

TD N°. 7: Mitochondria - Golgi Apparatus

Mitochondria

10 multiple-choice questions (MCQs):

MCQ 1

Mitochondria are found:

1. Only in eukaryotic cells.
2. In prokaryotic cells.
3. In all cell types except red blood cells.
4. In all cells of the human body.

MCQ 2

What is the main function of mitochondria?

1. Energy production through cellular respiration.
2. Protein synthesis.
3. Regulation of intracellular calcium concentration.
4. Production of red blood cells.

MCQ 3

Mitochondria have:

1. A double membrane.
2. Their own circular DNA.
3. An inner membrane rich in porins.
4. Ribosomes similar to those of bacteria.

MCQ 4

The inner membrane of mitochondria:

1. Is rich in cardiolipin.

2. Contains mitochondrial cristae.
3. Has a composition similar to the outer membrane.
4. Is the site of the respiratory chain.

MCQ 5

What is the average lifespan of a mitochondrion?

1. 1 to 2 days.
2. 6 to 10 days.
3. 30 days.
4. It does not degrade.

MCQ 6

Which mechanisms involve mitochondria in calcium regulation?

1. Calcium storage with the endoplasmic reticulum.
2. Transport through Na⁺/Ca⁺⁺ exchangers.
3. Intracellular calcium production.
4. Activation of apoptosis.

MCQ 7

Oxidative phosphorylation:

1. Occurs in the intermembrane space.
2. Takes place on the outer membrane.
3. Produces ATP.
4. Is associated with the respiratory chain.

MCQ 8

What roles do mitochondria play in steroid hormone synthesis?

1. Conversion of cholesterol using mitochondrial cytochromes P450.
2. Synthesis of all proteins.
3. Collaboration with the endoplasmic reticulum.
4. Transformation of essential amino acids.

MCQ 9

Mitochondria are:

1. Fixed in the cytoplasm.
2. Mobile thanks to the cytoskeleton.
3. Unable to divide.
4. Essential for cell survival.

MCQ 10

Mitochondria are involved in:

1. Thermogenesis.
2. Photosynthesis.
3. Cell apoptosis.
4. Cellular aging.

Golgi App

QCM 1

Which of the following are functions of mitochondria?

1. ATP production.
2. DNA replication.
3. Regulation of calcium homeostasis.
4. Apoptosis induction.

QCM 2

Mitochondrial DNA (mtDNA):

1. Is inherited maternally.
2. Encodes all mitochondrial proteins.
3. Is circular in shape.
4. Has a high mutation rate compared to nuclear DNA.

QCM 3

Which processes occur within the mitochondrial matrix?

1. Glycolysis.
2. Citric acid cycle (Krebs cycle).
3. Fatty acid oxidation.
4. Electron transport chain.

QCM 4

The mitochondrial respiratory chain:

1. Is located on the inner membrane.
2. Transfers electrons to produce ATP.
3. Pumps protons into the mitochondrial matrix.
4. Utilizes oxygen as the final electron acceptor.

QCM 5

What are characteristics of the mitochondrial inner membrane?

1. It contains cristae to increase surface area.
2. It is permeable to ions and small molecules.
3. It houses ATP synthase enzymes.
4. It separates the matrix from the intermembrane space.

QCM 6

Mitochondrial dysfunction can result in:

1. Neurodegenerative diseases.
2. Increased ATP production.
3. Muscle weakness.
4. Oxidative stress.

QCM 7

Which statements about mitochondrial biogenesis are correct?

1. It is regulated by nuclear genes.
2. It occurs in response to increased energy demand.
3. It requires the division of pre-existing mitochondria.
4. It leads to a decrease in mitochondrial number.

QCM 8

During apoptosis, mitochondria:

1. Release cytochrome c into the cytosol.
2. Maintain their membrane potential.
3. Activate caspases.

4. Produce reactive oxygen species (ROS).

QCM 9

Which of the following molecules are produced in the mitochondria?

1. NADH.
2. FADH₂.
3. Oxygen.
4. ATP.

QCM 10

Mitochondria are thought to have evolved from:

1. Eukaryotic cells.
2. Symbiotic relationships with bacteria.
3. Autotrophic prokaryotes.
4. Photosynthetic cyanobacteria.