CONCEPT: LYSOSOMAL AND OTHER DEGRADATIVE PATHWAYS

Lysosomal Characteristics and Sorting

● The lysosome contains many enzymes that _____ intracellular and extracellular materials

□ The lysosomal lumen is extremely acidic

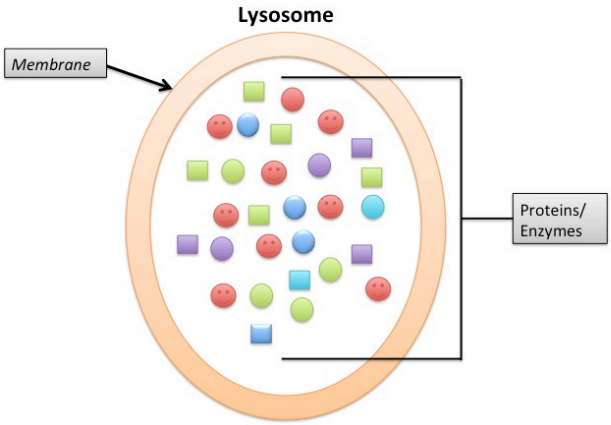
- ATP H^+ pump controls the acidity by pumping protons into the lysosome

- Lysosomal membrane is protected from the acidity due to glycosylation on the lipids and proteins

□ **Lysosomal acid hydrolases** are enzymes within the lysosomal lumen that breakdown materials

- Around 50 types in each lysosome

EXAMPLE: Lysosome with a variety of lysosomal acid hydrolases



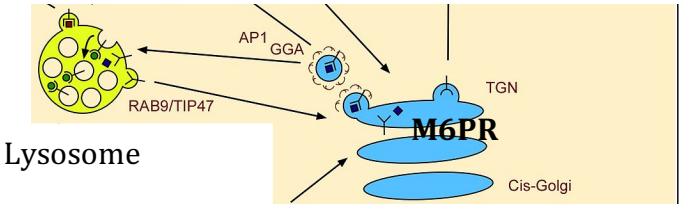
● Proteins destined for the lysosome must contain the appropriate _____

□ A **mannose 6 phosphate tag** is added onto lysosomal proteins in the Golgi

- This tag is recognized by lysosomal receptors in the Golgi

- Proteins with this tagged are sorted into transport vesicles destined for the lysosome

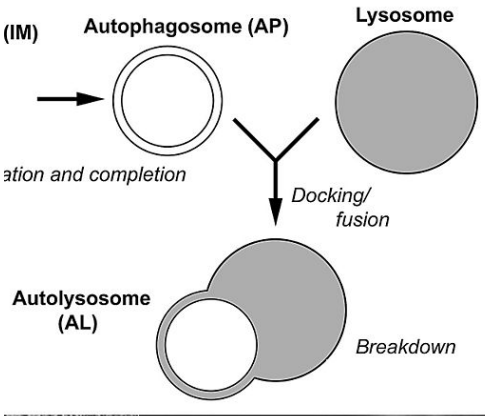
EXAMPLE: Mannose 6-phosphate tag directing proteins to the lysosome



Other Degradation Pathways

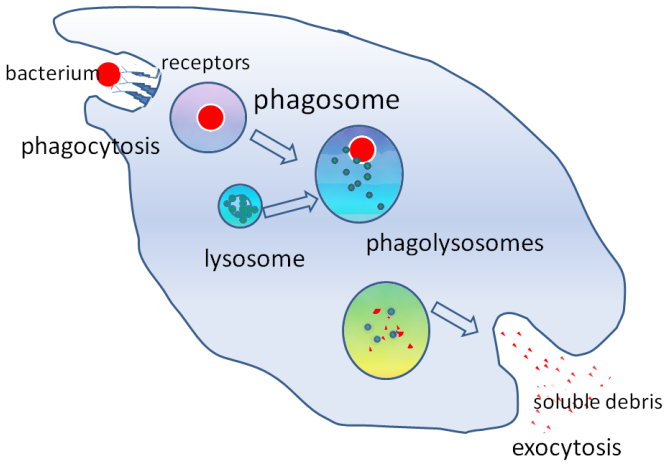
- **Autophagy** is the process of the cell "eating" itself by _____ large molecules or organelles
  - □ **Autophagosomes** form by enclosing old organelles with a double membrane
    - This large membrane fuses with the lysosome (*autolysosome)* for degradation
    - Also called **macrophagy** (*microphagy* is a smaller vessel with a single bilayer)

EXAMPLE: Autophagosome and autolysosome formation



- **Phagocytsosis** is the process of the cell internalizing large particles from the extracellular environment for degradation
  - □ **Phagosomes** form by enclosing the molecules with a _____ membrane
    - This large membrane fuses with the lysosome (*phagolysosome*) for degradation

EXAMPLE: Overview of Phagocytosis



PRACTICE:

1. Which of the following terms describes the cell eating itself?
    a. Lysosomal degradation
    b. Autophagy
    c. Phagocytosis
    d. Pinocytosis

2. The mannose 6 phosphate tag is added onto proteins for what region?
    a. Targets them to the lysosome for their function
    b. Targets them to the lysosome for degradation
    c. Targets them for autophagosomes
    d. Targets them to the cytoplasm

3. Macrophagy differs from microphagy in which of the following ways?
    a. Macrophagy degrades proteins and microphagy degrades small molecules
    b. Macrophagy is involved in cell death, microphagy is involved with taking things into the cell
    c. Macrophagy uses two membranes, microphagy uses one membrane
    d. Macrophagy uses autophagosomes, microphagy uses lysosomes