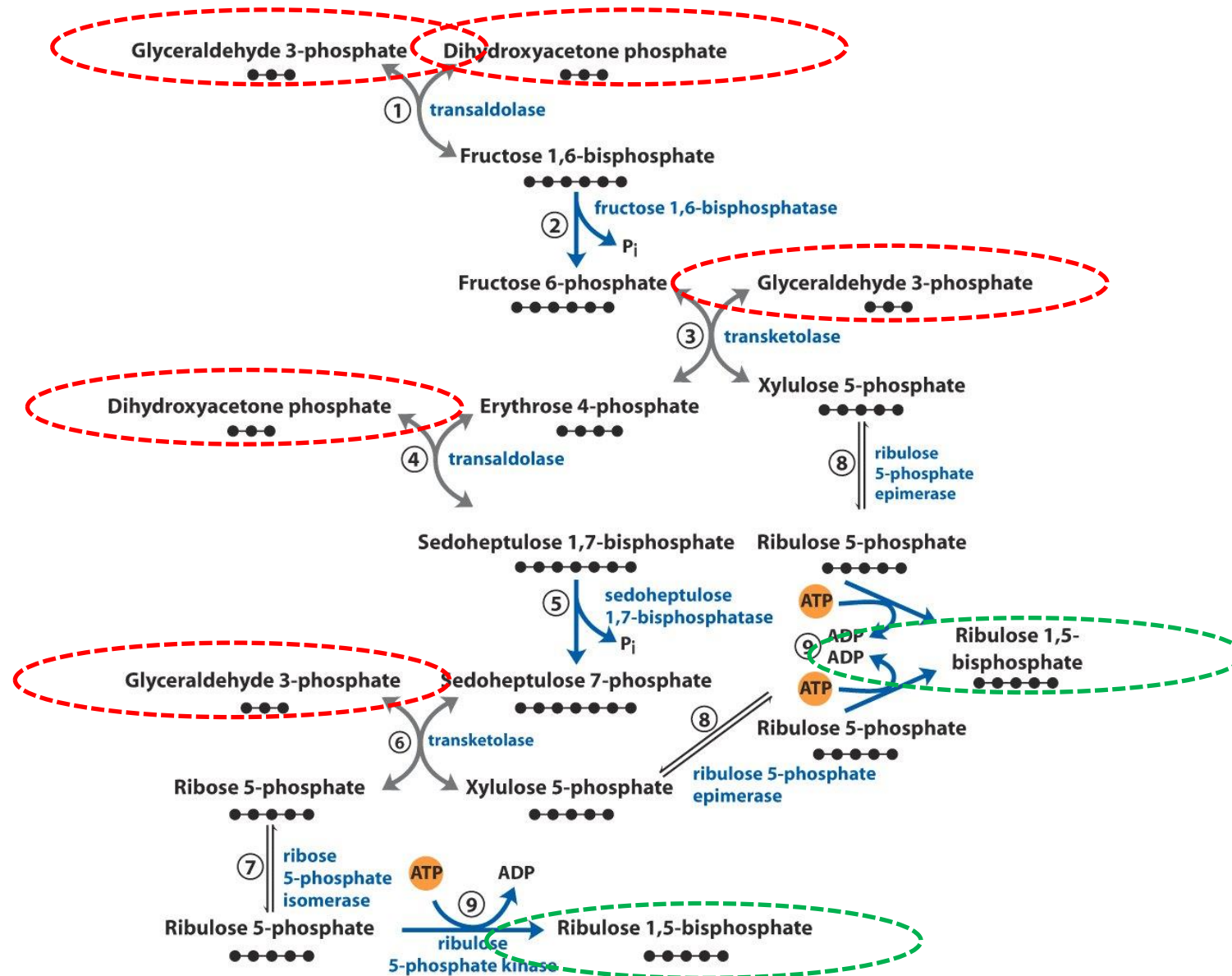
# Ciclo de Calvin



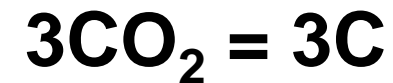
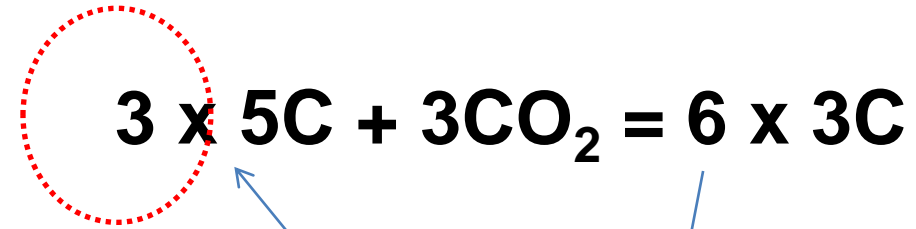
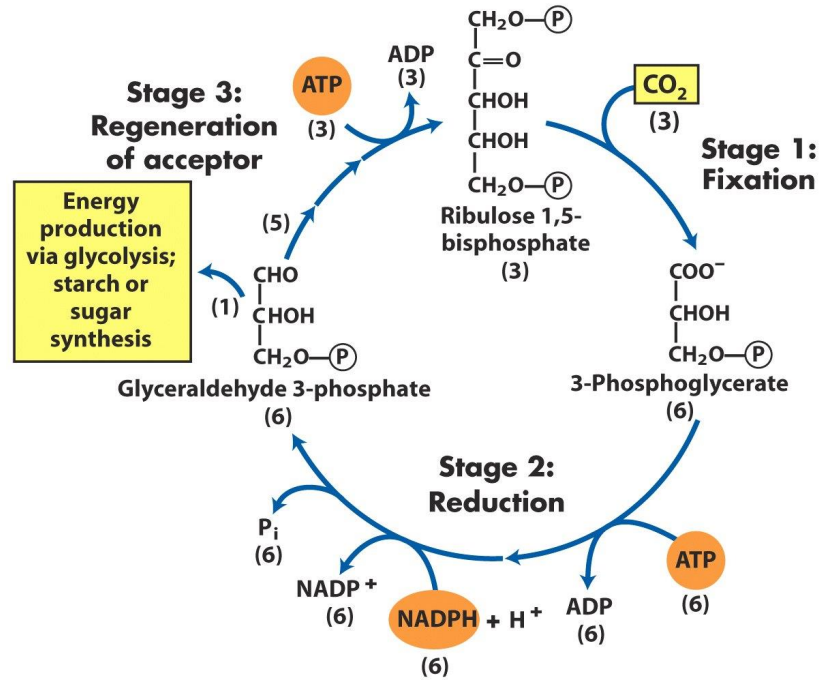
# Formação de Gliceraldeído 3 Fosfato



# Regeneração de Ribulose 1,5 Bisfosfato

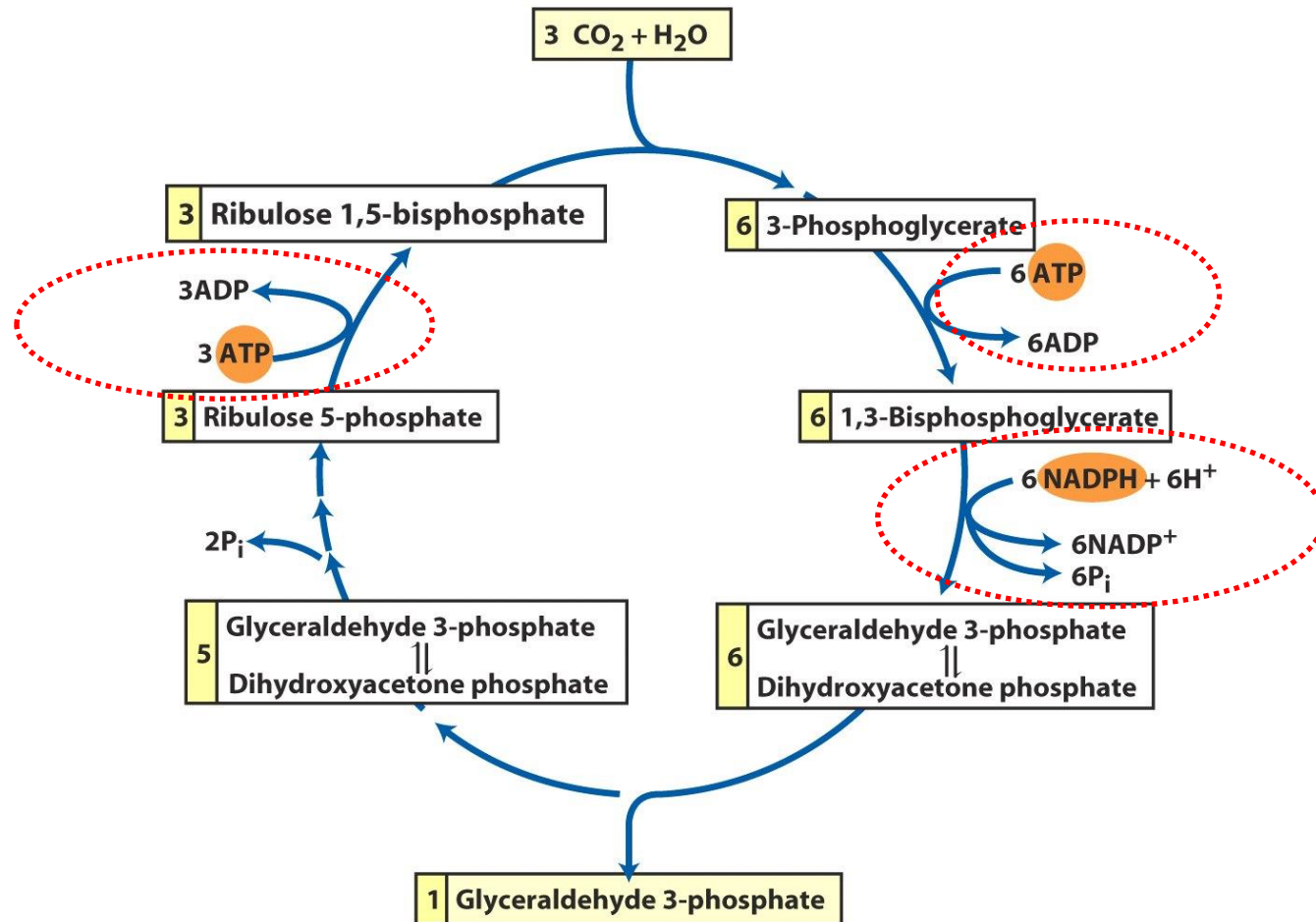


# Regeneração de Ribulose 1,5 Bisfosfato

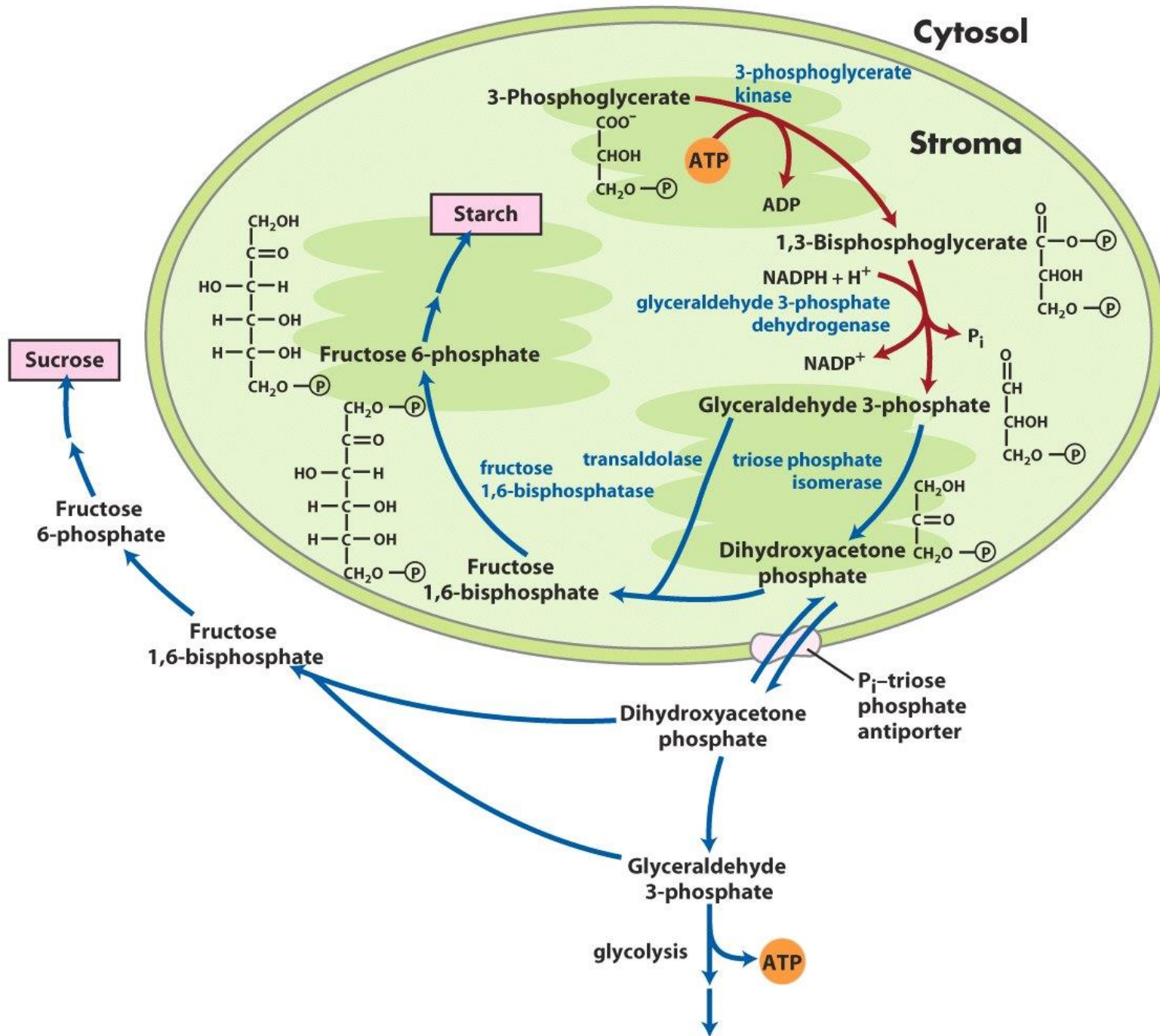




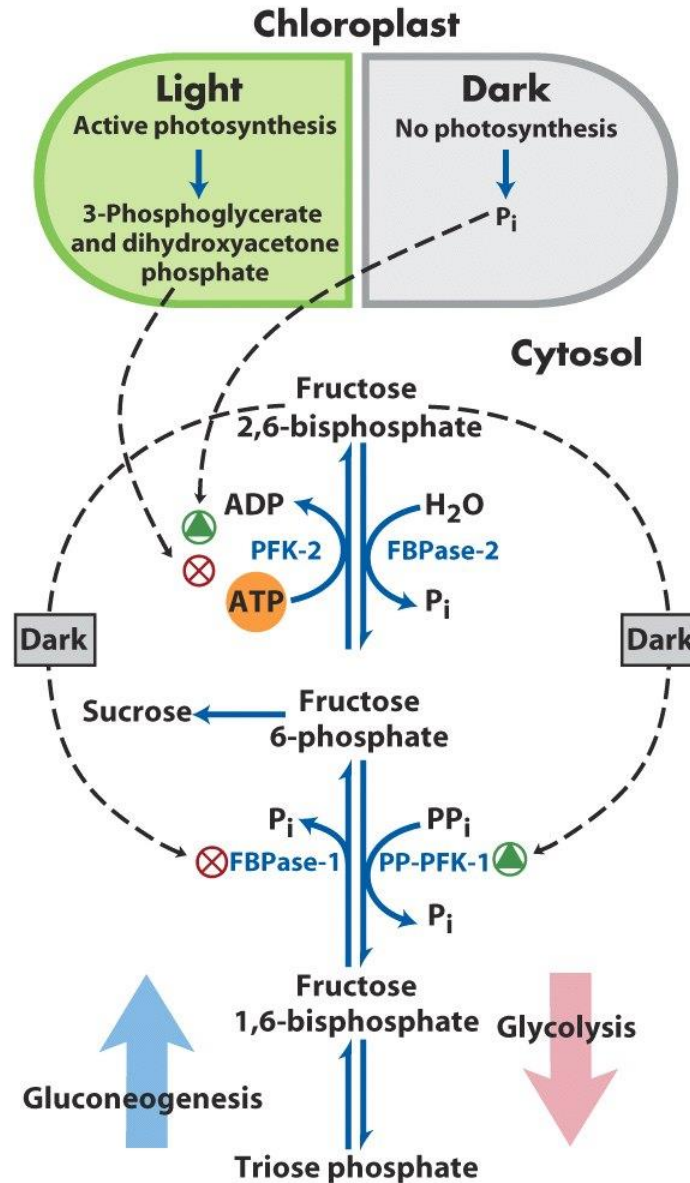
# Estequiometria



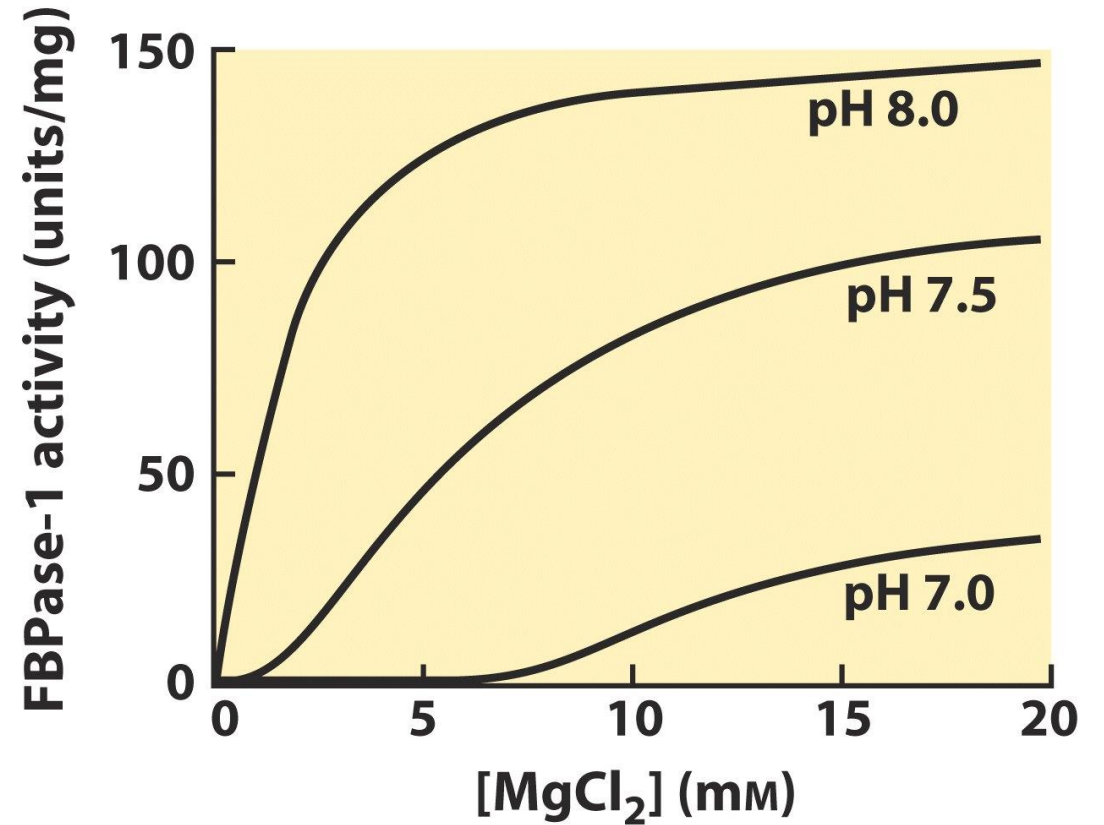
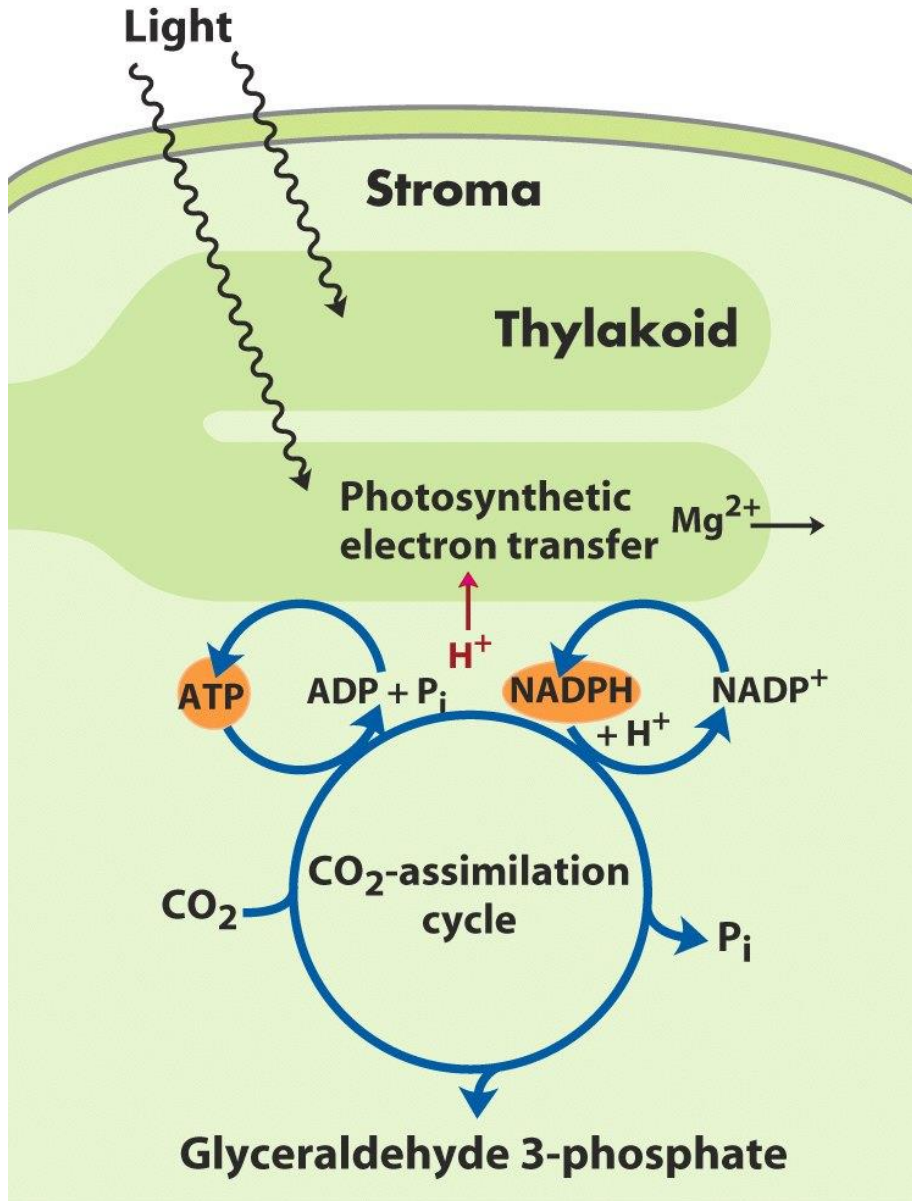
**1 gliceraldeído 3 P → 6 NADPH + 9 ATPs**



# Regulação da Fotossíntese



# Regulação da Fotossíntese



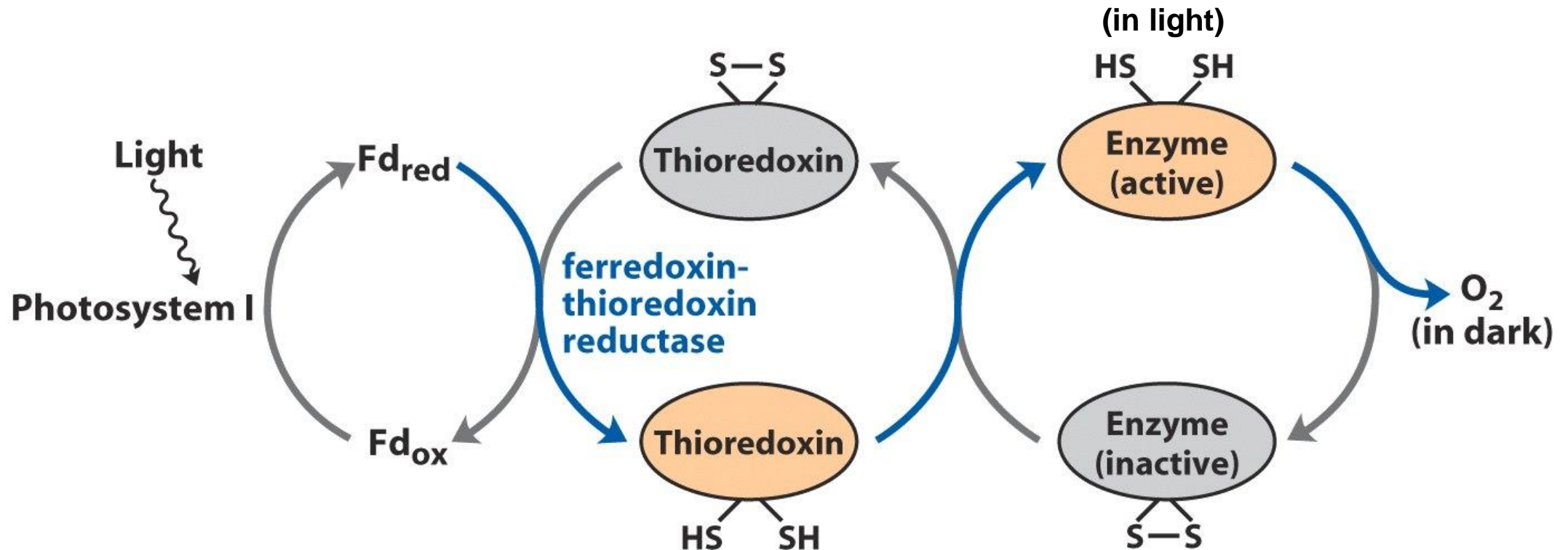


# Regulação da Fotossíntese

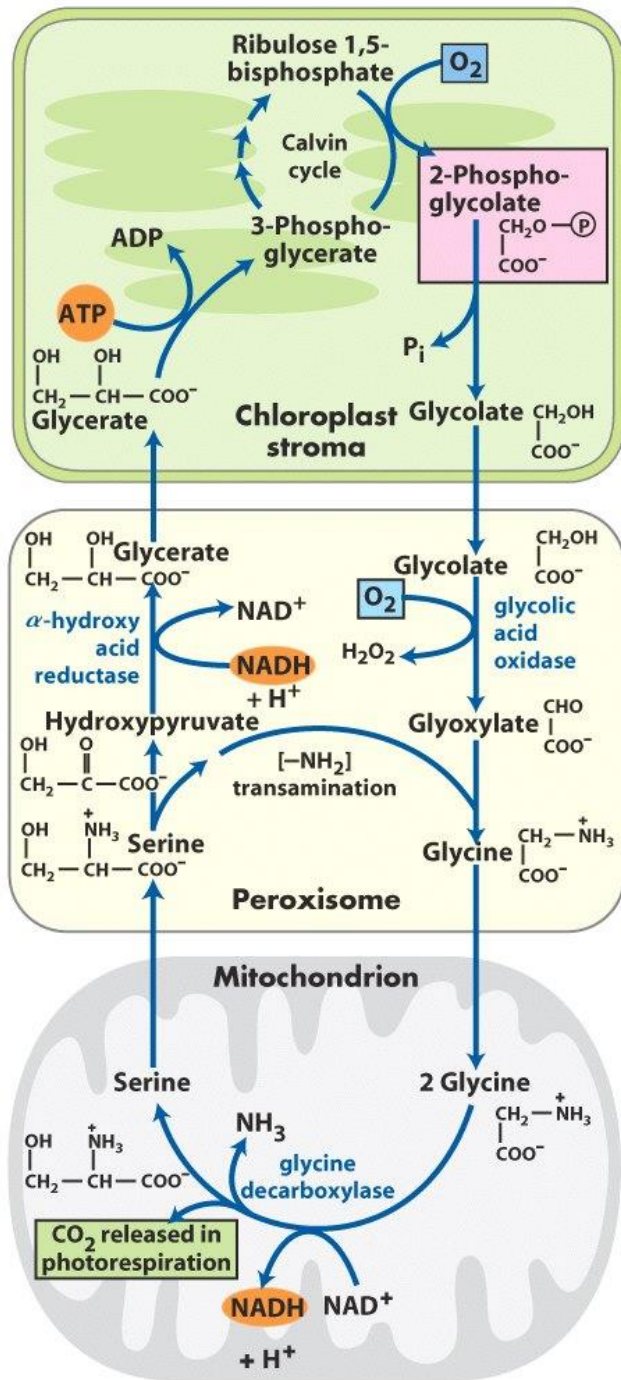
- Ribulose 5-P quinase
- Frutose 1,6 bisfosfatase
- Sedoheptulose 1,7 bisfosfatase
- Gliceraldeído 3 P desidrogenase



Ativadas por redução de Cys



# Fotorrespiração



- Rubisco não é específica para  $\text{CO}_2$  como substrato
- Com  $\downarrow \text{CO}_2$  ou alta temperatura → fotorrespiração
- Repor ribulose requer  $\text{ATP}$  e leva a perda de  $\text{CO}_2$
- Fotorrespiração limita produção agrícola

# Plantas C<sub>4</sub>

- Adaptadas a altas temperaturas
- Alta taxa de crescimento
- Malato desidrogenase é ativada por redução

