

Chapter 1: Functional Organization of the Human Body and Control of the "Internal Environment" Cells as the Living Units of the Body

3. The most abundant substance in the human body and the approximate percentage of that substance in the body is which of the following?
- Protein, 30%
 - Protein, 60%
 - Water, 30%
 - Water, 60%
 - Carbohydrate, 30%
 - Carbohydrate, 60%

ANS: D

4. Which of the following substances has the highest extracellular fluid to intracellular fluid concentration ratio for most mammalian cells?
- Sodium ions
 - Potassium ions
 - Carbon dioxide
 - Glucose
 - Protein

ANS: A

8. _____ feedback is often referred to as a *vicious cycle* because it leads to _____ instability and sometimes death.
- Positive, progressive
 - Positive, diminished
 - Negative, progressive
 - Negative, diminished
 - Adaptive, progressive

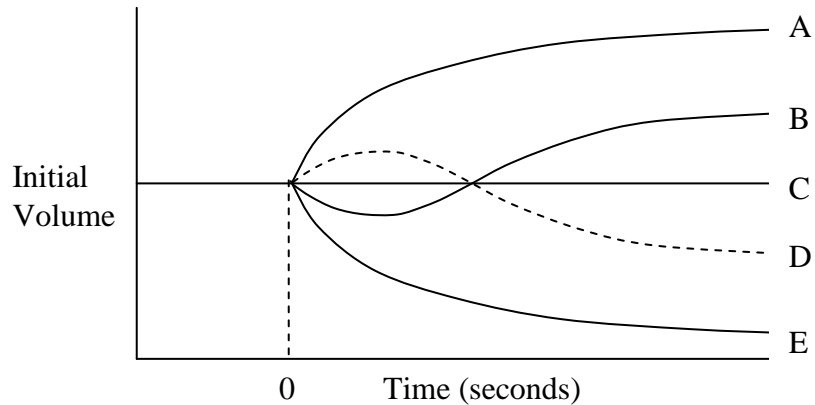
ANS: A

9. Which one of the following is an example of positive feedback in the body?
- Clotting of blood
 - Return of blood pressure toward normal after a hemorrhage
 - Increased respiration rate caused by accumulation of carbon dioxide in the blood
 - Decreased sympathetic nervous system activity that occurs in response to increased blood pressure

ANS: A

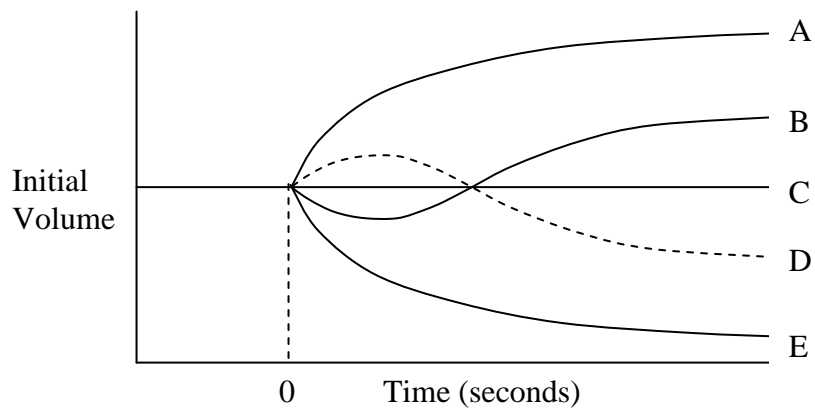
Chapter 4: Transport of Substances Through the Cell Membrane

1. The diagram illustrates possible changes in red blood cell volume resulting from a change in extracellular fluid composition for a cell equilibrated in a 150 mmol/L solution of sodium chloride (NaCl) at time 0. Which curve best illustrates the volume change caused by immersion of the cell in an aqueous solution of 300 mOsm/L calcium chloride (CaCl₂)?



Answer: C (because it's isotonic)

2. The diagram illustrates possible changes in red blood cell volume resulting from a change in extracellular fluid composition for a cell equilibrated in a 150 mmol/L solution of sodium chloride (NaCl) at time 0. Which curve best illustrates the volume change caused by immersion of the cell in an aqueous solution of 200 mOsm/L NaCl and 200 mOsm/L glycerol?



Answer: B

3. An artificial membrane is created that consists of a lipid bilayer. No protein molecules are present in this artificial membrane. The lipid composition of the membrane is essentially the same as that of a normal, biological membrane. Which of the following substances permeates the membrane more readily than water molecules?
- A. Glucose
 - B. Glycerol
 - C. Oxygen

- D. Sodium
- E. Urea

Answer: C

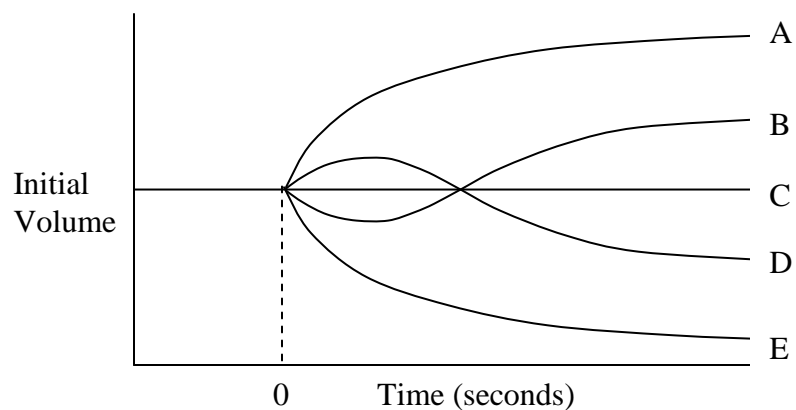
4. A cell is equilibrated in an aqueous solution of 300 mOsm/L sodium chloride. Which of the following best describes what will happen to cell volume when the cell is placed in an aqueous solution of 300 mOsm glycerol?
- A. Decrease
 - B. Decrease and then increase
 - C. Increase
 - D. Increase and then decrease
 - E. No change

Answer: C

5. The concentration of calcium ions inside ventricular muscle cells averages 10^{-4} mmol/L at rest (i.e., between contractions). The calcium concentration in the transverse tubules (T tubules) averages 2.5 mmol/L at rest. A protein transporter on the membrane of the T tubule exchanges sodium for calcium. The transporter uses the transmembrane sodium gradient to fuel the exchange. Which of the following transport mechanisms best describes this type of transporter?
- A. Facilitated diffusion
 - B. Primary active transport
 - C. Secondary active co-transport
 - D. Secondary active counter-transport
 - E. Simple diffusion

Answer: D

6. The diagram illustrates possible changes in red blood cell volume resulting from a change in extracellular fluid composition for a cell equilibrated in 150 mmol/L NaCl at time 0. Which curve best illustrates the volume caused by immersion of the cell in an aqueous solution of 150 mmol/L CaCl_2 ?



best illustrates the volume caused by immersion of the cell in an aqueous solution of 150 mmol/L CaCl_2 ?

Answer: E

7. Secondary active transport typically moves which of the following substances against a concentration gradient?

	<u>Glucose</u>	<u>Amino acids</u>	<u>Sodium ions</u>
A.	No	No	No
B.	No	No	Yes
C.	Yes	No	Yes
D.	Yes	Yes	No
E.	Yes	Yes	Yes

Answer: D

8. Which of the following transport mechanisms can move sodium ions across a cell membrane?

	<u>Primary active transport</u>	<u>Secondary active transport</u>	<u>Simple diffusion</u>
A.	No	No	No
B.	No	Yes	Yes
C.	Yes	No	Yes
D.	Yes	Yes	No
E.	Yes	Yes	Yes

Answer: E