

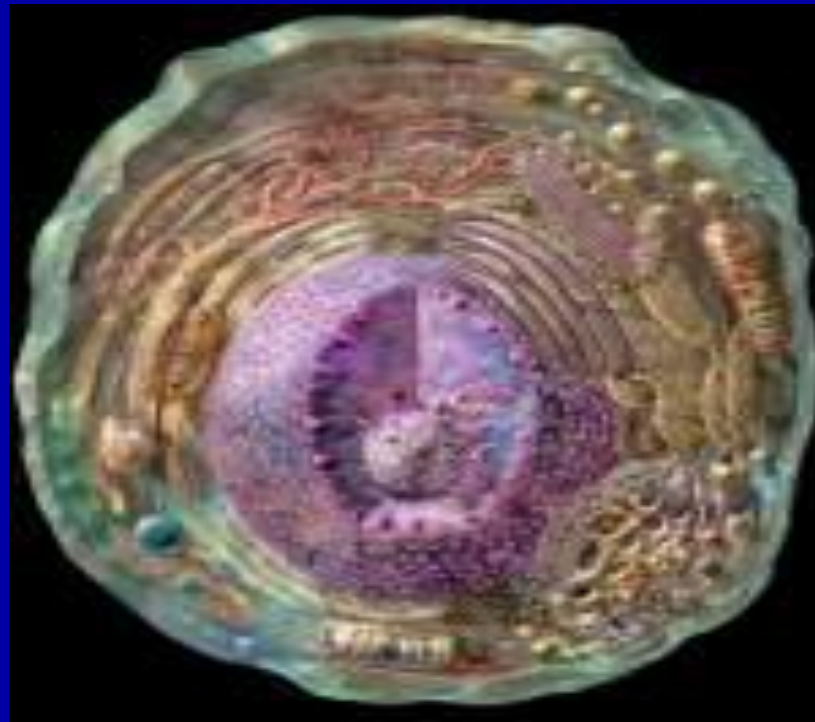
CELLS

THEORY, TYPES, &
STRUCTURE

Cell Theory

- 1. All living things are made up of cells & the products of those cells**
- 2. All cells carry out their own life functions**
- 3. New cells come from other living cells**

Cell Types & Structure



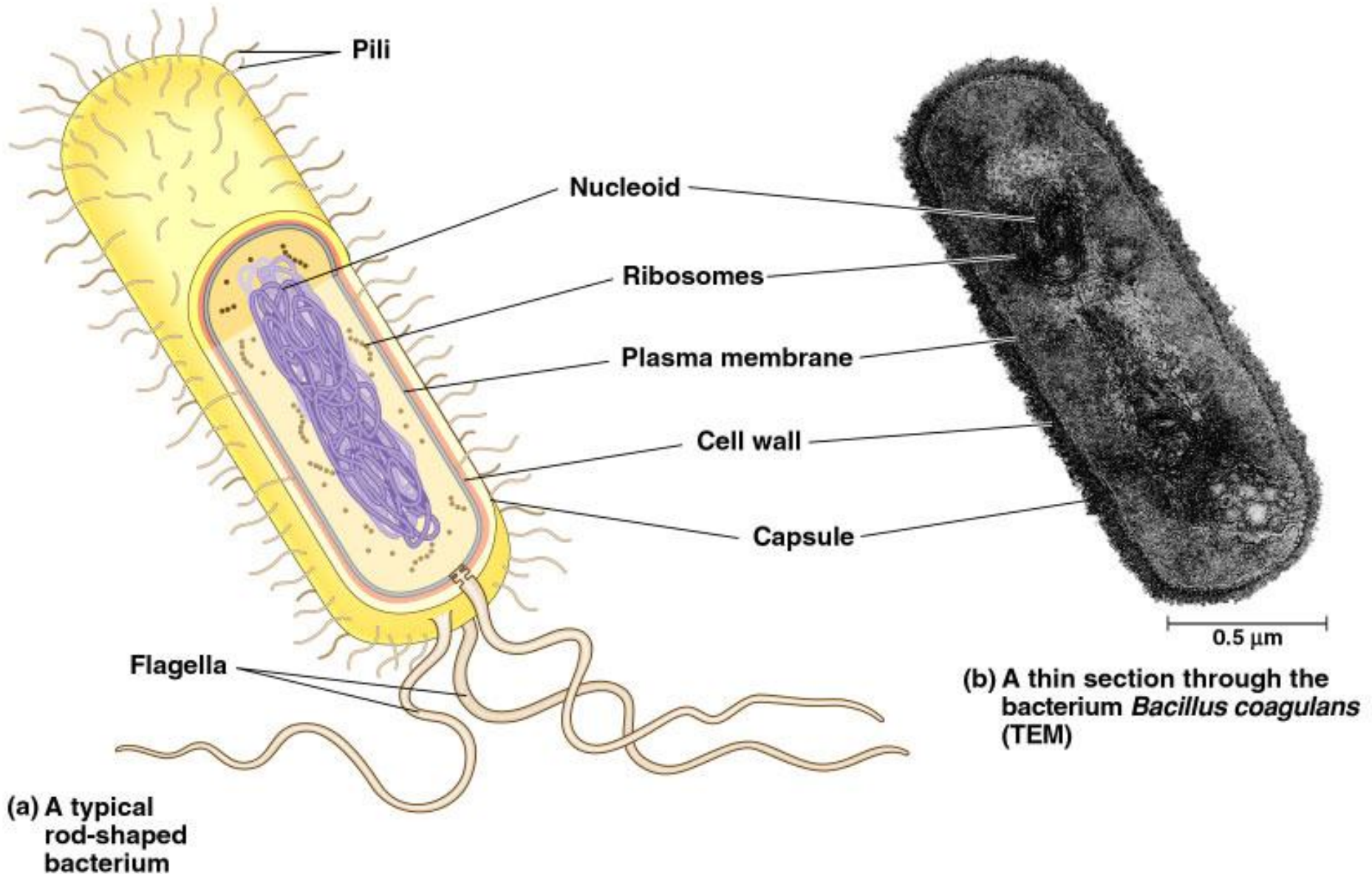
There are 2 types of cells:

- Prokaryotic cells
- Eukaryotic cells

PROKARYOTIC

- Single Cell
- No nucleus
- Only Bacteria

Figure 7.4 A prokaryotic cell

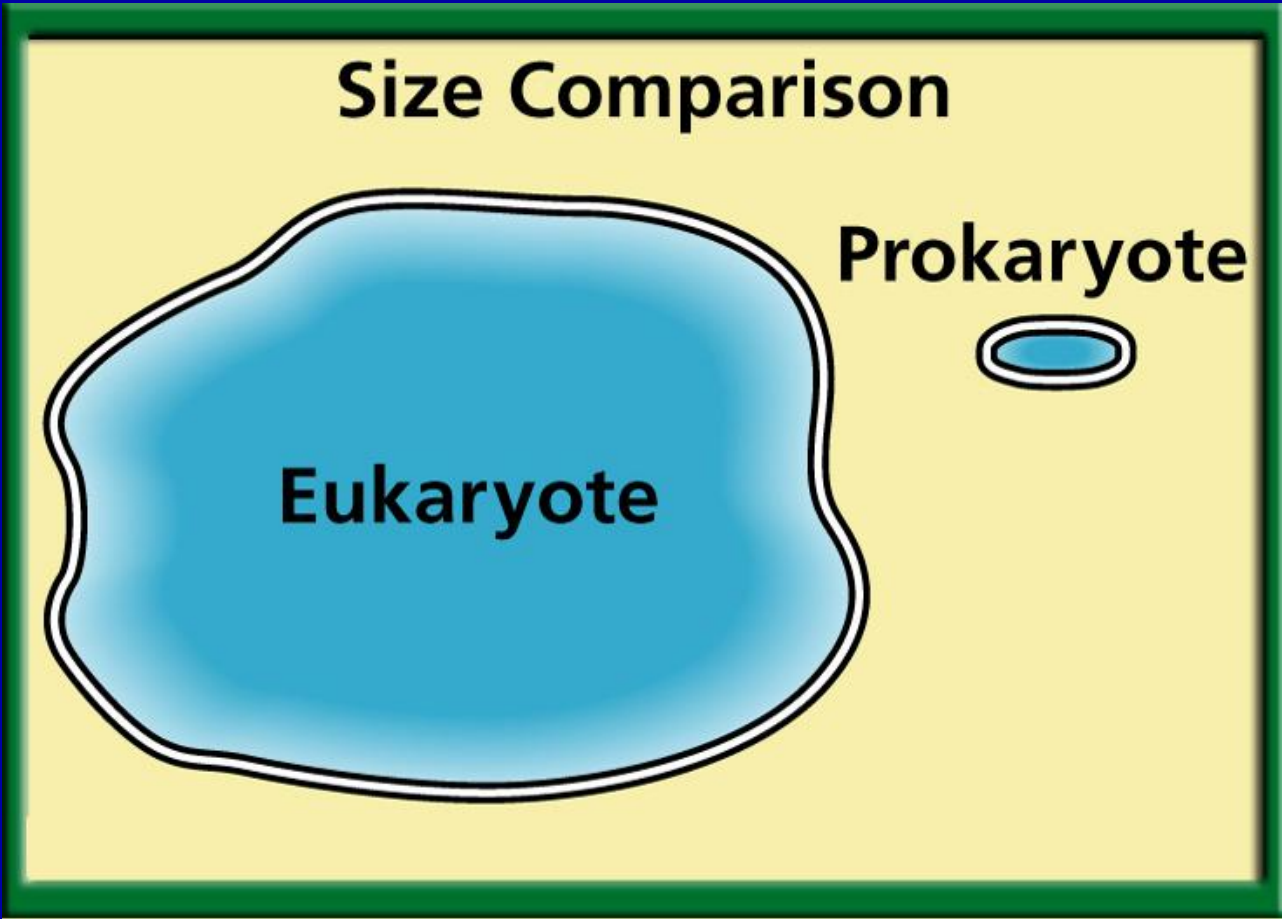


EUKARYOTIC ANIMAL CELL

- Can be unicellular or multicellular
- Round in shape
- Has membrane bound organelles.

EUKARYOTIC PLANT CELL

- Square in shape.
- Can be unicellular or multicellular.
- Membrane bound organelles.



Human cell

Bacteria cell

**ORGANELLES
FOUND IN
BOTH
ANIMAL AND PLANT
CELLS**

Organ = A group of tissues with one or a few functions : heart, lung, stomach, liver, pancreas, skin, kidney, etc.)

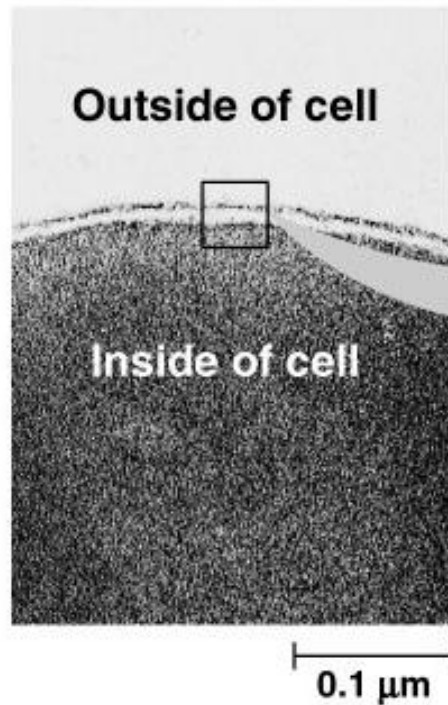
-elle = small or tiny

Organelle = **tiny organs**

PLASMA MEMBRANE

- **aka Cell Membrane**
- Flexible and allows for change of shape
- Controls the movement of materials entering and leaving the cell
- Helps maintain a chemical balance in the cell

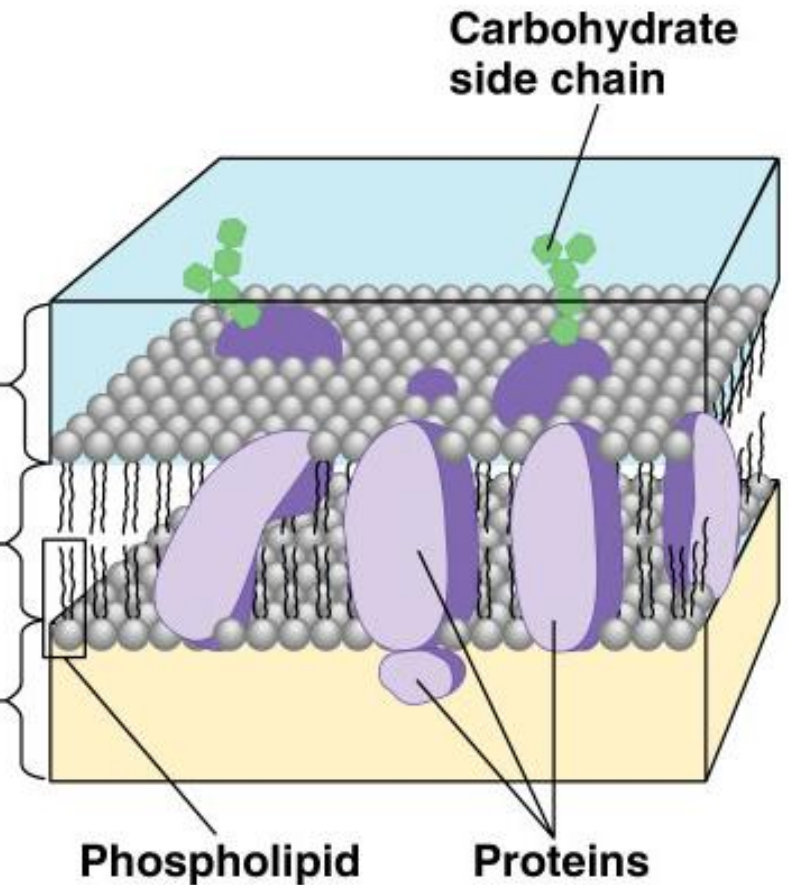
Figure 7.6 The plasma membrane



Hydrophilic region

Hydrophobic region

Hydrophilic region



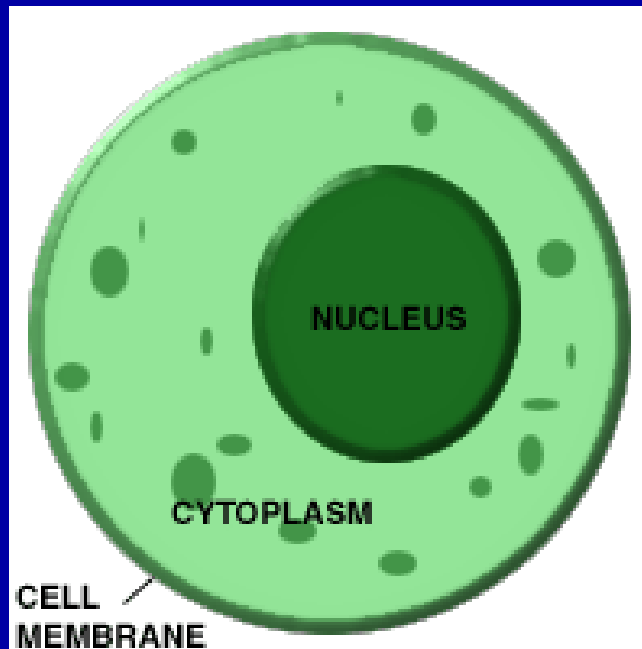
(a) TEM of a red blood cell

(b) Structure of the plasma membrane

CYTOPLASM

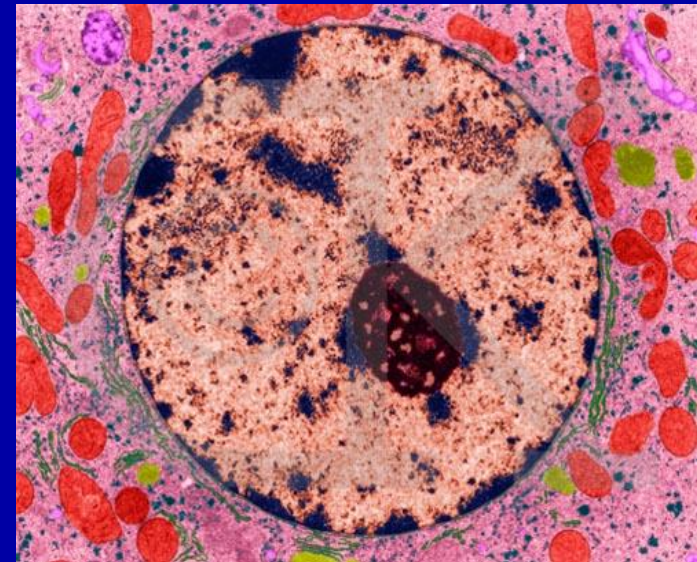
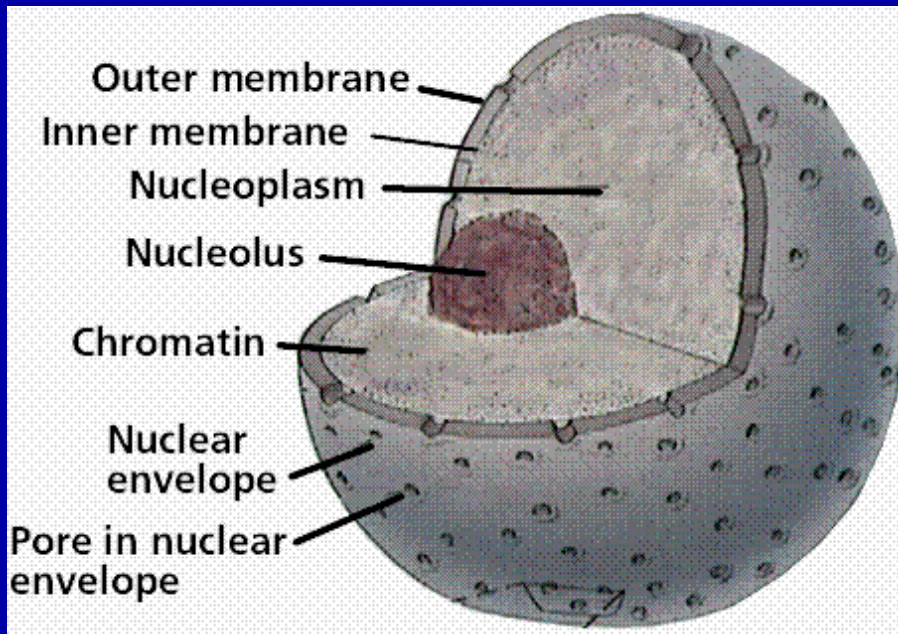
(jelly-like material)

- Supports cell parts
- Allows cell parts to move



NUCLEUS – “brain”

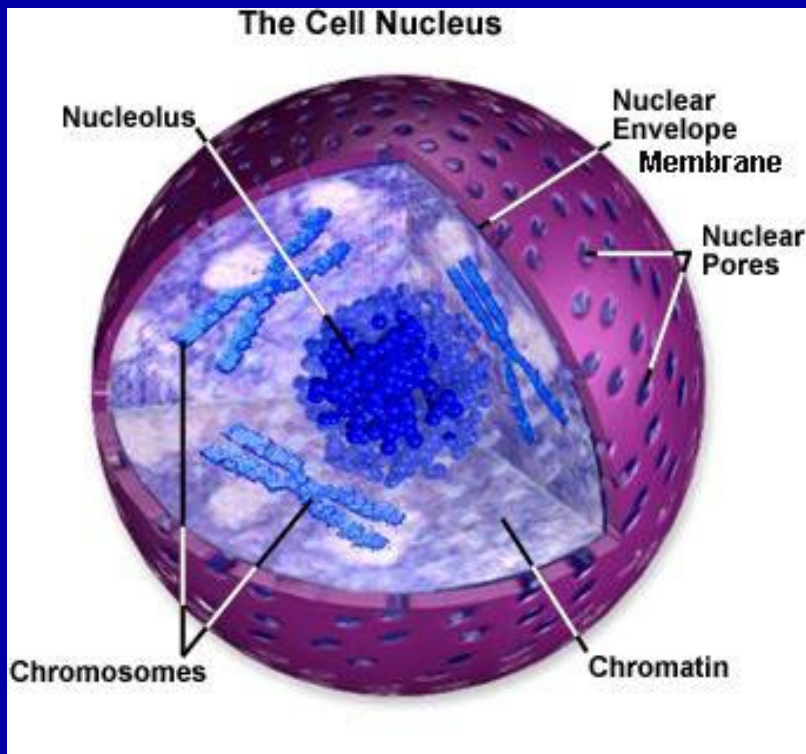
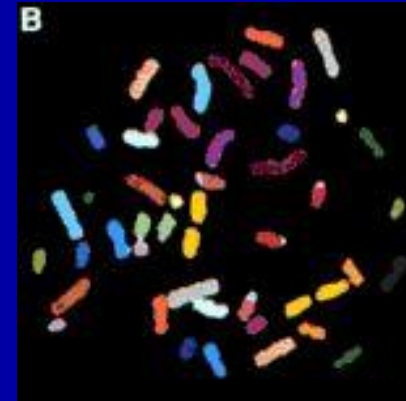
Control center of the cell



CHROMOSOMES (found in Nucleus)

Contains the DNA/genes that direct the making of **proteins** to make an organisms traits

i. Means “colored bodies”

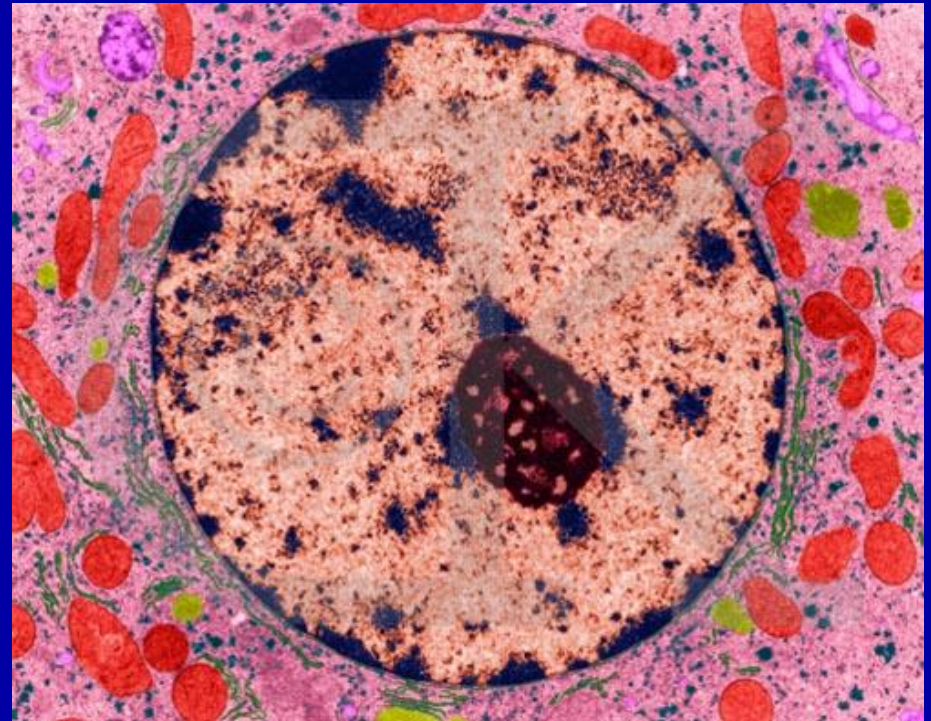
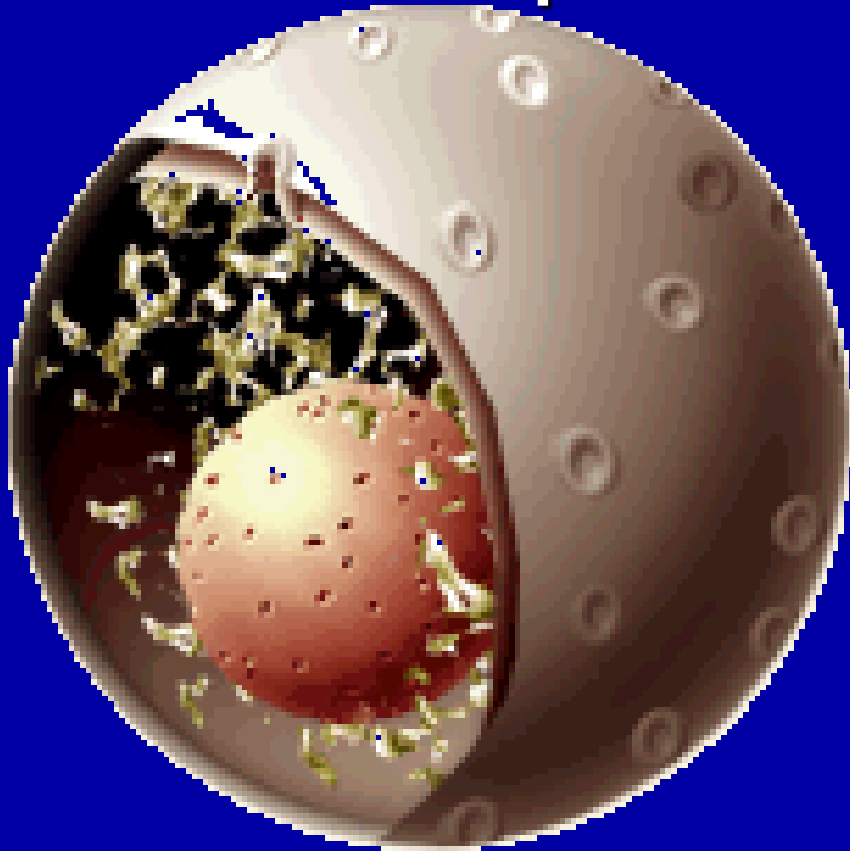


ii. Chromatin is long thin invisible DNA

iii. Chromosomes are short fat condensed visible DNA

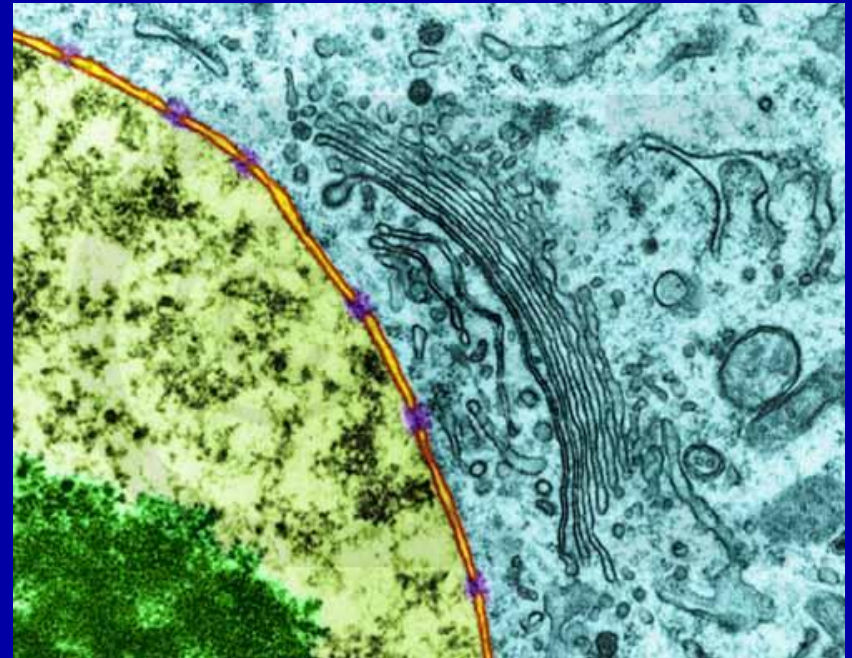
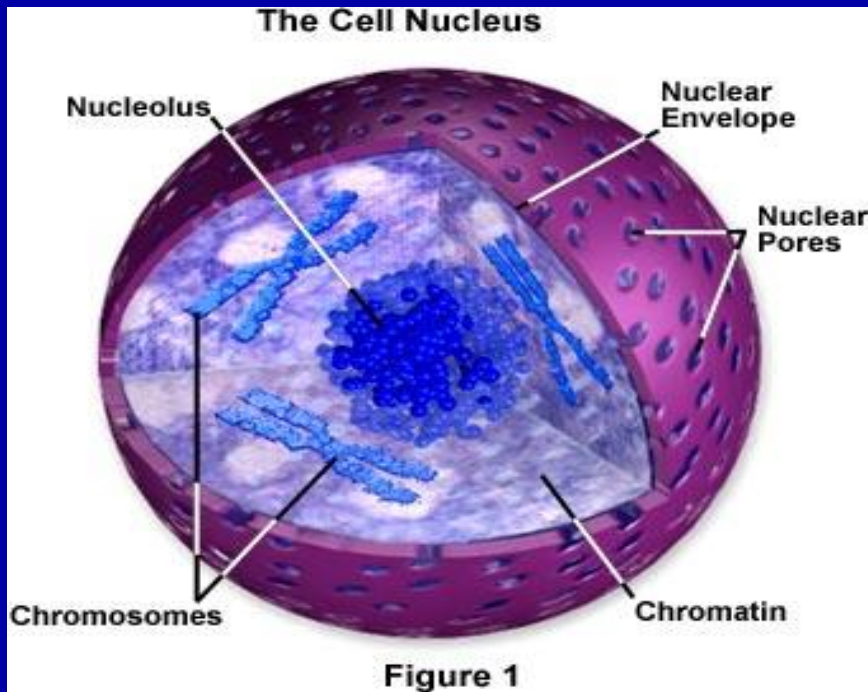
NUCLEOLUS (in Nucleus)

Controls cell reproduction and
makes ribosomes which make
proteins



NUCLEAR MEMBRANE (surrounds Nucleus)

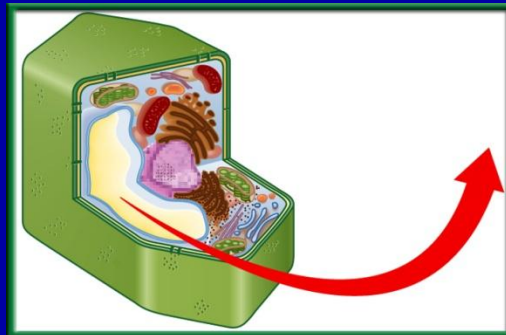
Controls what enters and leaves the nucleus



VACUOLES – “storage boxes” (bubbles)

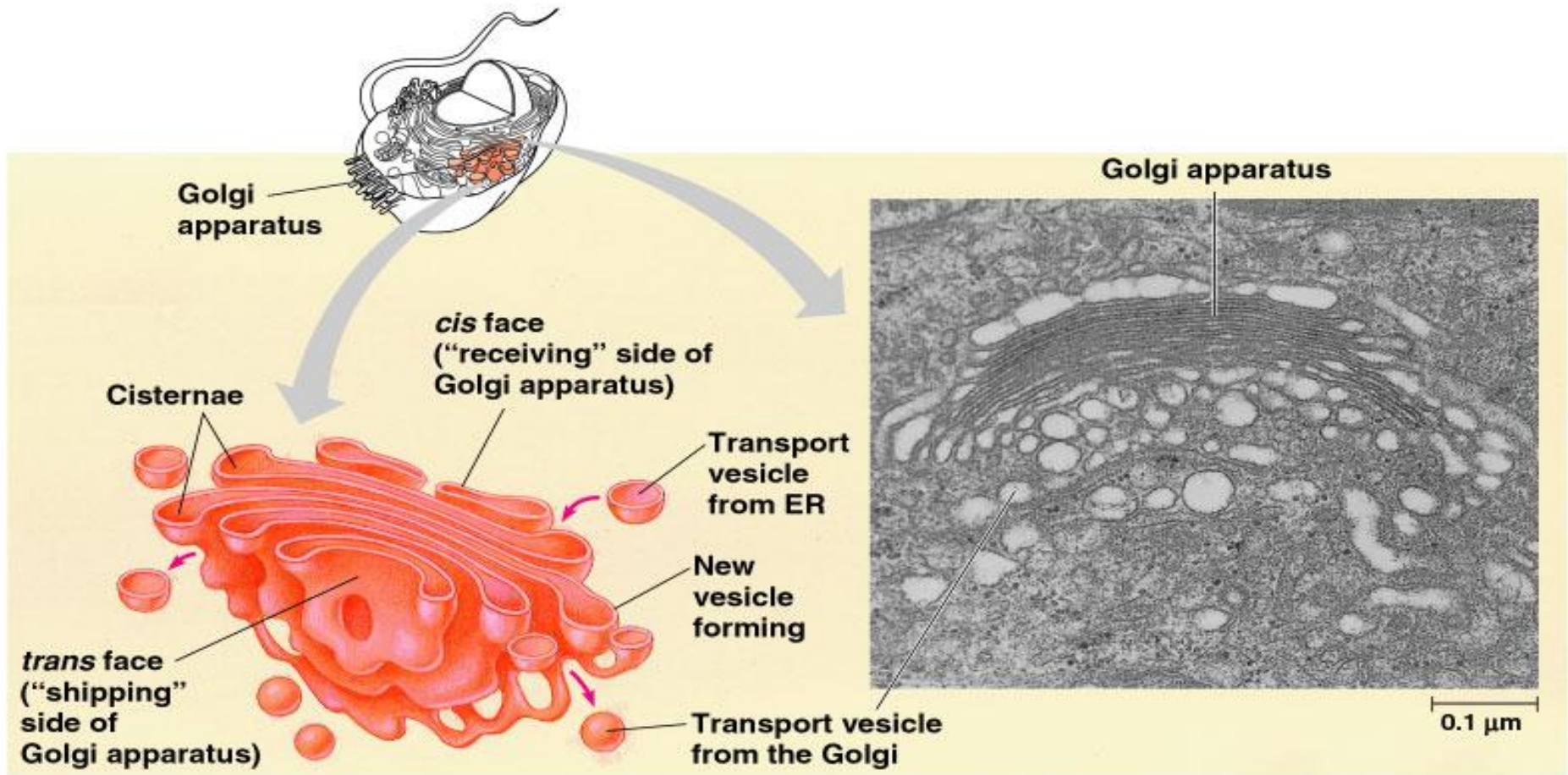
- a. Storage of **food** and **water**,
wastes and **enzymes**
- b. Animal cells have **many small**
ones while plant cells have **one**
large one

Plant
Vacuole



Golgi Apparatus

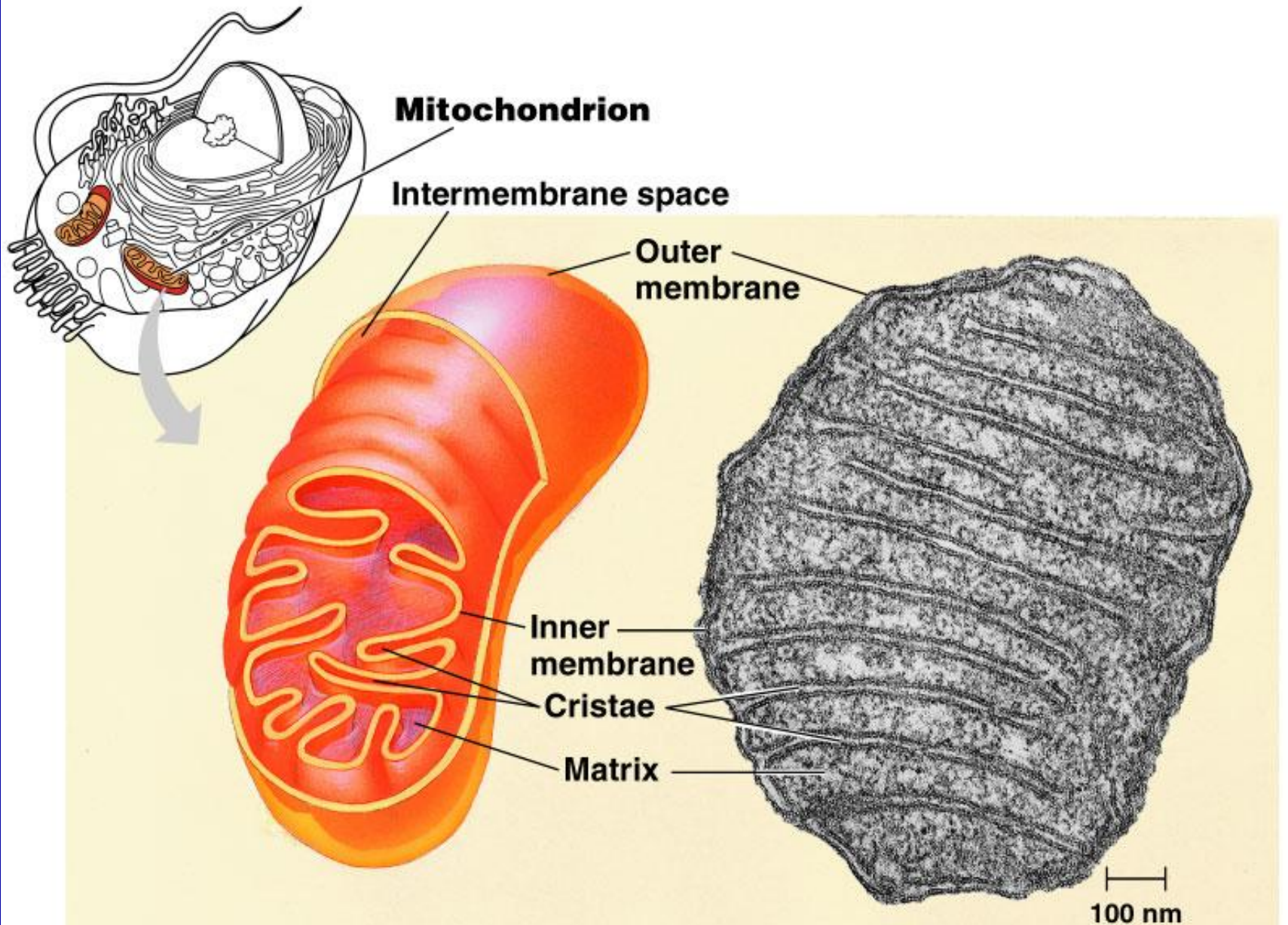
Responsible for shipping, packaging products of the ER



Mitochondria

- POWERHOUSE of the cell
- Where Cellular Respiration occurs (breaking down of food)
- Where ATP is made
- Lots of folds “cristae” for greater surface area

Figure 7.17 The mitochondrion, site of cellular respiration



RIBOSOMES: Site for protein synthesis

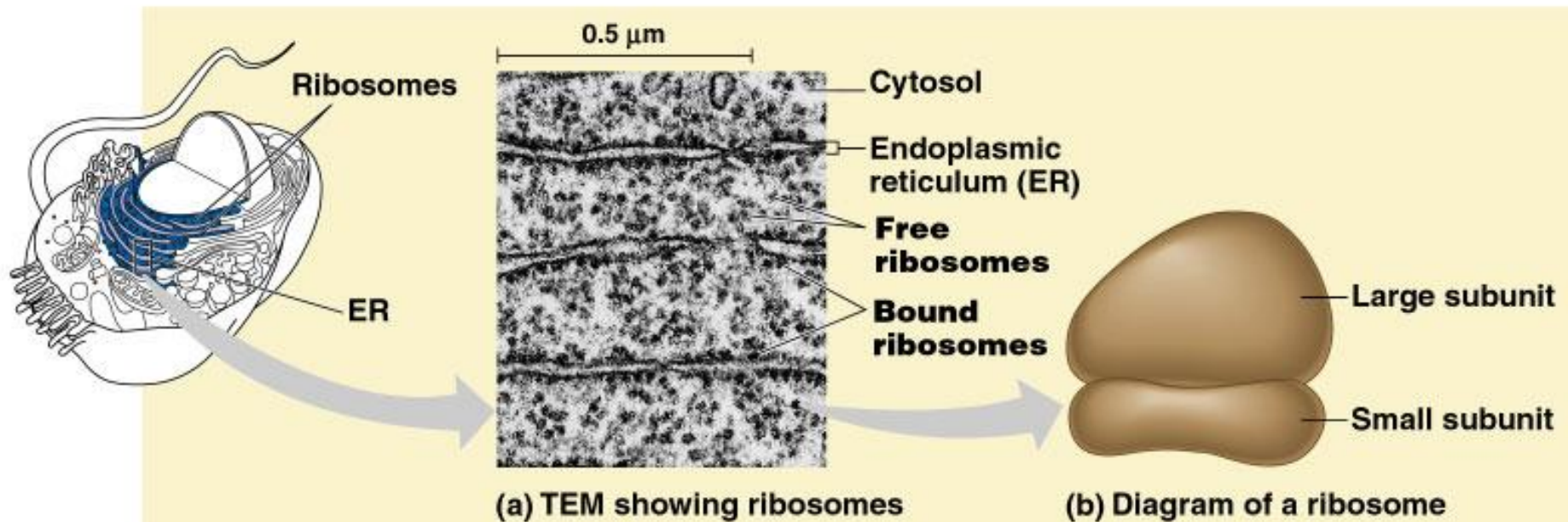
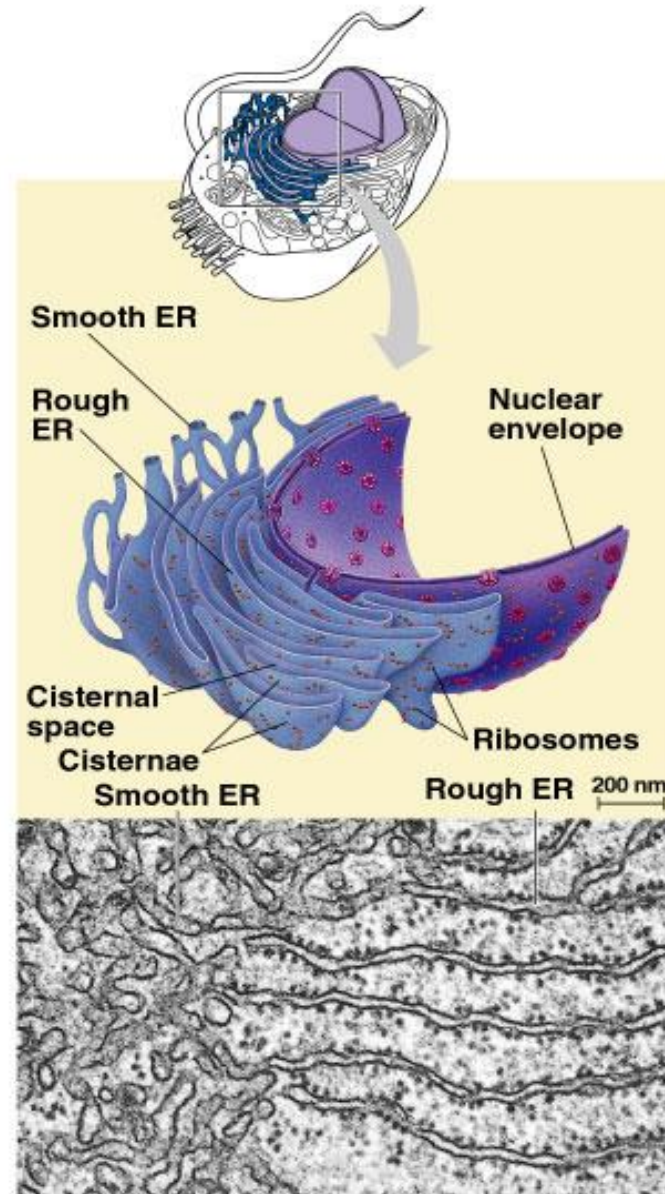


Figure 7.11 Endoplasmic reticulum (ER)

ER: synthesizes products for the cell.

Smooth ER:
Contains no ribosomes

Rough ER:
Contains ribosomes

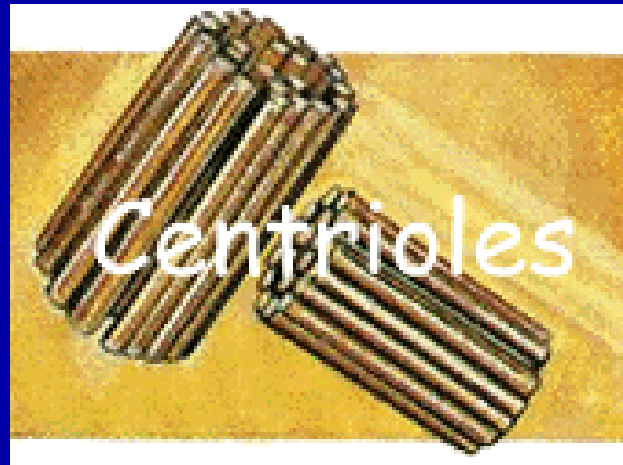


**ORGANELLES
FOUND IN
ONLY
ANIMAL CELLS**

ANIMAL CELLS ONLY

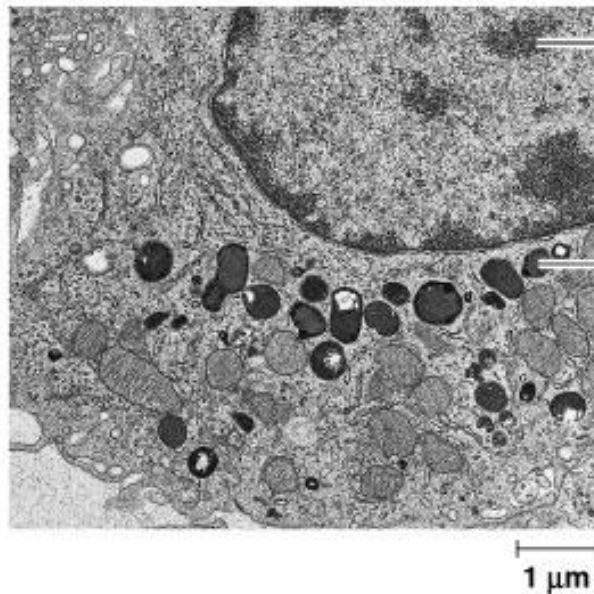
CENTRIOLE

- Small part of animal cell that helps in cell division



LYSOSOME:

Digests old worn out particles and/or waste



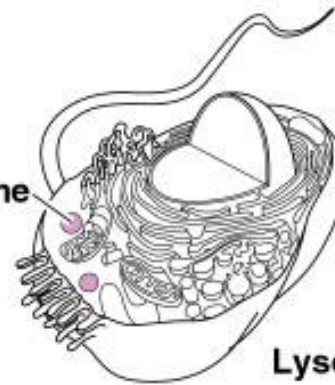
Nucleus

Lysosome

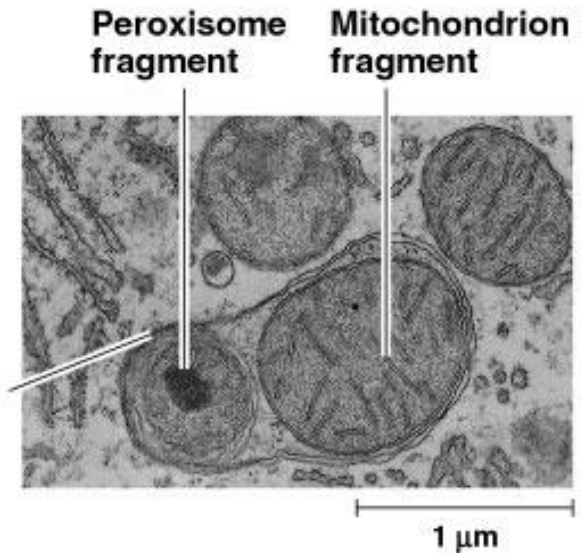
1 μm

(a) Lysosomes in a white blood cell

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Lysosome



Peroxisome
fragment

Mitochondrion
fragment

1 μm

(b) A lysosome in action

**ORGANELLES
FOUND IN
ONLY
PLANT CELLS**

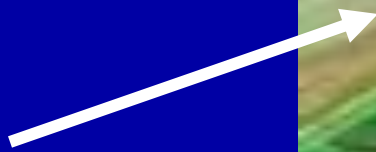
Another boundary that surrounds the plasma membrane.

It is INFLEXIBLE.

Found only in PLANT cells, fungi and some protists.

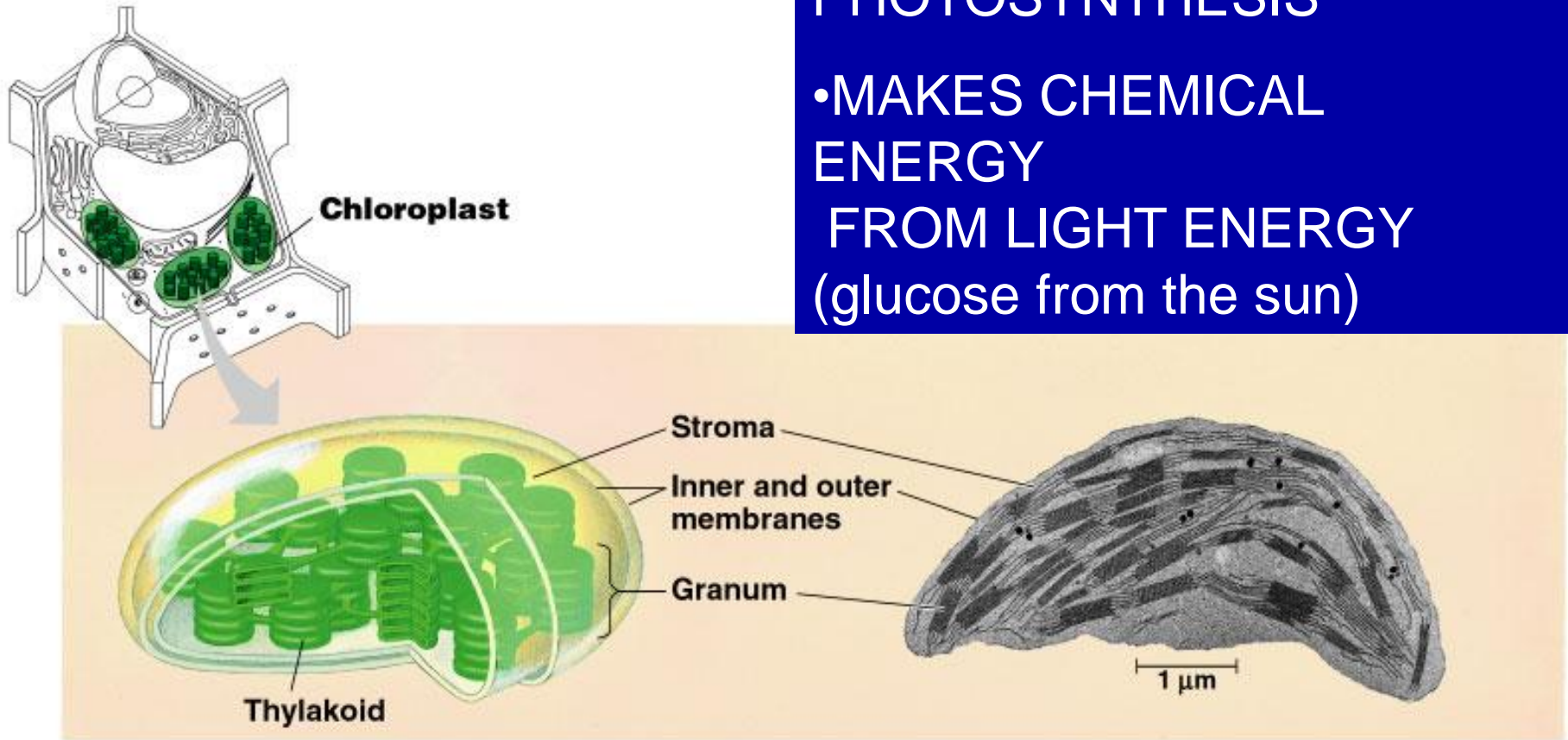
Contains cellulose and chitin to give it support.

Cell Wall



CHLOROPLASTS

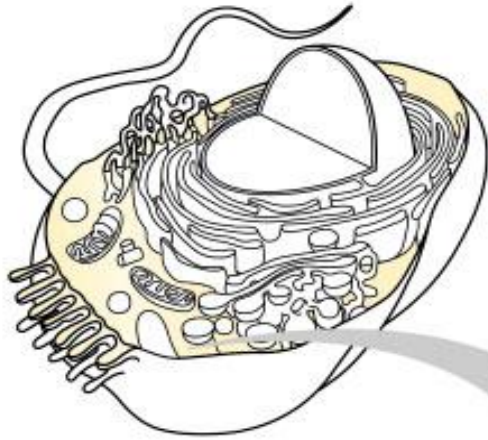
- ONLY FOUND IN AUTOTROPHS
- SITE OF PHOTOSYNTHESIS
- MAKES CHEMICAL ENERGY FROM LIGHT ENERGY (glucose from the sun)



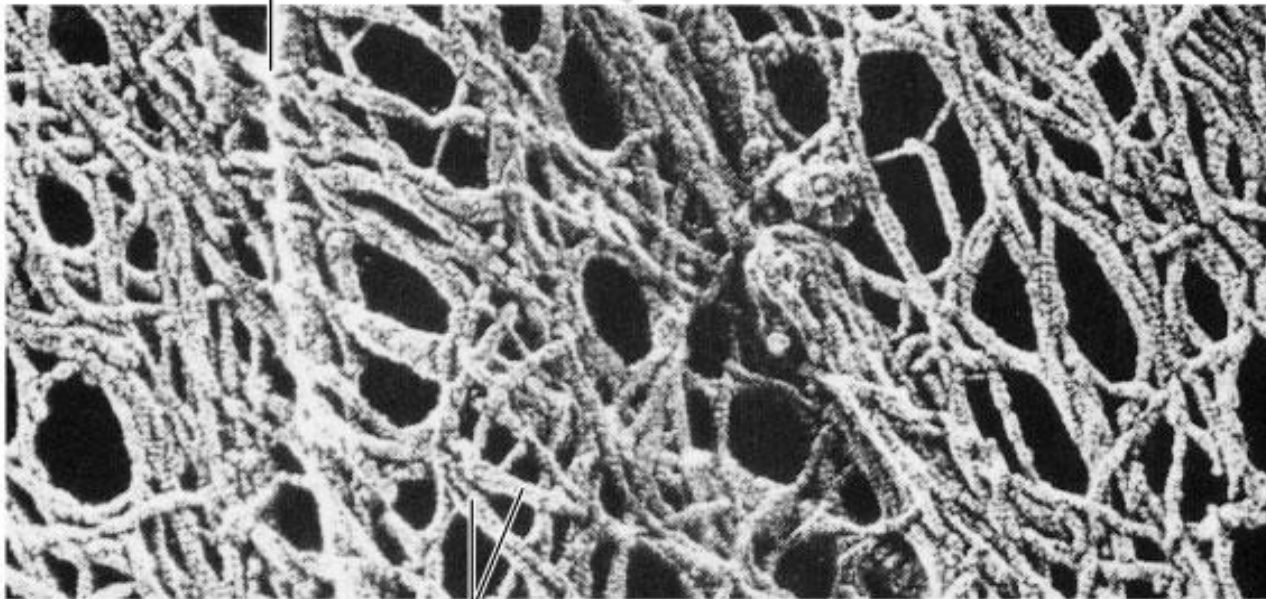
Cellular Structures for Support

- **Microtubules:**
 - cell motility (as cilia or flagella)
 - cell shape
- **Microfilaments:**
 - Maintenance of cell shape and changes in shape
 - Cell motility (as pseudopodia)

Figure 7.20 The cytoskeleton



Microtubule



Microfilaments

0.25 μm

ORGANELLES FOR MOVEMENT

- Cilia: tiny hairlike particles that beat against each other to propel the organism.
- Flagella: long whip-like tail that propels the organism.

Figure 7.23 A comparison of the beating of flagella and cilia

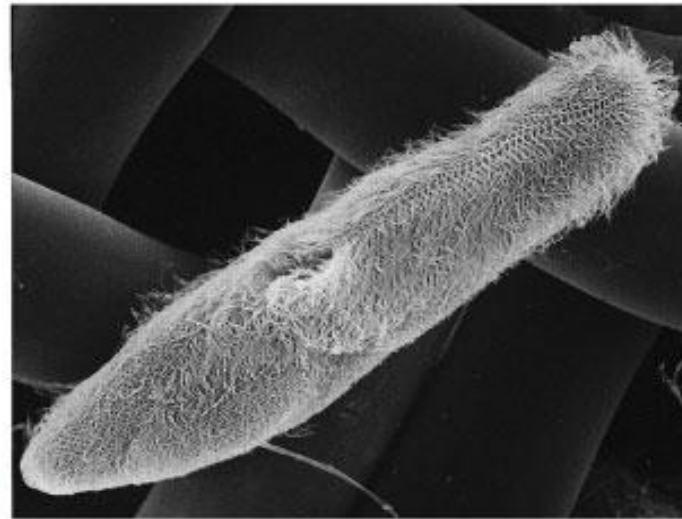
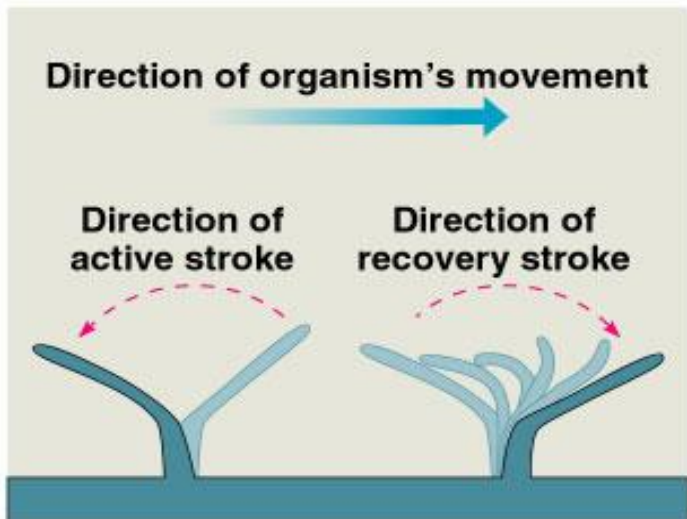
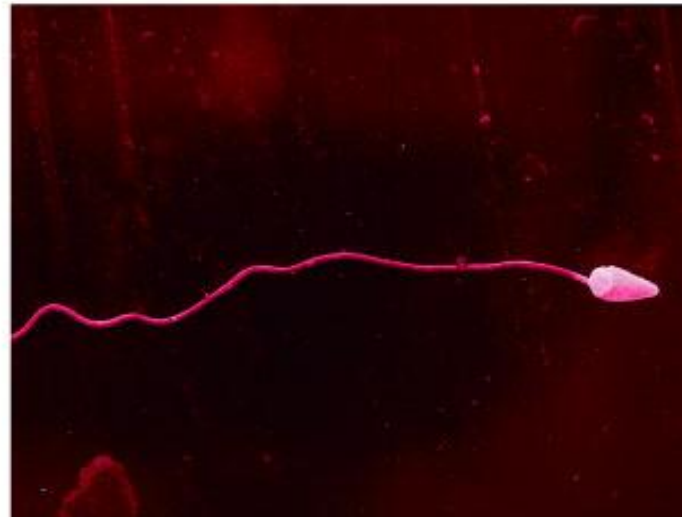
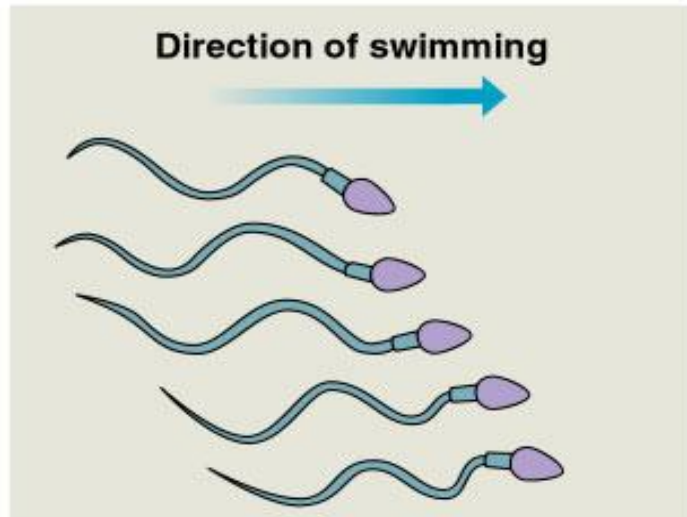


Figure 7.23x Sea urchin sperm

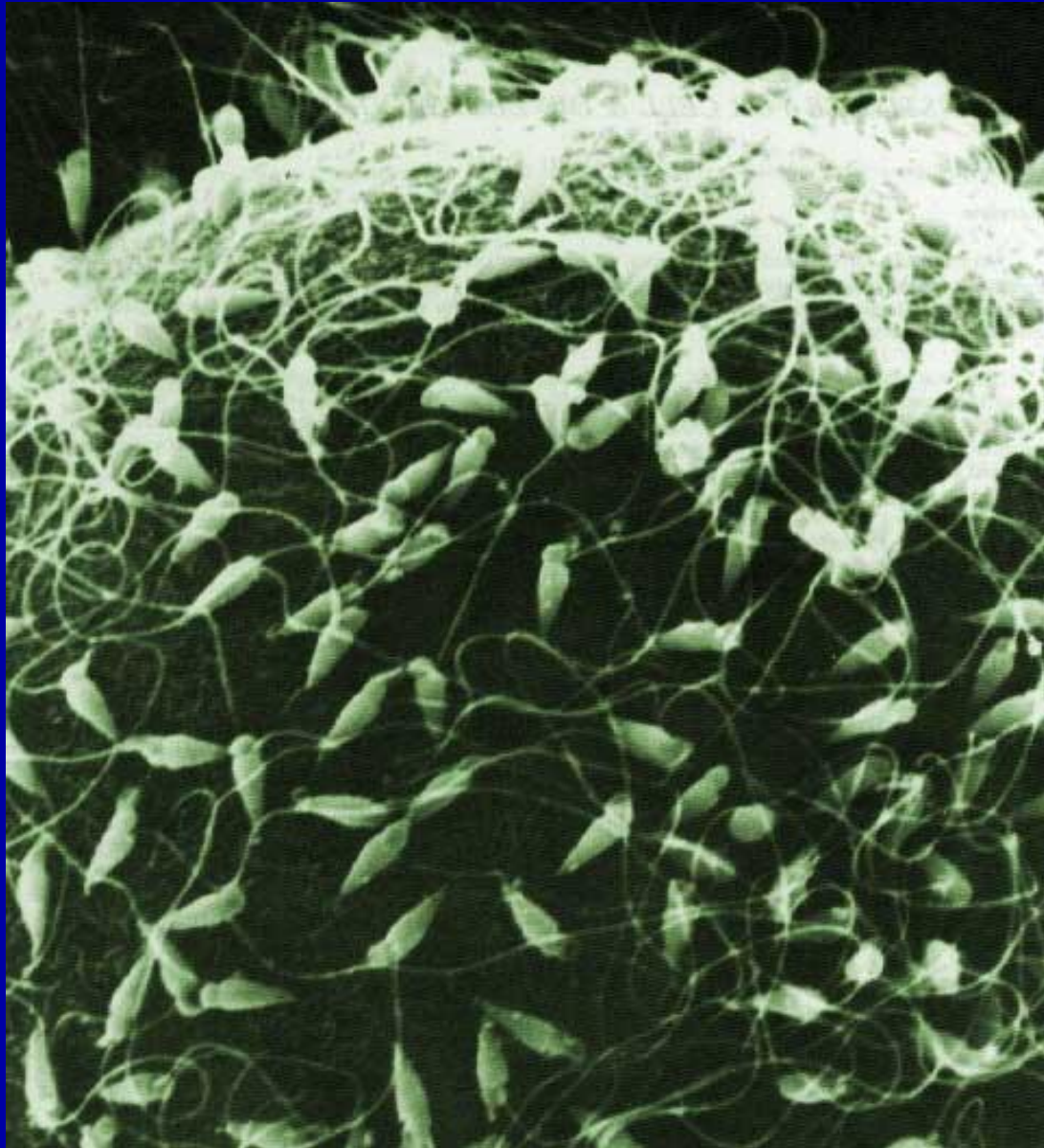


Figure 7.7 Overview of an animal cell

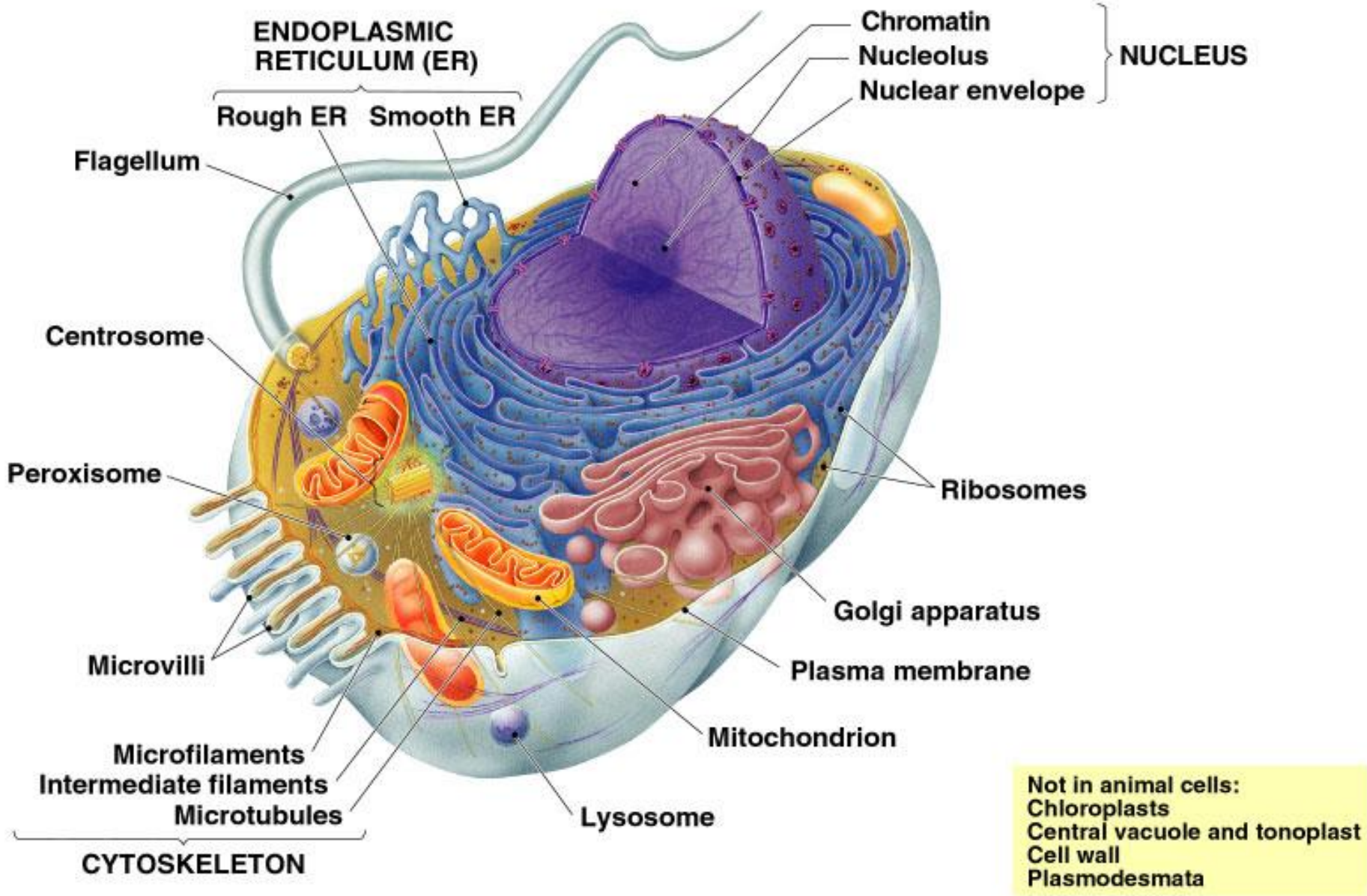


Figure 7.8 Overview of a plant cell

