

Rhodopseudomonas palustris

5.46 Mb
4,800 genes

Purple nonsulfur phototroph
 α -subgroup of the proteobacteria

Sequencing and assembly:
JGI: Patrick Chain, Stephanie
Stilwagen, Long Do, Jane Lamerdin

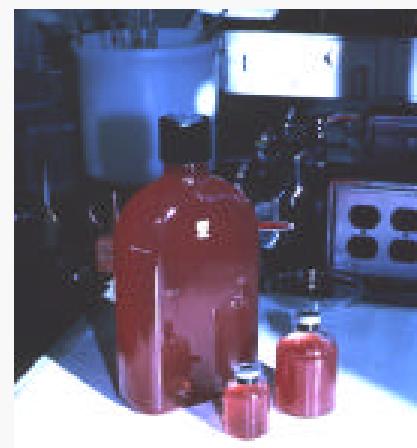
Annotation:
ORNL : Frank Larimer



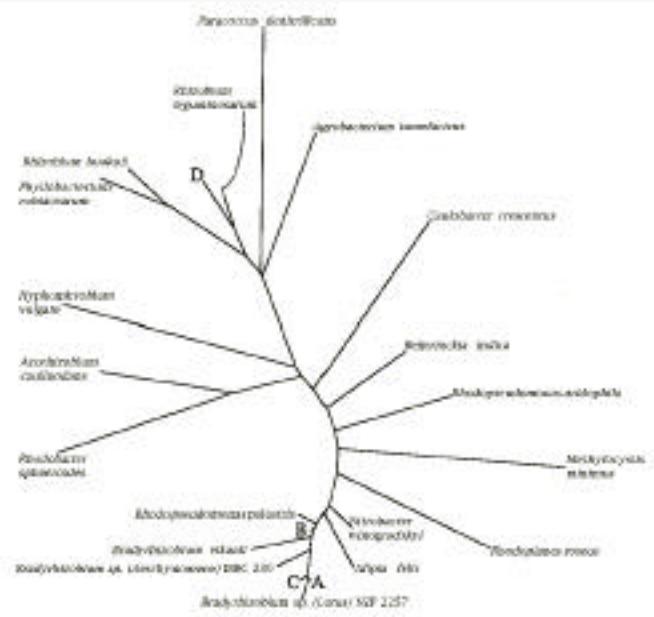
Rhodopseudomonas palustris

Purple nonsulfur phototroph
 α -subgroup of the proteobacteria

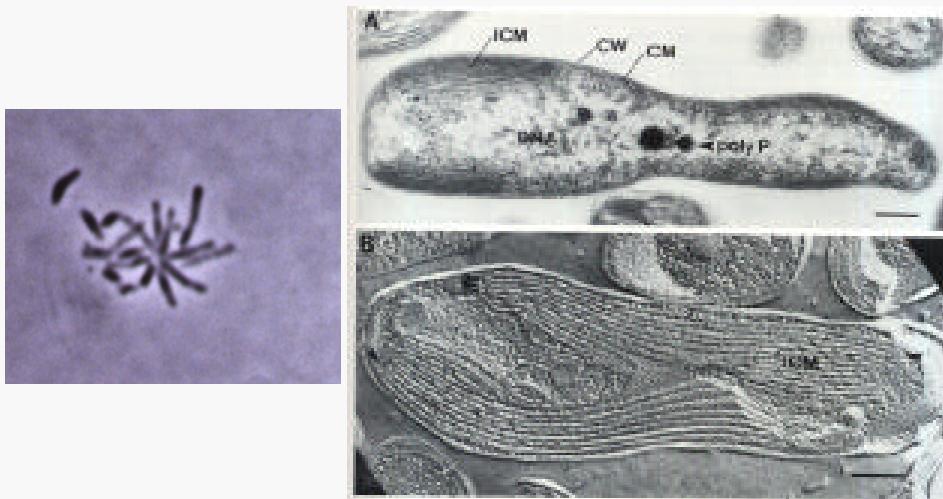
Versatile metabolism
Flexible metabolism
Cellular differentiation
Intriguing taxonomic placement



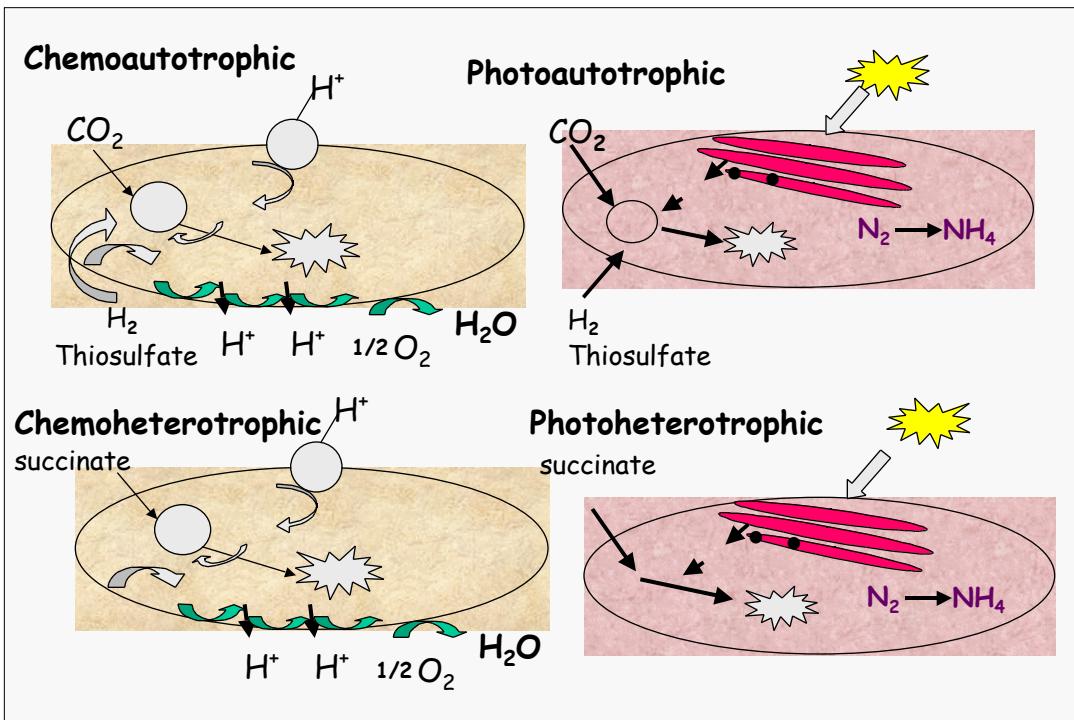
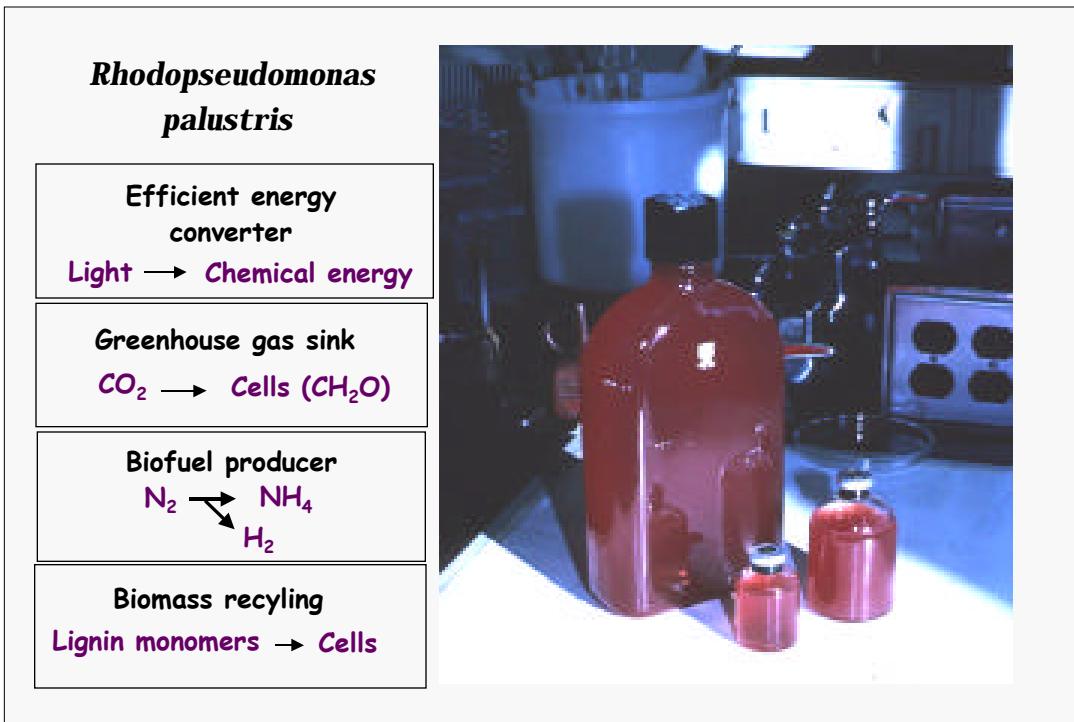
Rhodopseudomonas palustris and *Bradyrhizobium japonicum* are closely related



Rhodopseudomonas palustris is a budding bacterium



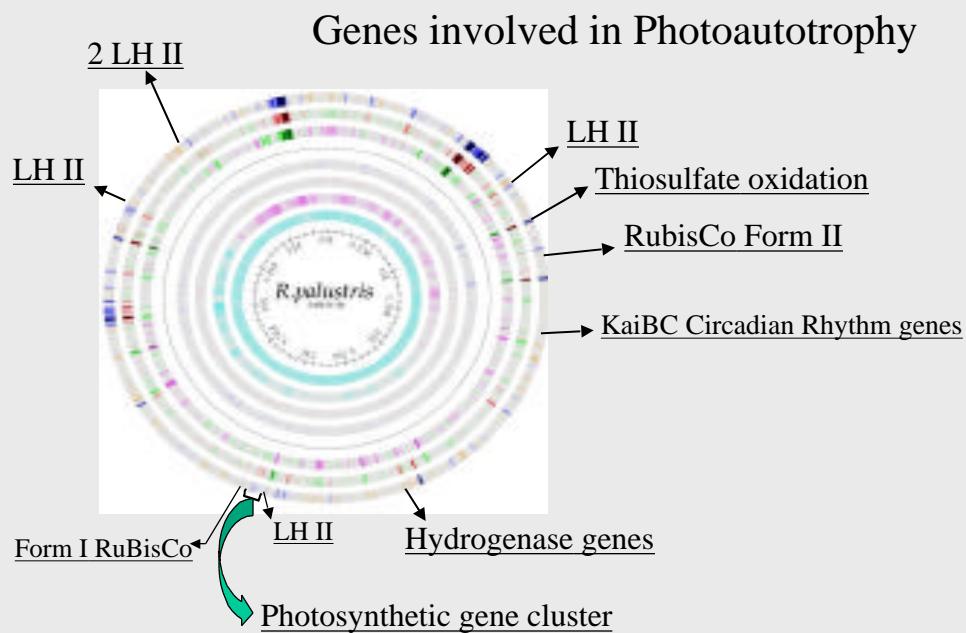
(Varga and Staehelin: J. Bact. 161:921-927)



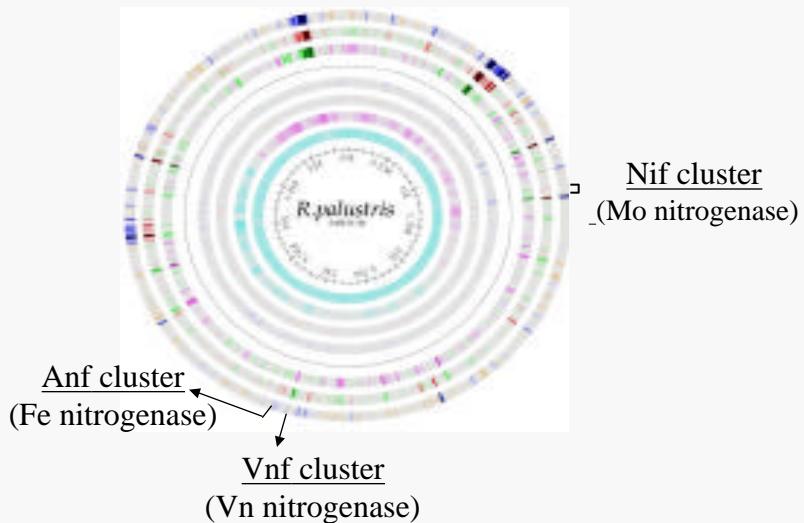
Rhodopseudomonas palustris

R. palustris DNA microarray to examine gene expression at the whole genome level
Carrie Harwood, Dorothea Thompson and Jizhong Zhou

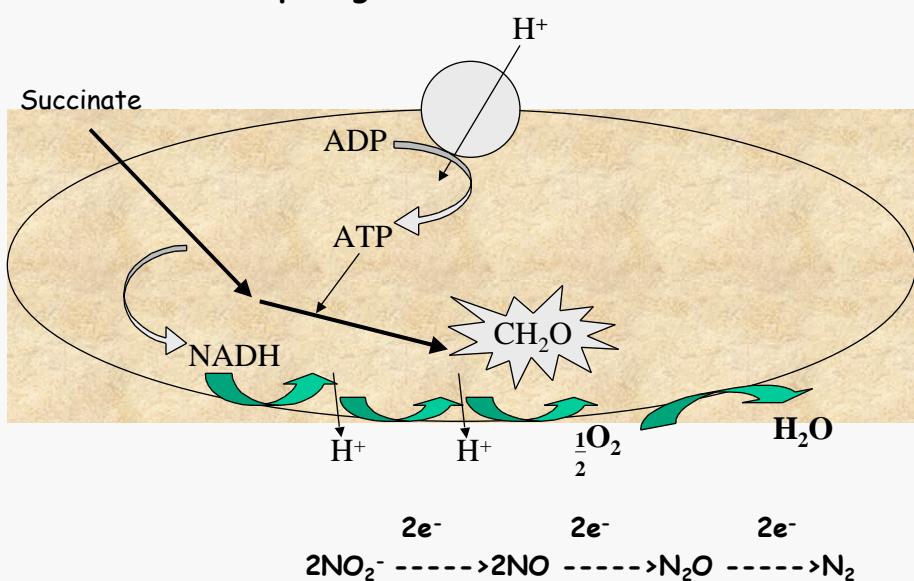
Rhodopseudomonas palustris Microbial Cell project
PI: F.R Tabita



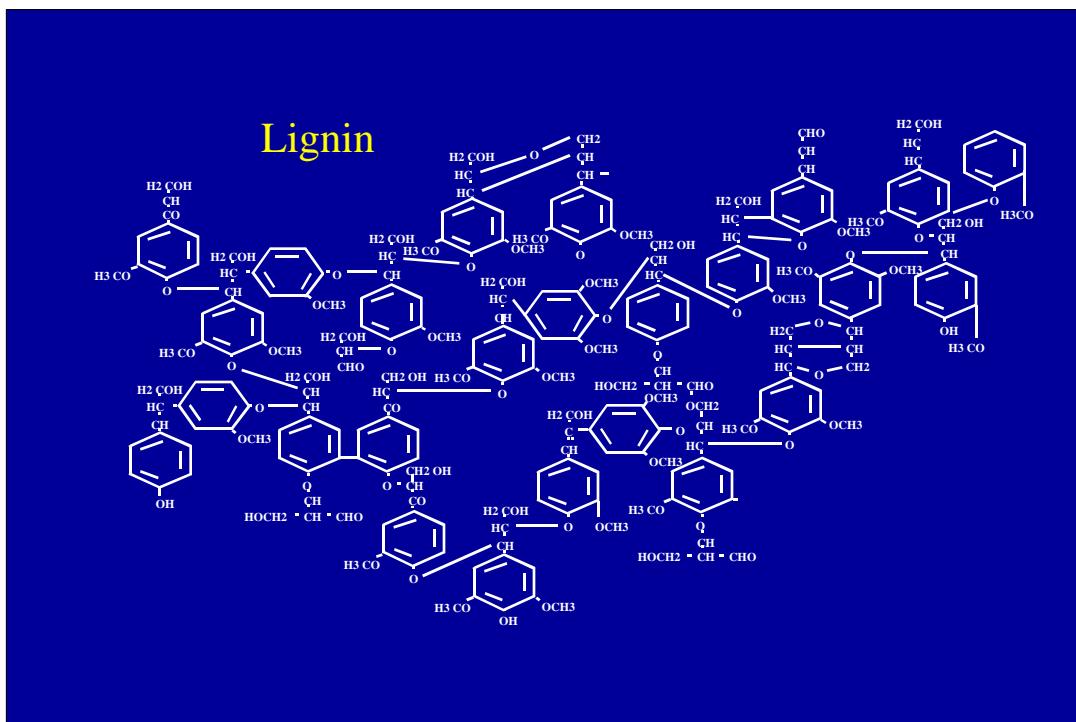
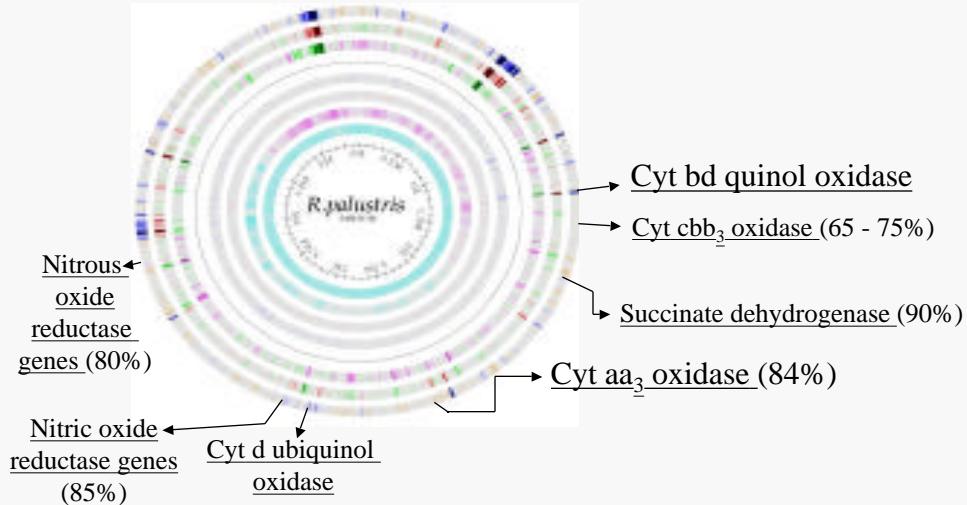
Nitrogen fixation genes



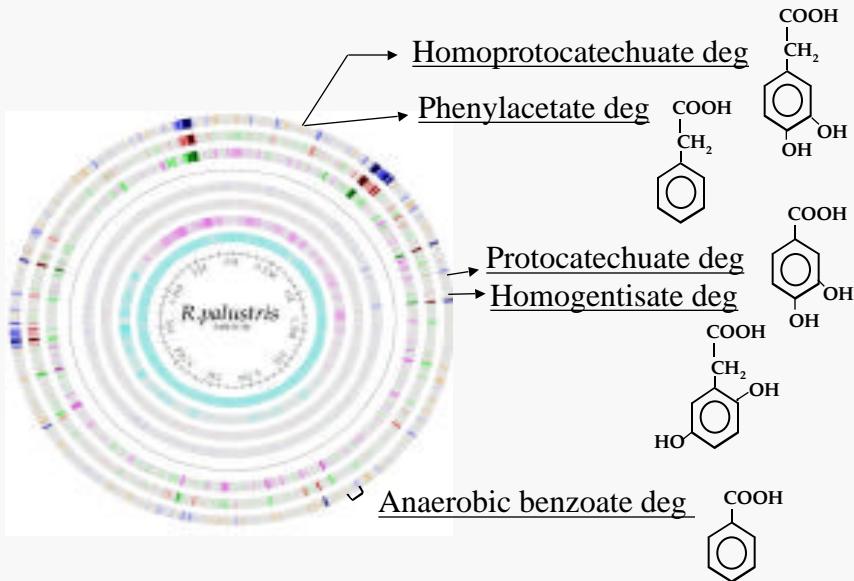
Chemoheterotrophic growth



R. palustris and Bradyrhizobium japonicum have similar terminal oxidase genes



R. palustris has five distinct aromatic degradation pathways



Rhodopseudomonas palustris genome

Metabolic versatility is readily apparent from the genome sequence.

Structural genes for major metabolic systems (photosynthesis, aerobic respiration, nitrogen fixation) are easily identified

Overlapping, apparently (really?) redundant systems

Complex regulation can be presumed but is poorly understood.

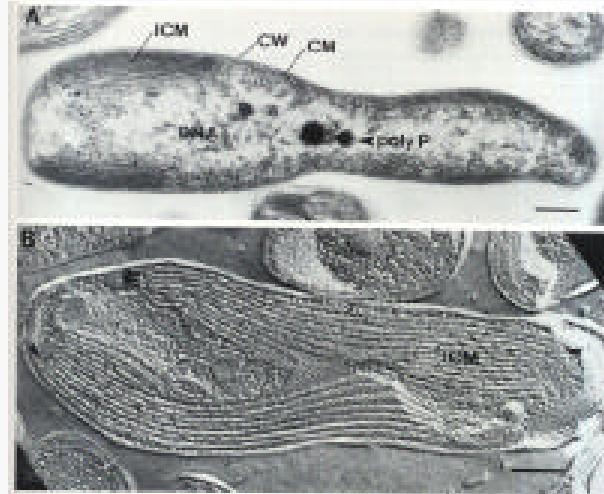
Many regulators to be explored. (Phytochromes, extracytoplasmic sigma factors etc)

Ancillary systems that feed into and support the major metabolic pathways are complex (e.g., iron acquisition systems, nitrogen acquisition systems).

Genome indicates that *R. palustris* has a highly developed stress coping mechanisms (multiple drug resistance efflux pumps, good oxidative stress response, genes for a cyclic peptide antibiotic)

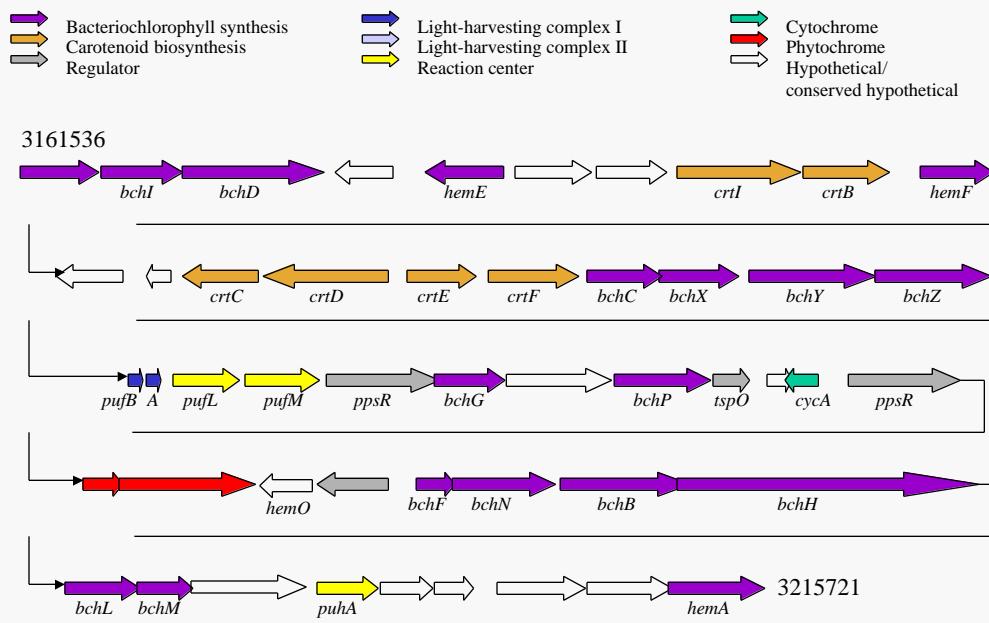
Close relationship to the rhizobiaceae, esp. *Bradyrhizobium*

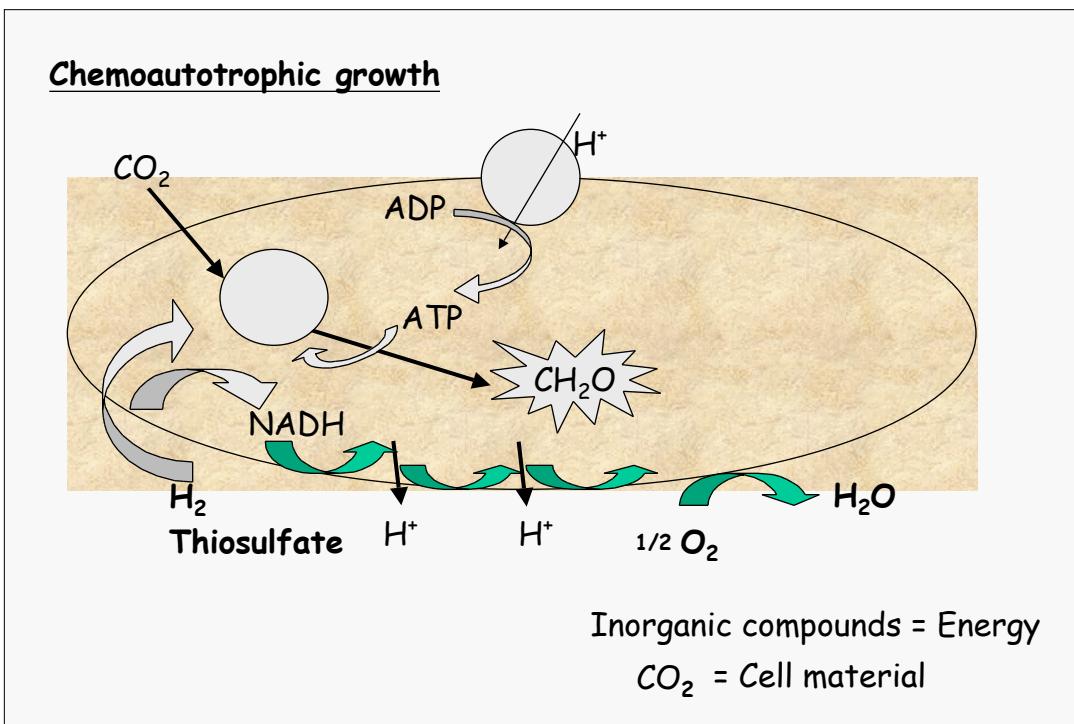
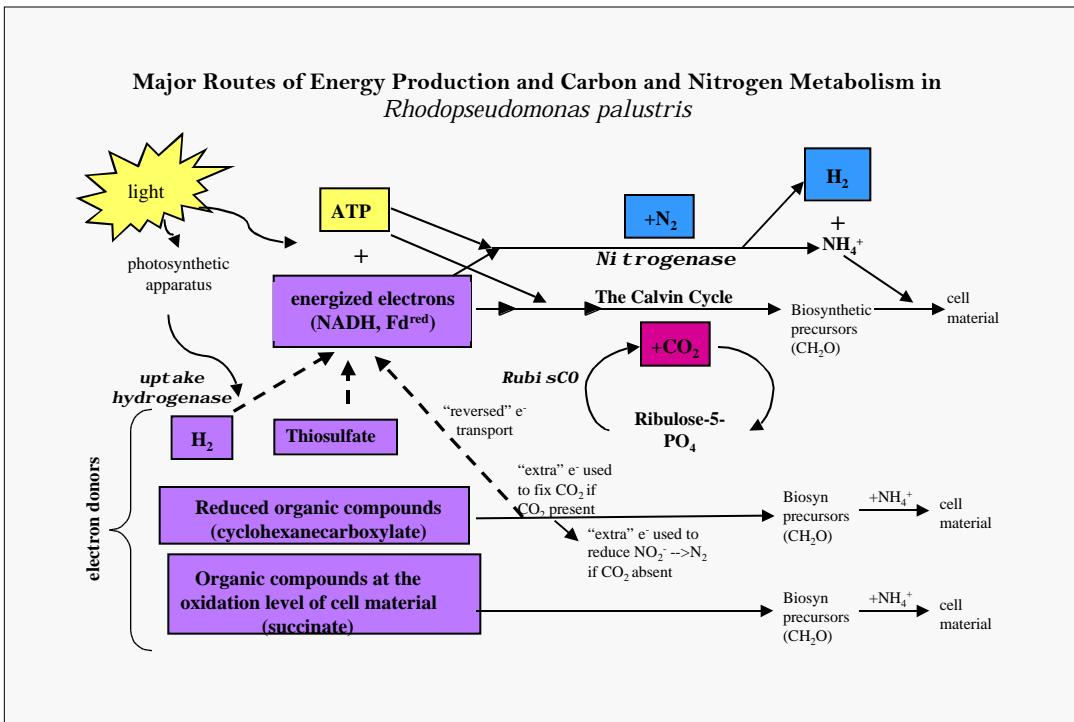
Rhodopseudomonas palustris is a budding bacterium



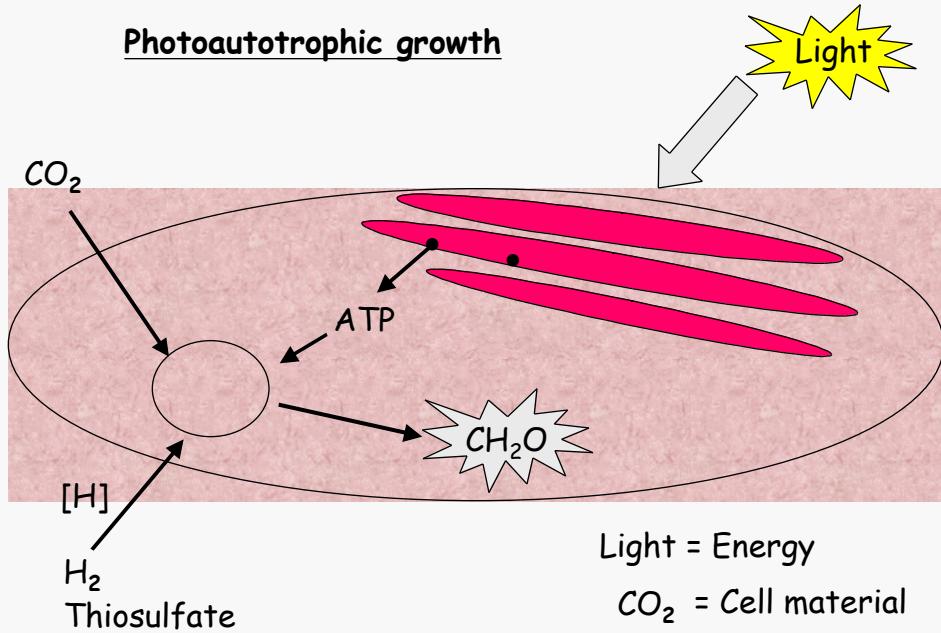
(Varga and Staehelin: J. Bact. 161:921-927)

Photosynthetic gene cluster



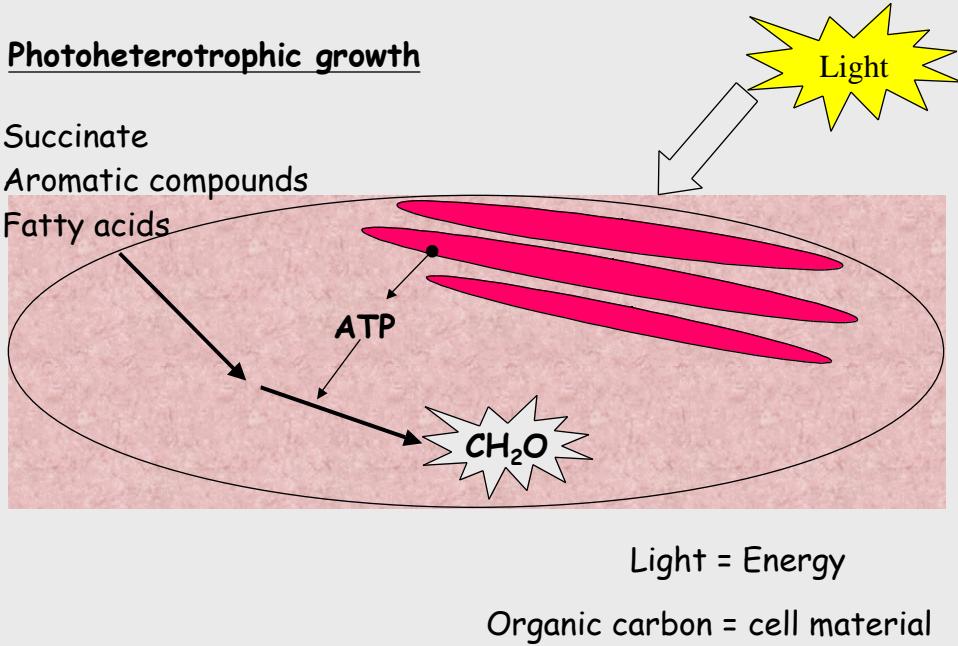


Photoautotrophic growth

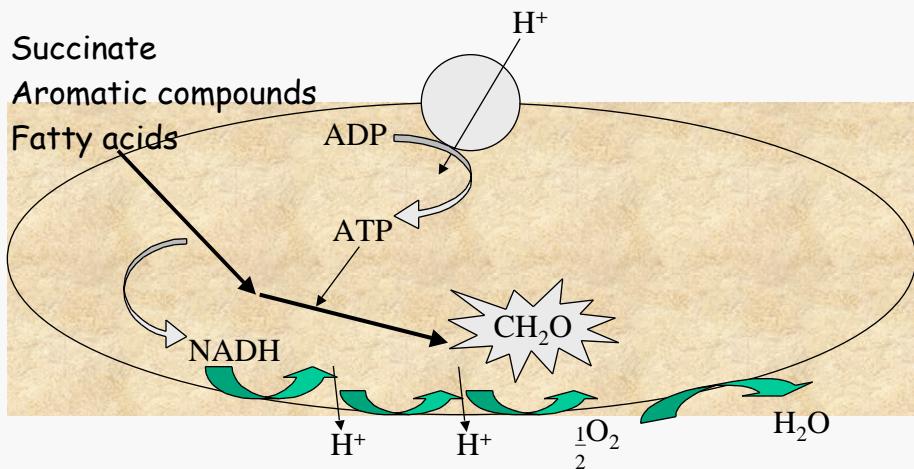


Photoheterotrophic growth

Succinate
Aromatic compounds
Fatty acids



Chemoheterotrophic growth



Organic carbon = Energy

Organic carbon = cell material