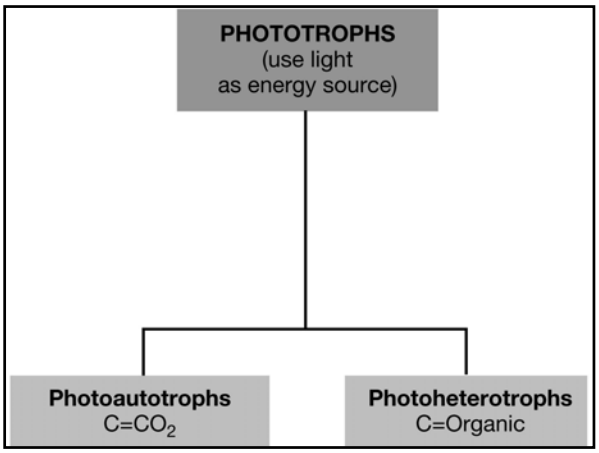
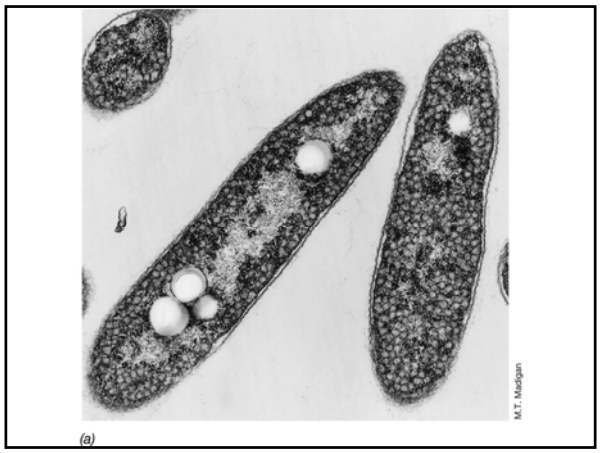
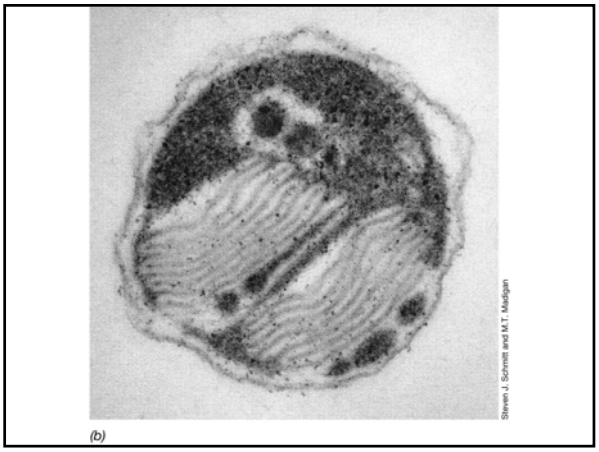
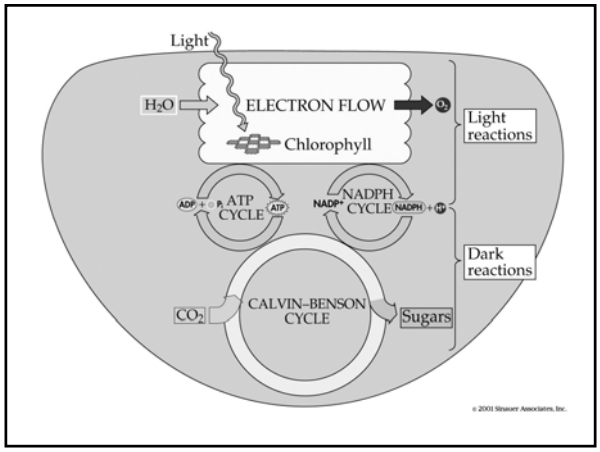
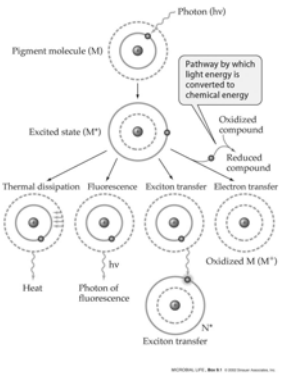


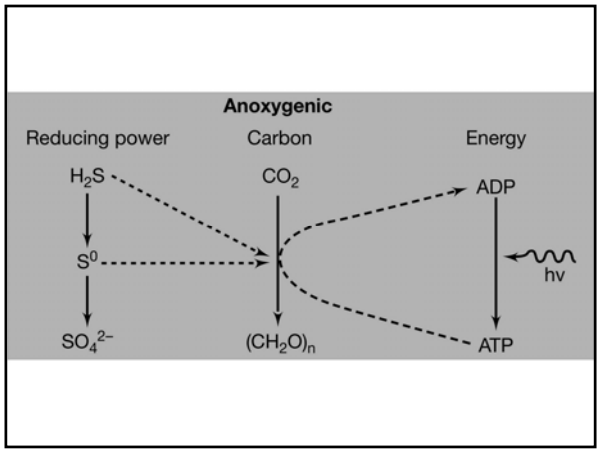


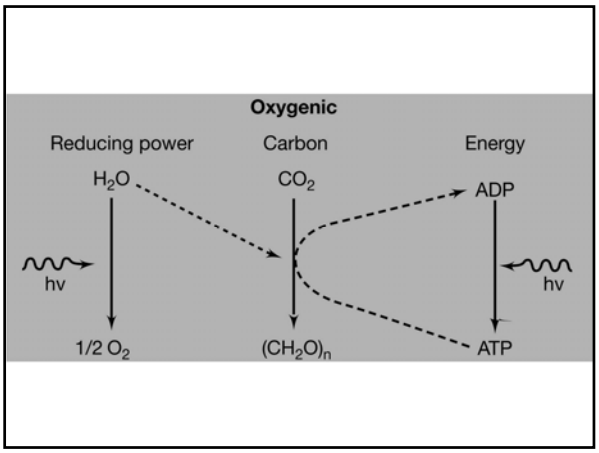




The possible fates of an excited electron

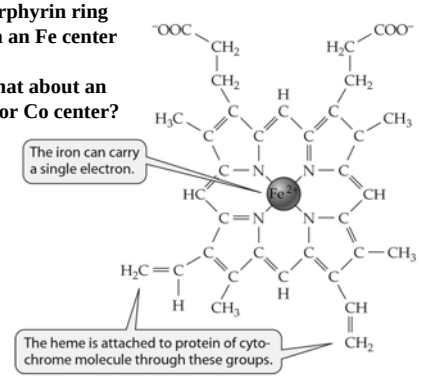


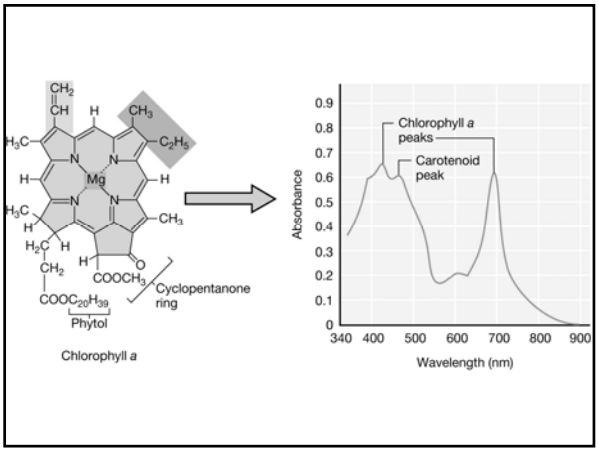


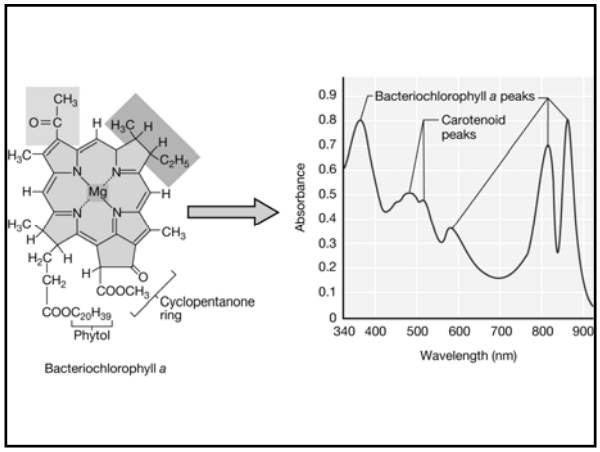


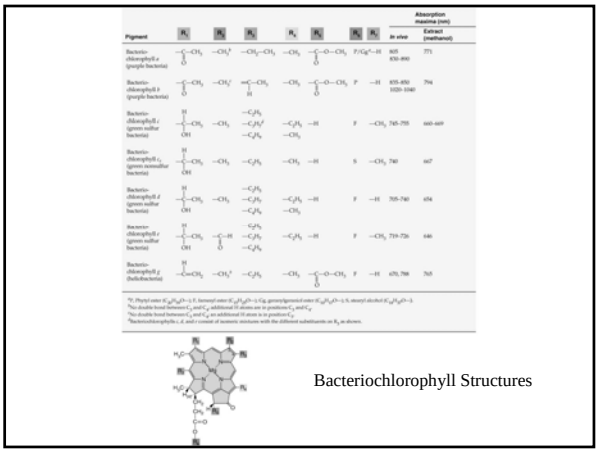
Porphyrin ring with an Fe center

What about an Mg or Co center?









Bacteriochlorophyll Structures

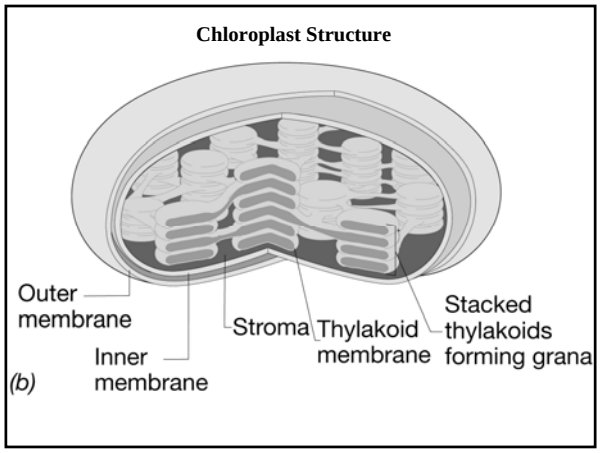
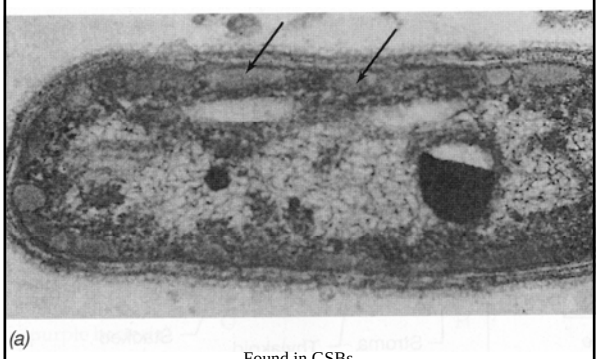


Table 9.1 Some general properties of the various photosynthetic bacteria

	Nonsulfur Purple Bacteria	Purple Sulfur Bacteria	Green Sulfur Bacteria	Cyano-bacteria	Helio-bacteria
Source of reducing power (e^-)	H_2, reduced organic	H_2S	H_2S	H_2O	Lactate, organic
Oxidized product	Oxidized organic	SO_4^{2-}	SO_4^{2-}	O_2	Oxidized organic
Source of carbon	CO_2 or organic	CO_2	CO_2	CO_2	Lactate pyruvate
Heterotrophic growth	Common	Limited[a]	Limited[a]	Limited[a]	Required

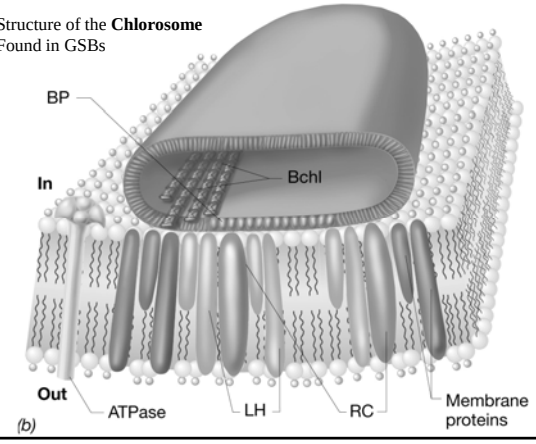
[a]Generally limited to assimilation of low molecular weight organics during autotrophic growth.

Structure and Location of the **Chlorosome**

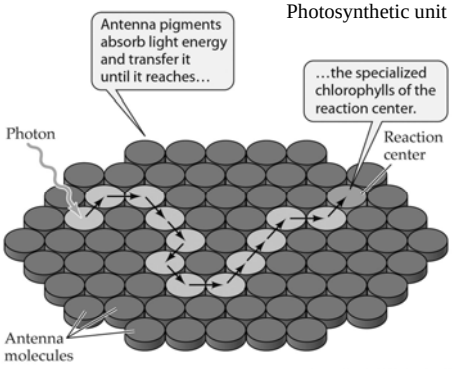


Found in GSBs

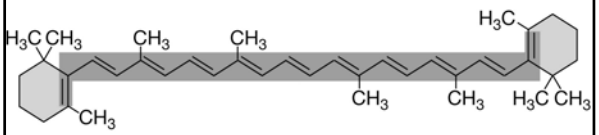
Structure of the **Chlorosome**
Found in GSBs



Photosynthetic unit



Beta-Carotene, a typical carotenoid



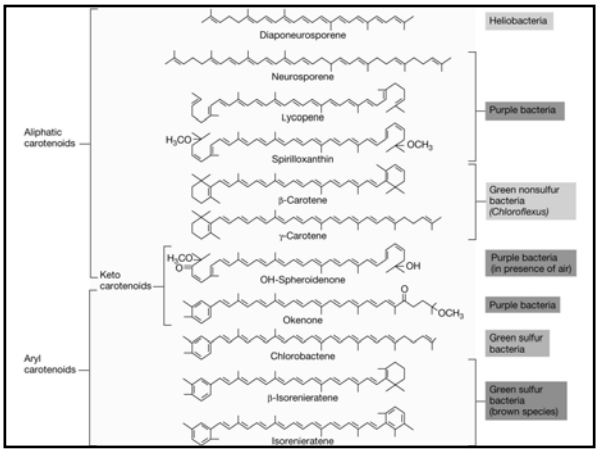
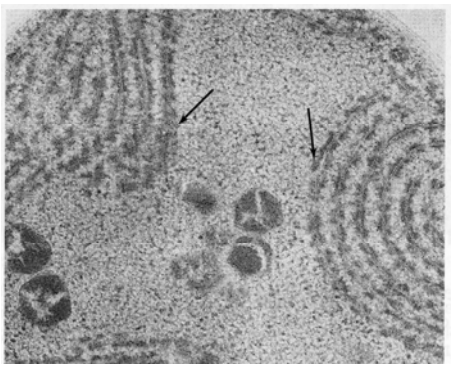


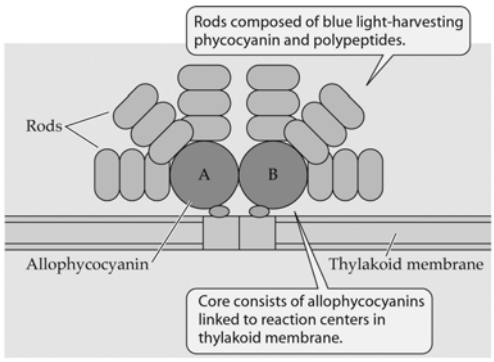
Table 9.2 The bacteriochlorophyll present in photosynthetic bacteria and primary acceptors involved in energy conserving reactions

	Electron Donor	Electron Acceptor
Purple nonsulfur bacteria	Bacteriochlorophyll *a* and *b*	Bacteriopheophytin *a*, Q_A, and Q_B
Green sulfur bacteria	Bacteriochlorophyll *c*, *d*, and *e*	Bacteriopheophytin *a* and FeS-protein
Cyanobacteria photosystem I	Chlorophyll *a*	Chlorophyll *a* and FeS-protein
Cyanobacteria photosystem II	Chlorophyll *a*	Pheophytin *a*, Q_A, Q_B, and plastoquinones
Heliobacteria	Bacteriochlorophyll *g*	Bacteriochlorophyll *c* and FeS-protein

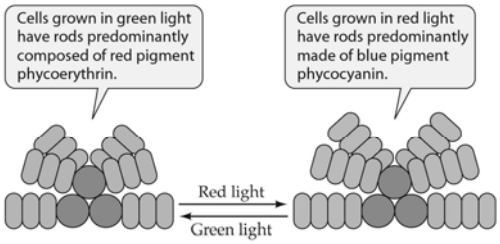
Structure and Location of **Phycobilisomes**



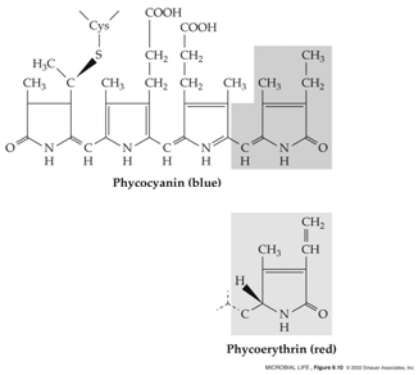
Phycobilisome of cyanobacteria



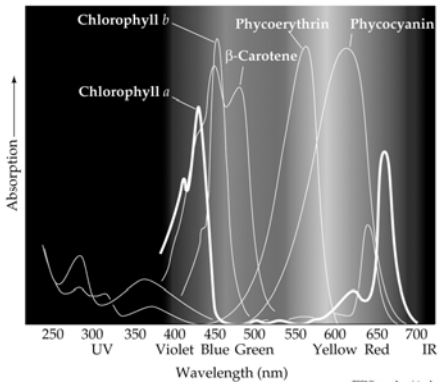
Chromatic adaptation of a phycobilisome

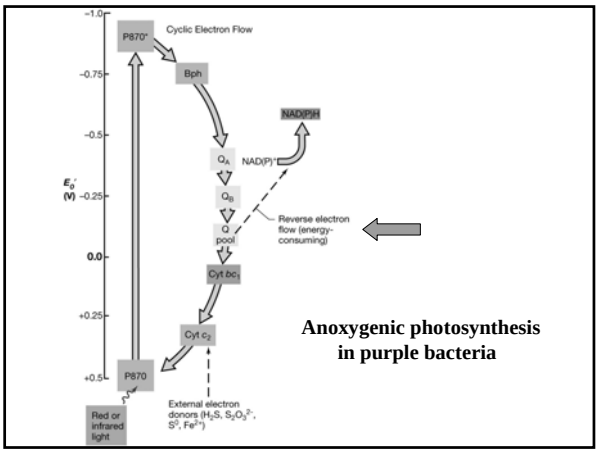


Chromophores of phycobilisomes



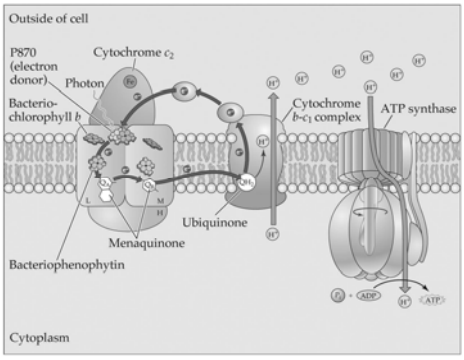
Absorption Spectra



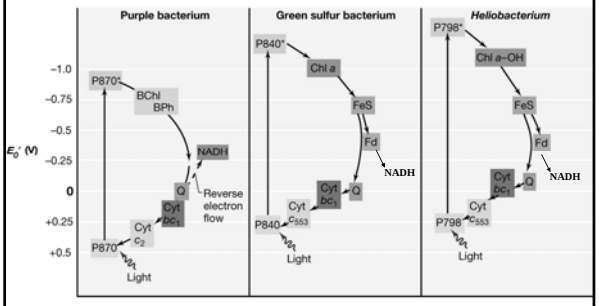


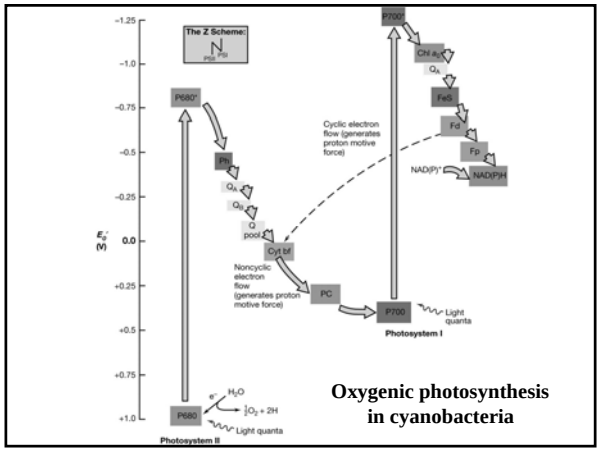
Anoxygenic photosynthesis in purple bacteria

Reaction center of purple nonsulfur bacteria

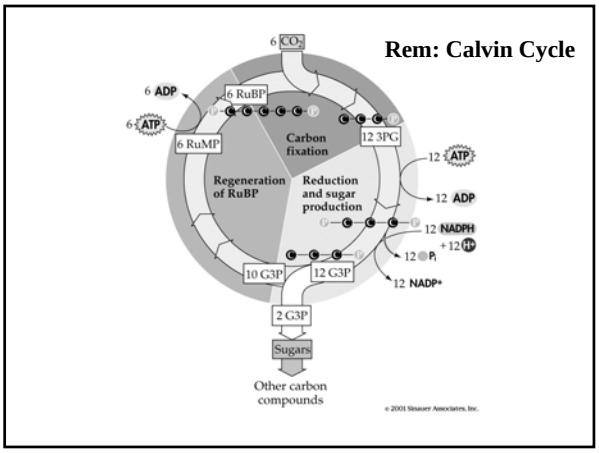


Electron flow in phototrophs

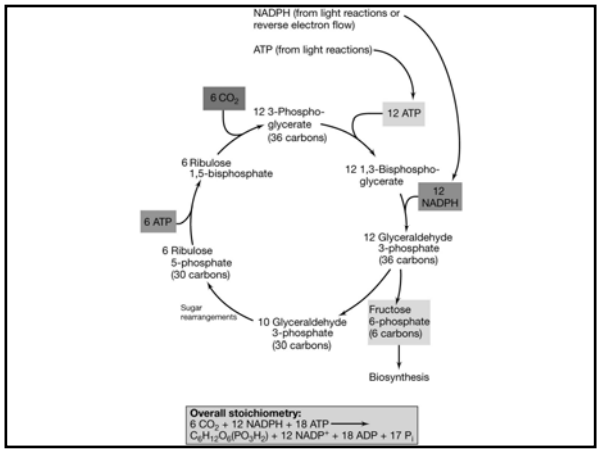




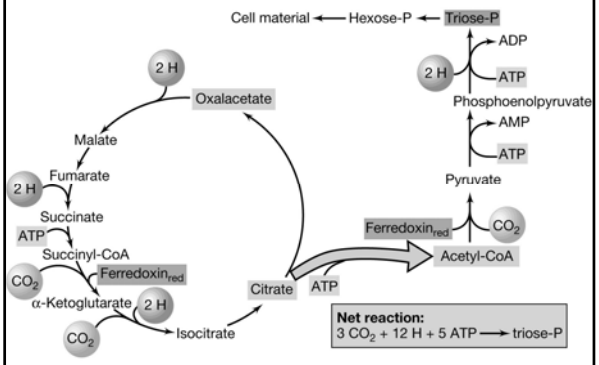
Oxygenic photosynthesis in cyanobacteria



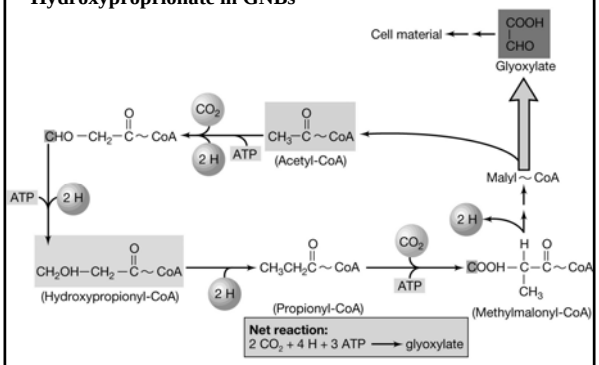
Rem: Calvin Cycle



Reverse TCA in GSBs

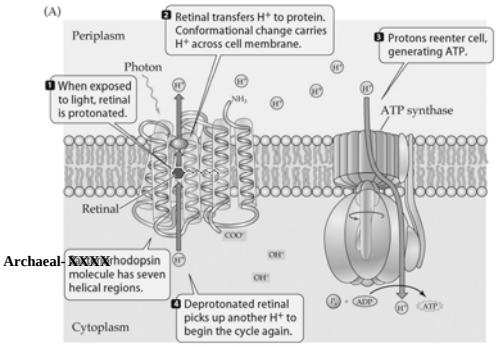


Hydroxyproprionate in GNBs

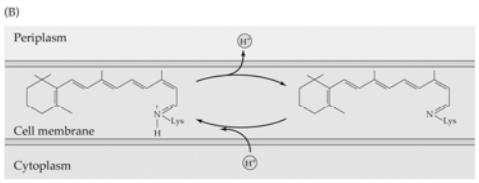


(b)

A light-driven proton pump of halophilic archaea



Light-driven proton pump of halophilic archaea



Archaeal rhodopsin: retinal structure

Banded Iron Formations ~2.5 Bya

Oxygenic or anoxygenic photosynthesis: Fe^{2+}_{sol} to Fe^{3+}_{insol}