

Arata Torii

Biology

3B Review: "Cells and their Environment" questions

7 November 2025

## Answers

### 3.4 Questions

Q.1 Why is homeostasis demonstrated by osmosis called an equilibrium? Why is it dynamic?

A: Osmosis balances leaving no net movement of water across the semipermeable membrane. It adjusts to its environment to maintain the conditions of life.

Q.2 Compare and contrast: optimal point, optimal range, range of tolerance, and limit of tolerance.

A: An optimal point is the exact optimal temperature for muscles. An optimal range is the range in which an organism's or cell's performance will be stable. The range of tolerance is where the organism or cell will be able to function but not function at its right. When an organism or cell reaches the limit of tolerance it will die.

Q.3 Differences: Plasmolysis and Cytolysis.

A: Cytolysis is when the cell bursts due to rising internal water pressure. Plasmolysis is the loss of water from a cell which if it continues will kill it.

Q.4 Compare and contrast: isotonic, hypotonic, and hypertonic solutions.

A: Isotonic is when the concentration in solutes outside of the cell and inside the cell are the same. Hypotonic is when the outside of the cell is higher in concentration in water and lower in solutes than the inside of a cell. Hypertonic is when the solute concentration is higher outside of the cell than inside. Hypotonic leads to a one way flow of water molecules leading the cell to burst. Hypertonic will make water molecules diffuse out of the cell and lead to the cell getting smaller.

Q.5 2 methods God designed for cells to withstand hypotonic environments. Discuss important structures and how they function.

A: God designed hard cell walls and flexible membranes, two ways to withstand a hypotonic environment. Cells living in water can have rigid cell walls which prevent cytolysis, which is when the cell bursts from pressure. Other organisms need flexible membranes because rigid ones would restrict the movement and nutrient getting capabilities. These have contractible vacuoles, so when water diffuses into the cell the vacuole will release it to the environment again.

### 3.5 Questions

Q.1 Difference?: Simple diffusion and facilitated diffusion.

A: Simple diffusion moves only small non-polar molecules as the facilitated diffusion can move a wide range of proteins due to transport proteins.

Q.2 Similarities and Differences: facilitated diffusion and active transport.

A: Facilitated diffusion and active transport both use transport proteins to help different molecules across the membrane but only the active transport uses cellular energy.

Q.3 Difference between 2 types of transport proteins?

A: Channel and carrier. Channel proteins make pores in the membrane to let the molecule through. Carrier proteins bind to the molecule and carry it through.

Q.4 Describe endocytosis process.

A: When enough substance goes into the gap in the membrane it folds in creating a cage for the substances. It is completely circled off.