Cellular Transport Worksheet Answer Key PDF

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Part 1: Foundational Knowledge

What is the primary function of the cell membrane in cellular transport?

undefined. To provide structural support

undefined. To regulate the movement of substances in and out of the cell ✓

undefined. To store genetic information

undefined. To produce energy

The primary function of the cell membrane is to regulate the movement of substances in and out of the cell.

Which of the following are types of passive transport? (Select all that apply)

undefined. Diffusion ✓

undefined. Osmosis ✓

undefined. Facilitated Diffusion ✓

undefined. Endocytosis

Types of passive transport include diffusion, osmosis, and facilitated diffusion.

Explain the process of osmosis and its importance in maintaining cell homeostasis.

Osmosis is the movement of water across a semipermeable membrane, crucial for maintaining cell turgor and overall homeostasis.

List two examples of active transport mechanisms and briefly describe their functions.

1. Example 1: Sodium-Potassium Pump

Moves sodium out and potassium into the cell, crucial for nerve impulse transmission.

2. Example 2: Endocytosis

Allows cells to engulf large particles or fluids.

Examples include the sodium-potassium pump, which maintains ion gradients, and endocytosis, which allows cells to intake large molecules.

Part 2: comprehension

Which statement best describes facilitated diffusion?

undefined. It requires energy to move substances against their concentration gradient.
undefined. It involves the movement of water molecules only.
undefined. It uses transport proteins to move substances down their concentration gradient. ✓
undefined. It is a form of endocytosis.

Facilitated diffusion uses transport proteins to move substances down their concentration gradient without energy.

What factors can affect the rate of diffusion across a cell membrane? (Select all that apply)

undefined. Temperature ✓
undefined. Membrane permeability ✓
undefined. Surface area ✓
undefined. Genetic material

Factors include temperature, membrane permeability, and surface area.

Describe how the concentration gradient influences the direction of diffusion.

The concentration gradient drives diffusion, with molecules moving from areas of higher concentration to lower concentration.

Part 3: Application and Analysis

If a red blood cell is placed in a hypertonic solution, what is likely to happen?

undefined. The cell will swell and burst.

undefined. The cell will shrink. ✓
undefined. The cell will remain unchanged.
undefined. The cell will become turgid.

The red blood cell will shrink due to water moving out of the cell into the hypertonic solution.

Which scenarios are examples of active transport? (Select all that apply)

undefined. Uptake of glucose in the intestines ✓
undefined. Movement of oxygen into the bloodstream
undefined. Secretion of neurotransmitters into a synapse ✓
undefined. Absorption of water in plant roots

Examples of active transport include the uptake of glucose in the intestines and secretion of neurotransmitters.

How might the principles of osmosis be applied in medical treatments, such as intravenous therapy?

Osmosis principles guide the use of isotonic solutions in IV therapy to prevent cell damage and maintain fluid balance.

Part 4: Evaluation and Creation

Which component of the cell membrane is primarily responsible for selective permeability?

undefined. Phospholipid bilayer
undefined. Cholesterol molecules
undefined. Transport proteins ✓
undefined. Carbohydrate chains

Transport proteins are primarily responsible for the selective permeability of the cell membrane.

Which transport mechanism would be most efficient for a cell to quickly intake large quantities of water?

undefined. Diffusion
undefined. Osmosis
undefined. Facilitated diffusion

undefined. Pinocytosis ✓

Pinocytosis would be the most efficient mechanism for a cell to quickly intake large quantities of water.

Evaluate the following statements and identify which are true regarding active transport. (Select all that apply)

undefined. It requires energy input. ✓

undefined. It moves substances down their concentration gradient.

undefined. It can involve transport proteins. ✓

undefined. It is unaffected by temperature changes.

Active transport requires energy, can involve transport proteins, and moves substances against their concentration gradient.

Design an experiment to test the effects of temperature on the rate of diffusion in a liquid medium. Outline the steps and expected outcomes.

An experiment could involve varying temperatures and measuring diffusion rates of a dye in water, expecting higher temperatures to increase diffusion rates.

Propose two real-world applications of cellular transport knowledge in biotechnology or medicine and explain their significance.

1. Application 1: Drug Delivery Systems

Utilize transport mechanisms to target specific cells for treatment.

2. Application 2: IV Fluids

Designed to maintain osmotic balance and prevent cell damage.

Applications include drug delivery systems that utilize transport mechanisms and the design of IV fluids that maintain osmotic balance.