

Advanced Human Biology Challenges

Human Biology · Answer Key · 10 Questions

1. Which specific protein is responsible for the rapid breakdown of ATP into ADP and inorganic phosphate, releasing energy for muscle contraction?

- A) Actin
- B) Myosin**
- C) Troponin
- D) Tropomyosin

2. During the process of cellular respiration, the electron transport chain primarily pumps protons (H⁺) from which mitochondrial compartment to another?

- A) Mitochondrial matrix to the intermembrane space**
- B) Intermembrane space to the mitochondrial matrix
- C) Inner mitochondrial membrane to the outer mitochondrial membrane
- D) Outer mitochondrial membrane to the intermembrane space

3. What is the primary role of the juxtaglomerular apparatus in the nephron of the kidney?

- A) Reabsorption of glucose
- B) Regulation of blood pressure via renin release**
- C) Filtration of blood plasma
- D) Secretion of potassium ions

4. Which type of glial cell in the central nervous system is responsible for forming the myelin sheath around axons in the peripheral nervous system?

- A) Oligodendrocytes
- B) Astrocytes
- C) Microglia
- D) Schwann cells**

5. The lac operon in bacteria is an example of gene regulation. What molecule acts as an inducer for the lac operon, initiating transcription?

- A) Glucose
- B) Lactose**
- C) Repressor protein
- D) Promoter

6. What is the main function of the semicircular canals within the inner ear?

- A) Hearing
- B) Detecting linear acceleration and gravity
- C) Detecting rotational acceleration**
- D) Processing olfactory signals

7. Which hormone is primarily responsible for increasing blood glucose levels by stimulating glycogenolysis and gluconeogenesis in the liver?

- A) Insulin
- B) Glucagon**
- C) Cortisol
- D) Epinephrine

8. During the process of DNA replication, which enzyme is responsible for unwinding the double helix by breaking hydrogen bonds between nucleotide bases?

- A) DNA polymerase
- B) RNA polymerase
- C) Helicase**
- D) Ligase

9. The adrenal medulla produces which two primary hormones that are involved in the 'fight-or-flight' response?

- A) Aldosterone and cortisol
- B) Adrenaline (epinephrine) and noradrenaline (norepinephrine)**
- C) Estrogen and testosterone
- D) Thyroxine and triiodothyronine

10. What is the critical function of the sinoatrial (SA) node in the heart?

- A) To contract the ventricles
- B) To initiate and regulate the heart's rhythm**
- C) To close the atrioventricular valves
- D) To pump oxygenated blood to the body