

Organization of Prokaryotic and Eukaryotic Cells

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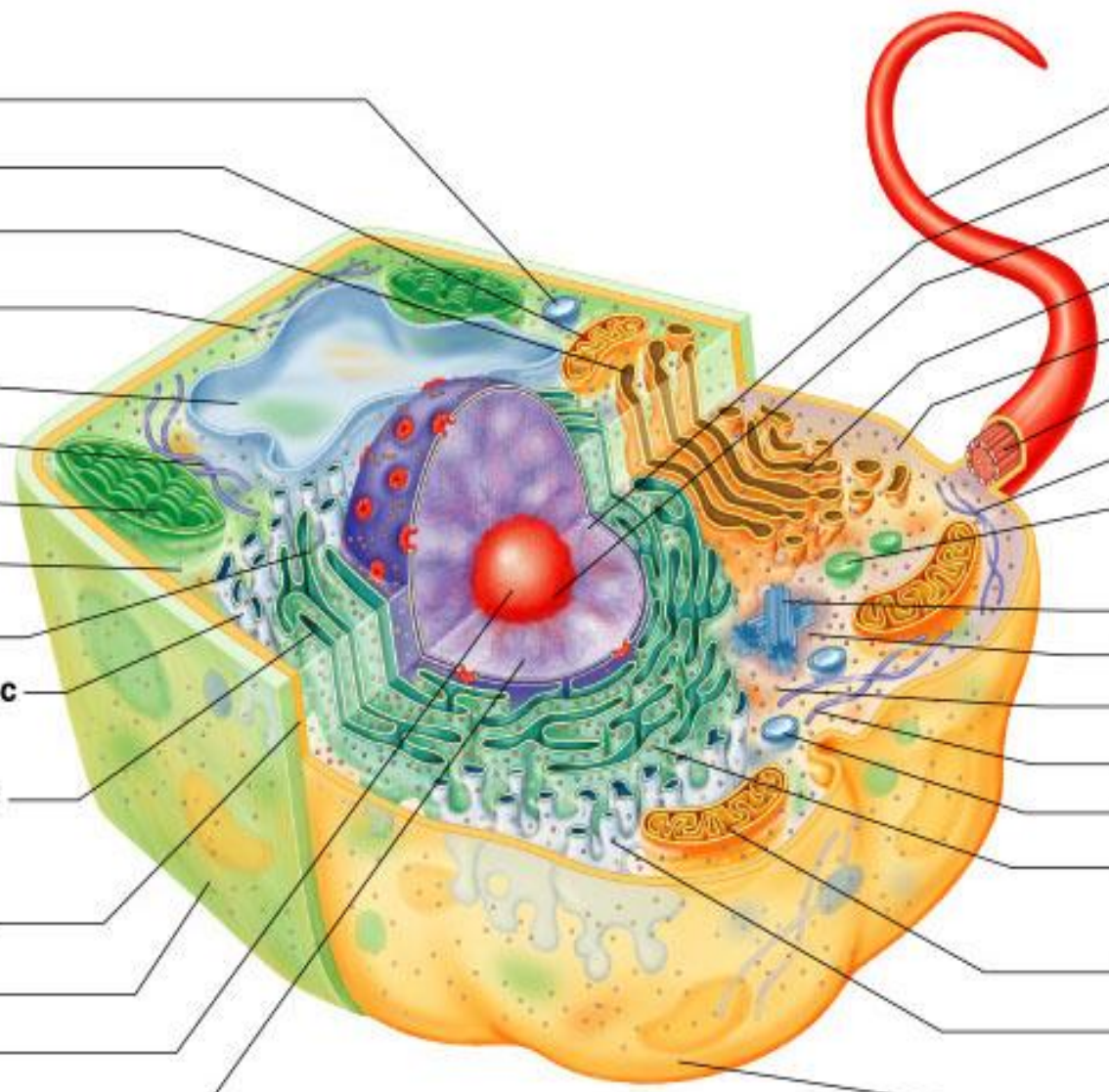
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PLANT CELL

- Peroxisome
- Mitochondrion
- Golgi complex
- Microfilament
- Vacuole
- Microtubule
- Chloroplast
- Cytoplasm
- Ribosome
- Smooth endoplasmic reticulum
- Rough endoplasmic reticulum
- Plasma membrane
- Cell wall
- Nucleolus
- Nucleus

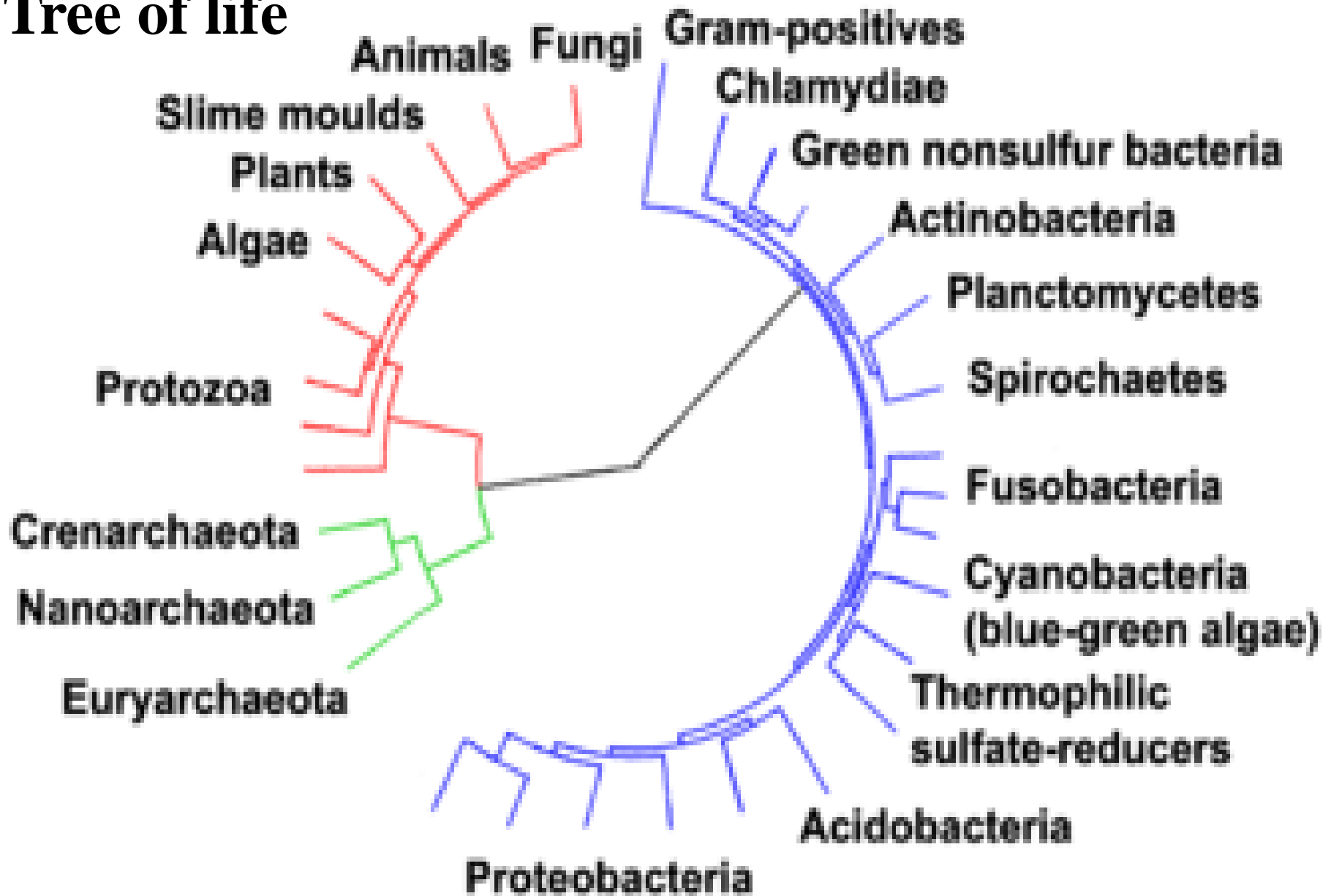
ANIMAL CELL

- Flagellum
- Nucleus
- Nucleolus
- Golgi complex
- Cytoplasm
- Basal body
- Microfilament
- Lysosome
- Centrosome:
Centriole
Pericentriolar material
- Ribosome
- Microtubule
- Peroxisome
- Rough endoplasmic reticulum
- Mitochondrion
- Smooth endoplasmic reticulum
- Plasma membrane



(a) Highly schematic diagram of a composite eukaryotic cell, half plant and half animal

Tree of life



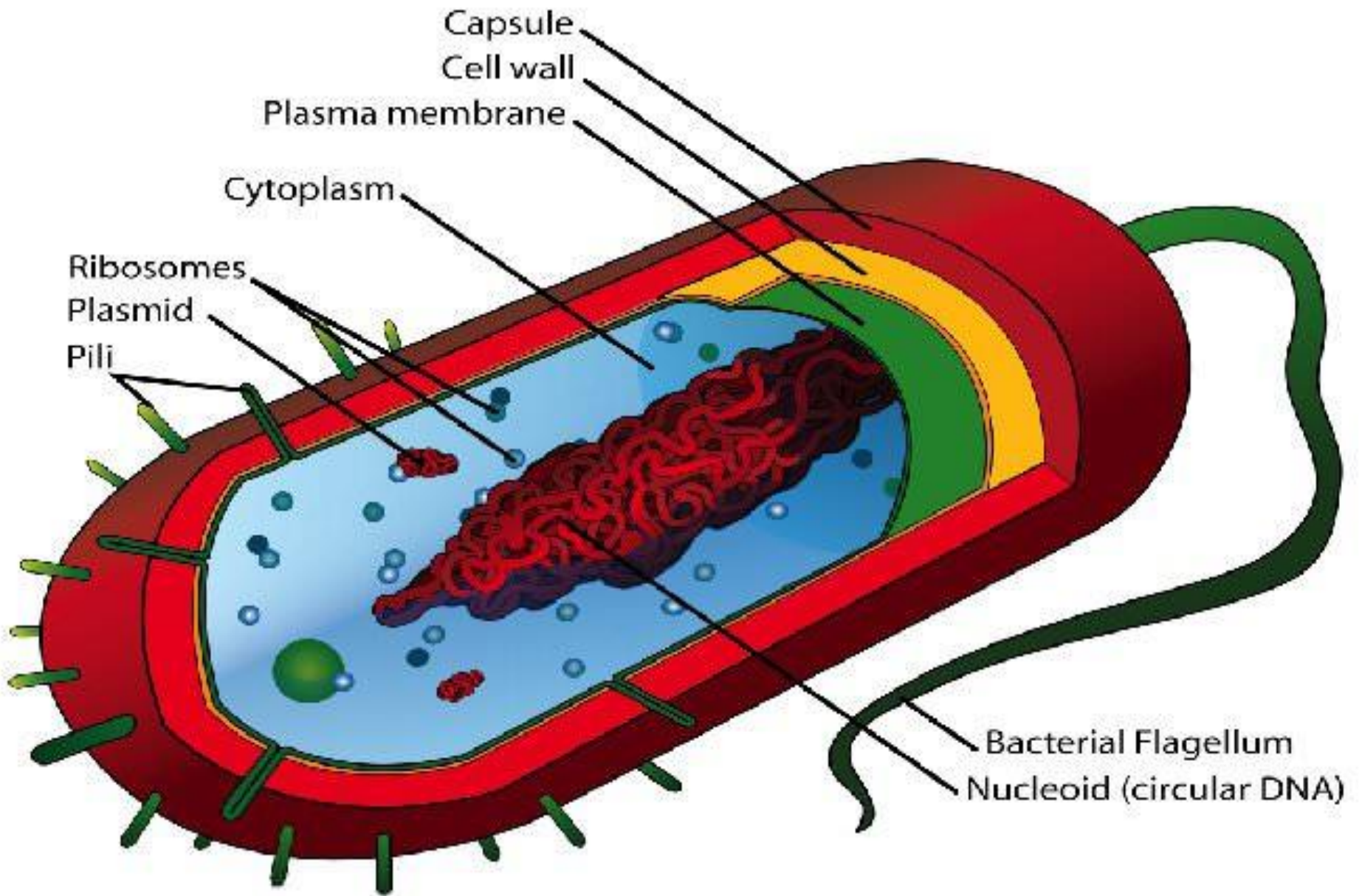
Definition of Prokaryotes

Prokaryotes (pro-KAR-ee-ot-es) (from Old Greek *pro-* before + *karyon* nut or kernel, referring to the cell nucleus, + suffix *-otos*, pl. *-otes*; also spelled "procaryotes") are organisms without a cell nucleus (= karyon), or any other membrane-bound organelles. Most are unicellular, but some prokaryotes are multicellular.

Definition of Eukaryotes

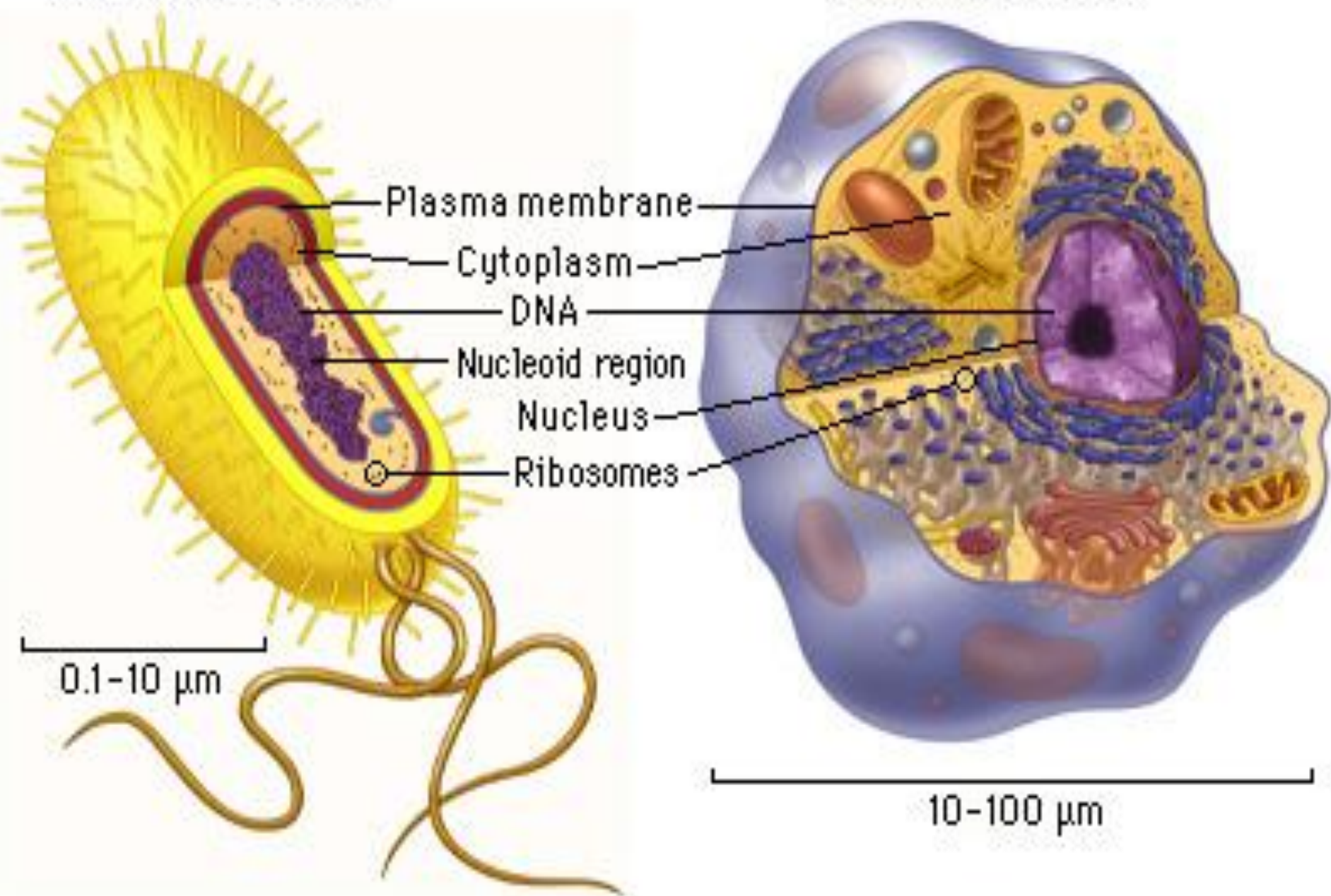
Eukaryotes (IPA: [ju: 'kæɪrɪt]) are organisms whose cells are organized into complex structures by internal membranes and a cytoskeleton. The most characteristic membrane bound structure is the nucleus. This feature gives them their name, (also spelled "eucaryote,") which comes from the Greek εὖ, meaning good/true, and κάρυον, meaning nut, referring to the nucleus. Animals, plants, fungi, and protists are eukaryotes.

Typical Bacterial Cell



Prokaryotic cell

Eukaryotic cell



Summary of differences between prokaryote and eukaryote cells

Prokaryotic cells	Eukaryote cells
Small cell (< 5 μ m)	Larger cells (> 10 μ m)
Always unicellular	Often multicellular
No nucleus or any membrane bound organelles	Always have nucleus and membranes bound organelles.
DNA circular, without proteins	DNA is linear and associated with proteins to form chromatin.
Ribosomes are small 70S	Ribosomes are large 80S
No cytoskeleton	Always have cytoskeleton
Motility by rigid rotating flagellum made from flagellin	Motility by flexible waving cilia or flagella made from tubulins.
Cell division is by binary fission	Cell division is by meiosis and mitosis.
Reproduction is always asexual	Reproduction is sexual and asexual.

Prokaryotic versus Eukaryotic Chromosomes

Prokaryotic Chromosomes

- Many prokaryotes contain a single circular chromosome.
- Prokaryotic chromosomes are condensed in the nucleoid via DNA supercoiling and the binding of various architectural proteins.
- Because prokaryotic DNA can interact with the cytoplasm, transcription and translation occur simultaneously.
- Most prokaryotes contain only one copy of each gene (i.e., they are haploid).
- Nonessential prokaryotic genes are commonly encoded on extrachromosomal plasmids.
- Prokaryotic genomes are efficient and compact, containing little repetitive DNA.

Eukaryotic Chromosomes

- Eukaryotes contain multiple linear chromosomes.
- Eukaryotic chromosomes are condensed in a membrane-bound nucleus via histones.
- In eukaryotes, transcription occurs in the nucleus, and translation occurs in the cytoplasm.
- Most eukaryotes contain two copies of each gene (i.e., they are diploid).
- Some eukaryotic genomes are organized into operons, but most are not.
- Extrachromosomal plasmids are not commonly present in eukaryotes.
- Eukaryotes contain large amounts of noncoding and repetitive DNA.

A person is shown in profile on the left side of the frame, speaking into a microphone. The background is a smooth blue gradient with faint, semi-transparent silhouettes of people in the background. The text is centered in a white, serif font.

Thanks for the
opportunity to share.