

METHANOGENS

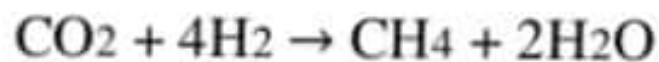
- Methanogens are a relative diverse group of archaea and prokaryotic organisms that can be found in various anoxic habitats.
- Methanogenic archaea are a very diverse group and some strains can grow under extreme conditions, like extremely high or low temperatures, high osmolarities or pH values.
- Methanogens are coccoid (spherical shaped) or bacilli (rod shaped).
- There are over 50 described species of methanogens, which do not form a monophyletic group, although all methanogens belong to archaea.
- They are mostly anaerobic organisms that cannot function under aerobic conditions.

- Methanogens lack peptidoglycan, a polymer that is found in the cell walls of the Bacteria. Some methanogens have a cell wall that is composed of pseudopeptidoglycan.
- Other methanogens do not, but have at least one paracrystalline array (S-layer) made up of proteins that fit together like a jigsaw puzzle.
- Methanogenic bacteria are considered a critical group of bacteria, because of their phylogenetic diversity and the only producers of a hydrocarbon, methane. They require anoxic and highly reduced conditions for growth.
- These bacteria use CO_2 or a methyl group as the terminal electron acceptor and produce methane as their catabolic end product.

Habitat:

- They are found in diverse habitats which are associated with decomposition of organic matter, bogs, anaerobic digestors, aquatic sediments, hydrothermal submarine vents and geothermal springs.
- In animals, they are found in rumens of herbivores, mammalian intestines, human oral cavity, guts of insects.

- Methanogens produce methane from substrates such as H_2/CO_2 , acetate, formate, methanol and methylamines by a process called methanogenesis.



Example: *Methanobacterium bryantii*, *Methanococcus deltae*

Application:

Methane production, biogas production, waste water treatment