

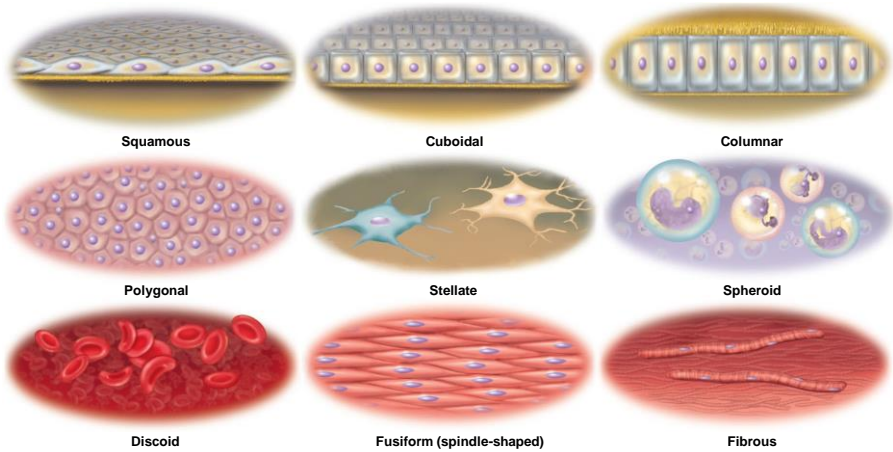


## Cytology: The Study of Cells



# ST. CATHERINE UNIVERSITY Cell Shapes

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# Cells

- First living level of organization
- Primary Components:
  - Cell Membrane
  - Cytoskeleton
  - Cytoplasm
    - Cytosol
    - Organelles

# Cell Surface

## Cell Membrane

### Functions:

- Defines boundaries and protects the cell
- Controls interactions with other cells
- Controls movement of materials into and out of the cell

### Structure

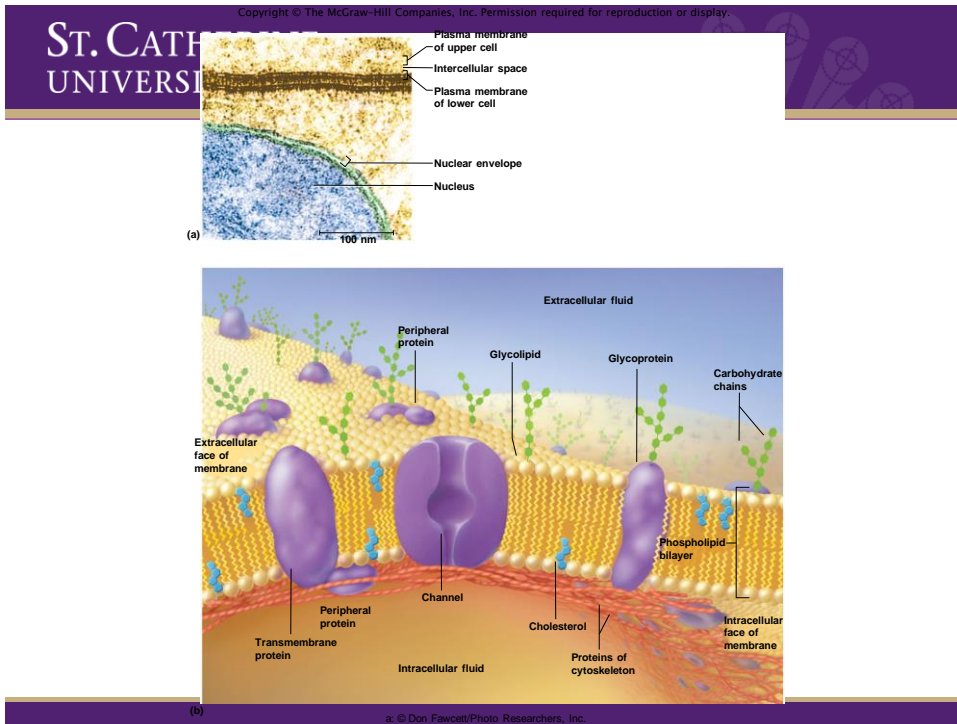
- Bilayer membrane
- Phospholipids
  - Hydrophilic vs. Hydrophobic
- Cholesterol
- Glycolipids
- Membrane proteins

## Membrane Protein Functions

- Membrane Protein Functions
  - Receptors
  - Second-messengers
  - Enzymes
  - Channel proteins
  - Carriers
  - Cell-identity markers
  - Cell-adhesion molecules

## Cell Membrane, continued

- Surface Extensions
  - Microvilli
  - Cilia
  - Flagella



## Membrane Transport

- Mechanisms for moving substances across the cell membrane
- Passive Vs. Active
- Examples
  - Filtration
  - Simple diffusion
  - Osmosis
  - Carrier-Mediated Transport
    - Facilitated Diffusion
    - Active Transport
  - Vesicular Transport
    - Endocytosis
    - Exocytosis

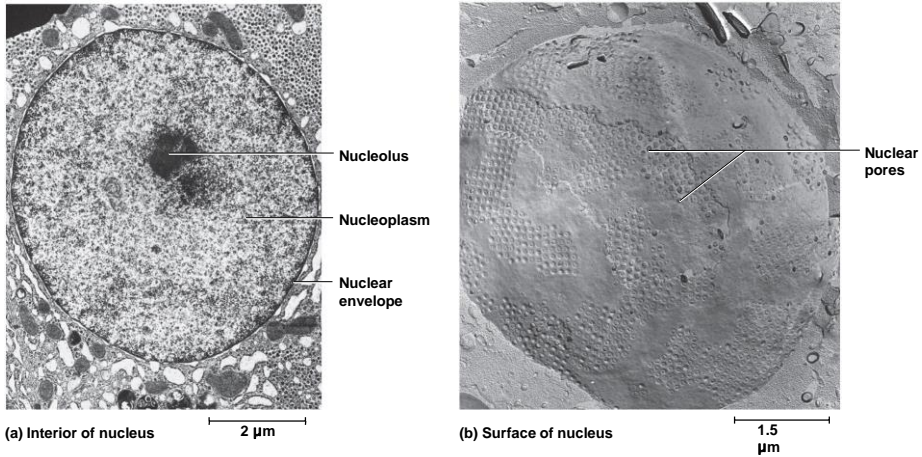
## Cytoplasm

- Cytoplasm
  - Cytosol
  - Organelles

## Organelles

- Nucleus
  - “Control Center”
  - Found in most cells
  - Contains DNA
  - Surround by a bilayer membrane
    - Nuclear envelope
  - Contains the nucleolus
    - Produce Ribosomes

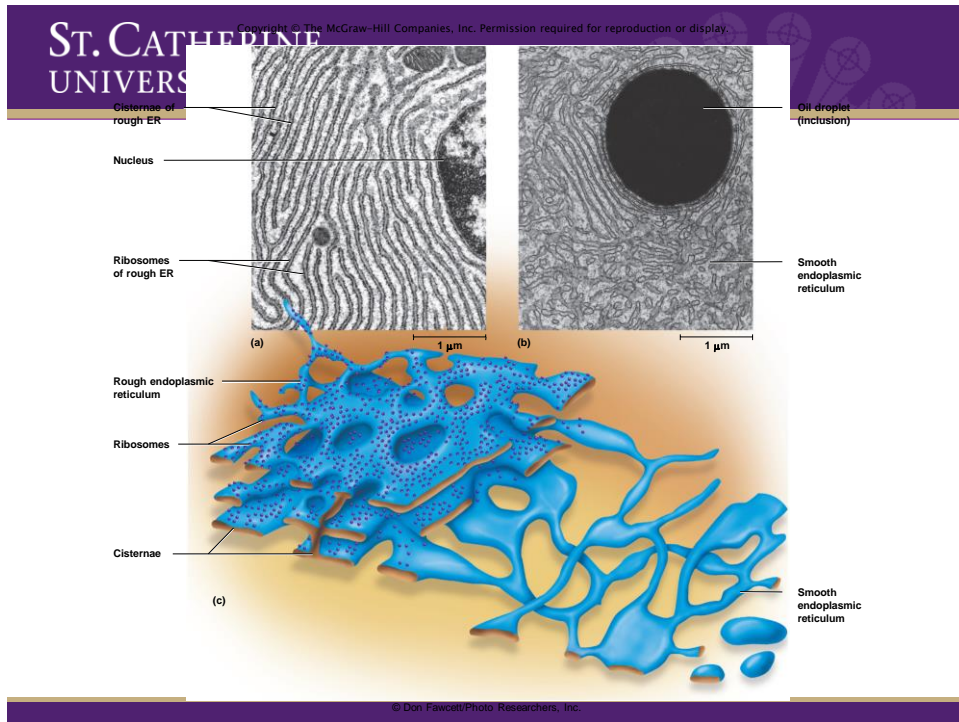
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## Organelles Cont'd

### Endoplasmic Reticulum (ER)

- System of interconnected channels called cisternae
- 2 types
  - Rough
  - Smooth

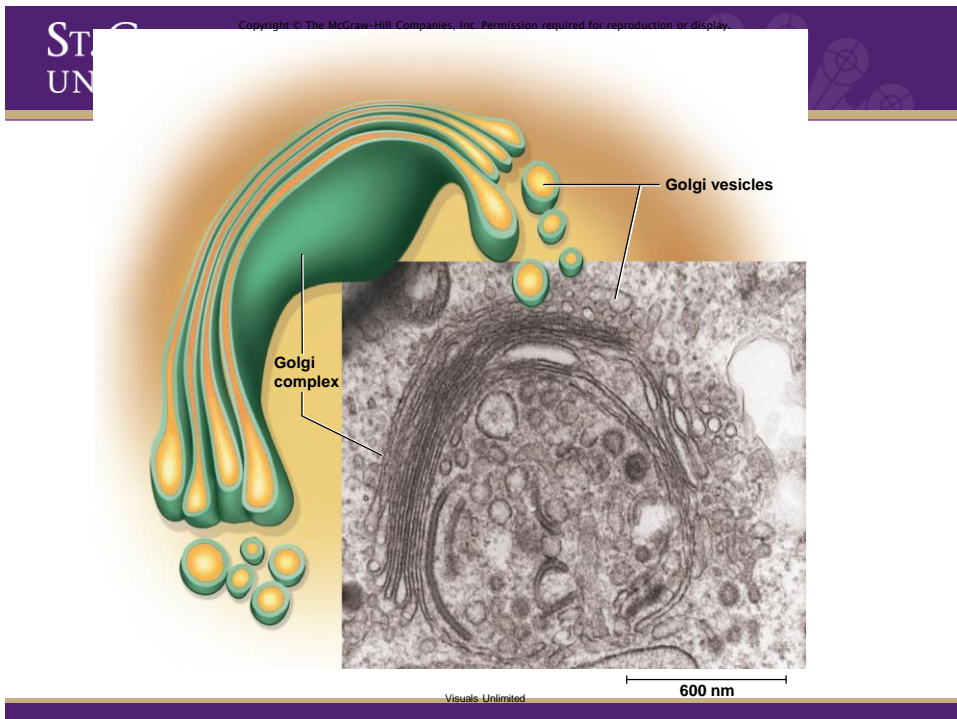


## Organelles Cont'd

- Ribosomes
  - Produced in the nucleolus of the nucleus
  - Found attached to rough ER and free in cytosol
  - Reads the genetic material and produces peptides and proteins

## Organelles Cont'd

- Golgi Complex
  - Small stacks of cisternae
  - Finishes off proteins and synthesizes carbs
  - Golgi vesicles transport products





## Organelles Cont'd

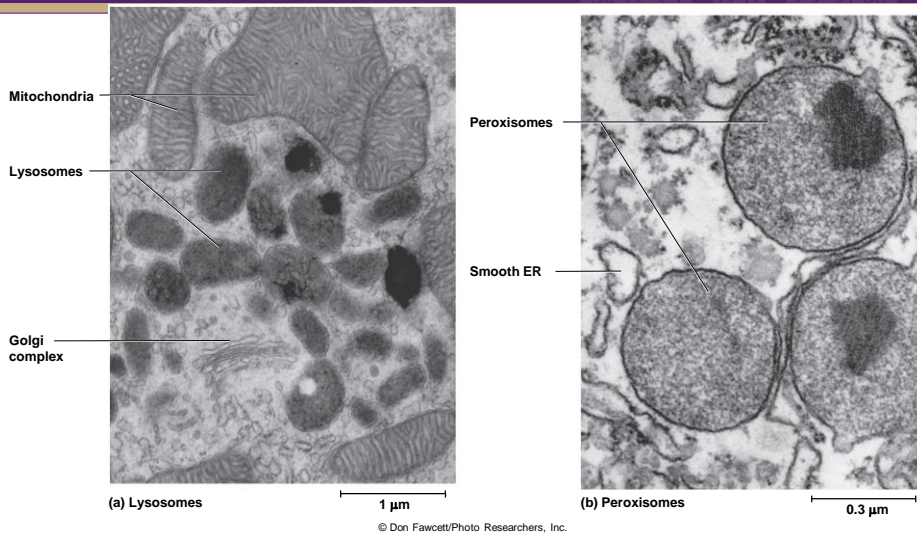


- Lysosomes
    - Specialized type of Golgi Vesicle
    - Small hollow pockets
    - Contain digestive enzymes
    - Travel through cell and breakdown unwanted materials
- 

## Organelles Cont'd

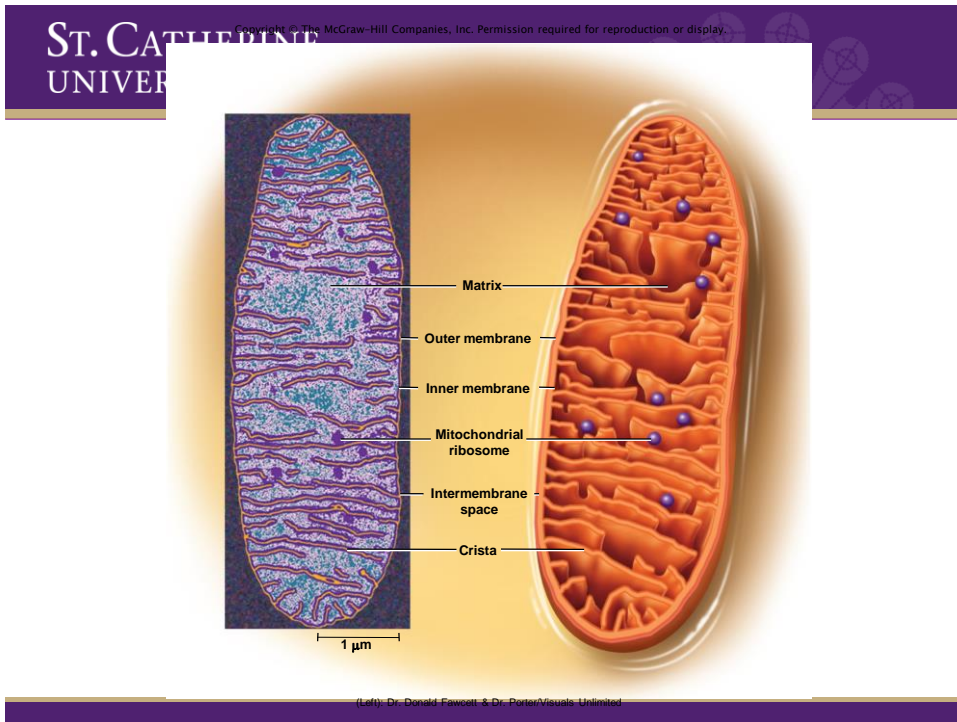


- Peroxisomes
    - Resemble Lysosomes
    - Produced by Endoplasmic Reticulum
    - Help to detoxify cytosol
-



## Organelles Cont'd

- Mitochondria
  - Oval in shape
  - Internal folds known as Cristae
  - Synthesize ATP



## Organelles Cont'd

- Centrioles
  - Short cylindrical assembly of microtubules
  - Found in pairs
  - Perpendicular to one another
  - Used in cell division

