

# What is the Endoplasmic Reticulum?

## Worksheet

The endoplasmic reticulum is a continuous membrane network in the cytoplasm that synthesizes and processes proteins (rough ER) and lipids (smooth ER), forming a transport pathway to the Golgi apparatus.

## Questions

1. Which feature distinguishes rough ER from smooth ER?

- A) Presence of ribosomes on its surface
- B) Location in the nucleus
- C) Ability to divide
- D) Presence of a cell wall

2. What is the main function of smooth ER in liver cells?

- A) Photosynthesis
- B) Detoxifying drugs and poisons
- C) Digesting bacteria
- D) Producing ATP

3. Proteins made on rough ER are typically destined for

- A) The Golgi apparatus for further processing
- B) Immediate destruction
- C) The mitochondria only
- D) The cell wall

4. Which organelle is directly connected to the nuclear envelope?

- A) Golgi apparatus
- B) Lysosome
- C) Endoplasmic reticulum
- D) Mitochondrion

5. A pancreatic cell must secrete large amounts of digestive enzymes. Which type of ER dominates, and why?

6. A liver cell is exposed to a new drug. Which organelle helps detoxify it and how?

7. A newly made protein enters the rough ER lumen. Trace its next likely destination.

8. Define: What is the endoplasmic reticulum?

9. Define: What makes rough ER 'rough'?

10. Define: What does smooth ER produce?

## Answer Key

1. A) Presence of ribosomes on its surface - Rough ER has ribosomes attached; smooth ER does not.
2. B) Detoxifying drugs and poisons - Smooth ER enzymes break down toxic substances.
3. A) The Golgi apparatus for further processing - They travel via vesicles to the Golgi apparatus.
4. C) Endoplasmic reticulum - The ER membrane is continuous with the outer nuclear membrane.
5. Digestive enzymes are proteins that must be secreted. Secreted proteins are made by ribosomes attached to rough ER. So the cell has an extensive rough ER network to mass-produce and fold these enzymes.
6. Detoxification of drugs is a lipid-based enzymatic process. Smooth ER contains enzymes (e.g., cytochrome P450) that modify toxic molecules. The smooth ER converts the drug into a water-soluble form for excretion.
7. The ribosome on rough ER synthesizes the protein and threads it into the ER lumen. Chaperone proteins fold it and check quality control. It buds off in a transport vesicle heading to the Golgi apparatus for further processing.
8. A network of membranous tubules and sacs in the cytoplasm that synthesizes, folds, and transports proteins and lipids.
9. Ribosomes attached to its outer surface, giving it a studded appearance under a microscope.
10. Lipids, steroid hormones, and it detoxifies drugs; it also stores calcium ions.

### **Bounlu**

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