

To get the total magnification take the power of the objective (4X, 10X, 40x) and multiply by the power of the eyepiece, usually 10X.

## Magnification

- Magnification is the **enlargement of the image**
- The magnification of a microscope is given by-

$$M_{\text{microscope}} = M_{\text{ocular}} \times M_{\text{eyepiece}}$$

- Generally used class microscope has following magnification-

	<b>Magnification</b>	<b>Ocular lens</b>	<b>Total Magnification</b>
<b>Scanning</b>	4x	10x	40x
<b>Low Power</b>	10x	10x	100x
<b>High Power</b>	40x	10x	400x

# Total Magnification:

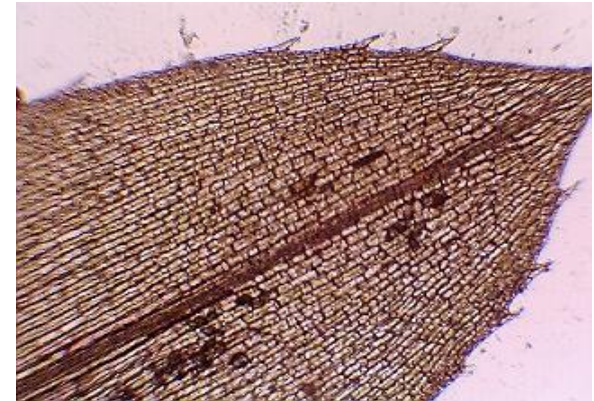


**X**



**= 40 X**

4X Scanning Objective 10X Eyepiece



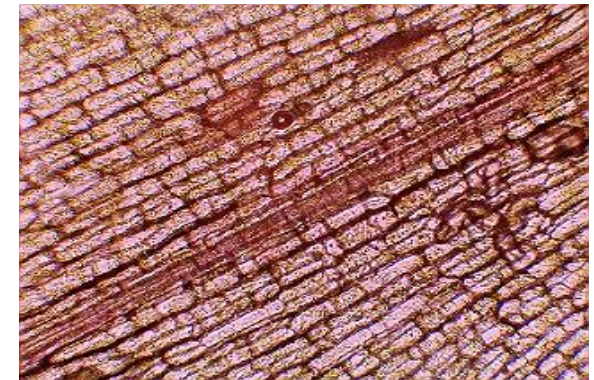
**X**



**= 100 X**

10X Objective

10X Eyepiece



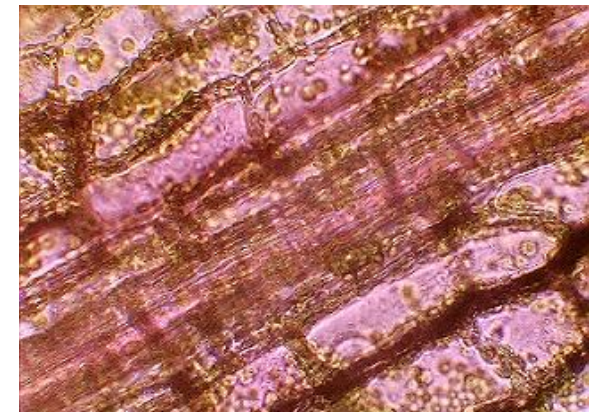
**X**



**= 400 X**

40X Objective

10X Eyepiece





# Organelles of Animal Cells

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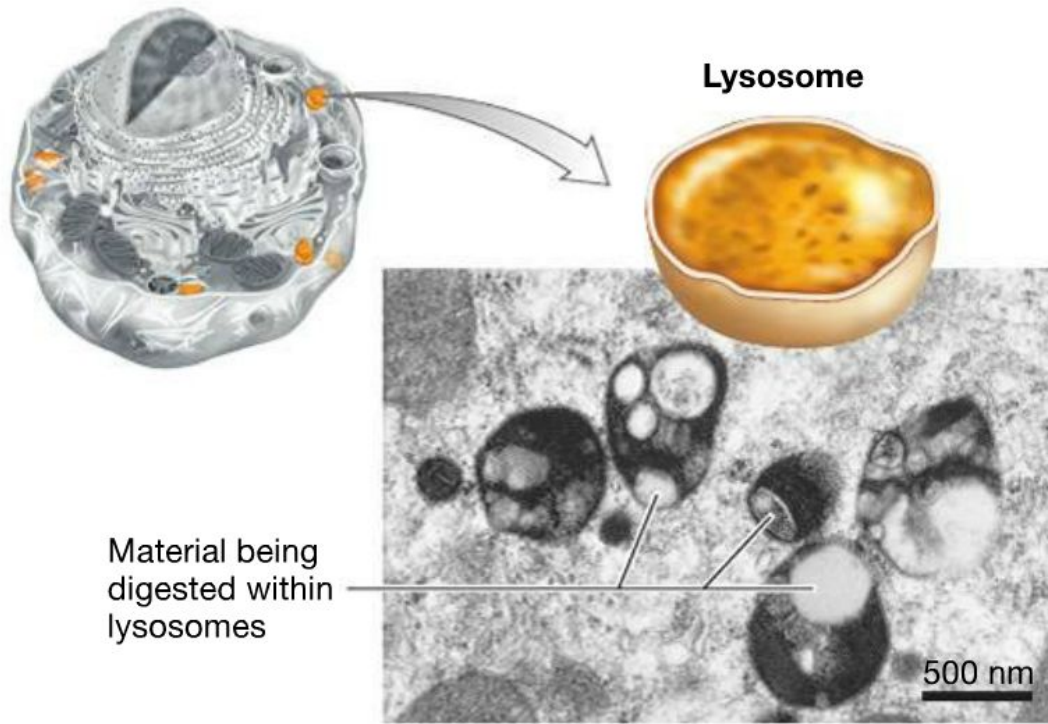
- Endoplasmic reticulum (ER)
- Ribosomes
- Golgi Body
- Peroxisomes
- Lysosomes
- Mitochondria
- Cell Nucleus



## Functions of organelles

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- compartmentalize a cell's activities
- keep reactions isolated from one another
- increase efficiency in the cell



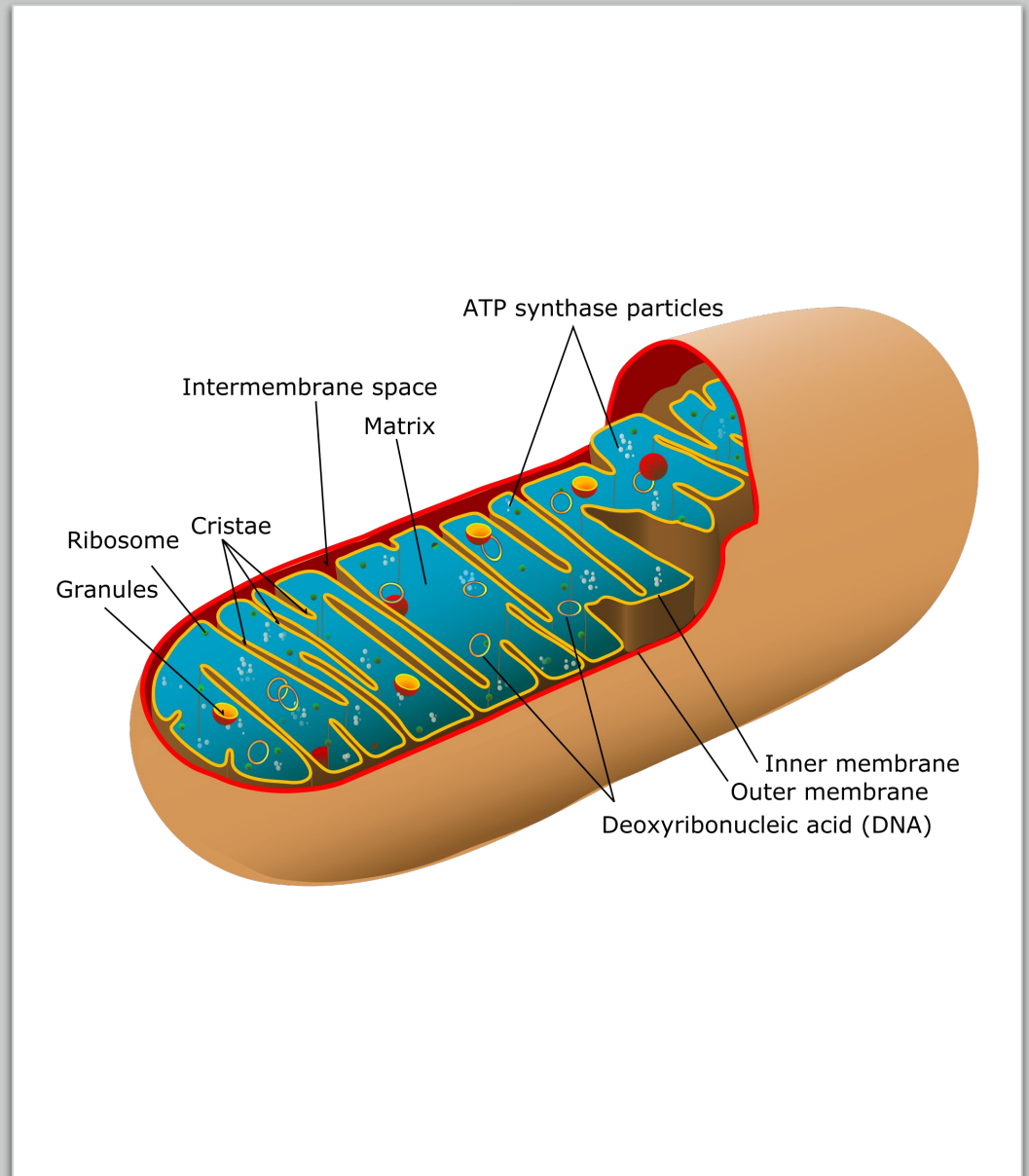
**FIGURE 7.13 Lysosomes Are Recycling Centers.** Lysosomes are usually oval or globular and have a single membrane.

## Lysosomes (or suicide sacs)

- Vesicles containing > 40 types of digestive enzymes
- These enzymes are called *acid hydrolases*
- The interior of lysosome is acidic (pH 5.0)
- Function to recycle damaged organelles, break down cellular byproducts & destroy invading microbes

# Mitochondria

- double-membrane: outer is smooth inner is highly folded (cristae)
- contain DNA, ribosomes
- can grow and divide independently of cell division
- mitochondria are rod-shaped organelles that can be considered the power generators of the cell, converting oxygen and nutrients into adenosine triphosphate (ATP).
- **ATP** is the chemical energy "currency" of the cell that powers the cell's metabolic activities. This process is called aerobic respiration.



# Mitochondria I DNA

- Mitochondrial DNA contains 37 genes. Compared to nuclear DNA, which contains some 20,000 encoding genes.
- This DNA is maternally inherited – males and females inherit a copy of MtDNA from their mother. (Nuclear DNA, on the other hand, is inherited equally from both parents; a child will inherit 50% of their nuclear DNA from the mother and the other 50% from their father).
- A MtDNA copy is passed down entirely unchanged, through the maternal line.
- For instance, scientists have used MtDNA to compare the DNA of living humans of diverse origins to build evolutionary trees.
- [MtDNA analyses](#) suggest humans originated in Africa, appeared in one founding population some 170,000 years ago, then migrated to other parts of the world.

