

EVOLUTIONARY DEVELOPMENT OF BACTERIAL ENERGY PATHWAYS

Anoxic Living

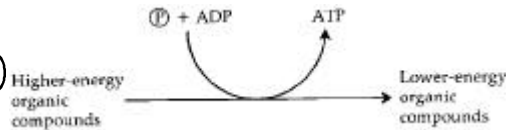
Rising O₂

Oxic Living

BACTERIA AND EUKARYA

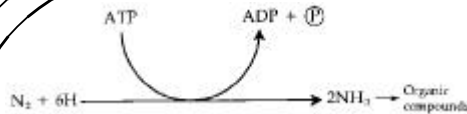
PYRUVIC FERMENTATION

1

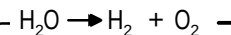


2

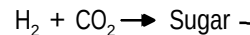
NITROGEN FIXING BACTERIA



H₂ Generating Reaction



CO₂ Reducing Reaction



The problem h
h o o h h e o e
re l rom he pl o
er o e h ro e ore e
o r The o l o
m e e o h e o h e
e r l e b o
e r o r m o

The l e r e o
m e e o h e o e b
o o e r b o
h b r e e r h e
ph o h e r e o
r e l l h e e r o r e p
r h e

3

DESULFOVIBRIO FERMENTATION

Invention of electron transport chains
ELECTRON SINK = $\text{SO}_4^{2-} \rightarrow \text{H}_2\text{S}$

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PHOTOSYNTHETIC GREEN & PURPLE SULFUR BACTERIA

Source of electron transport chains
SOURCE OF HYDROGEN = $\text{H}_2\text{S} \rightarrow \text{S} + \text{H}_2$
 $\text{H}_2 + \text{CO}_2 \rightarrow \text{Sugar}$

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PHOTOSYNTHETIC PRECURSOR BGA (BLUE GREEN ALGAE)

Reaction center II
SOURCE OF HYDROGEN = for photosynthesis obtained from water releasing O₂
OXYGEN SINK = $\text{Fe}_2\text{CO}_3 + \text{O}_2 \rightarrow \text{BIF}$

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PHOTOSYNTHETIC BLUE GREEN ALGAE

SOURCE OF HYDROGEN = for photosynthesis obtained from water releasing O₂
No OXYGEN SINK
O₂ released into atmosphere
Photosynthesize during the day and respire at night using same chemistry

HIGHER PLANTS

