

Microbial group

Group characteristics

- images
- description and significance
- genomic information if known
- cell structure and metabolism
- ecology
- phylogeny

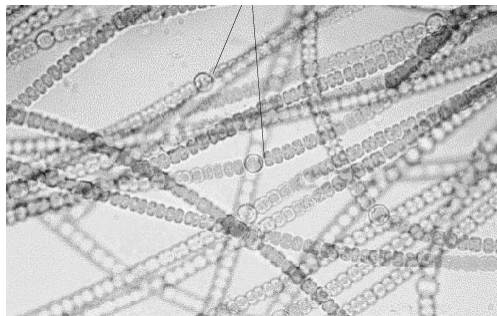
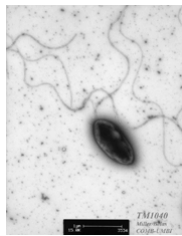
Individual species or genera and their characteristics (one per group member)

- images
- habitat
- growth conditions (if known)

References

Proteobacteria

Robyn Jones
Chelsea Jones
Liz Jones
Christian Jones
Brittney Jones

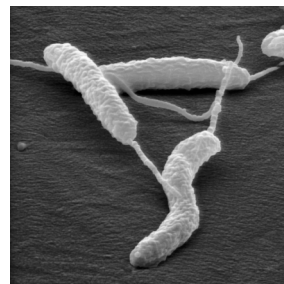
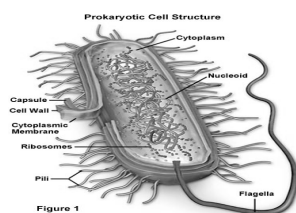


“Purple Bacteria”

- Include wide variety of pathogens, such as *Escherichia*, *Salmonella*, *Vibrio*
- All gram negative with an outer membrane mainly composed of lipopolysaccharides
- Many move using flagella but some are non-motile
- Most members are facultative or obligatory anaerobic and heterotrophic, but there are many exceptions
- A very large and metabolically diverse phylum

Structure and Metabolism

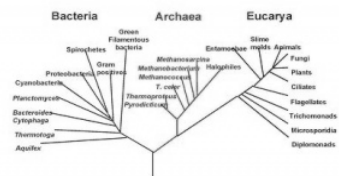
- Membrane system infolded from cytoplasm membrane
- Sulfur granules deposited inside (*Chromatium*) or outside of cell (*Ectothiorhodospira*)
- May have gas vesicles, flagella, or gliding
- May have stalks or appendages
- Prokaryotic cell structure



Ecology and Phylogeny

- Photosynthesis is generally facultative
- Uses H₂S as electron donor
- Habitats where H₂S is available
- Extreme environments can reduce competition

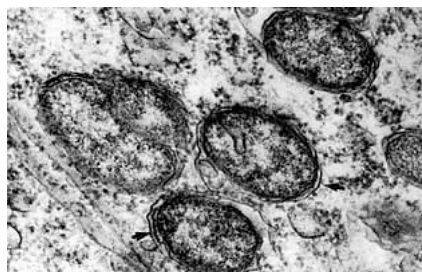
Phylogenetic Tree of Life



- Found within Domain Bacteria
- Contains five subgroups (alpha-, beta-, delta-, gamma-, and epsilon-)

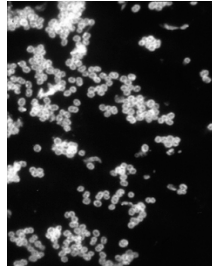
Alphaproteobacteria

- Comprise most photosynthetic genera, symbionts of plants (rhizobia), and group of dangerous pathogens, the Rickettsiaceae
- Found in mud and water of lakes and ponds with abundant organic matter and low sulfide levels
- Flexible in choice of energy source; normally they are grown anaerobically as photoorganoheterotroph, but they can grow aerobically



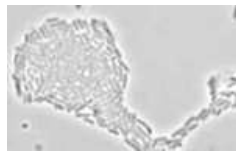
Betaproteobacteria

- Consists of several groups of aerobic or facultative bacteria
- Contains chemolithotrophs and phototrophs genera
- Thrives in environmental samples such as fresh water to waste water or soil
- Familiar pathogenic species include *Neisseriaceae* and *Burkholderia*



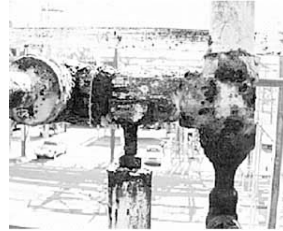
Gammaproteobacteria

- Largest of the subgroups of Proteobacteria.
- Several medically and scientifically important groups of bacteria such as Enterobacteria, Vibrionaceae and Pseudomonadaecea.
- An exceeding number of important pathogens belongs to this class, e.g. *Salmonella* (enteritis and typhoid fever), *Yersinia* (plague), *Vibrio* (cholera), *Pseudomonas aeruginosa* (lung infections in hospitalized or cystic fibrosis patients).
- Gram (-) rods/cocci can be aerobic or anaerobes.
- Can be found in many habitats from aquatic habitat to the intestinal tract of humans.



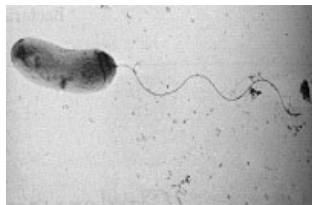
Deltaproteobacteria

- Predominantly aerobic genera, the fruit-body-forming myxobacteria, and strictly anaerobic genera, which contains most of the known sulfate and sulfur reducing bacteria
- Important in sulfur cycling
- Thrive in muds, polluted lake sediment, and methane digesters
- Prey on other gram negative bacteria
- Negative impact on industry because they cause corrosion of iron in pipelines



Epsilonproteobacteria

- This is the smallest and a more recently recognized line of descent within the Proteobacteria
- Key representatives are the genera *Campylobacter* and *Helicobacter*
- Most of the species are microaerophilic, chemoorganotrophic nonsaccharolytic spiral-shaped or curved bacteria.
- They are typically motile with a corkscrew-like motion by means of polar flagella.
- They obtain their energy mainly from amino acids or tricarboxylic acid cycle intermediates.



References

- en.wikipedia.org/wiki/Proteobacteria
- www.earthlife.net/prokaryotes/proteo.html
- www.life.umd.edu/labs/delwiche/PSlife/lectures/Proteo.html