

## **Anatomy and Physiology 121: The Cell**

**Cells** = the basic unit of life, smallest unit to carry out **metabolism**

Composite animal cell: animal cells vary widely, hypothetical example.

- cells can vary in size, shape, content and function
- ex. Nerve cells, epithelial, muscle

### *Cytology*

Three major parts:

- 1) Cell membrane
- 2) Nucleus
- 3) Cytoplasm
  - cytoplasmic organelles

### Cell Membrane

- Flexible, elastic
- Sealable
- Selectively permeable
- Signal transduction

### MEMBRANE STRUCTURE

- Fluid mosaic model
  - Phospholipid bilayer
  - Proteins
- Intercellular junctions
  - Tight junctions
  - Desmosomes
  - Gap junctions

### Cytoplasm

- Clear fluid of cell
- Cytosol and Organelles
- Cytoskeleton

### Organelles (Table 3.2)

- 1) Endoplasmic reticulum

- tubular transport system
- 2) Ribosomes
  - manufacture proteins
- 3) Golgi apparatus
  - refines, modifies, packages and delivers proteins
- 4) Mitochondria
  - produce energy in the form of **adenosine triphosphate**
- 5) Lysosomes and Peroxisomes
- 6) Centrosome
  - contains centrioles, used for reproduction, cilia and flagella
- 7) Cilia and flagella
- 8) Vesicles
- 9) Microfilaments and microtubules

### **Nucleus**

- cell control center
- nucleus, nuclear envelope, nuclear pores
  - 1) Nucleolus
  - 2) Chromatin

### **Movement into and out of the cell: (Table 3.3)**

- 1) Passive processes
  - A) Diffusion
  - B) Facilitated diffusion
  - C) Osmosis
  - D) Filtration
- 2) Active processes
  - A) Active transport
  - B) Endocytosis
    - pinocytosis, phagocytosis, receptor mediated
  - C) Exocytosis
  - D) Transcytosis

### **The Cell Life Cycle**

- circular (know Figure 3.34)
- distinct stages
  - 1) Interphase
  - 2) Mitosis
  - 3) Cytokinesis
  - 4) Differentiation

## Cell Life Cycle

- I. Interphase
  - A. G one
  - B. S
  - C. G two
- II. Mitosis
  - A. Prophase
  - B. Metaphase
  - C. Anaphase
  - D. Telophase

- Cytokinesis
- Cellular differentiation

## Control of Cell Division

### Cancerous Cells

- Tumor
- Malignant
- Benign