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Golgi Apparatus

Study Guide — Cell Organelles

Pre-Med practice questions about Golgi structure, function, and protein sorting

6 items — Study Guide with Answers

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1 **Which of the following is a primary function of the Golgi apparatus?**

A Synthesis of ribosomal RNA.

B ATP production via oxidative phosphorylation.

C **Modification, sorting, and packaging of proteins received from the rough ER.** ✓

D Replication of mitochondrial DNA.

E Degradation of macromolecules at low pH.

▶ **Explanation:** The Golgi receives proteins and lipids from the ER, modifies them (e.g. glycosylation), and sorts them into vesicles for different destinations.

2 **A protein moves from the rough ER to the Golgi apparatus. Which face of the Golgi does it enter first?**

A Trans face.

B Medial face.

C **Cis face.** ✓

D Trans-Golgi network.

E Lysosomal face.

▶ **Explanation:** Vesicles from the ER fuse with the cis face of the Golgi; proteins then move through medial cisternae to the trans face.

3 **Lysosomal enzymes are tagged in the Golgi apparatus to ensure their delivery to lysosomes. Which modification is crucial for this targeting?**

A **Addition of mannose-6-phosphate to their oligosaccharide chains.** ✓

B Phosphorylation of serine residues in their polypeptide backbone.

C Attachment of ubiquitin molecules.

D N-terminal acetylation.

E Removal of all carbohydrate side chains.

▶ **Explanation:** Mannose-6-phosphate tags on N-linked oligosaccharides are recognized by specific receptors that route enzymes to lysosomes.

4 A drug specifically disrupts vesicle formation at the trans face of the Golgi. Which process is most directly impaired?

A Entry of newly synthesized proteins from the rough ER.

B Synthesis of rRNA.

C **Sorting of proteins into secretory vesicles headed for the plasma membrane.** ✓

D Replication of nuclear DNA.

E Formation of peroxisomes from pre-existing peroxisomes.

▶ **Explanation:** The trans-Golgi network is the major sorting station for proteins destined for secretion, lysosomes, or the plasma membrane; blocking vesicle formation here blocks their export.

5 A secreted glycoprotein is produced at normal levels in the rough ER but is released from the cell with abnormally truncated oligosaccharide chains. Which site is most likely defective?

A The nucleus, where the glycoprotein should be glycosylated before export.

B The smooth ER, which normally adds all complex sugars to glycoproteins.

C **Glycosyltransferase enzymes in the Golgi apparatus that extend and modify core oligosaccharides.** ✓

D Peroxisomes, which normally attach mannose-6-phosphate to secreted glycoproteins.

E Lysosomes, which normally trim glycoproteins before secretion.

▶ **Explanation:** Core N-linked oligosaccharides are added in the ER, but extensive trimming and addition of sugars occur in the Golgi; defective Golgi glycosyltransferases produce under-glycosylated secreted proteins.

6 **A newly synthesized lysosomal membrane protein has a cytosolic tail with a specific sorting signal and a luminal domain heavily glycosylated in the Golgi. Once it reaches the lysosome, how is the protein oriented in the lysosomal membrane?**

A The glycosylated domain faces the cytosol and the sorting signal faces the lysosomal lumen.

B Both the glycosylated domain and the sorting signal face the lysosomal lumen.

C Both the glycosylated domain and the sorting signal face the cytosol.

D The glycosylated domain faces the lysosomal lumen and the sorting signal faces the cytosol. ✓

E Orientation is random because vesicle fusion inverts membrane topology.

▶ **Explanation:** Membrane orientation is preserved during vesicular transport: domains in the ER and Golgi lumen face the interior of lysosomes, while cytosolic tails (containing sorting signals) remain cytosolic.