TD N7.

Exercise 1: Answer this series of questions by placing a cross in front of the correct answer(s).

1. Regarding mitochondria:

a) On average, a mitochondrion is between 10 and 100 μm long.
b) Mitochondria are capable of synthesizing all of their own proteins.
c) The Krebs cycle produces NADH, ATP, and CO2.
d) Electron transfer allows H^+ to accumulate in the mitochondrial matrix.
d) In aerobic conditions, oxidative phosphorylation is not the cell's main source of ATP.

2. Mitochondria:

a) ATP synthase uses the sodium gradient.
b) ATP synthase is responsible for ATP synthesis.
c) Mitochondria contain DNA and ribosomes.
d) Oxidative phosphorylation is the process by which electrons from NADH are transferred to ATP.

3. The mitochondrion:

a) contains its own DNA (circular mtDNA of 16.5 Kb in humans)
b) is involved in glucose catabolism
c) is an important site of ATP production
d) is surrounded by a single membrane
e) contains a membrane network called thylakoid

4. The mitochondrion:

a) Contain the equipment necessary for protein synthesis in their matrix
b) Contain circular DNA
c) Contain the enzymatic equipment necessary for fatty acid biosynthesis in their matrix
d) Are the site of biosynthesis of certain steroid hormones

5. The inner membrane of mitochondria is characterized by:

a) Numerous cristae.
b) The presence of highly permeable porins.
c) A high concentration of ATP synthase.
d) A high concentration of cardiolipin and phosphatidylcholine.
e) Integrins that bind to the cytoskeleton.

6. Lysosomes:

a) Are bounded by a double membrane
b) Have a pH close to that of the cytosol
c) Are formed by budding from the endoplasmic reticulum
d) Contain hydrolytic enzymes (hydrolases)
e) Only digest cytosolic products

7. Lysosomes:

a) Are vesicles permanently covered with clathrin
b) Are vesicles that bind ribosomes
c) Use microtubule networks to move within the cell

d) Are the destination of proteins from the Golgi apparatus that are labeled with mannose-6-phosphate
e) Have a proton pump (ATPase H+)

8. Lysosomes:

a) Lysosomes are organelles found in all eukaryotic and prokaryotic cells.
b) Lysosomal membranes contain proton pumps.
c) Protons leave the lysosomes to maintain the lysosomal lumen at a low pH.
d) Mannose-6-phosphate is the destination signal added to hydrolases to direct them to primary lysosomes.

9. Endocytosis:

a) This refers to the formation of vesicles by the inclusion of the plasma membrane surrounding a particle or extracellular fluid.
b) Extracellular materials can penetrate in at least two ways, depending on the size of the vesicles and the specificity of the compounds transported: endocytosis (ingestion of fluid and small molecules) and phagocytosis (ingestion of large particles).
c) There are two forms of endocytosis: bulk endocytosis (capture of compounds without any recognition by the membrane surface) and receptor-mediated endocytosis (capture of specific molecules after binding to membrane proteins).
d) During receptor-mediated endocytosis, receptors gather in specialized areas of the plasma membrane rich in a protein called clathrin.
e) The material captured by endocytosis is directly transported and released by membrane fusion at the endoplasmic reticulum to be degraded.

10. The rough endoplasmic reticulum (ER) is:

a) A site of protein synthesis
b) A site of protein glycosylation
c) A site of ribosome maturation
d) A site of calcium storage
e) Continuously connected to the nuclear envelope

11. The smooth endoplasmic reticulum (SER) is:

a) The main site of lipid synthesis.
b) Composed of membranes forming folds called grana.
c) The only site of protein glycosylation.
d) One of the sites of protein maturation.
e) A possible site of calcium storage.

<u>Exercise 2:</u> Oxidative phosphorylation is the process by which electrons from NADH2 and FADH2 are transferred to O2. Draw the oxidative phosphorylation chain.