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561 MIC

Reference
BROCK
BIOLOGY OF
MICROORGANISMS
ELEVENTH EDITION

The Tree of Life

- Comparative ribosomal RNA sequencing has defined the three **domains** of life: *Bacteria*, *Archaea*, and *Eukarya*.

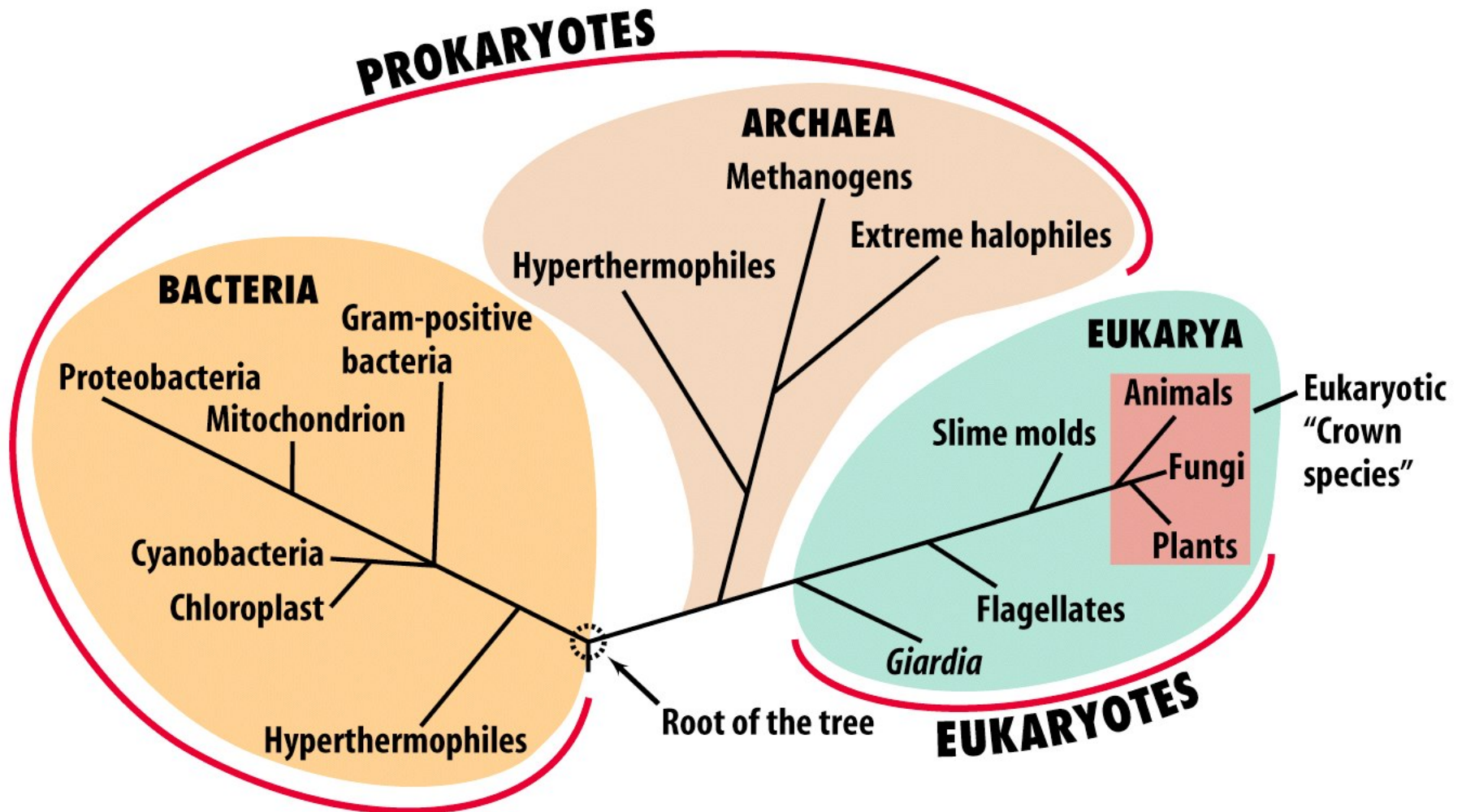


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Prokaryotic Diversity

- Several lineages are present in the domains *Bacteria* and *Archaea*, and an enormous diversity of cell **morphologies** and physiologies are represented there.

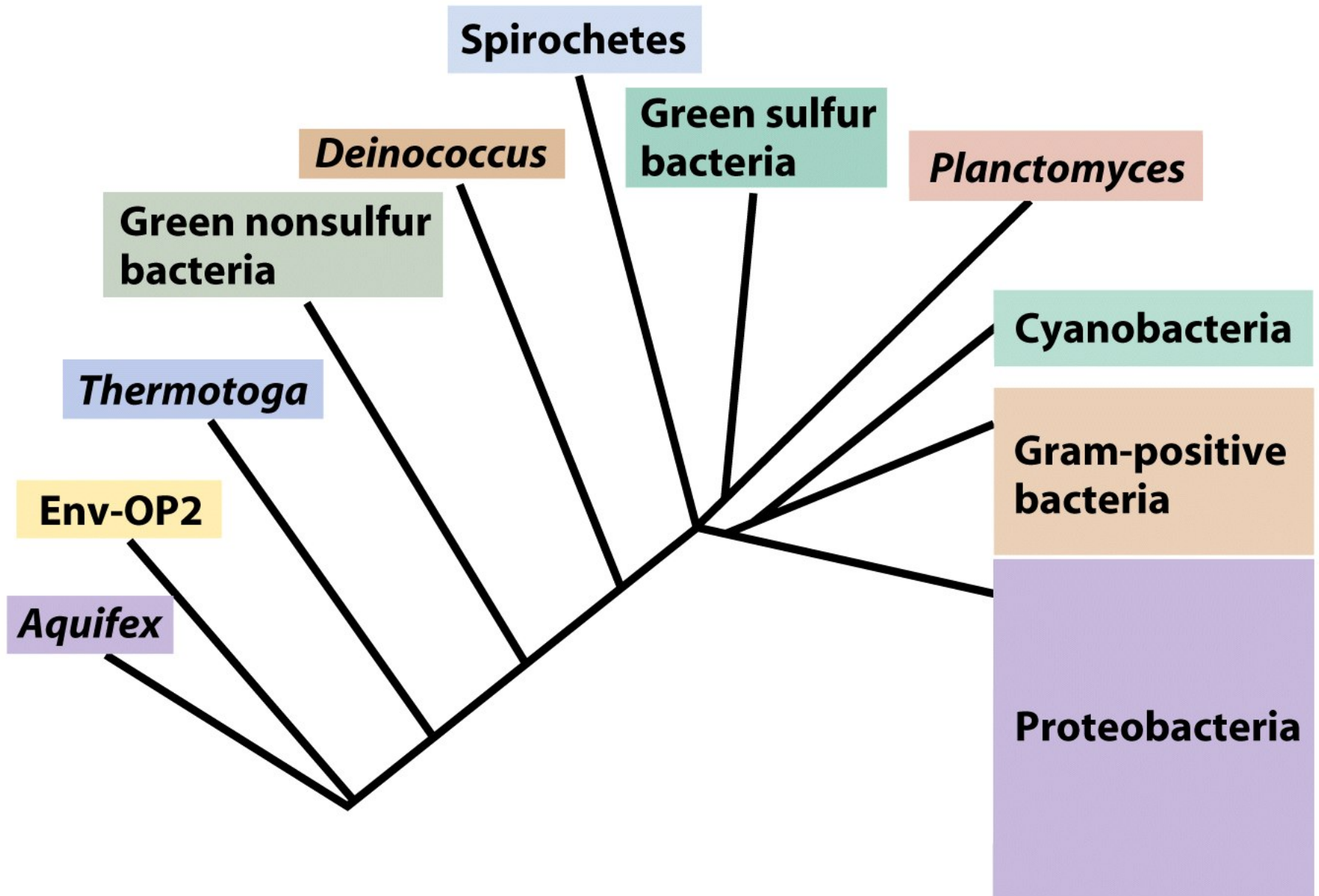


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Cell Structure

- Two structural types of cells are recognized: the **prokaryote** and the **eukaryote**.

Prokaryotic cells have a simpler internal structure than eukaryotic cells, lacking membrane-enclosed organelles.

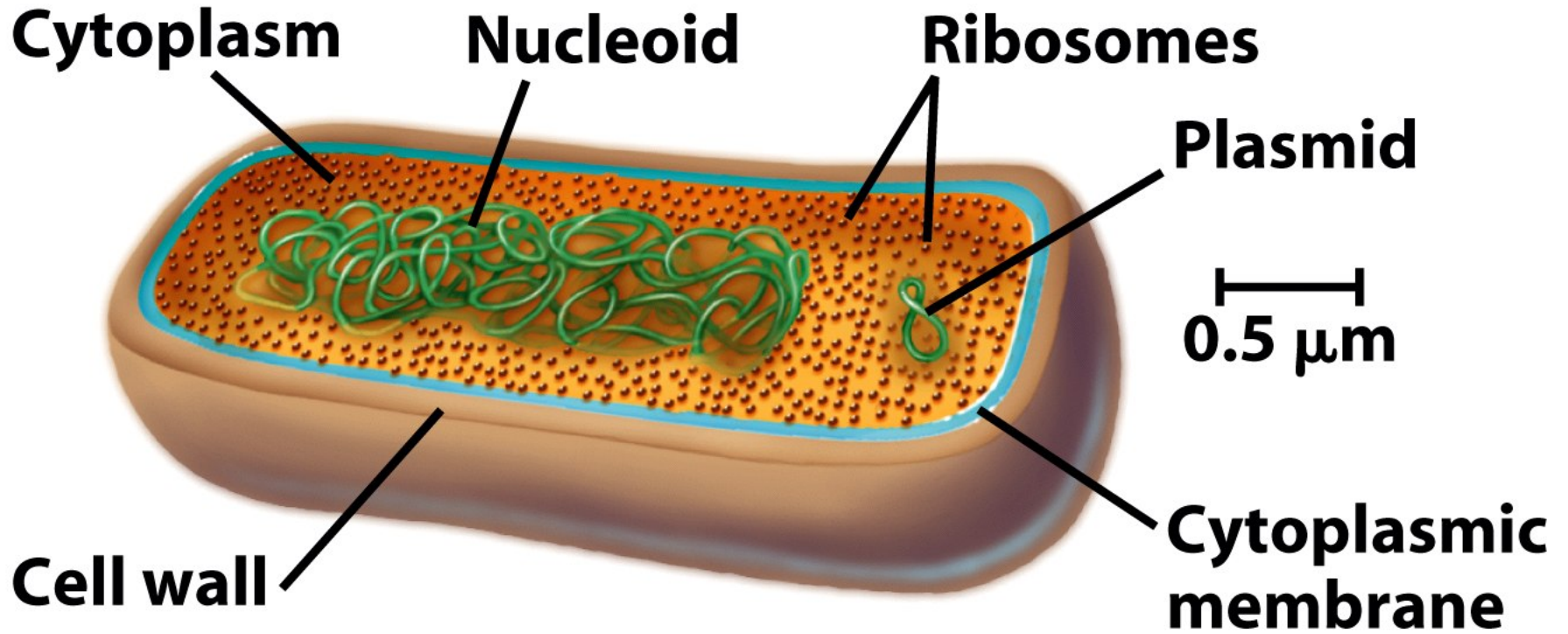


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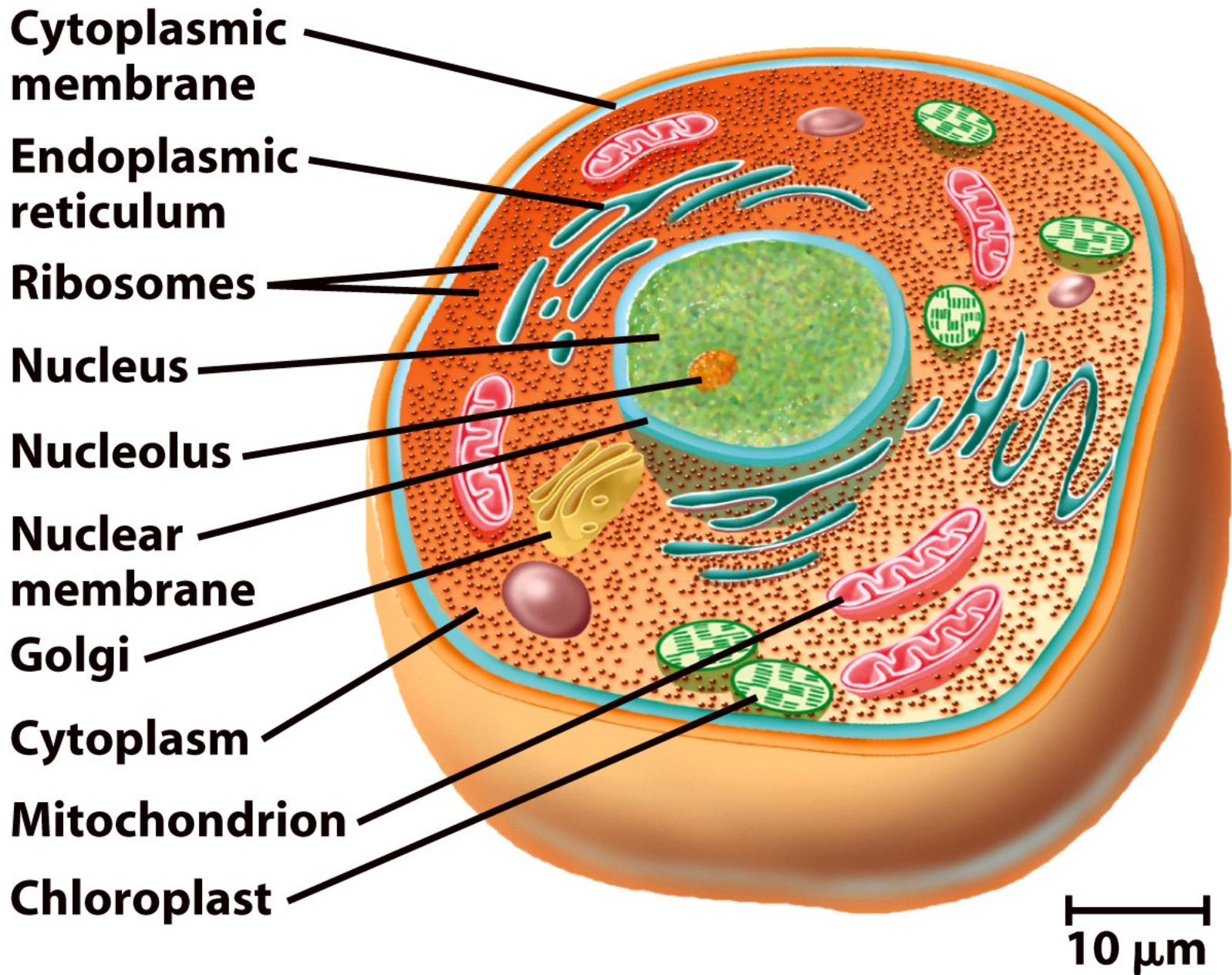
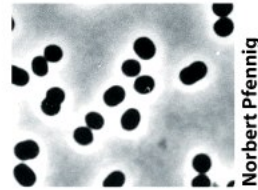


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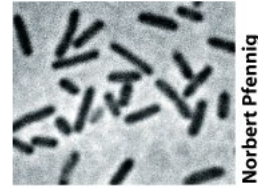
Bacterial Morphology

- Some typical bacterial morphologies include coccus, rod, spirillum, spirochete, appendaged, and filamentous.


Coccus



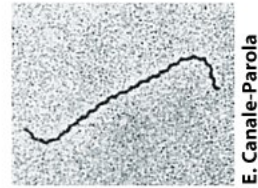

Rod



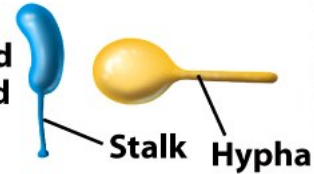

Spirillum




Spirochete



**Budding and
appendaged
bacteria**


Stalk **Hypha**



**Filamentous
bacteria**



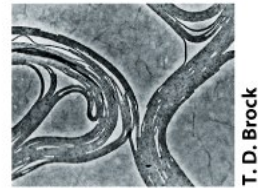


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Cytoplasmic Membrane

- The **cytoplasmic membrane** is a highly selective permeability barrier constructed of lipids and proteins that forms a bilayer with hydrophilic exteriors and a hydrophobic interior.

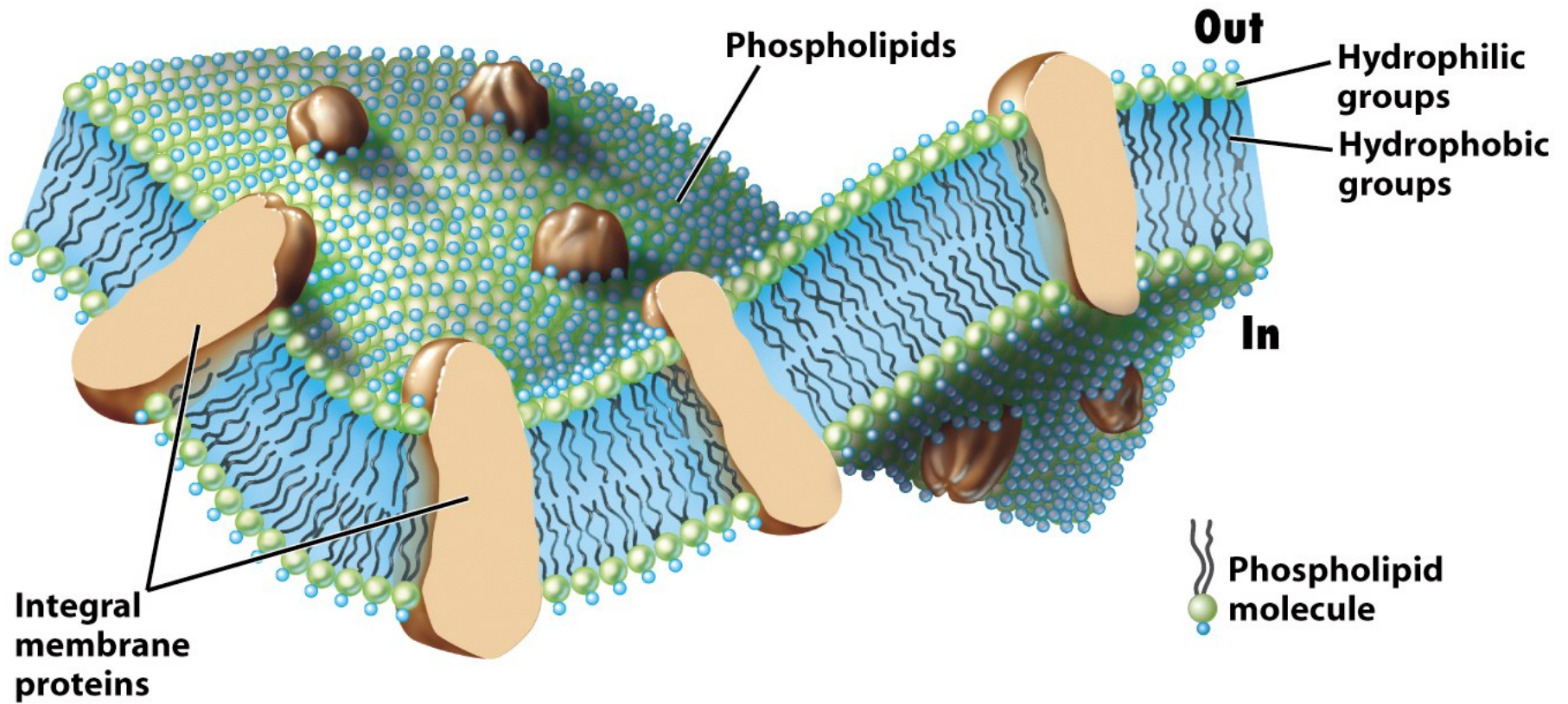
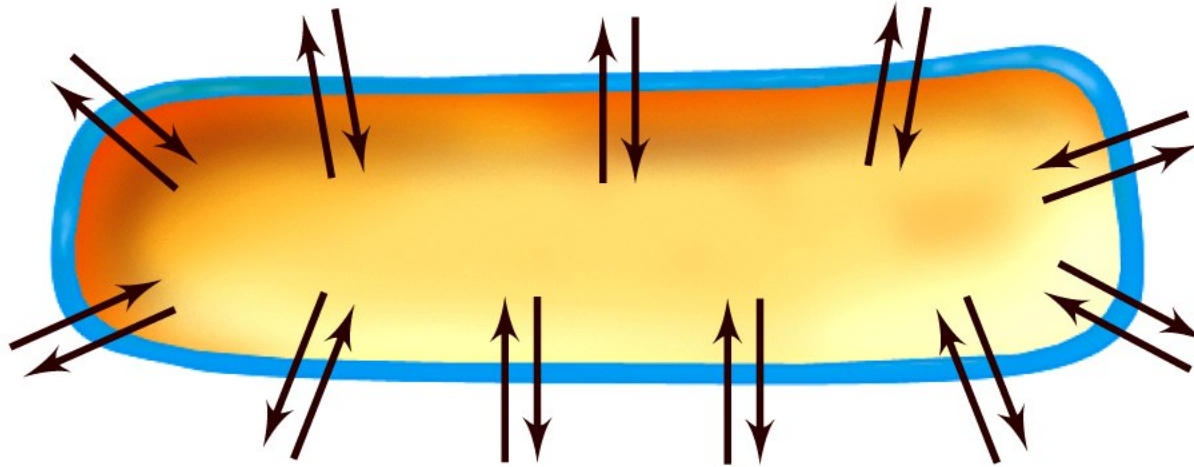


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- The major function of the cytoplasmic membrane is to act as a permeability barrier, preventing leakage of cytoplasmic metabolites into the environment.



1. **Permeability Barrier** — Prevents leakage and functions as a gateway for transport of nutrients into and out of the cell

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Simple transport:
Driven by the energy in the proton motive force

Transported substance

Group translocation:
Chemical modification of the transported substance driven by phosphoenolpyruvate

The ABC system:
Periplasmic binding proteins are involved and energy comes from ATP

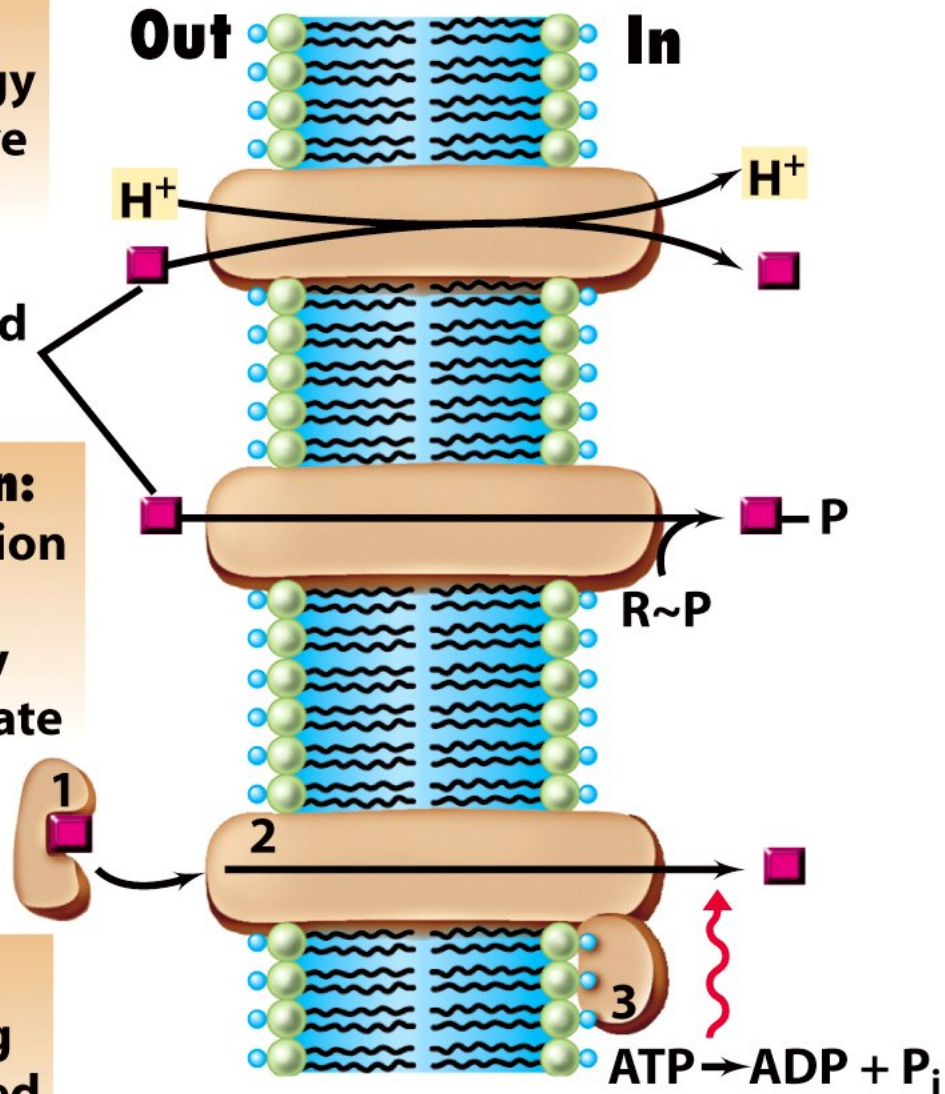


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