Hemolysis of horse red blood cell

Hemolysis of Horse Red Blood Cell Practical Aim The results of this study will help show what solutes easily permeate a membrane. Further, this will help determine the factors affecting the rate of permeability of solutes.

Results

Isotonic Solution

Volume of Isotonic Solution (cm3)

Volume of Stock Solution (cm3)

Time

(min)

Sodium Chloride

10

1

30 (no hemolysis)

Ammonium Chloride

10

1

4

Ammonium Ethanoate

10

1

1

Ammonium Ethanodioate

10

1

4

Sodium Sulfate

10

1

33 (no hemolysis)

D-Glucose

10

1

35 (no hemolysis)

Glycerol

10

1

11

Ethanol

10

1

0. 8

Propano-1-ol

10

1

0. 9

Discussion/Conclusion

Hemolysis is the rupture of red blood cells when water enters the cell due to osmosis (Crawford). Osmosis is the movement of water from a higher water concentration to a lower water concentration. Thus, hemolysis will occur when a red blood cell is placed in a hypotonic medium, a medium that has a higher water concentration relative to that of the cytosol (Kimball). Hemolysis will also happen if the cell is placed in an isotonic medium but the

solute can pass through the cell membrane and the cell cannot remove these molecules that entered it (Ecklund, 4). This is shown in the above results. Despite that the cell was placed in an isotonic medium, 6 solutions caused hemolysis.

There are factors that contribute to the ability of the solute to pass through the cell membrane. One is the permeability of the cell membrane. Cell membrane is a lipid bilayer which does not allow ions and small hydrophilic molecules to freely pass the membrane (Kimball). Thus, for the sodium chloride, sodium sulfate and D-glucose solution to hemolyze the cell, a dilute solution should be used since this would increase the water concentration in the medium causing osmosis to occur.

Another factor that determine membrane permeability is lipid solubility. Generally, low solubility in lipid would mean slower rate of entry to the cell (Crawford). Hydrophilic substances will pass through the membrane slowly. As shown in the results, D-glucose, sodium chloride and sodium sulfate were not able to cause hemolysis,

Polarity and molecular size also affect the rate of entry of solute. Most polar molecules are hydrophilic; they cannot easily permeate the membrane (Cell Membrane, 2). Ethanol, propano-1-ol and glycerol, although polar, are small enough to pass through the membrane (Membrane Permeability). Notice that the time of hemolysis increases with molecular size with the glycerol having the longest time.

Ammonium chloride was able to hemolyze the cell compared to other salts. Unlike the other salts, ammonium chloride does not completely ionize in water. A lower degree of ionization would mean a faster rate of entry (Crawford).

Noting that glucose was not able to hemolyze the cell in 35 minutes, this shows that the cell absorbs glucose not simply through diffusion but using another mechanism.

Works Cited

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