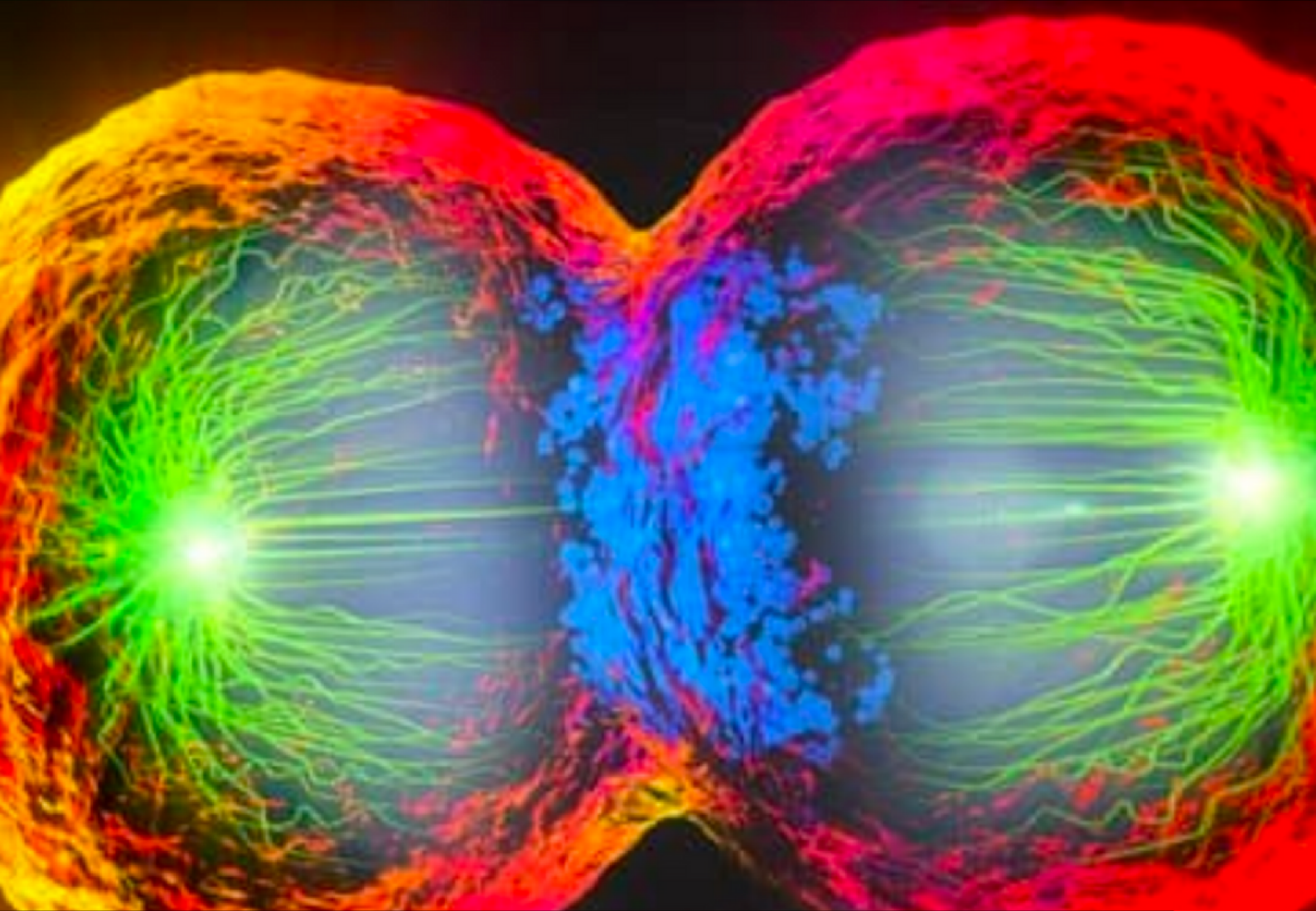


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## A Message From Our Team

Revising for medical exams is stressful; believe us, we know from experience! Trying to balance depth of knowledge with breadth of knowledge is always the challenge. And as a student, it's often hard to know where the right balance is, and it's easy to go down unnecessary and time-consuming rabbit holes that won't help you in the exams. That's where the experienced team at MedStudentNotes comes in!

In this series of **PRACTICE EXAMS** we have used our medical experience to create a comprehensive set of quizzes that are tailored just right to help you to ACE your exams and maximize retention. We have created numerous mini-quizzes (both multi-choice and short-answer) on all the subtopics relating to this subject. That way you can do them at your own pace and correct the questions you get wrong there and then!

**If you are new to us, here are a few things to help get the most out of these Practice Exams:**

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## Table Of Contents:

**What's included:** A comprehensive set of university-level multiple-choice (MCQ) and short-answer (SAQ) exam questions covering everything to do with **Cell Biology & Biochemistry**. All answer keys are provided directly after each quiz so that you can revise and reassess as you go, helping you learn better and improve retention.

## Quizzes in this booklet:

- [5 LEVELS OF ORGANIZATION IN THE HUMAN BODY AND MOLECULAR BUILDING BLOCKS OF LIFE](#)
- [CELL STRUCTURE AND OVERVIEW OF THE ORGANELLES](#)
- [CELL MEMBRANE AND TRANSPORT](#)
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**MCQ: 5 levels of organization in the human body and molecular building blocks of life:**

1. Which of the following is NOT one of the 5 levels of organization in the human body?
  - A) Chemical level
  - B) Cellular level
  - C) Tissue level
  - D) Bone level
  - E) Organ level
2. What is the smallest unit of life?
  - A) Atom
  - B) Molecule
  - C) Cell
  - D) Organ
  - E) Tissue
3. What is the basic unit of all living organisms?
  - A) Atom
  - B) Molecule
  - C) Cell
  - D) Organ
  - E) Tissue
4. What is the most abundant element in the human body?
  - A) Oxygen
  - B) Carbon
  - C) Nitrogen
  - D) Hydrogen
  - E) Calcium
5. Which of the following macromolecules is NOT correctly matched with its function?
  - A) Carbohydrates - short-term energy storage
  - B) Lipids - long-term energy storage
  - C) Proteins - enzyme catalysts
  - D) Nucleic acids - structural support
  - E) All of the above are correctly matched
6. What is the monomer of carbohydrates?
  - A) Amino acid
  - B) Nucleotide
  - C) Monosaccharide
  - D) Fatty acid
  - E) None of the above
7. What is the primary function of DNA?
  - A) Energy storage
  - B) Protein synthesis
  - C) Cellular respiration
  - D) Lipid synthesis
  - E) All of the above

8. Which of the following is NOT one of the four major classes of macromolecules?
- A) Carbohydrates
  - B) Lipids
  - C) Proteins
  - D) Nucleic acids
  - E) All of the above are major classes of macromolecules
9. Which of the following is NOT an organ system in the human body?
- A) Digestive system
  - B) Respiratory system
  - C) Cardiovascular system
  - D) Skeletal system
  - E) All of the above are organ systems in the human body
10. What is a primary function of proteins?
- A) Long-term energy storage
  - B) Short-term energy storage
  - C) Enzyme catalysts
  - D) Structural support
  - E) Information storage and transmission

**Answer Key:**

1. D
2. C
3. C
4. A
5. D
6. C
7. B
8. E
9. E
10. C

**SAQ: 5 levels of organization in the human body and molecular building blocks of life**

1. Describe the structure and function of carbohydrates.
2. Compare and contrast the structures of DNA and RNA.
3. Explain the difference between a tissue and an organ, and provide an example of each.
4. Describe the role of enzymes in biochemical reactions and provide an example.
5. Explain the role of the cardiovascular system in the human body and identify two organs that are a part of this system.

### Answer Key:

1. Carbohydrates are organic molecules made up of carbon, hydrogen, and oxygen. They function as a source of energy for the body and play a structural role in cell walls and other tissues. The basic building blocks of carbohydrates are monosaccharides, which can link together to form disaccharides and polysaccharides.
2. Both DNA and RNA are nucleic acids made up of nucleotides, but their structures differ in a few key ways. DNA has a double-stranded helix structure, while RNA is single-stranded. DNA uses the nitrogenous base thymine, while RNA uses uracil. DNA is found in the nucleus of the cell, while RNA is found both in the nucleus and in the cytoplasm.
3. A tissue is a group of similar cells that perform a specific function, while an organ is a group of different tissues that work together to perform a specific function. An example of a tissue is muscle tissue, which is made up of muscle cells and is responsible for movement. An example of an organ is the heart, which is made up of different tissues including muscle, nervous, and connective tissues and is responsible for pumping blood throughout the body.
4. Enzymes are proteins that catalyze biochemical reactions in the body. They do this by lowering the activation energy required for the reaction to occur. For example, the enzyme lactase catalyzes the breakdown of lactose into glucose and galactose in the small intestine.
5. The cardiovascular system is responsible for transporting blood throughout the body. It consists of the heart, blood vessels, and blood. The heart pumps oxygen-rich blood to the body's tissues through arteries, and returns oxygen-poor blood to the lungs through veins. Two organs that are a part of the cardiovascular system are the heart and the lungs.



**MCQ: Cell structure and overview of the organelles:**

1. What is the basic unit of all living organisms?
  - A) Atom
  - B) Molecule
  - C) Cell
  - D) Organ
  - E) Tissue
  
2. What is the cell membrane composed of?
  - A) Phospholipids and proteins
  - B) Nucleic acids and proteins
  - C) Carbohydrates and lipids
  - D) Nucleotides and phospholipids
  - E) None of the above
  
3. What is the function of the nucleus?
  - A) Protein synthesis
  - B) Cellular respiration
  - C) Energy storage
  - D) Genetic control
  - E) None of the above
  
4. Which organelle is responsible for protein synthesis?
  - A) Mitochondria
  - B) Golgi apparatus
  - C) Endoplasmic reticulum
  - D) Nucleus
  - E) Ribosomes
  
5. Which organelle is responsible for detoxifying harmful substances in the cell?
  - A) Mitochondria
  - B) Lysosomes
  - C) Endoplasmic reticulum
  - D) Nucleus
  - E) Peroxisomes
  
6. What is the function of the cytoskeleton?
  - A) To provide structural support for the cell
  - B) To transport proteins within the cell
  - C) To synthesize ATP
  - D) To store genetic information
  - E) None of the above

7. Which organelle is responsible for breaking down and digesting cellular waste and old cell parts?
- A) Mitochondria
  - B) Lysosomes
  - C) Endoplasmic reticulum
  - D) Nucleus
  - E) Peroxisomes
8. What is the function of the mitochondria?
- A) To synthesize proteins
  - B) To synthesize lipids
  - C) To produce ATP
  - D) To package and distribute proteins
  - E) None of the above
9. Which organelle is responsible for modifying, sorting, and packaging proteins for secretion?
- A) Mitochondria
  - B) Golgi apparatus
  - C) Endoplasmic reticulum
  - D) Nucleus
  - E) Ribosomes
10. What is the function of the ribosomes?
- A) To produce ATP
  - B) To synthesize proteins
  - C) To break down old cell parts
  - D) To detoxify harmful substances
  - E) None of the above

**Answer Key:**

1. C
2. A
3. D
4. E
5. E
6. A
7. B
8. C
9. B
10. B

**SAQ: Cell structure and overview of the organelles**

1. Describe the structure and function of the cell membrane.
2. Compare and contrast the structures and functions of plant and animal cells.
3. Explain the difference between rough and smooth endoplasmic reticulum, and provide an example of a cell type where each would be important.
4. Describe the function of the Golgi apparatus in protein synthesis and secretion.
5. Explain the function of the lysosomes and their role in cellular homeostasis.

### Answer Key:

1. The cell membrane is composed of a phospholipid bilayer with embedded proteins. It regulates the passage of materials in and out of the cell, maintains cell shape and structure, and participates in cell signaling.
2. Plant and animal cells both have a cell membrane, nucleus, and cytoplasm, but plant cells also have a cell wall, chloroplasts, and a large central vacuole, while animal cells have lysosomes, centrioles, and flagella or cilia in some cases.
3. Rough endoplasmic reticulum (ER) has ribosomes attached to its surface and is involved in protein synthesis, while smooth ER lacks ribosomes and is involved in lipid synthesis. An example of a cell type where rough ER would be important is a pancreatic cell that produces insulin, while an example of a cell type where smooth ER would be important is a liver cell that detoxifies harmful substances.
4. The Golgi apparatus is responsible for modifying, sorting, and packaging proteins for secretion. It receives proteins from the endoplasmic reticulum and modifies them by adding carbohydrates and lipids, and then sorts them and packages them into vesicles for secretion or transport to other parts of the cell.
5. Lysosomes are organelles that contain enzymes capable of breaking down and digesting cellular waste and old cell parts. They play a crucial role in cellular homeostasis by preventing the accumulation of damaged or unnecessary cellular components. If lysosomes fail to function properly, it can lead to a number of diseases such as lysosomal storage disorders.

**MCQ: Cell membrane and transport:**

1. What is the main component of the cell membrane?
  - A) Nucleic acids
  - B) Carbohydrates
  - C) Proteins
  - D) Phospholipids
  - E) All of the above
  
2. Which of the following is a passive form of transport across the cell membrane?
  - A) Facilitated diffusion
  - B) Active transport
  - C) Endocytosis
  - D) Exocytosis
  - E) None of the above
  
3. What is osmosis?
  - A) The movement of water from an area of low solute concentration to an area of high concentration
  - B) The movement of water from an area of high solute concentration to an area of low concentration
  - C) The movement of solutes from an area of low solute concentration to an area of high concentration
  - D) The movement of solutes from an area of high solute concentration to an area of low concentration
  - E) None of the above
  
4. Which of the following is NOT a type of passive transport?
  - A) Simple diffusion
  - B) Facilitated diffusion
  - C) Osmosis
  - D) Active transport
  - E) All of the above are types of passive transport
  
5. Which of the following types of transport requires the input of energy?
  - A) Simple diffusion
  - B) Facilitated diffusion
  - C) Osmosis
  - D) Active transport
  - E) None of the above
  
6. What is an example of a molecule that can cross the cell membrane via simple diffusion?
  - A) Glucose
  - B) Sodium ion
  - C) Potassium ion
  - D) Oxygen
  - E) None of the above

7. Which of the following is an example of vesicular transport?
  - A) Facilitated diffusion
  - B) Osmosis
  - C) Endocytosis
  - D) Exocytosis
  - E) None of the above
  
8. Which of the following is a protein that is involved in active transport?
  - A) ATP synthase
  - B) ATPase
  - C) Sodium-potassium pump
  - D) Ribosome
  - E) None of the above
  
9. Which of the following describes the movement of solutes from an area of high concentration to an area of low concentration?
  - A) Simple diffusion
  - B) Facilitated diffusion
  - C) Osmosis
  - D) Active transport
  - E) None of the above
  
10. What is the main function of the sodium-potassium pump?
  - A) To move sodium ions out of the cell and potassium ions into the cell
  - B) To move potassium ions out of the cell and sodium ions into the cell
  - C) To move calcium ions out of the cell and sodium ions into the cell
  - D) To move sodium ions out of the cell and calcium ions into the cell
  - E) None of the above

**Answer Key:**

1. D
2. A
3. A
4. D
5. D
6. D
7. C & D
8. C
9. A & B
10. A



### **SAQ: Cell membrane and transport**

1. Describe the structure of the cell membrane, and explain how it maintains selective permeability.
2. Explain the process of osmosis, and describe how it differs from diffusion.
3. Compare and contrast facilitated diffusion and active transport, and provide an example of each.
4. Describe the process of endocytosis and provide an example of a cell type that uses this process.
5. Explain how vesicular transport is used by cells to transport materials across the cell membrane.

Answer Key:

1. The cell membrane is composed of a phospholipid bilayer with embedded proteins. The hydrophobic tails of the phospholipids face inward towards each other, while the hydrophilic heads face outward towards the aqueous environment inside and outside the cell. The membrane maintains selective permeability through various mechanisms such as the presence of transport proteins that allow specific molecules to pass through the membrane.
2. Osmosis is the movement of water across a selectively permeable membrane from an area of low solute concentration to an area of high solute concentration. It differs from diffusion in that it specifically refers to the movement of water molecules across a membrane, while diffusion refers to the movement of any molecule across a membrane.
3. Facilitated diffusion is a passive form of transport that requires the use of transport proteins to move molecules across a membrane from an area of high concentration to an area of low concentration. An example of facilitated diffusion is the movement of glucose into cells through glucose transporters. Active transport is the movement of molecules against their concentration gradient, from an area of low concentration to an area of high concentration, using energy in the form of ATP. An example of active transport is the sodium-potassium pump that maintains the concentration gradients of sodium and potassium ions in animal cells.
4. Endocytosis is the process by which cells engulf extracellular material by forming a vesicle around it and bringing it into the cell. An example of a cell type that uses endocytosis is a white blood cell that engulfs and destroys bacteria and other pathogens through phagocytosis.
5. Vesicular transport is the movement of materials across the cell membrane through the use of vesicles, which are small membrane-bound sacs that transport materials both within and outside the cell. Endocytosis is an example of vesicular transport, where a vesicle is formed around extracellular material and brought into the cell. Exocytosis is another example, where a vesicle fuses with the cell membrane and releases its contents outside the cell.



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