



Cell Structure: Subcellular Components

SYI-1.D.1

Ribosomes comprise ribosomal RNA (rRNA) and protein. Ribosomes synthesize protein according to mRNA sequence.

SYI-1.D.2

Ribosomes are found in all forms of life, reflecting the common ancestry of all known life.



Cell Structure: Subcellular Components

SYI-1.D.3

Endoplasmic reticulum (ER) occurs in two forms—smooth and rough. Rough ER is associated with membrane-bound ribosomes—

- a. Rough ER compartmentalizes the cell.
- b. Smooth ER functions include detoxification and lipid synthesis.



Cell Structure: Subcellular Components

SYI-1.D.4

The Golgi complex is a membrane-bound structure that consists of a series of flattened membrane sacs—

- a. Functions of the Golgi include the correct folding and chemical modification of newly synthesized proteins and packaging for protein trafficking.



Cell Structure: Subcellular Components

SYI-1.D.5

Mitochondria have a double membrane. The outer membrane is smooth, but the inner membrane is highly convoluted, forming folds.

SYI-1.D.6

Lysosomes are membrane-enclosed sacs that contain hydrolytic enzymes.



Cell Structure: Subcellular Components

SYI-1.D.7

A vacuole is a membrane-bound sac that plays many and differing roles. In plants, a specialized large vacuole serves multiple functions.

SYI-1.D.8

Chloroplasts are specialized organelles that are found in photosynthetic algae and plants. Chloroplasts have a double outer membrane.



Which organelle is responsible for detoxification and storage of Ca^{2+} ?

- A. Golgi Bodies**
- B. Lysosome**
- C. Rough ER**
- D. Smooth ER**

Which organelle is responsible for detoxification and storage of Ca^{2+} ?

D. Smooth ER



The smooth ER has multiple functions in the cell

- Storage of Calcium
- Detoxification
- Lipid Synthesis



Which organelle is responsible for modification of proteins?

- A. Golgi Bodies**
- B. Lysosome**
- C. Rough ER**
- D. Smooth ER**

**Which organelle is responsible for modification of proteins?
A. Golgi Bodies**



The Golgi Bodies will receive the proteins from the Rough ER. It will then package and modify the products from the rough ER before sorting and sending to another part of the cell.



Which organelle is responsible for digestion of macromolecules?

- A. Golgi Bodies**
- B. Lysosome**
- C. Rough ER**
- D. Smooth ER**

Which organelle is responsible for digestion of macromolecules?

B. Lysosome



The lysosome is a sac with hydrolytic enzymes. These hydrolytic enzymes will undergo hydrolysis to digest macromolecules.

AP BIO INSTA-REVIEW

TOPIC

2.1



Describe two locations of ribosomes plus their function.

AP BIO INSTA-REVIEW

TOPIC

2.1

Describe two locations of ribosomes plus their function.



Ribosomes can be found bound or free. They all start out as free ribosomes. Then once they receive a single peptide, the free ribosomes can move through the rough ER membrane to continue their process. Ribosomes function in protein synthesis. If free, they produce cytosolic proteins. If bound, they produce membrane proteins or proteins for secretion.



Which organelle with highly folded cristae for ATP synthesis?

- A. Chloroplast**
- B. Mitochondria**

Which organelle with highly folded cristae for ATP synthesis?

B. Mitochondria



Recall: the cristae is the inner membrane of the mitochondria.

The electron transport chain takes place here generating the proton gradient that is used by ATP synthase in chemiosmosis to synthesize ATP.



Which organelle with highly folded thylakoid for ATP synthesis?

- A. Chloroplast**
- B. Mitochondria**

AP BIO INSTA-REVIEW

TOPIC

2.1

Which organelle with highly folded thylakoid for ATP synthesis?

A. Chloroplast



Recall: the thylakoid are membraneous sacs in the chloroplasts. During the light reactions, the proton gradient is generated then used to synthesize ATP for the Calvin Cycle.



Which organelle that aids in turgid pressure in plant cells?

- A. Central vacuole**
- B. Contractile vacuole**
- C. Food vacuole**
- D. Transport vesicle**

Which organelle that aids in turgid pressure in plant cells?

A. Central vacuole



Central vacuole is found in plant cells and is mostly responsible for maintaining the turgor pressure due to the storage of water. This turgor pressure allows the plant cells to be turgid (in a hypotonic environment).

Additionally, nutrients, enzymes, and wastes can also be stored.



Which organelle fuses with lysosome?

- A. Central vacuole**
- B. Contractile vacuole**
- C. Food vacuole**
- D. Transport vesicle**

**Which organelle fuses
with lysosome?**

C. Food vacuole



During phagocytosis (cellular eating), the pseudopodia surrounds the food creating the food vacuole. This membranous sac will fuse with the lysosome to assist with digestion of the food materials.



**Which organelle is produced by
Rough ER and Golgi after their
function?**

- A. Central vacuole**
- B. Contractile vacuole**
- C. Food vacuole**
- D. Transport vesicle**

AP BIO INSTA-REVIEW

TOPIC

2.1

Which organelle is produced by Rough ER and Golgi after their function?

D. Transport vesicle



Transport vesicles are created from the membrane of the rough ER and Golgi bodies as materials are transported throughout the cell carrying materials from one organelle to another organelle.

AP BIO INSTA-REVIEW

TOPIC

2.1



How does a contractile vacuole function in osmoregulation?

How does a contractile vacuole function in osmoregulation?



Found in protists that live in a hypotonic environment. This organelle will contract to push water out of the organism as water rushes in to inhibit cell from lysing



What makes up ribosomes?

- A. mRNA & proteins**
- B. mRNA & tRNA**
- C. rRNA & proteins**
- D. rRNA & tRNA**

**What makes up
ribosomes?**

C. rRNA & proteins



rRNA is the ribosomal RNA. This RNA folds with proteins to create the large and small subunits of the ribosomes.



What binds to the small subunit of a ribosome?

- A. DNA**
- B. mRNA**
- C. rRNA**
- D. tRNA**

What binds to the small subunit of a ribosome?

B. mRNA



The ribosome is arranged with the large subunit on "top" and the small subunit on "bottom". The large subunit has the A, P, and E sites for the tRNA and the small subunit binds to the mRNA for translation.



**What binds to the large subunit
of a ribosome?**

- A. DNA**
- B. mRNA**
- C. rRNA**
- D. tRNA**

What binds to the large subunit of a ribosome?

D. tRNA



The ribosome is arranged with the large subunit on "top" and the small subunit on "bottom". The large subunit has the A, P, and E sites for the tRNA and the small subunit binds to the mRNA for translation.

AP BIO INSTA-REVIEW

TOPIC

2.1



**Name the three types of RNA
and their functions**

Name the three types of RNA and their functions



mRNA (messenger RNA) is the RNA transcript synthesized from the DNA template. This binds to the ribosome to provide the codon sequence that is read to synthesize a polypeptide.

rRNA (ribosomal RNA) is the RNA that comprises the ribosome. It binds with protein to make the ribosome.

tRNA (transfer RNA) will transfer amino acids to the ribosome to allow for translation.



Which organelle synthesizes cytosolic proteins?

- A. Free Ribosomes**
- B. Golgi Bodies**
- C. Rough ER**
- D. Smooth ER**

Which organelle synthesizes cytosolic proteins?

A. Free Ribosomes



Cytosolic proteins are proteins found in the cytosol. This means that the ribosome will not be attached to a membrane since the protein is not in or surrounded by membrane. These ribosomes are called free ribosomes.



Which organelle synthesizes proteins for secretion or membrane bound?

- A. Free Ribosomes**
- B. Golgi Bodies**
- C. Rough ER**
- D. Smooth ER**

Which organelle synthesizes proteins for secretion or membrane bound?

C. Rough ER



Membrane bound proteins are in a membrane. Proteins for secretion are surrounded by a membrane. This means that the ribosome that synthesized these proteins must be attached to a membrane to allow for protein placements. The Rough ER is studded with ribosomes for this function.



Which organelle stores calcium?

- A. Free Ribosomes**
- B. Golgi Bodies**
- C. Rough ER**
- D. Smooth ER**

Which organelle stores calcium?

D. Smooth ER



The smooth ER has multiple functions in the cell

- **Storage of Calcium**
 - **Detoxification**
 - **Lipid Synthesis**

AP BIO INSTA-REVIEW

TOPIC

2.1



Which organelle sorts, modifies, and packages protein products?

- A. Free Ribosomes**
- B. Golgi Bodies**
- C. Rough ER**
- D. Smooth ER**

Which organelle sorts, modifies, and packages protein products?

B. Golgi Bodies



The Golgi Bodies are responsible for sorting, modifying, and packaging the protein products from the Rough ER. This occurs as the materials pass through each cisternae of the Golgi.



Which organelle has the role of detoxification?

- A. Free Ribosomes**
- B. Golgi Bodies**
- C. Rough ER**
- D. Smooth ER**

Which organelle has the role of detoxification?

D. Smooth ER



The smooth ER has multiple functions in the cell

- **Storage of Calcium**
 - **Detoxification**
 - **Lipid Synthesis**

AP BIO INSTA-REVIEW

TOPIC

2.1



**Describe the relationship
between ribosome, rough ER,
and Golgi?**

AP BIO INSTA-REVIEW

TOPIC

2.1

Describe the relationship between ribosome, rough ER, and Golgi?



mRNA binds to the ribosome to begin translation. The ribosome moves to the membrane of the rough ER to continue protein synthesis.

After synthesis the rough ER packages protein in a vesicle that leads to the Golgi to be modified before leaving the cell.



**Which organelle has the role of
Intracellular digestion?**

- A. Chloroplast**
- B. Lysosome**
- C. Mitochondria**
- D. Vacuole**

Which organelle has the role of Intracellular digestion?

B. Lysosome



The lysosome is a sac of hydrolytic enzymes. The enzymes assist the organelle in digesting macromolecules and defective organelles (autophagy).