entering the hypertonic solution equals the number of water molecules leaving the solution.

7. The maximum or potential osmotic pressure of a solution containing solute is determined by using a semipermeable membrane to separate the solution from pure water and then measuring the hydrostatic pressure in the solution at the point when osmosis stops.

8. The maximum (potential) osmotic pressure of a given solution depends upon and can be predicted by the concentration of solute particles in the solution; the more solute particles in the solution, the greater will be the osmotic pressure generated.

9. The greater the potential osmotic pressure of a solution, the greater the tendency for water to move into the solution.

10. When comparing two solutions, the one that is hypertonic (has more solute particles) will have the greater potential osmotic pressure.

11. If separated from one another by a semipermeable membrane, water will diffuse from the solution with the lower osmotic potential (hypotonic) into the solution with the higher osmotic potential (hypertonic).

Questions:

1. When you compare the solution in bag A with the solution in Bag B, which solution is hypertonic?
2. Both bags are immersed in the same solution, 98% water and 2% sugar. The most water will enter which bag?
3. Which bag will generate the greatest hydrostatic pressure?
4. Which solution has the greatest potential osmotic pressure?

If your answers to questions 1 through 4 are all the same, they are either all right, or they are all wrong, so you had better check your answers.
Potential osmotic pressure | Potential osmotic pressure
---|---
45 | 30

| Solution A | Solution B |
---|---|

5. These two solutions are separated from one another by a semipermeable membrane. Water will move from
a) from solution A to solution B  b) from solution B to solution A

If you're having trouble with this one, study questions 1 through 4 and/or read numbers 10 and 11 above.

Definitions:

1) **Interstitial fluid (IF):** The fluid found in the space (interstitial space) that surrounds blood vessels and cells.
2) **Interstitial fluid hydrostatic pressure (IFHP):** The pressure that the interstitial fluid exerts on the outside walls of blood vessels and cell membranes of cells.
3) **Interstitial fluid osmotic pressure (IFOP):** The potential osmotic pressure that interstitial fluid could generate if separated from pure water by a semipermeable membrane. The tendency for water to move into the interstitial fluid.
4) **Blood hydrostatic pressure (BHP):** The pressure blood exerts on the inside walls of blood vessels.
5) **Blood osmotic pressure (BOP):** The potential osmotic pressure of blood. The tendency for water to move into the blood.

**Note:** Water moves from an area with high hydrostatic pressure to an area with low hydrostatic pressure. If the water is forced by hydrostatic pressure through a semipermeable membrane, filtration occurs.

6. IFHP is 17mmHg and BHP is 30mmHg. From this information, filtration will occur

   a) from the blood into the interstitial space.
   b) from the interstitial space into the blood.
IFHP = 0mmHg and IFOP = 6mmHg

BHP = 30mmHg and BOP = 28mmHg (within the blood vessel)

7. B From the information given, water will move
   a) into the blood            b) into the interstitial fluid

IFHP = 0mmHg and IFOP = 6mmHg

BHP = 15mmHg and BOP = 28mmHg (within the blood vessel)

8. A From the information above, the net movement of water be
   a) into the blood            b) out of the blood into the interstitial fluid

Use the information given in question 8 to answer the following set of questions.

   a) water will move into the interstitial fluid from the blood.
   b) water will move into the blood from the interstitial fluid.

9. B What would happen if you increased the IFHP in question 8 from 0mmHg to 6mmHg?

10. A What would happen if you increased the IFOP in question 8 from 6mmHg to 15mmHg? (go back to the original question 8)

11. A What would happen if you increase the BHP in question 8 from 15mmHg to 25mmHg? (go back to the original question 8)

12. A What would happen if you decrease the BOP in question 8 from 28mmHg to 15 mmHg? (go back to the original question 8)