



1. Decide whether the statements are true (T) or false (F). Explain your answer in both cases. (5 points)

The peroxisome organelles produce hydrogen-peroxide to defend the cell against microbial infections. F

Why? They are involved in catabolism (breaking down) of very long chain fatty acids, branched chain fatty acids, D-amino acids, and polyamines, reduction of reactive oxygen species – specifically hydrogen peroxide[3] – and biosynthesis of plasmalogens, i.e., ether phospholipids critical for the normal function of mammalian brains and lungs.

Astrocytes are coupled by gap junctions. T

Why? ? Astrocytes are connected to each other by gap junctions, which enable diffusion of calcium ions, IP3 and potassium from cell to cell (through the syncytium established by cells). Tight junctions are at the astrocytic feet to form the BBB.

The Golgi complex is responsible for ATP-production. F

Why? The mitochondria are responsible for that. The Golgi complex packages proteins into membrane-bound secretory vesicles. It attaches various sugar monomers to proteins (glycosylation) – production of ECM.

To respond to a microbial infection in the tissue, the microglia synthesizes a special molecule to recruit tanycytes to the site of infection. F

Why? Tanycytes have different functions e.g. turn the inactive thyroid hormone (T4) to the active form (T3) – they do not migrate from the wall of the ventricles.

Dehydration happens with the series of descending concentration of alcohol (csökkenő alkoholsor). F

Why? The series of descending concentration of alcohol does the opposite, i.e. rehydrate the tissue.

2. Fill in the missing words! (5 points)

The glycolysis is an ancient cellular metabolic pathway. At the end of it, 2 pyruvate molecules are going to be produced. During this metabolic pathway 2 ATP are used up, while 4 ATP + 2NADH are synthesized. To enter the Szentgyörgyi-cycle, an enzyme has to convert the pyruvate molecule into AcCoA (acetylcoenzyme A).



1. Decide whether the statements are true (T) or false (F). Explain your answer in both cases. (5 points)

All neurons in the human body have an axon. F _____

Why? There are axonless neurons in the CNS. i.e. granule cells in the OB, amacrine cells in the retina, or the neuroblasts.

The axon hillock is the initiation site of the action potential generation. T _____

Why? Because the much higher density of voltage-gated ion channels than is found in the rest of the cell body.

The extracellular matrix (ECM) originates from the Golgi complex. T _____

Why? ECM are produced intracellularly by resident cells of the brain and secreted into the ECM via exocytosis. Glycosaminoglycans (GAGs) are carbohydrate polymers and mostly attached to extracellular matrix proteins to form proteoglycans. The Golgi complex attaches various sugar monomers to proteins (glycosylation) for production of ECM

The myelin is composed of lipids and proteins. T _____

Why? Around 75% are lipids and the remaining 15-25% are protein molecules. Lipid layers are insulators, proteins holding together the multiple concentric layers of glial cell membrane.

Or alternatively FALSE can also be accepted if the explanation is:
In addition it contains also hydrocarbon chains (sphingomyelin) and cholesterol an essential lipid component of myelin with sterol (steroid) skeleton.

The glutaraldehyde is a good decision as a fixative for electron microscopy. T _____

Why? Glutaraldehyde makes irreversible methylene bridges and cross-links with functional groups of proteins such as thiol, amine, imidazole, phenol, stabilizing the ultrastructural state of the tissue.

2. Fill in the missing words! (5 points)

The mitochondrion is a double membrane-bound cellular organ. While the glycolysis takes place in the cytosol, the Szentgyörgyi-cycle happens in the mitochondrial matrix. This is also a store for calcium ions and also contains genetic information. At the end of the energy production processes, minimum

30 ATP molecules are produced from 1 glucose molecule.