

GBIO 1 LESSON 2

CELLULAR TYPES AND ORGANIZATION

PROKARYOTES vs. EUKARYOTES

Structure, Function, and Classification

OBJECTIVES

By the end of this lesson, learners should be able to:

- Explain the structural differences between prokaryotic and eukaryotic cells using scaled diagrams.
- Describe how cell types contribute to the diversity and classification of living organisms.

CELLS

All living organisms are made of cells, which are classified into two major types:

Prokaryotic

- Simple structure
- No true nucleus
- Usually unicellular

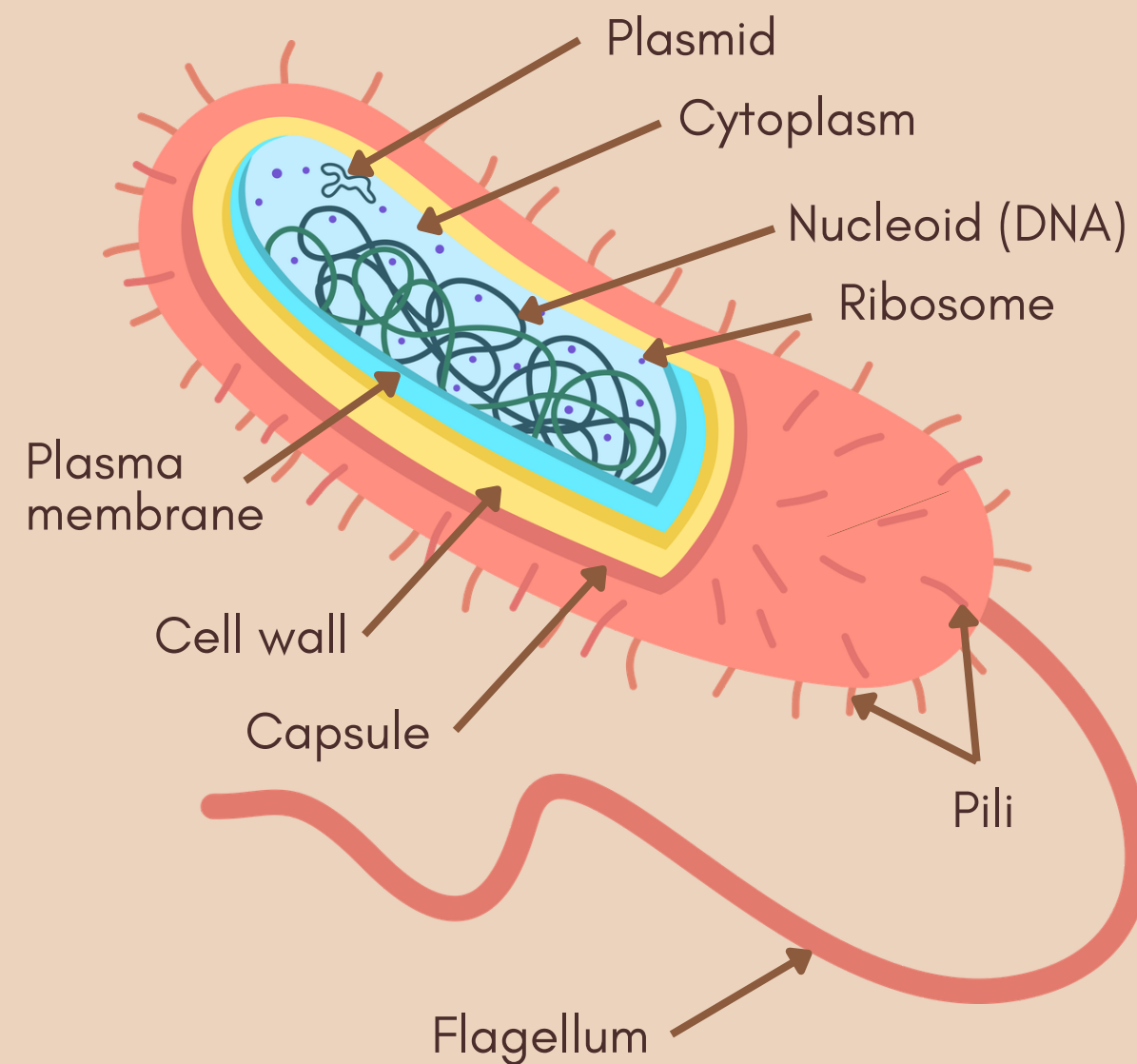
Eukaryotic

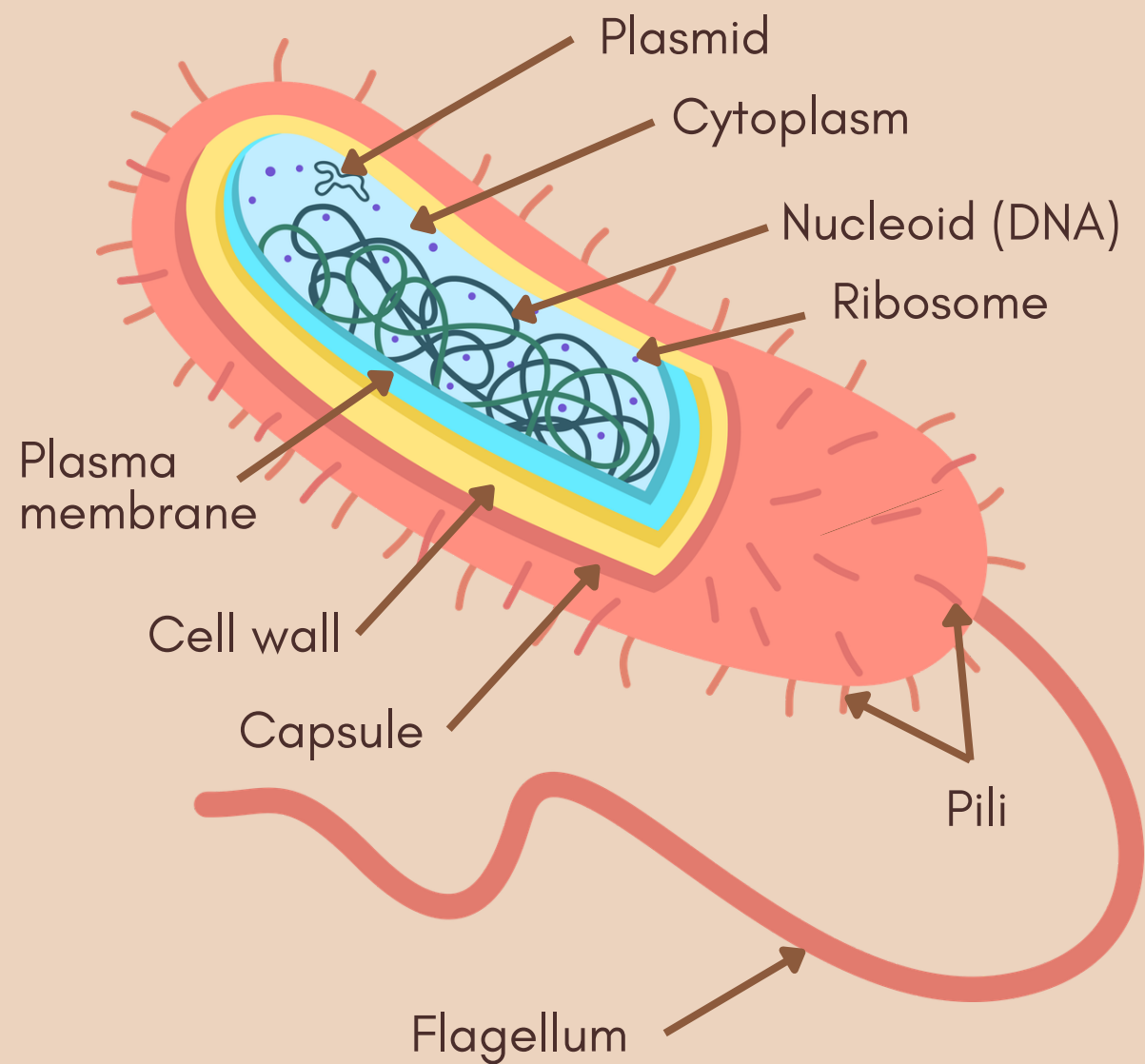
- More complex structure
- Has a true nucleus
- Can be unicellular or multicellular

PROKARYOTIC CELL

Characteristics

- Size: 1-5 μm
- No nucleus
- No membrane-bound organelles
- DNA is located in the nucleoid region
- Ex. Bacteria, Archaea





Capsule

Protects the cell and helps it attach to surfaces.

Cell Wall

Provides shape, support, and protection.

Plasma Membrane

Controls the movement of substances into and out of the cell.

Cytoplasm

Jelly-like fluid where cellular activities occur.

Ribosomes

Produce proteins needed by the cell.

Nucleoid (DNA)

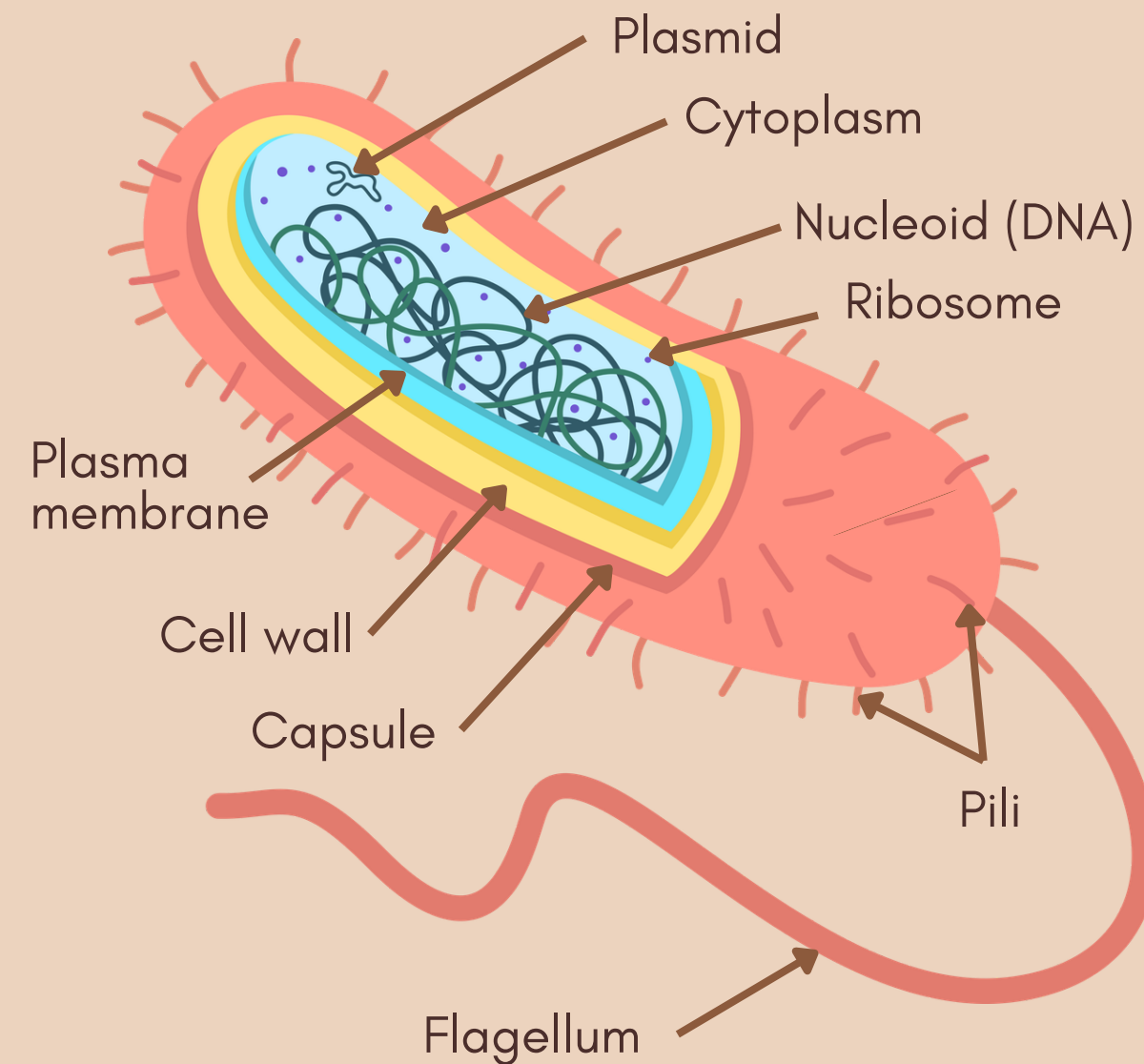
Contains the cell's genetic material and controls cell functions.

Pili

Hair-like structures that help with attachment and DNA transfer.

Flagellum

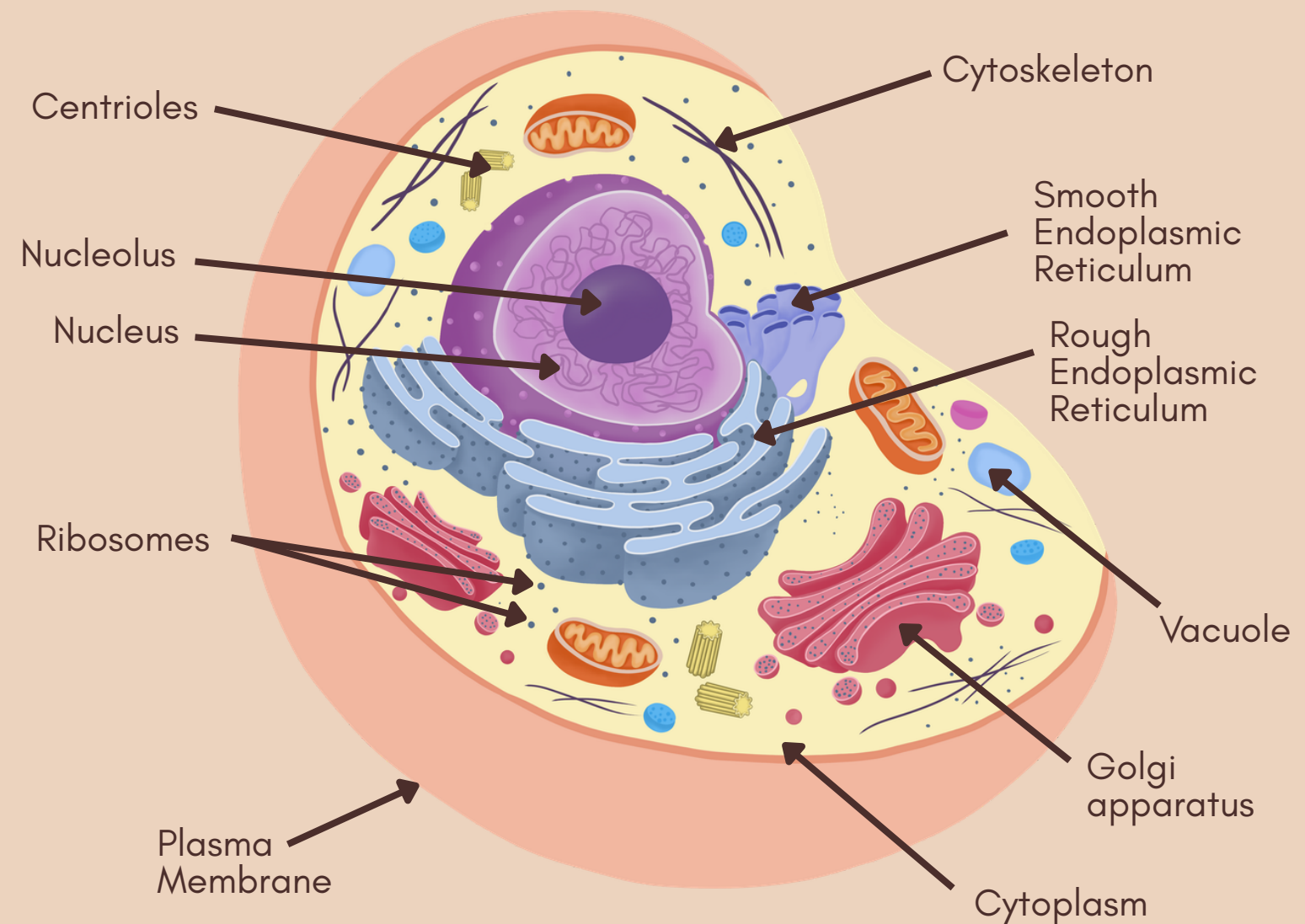
Whip-like structure that enables the cell to move.



EUKARYOTIC CELL

Characteristics

- Size: 10–100 μm
- Has a true nucleus
- Contains membrane-bound organelles
- More complex internal organization



Plasma Membrane

Regulates what enters and leaves the cell.

Nucleus

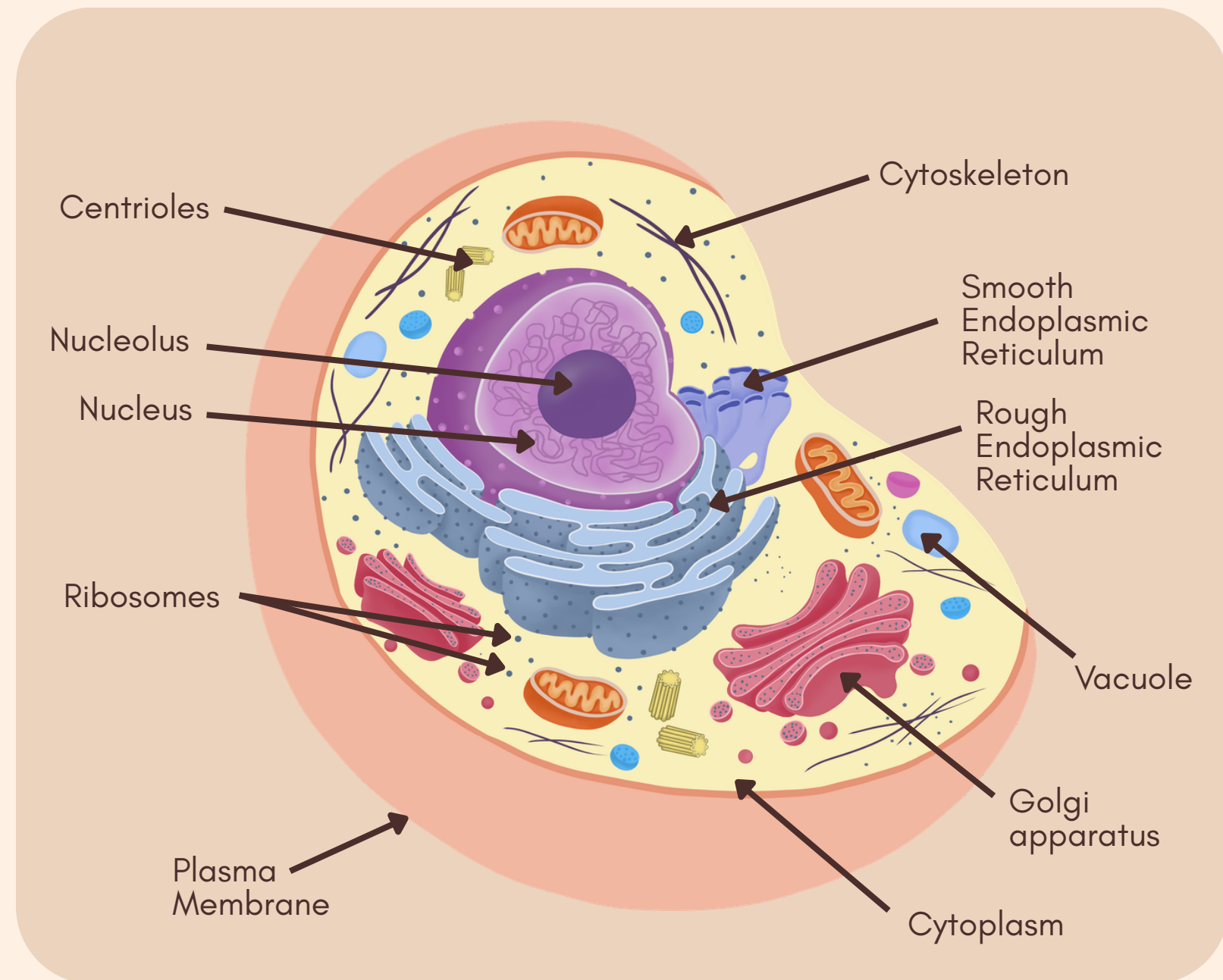
Contains DNA and controls cell activities.

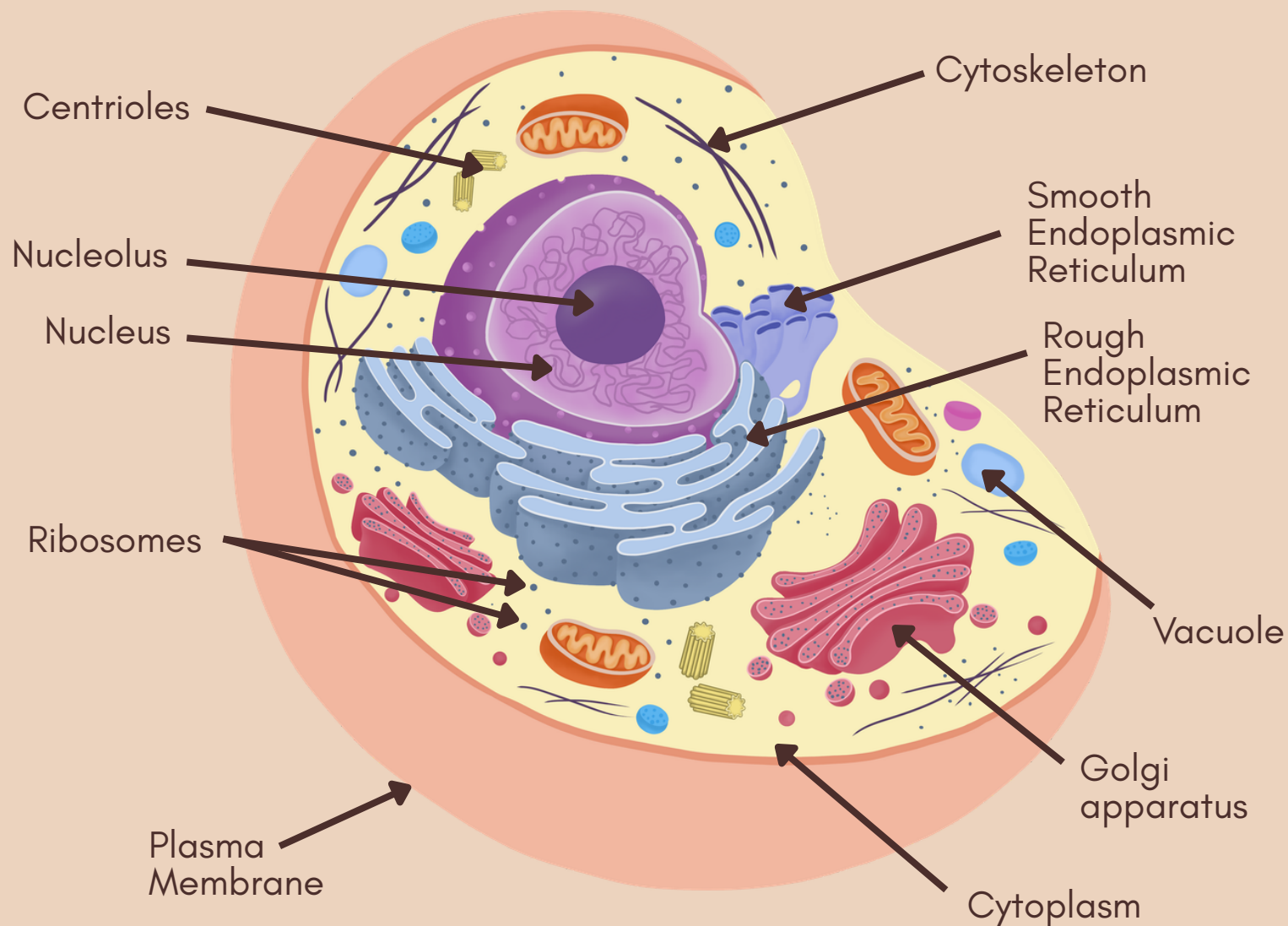
Nucleolus

Produces and assembles ribosomes.

Cytoplasm

Jelly-like fluid where organelles are suspended.





Golgi Apparatus

Modifies, packages, and transports proteins and lipids.

Rough Endoplasmic Reticulum (RER)

Synthesizes and transports proteins.

Smooth Endoplasmic Reticulum (SER)

Produces lipids and detoxifies harmful substances.

Centrioles

Help organize chromosomes during cell division.

Ribosomes

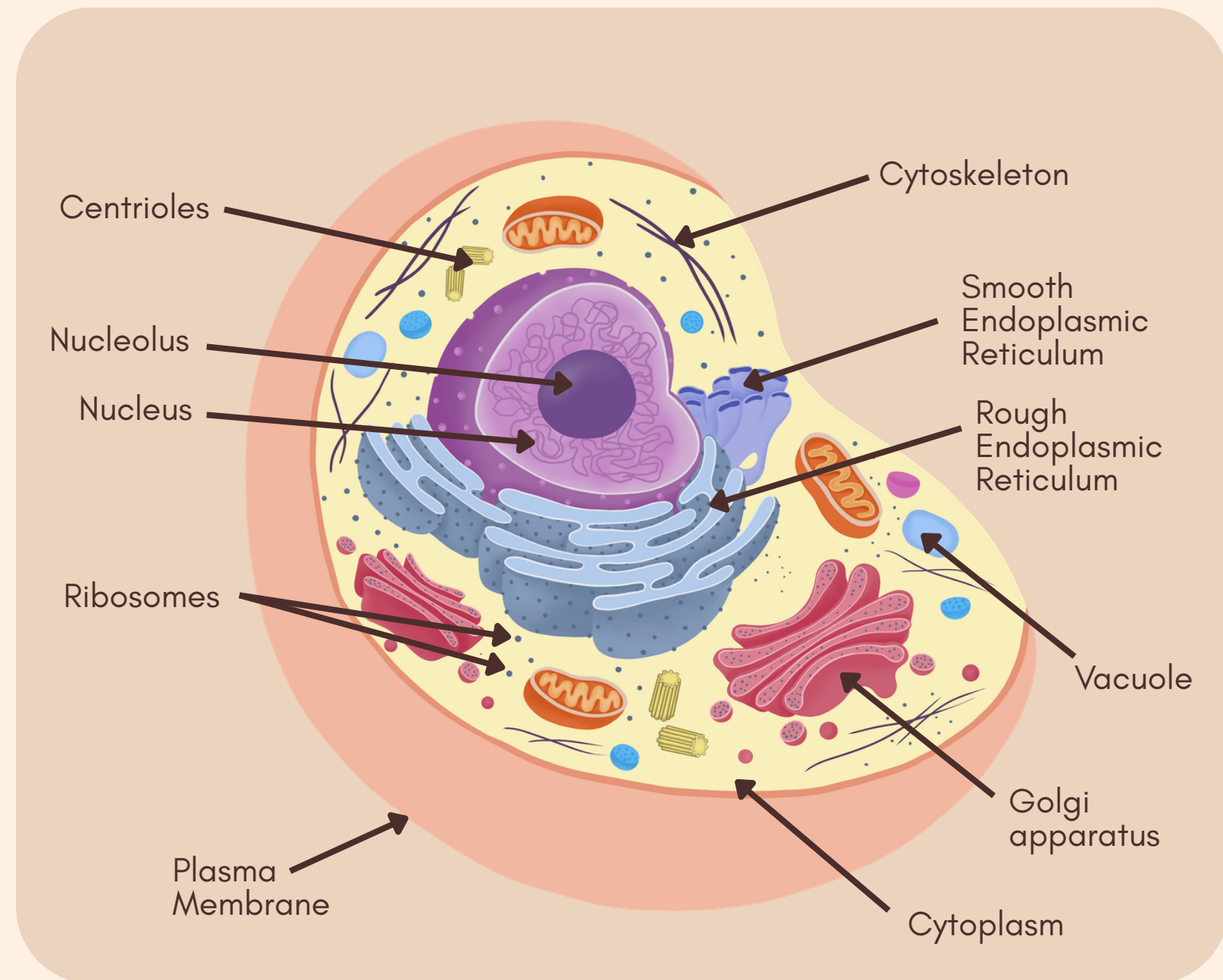
Build proteins for the cell.

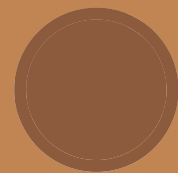
Vacuole

Stores water, nutrients, and waste materials.

Cytoskeleton

Maintains cell shape and supports movement.





Features

Prokaryotic

Eukaryotic

Size

1-5 μm

10-100 μm

Nucleus

Absent

Present

DNA

Circular

Linear

Organelles

None

Present

Complexity

Simple

Complex

Cell Division

Binary Fission

Mitosis/Meiosis

Examples

Bacteria, Archaea

Plants, Animals, Fungi, Protists