

Resting membrane potential

Question 1

Among the following cell types, which cell type does not have a resting membrane potential ?

- a. nerve cells (neurons)
- b. striated muscle cells
- c. smooth muscle cells
- d. cells in a salivary gland
- e. none of the above

Question 2

By convention, during an electrophysiological recording of the resting membrane potential the recording electrode is located

- a. inside the cell
- b. outside the cell, in the extracellular fluid.

Question 3

A potassium ion channel that opens when a ligand binds to the channel is

- a. a leakage channel
- b. a gated channel

Question 4

The Na⁺/ K⁺ ATPase pump moves

- a. 1 K⁺ out of the cell for each Na⁺ moved into the cell
- b. 3 Na⁺ out of the cell for 2 K⁺ moved into the cell
- c. 2 Na⁺ out of the cell for 3 K⁺ moved into the cell
- d. 3 K⁺ out of the cell for 2 Na⁺ moved into the cell
- e. 2 K⁺ out of the cell for 3 Na⁺ moved into the cell

Question 5

If a cell plasma membrane had only leakage channels specific for potassium and no leakage channels for the 3 other main ions, its resting membrane potential would be

- a. about – 70 mV, the typical value observed in human cells
- b. about 70 mV, the typical value observed in human cells
- c. lower than -70 mV, about – 90 mV
- d. higher than – 70 mV, around – 20 mV

Question 6

In humans, the normal K⁺ plasma concentration is 4.5 mM. What happens to the resting membrane potential of cells when the plasma concentration increases up to 6 mM ?

- a. it remains unchanged due to homeostasis
- b. it increases (becomes less negative), cells get depolarized
- c. it decreases (becomes more negative), cells get hyperpolarized

Question 7

Aquaporin 1 is a channel allowing water to cross the plasma membrane.

The movement of water through aquaporin is

- a. a passive transport
- b. an active transport

Question 8

A knock out mouse was generated in which the gene encoding aquaporin 1 is inactivated.

Aquaporin 1 is the only aquaporin present in the red blood cells' plasma membrane.

When red blood cells taken from the KO mice are put in pure distilled water

- a. the red blood cells volume remains unchanged
- b. the red blood cell bursts open but it takes more time than for the red blood cells from a control mouse
- c. the red blood cells shrink but it takes more time than for the red blood cell from a control mouse
- d. the red blood cells shrink faster than the red blood cells from a control mouse

Energy

Question 9

Life requires energy. From which primary source does the energy used by the human body to stay alive come ?

- a. ATP
- b. food
- c. sun
- d. photosynthesis

Question 10

An untrained student starts training to run a marathon. As the training progresses, what change occurs in his leg muscles ?

- a. The number of slow-twitch fibers containing a lot of mitochondria increases
- b. The number of fast-twitch fibers containing fewer mitochondria increases

Question 11

How much ATP is produced daily by a healthy male human being with a body weight of 60 kg?

- a. 2 g
- b. 500 g
- c. 2 kg
- d. 10 kg
- e. 60 kg

Question 12

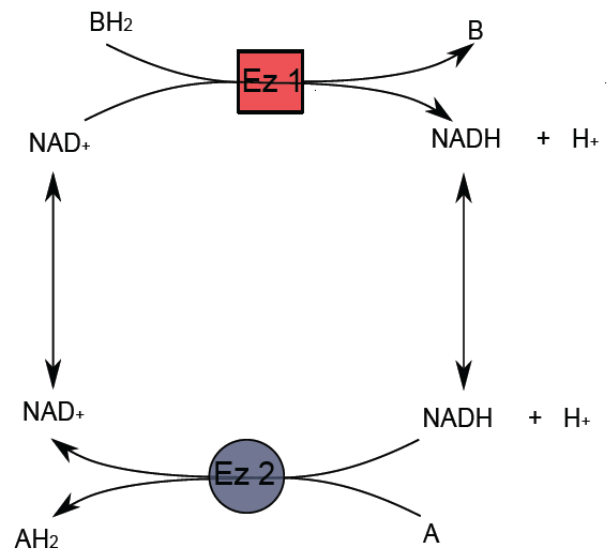
The figure shows an enzyme 1 (Ez1) catalyzing the reaction $BH_2 \rightarrow B$ and another enzyme (Ez2) catalyzing the reaction $A \rightarrow AH_2$

The enzyme 1 is

- a. a reductase
- b. an oxidase

The enzyme 2 is

- a. a reductase
- b. an oxidase



In these reaction NAD^+ or $NADH$ is

- a. a substrate for the enzymes
- b. a co-enzyme