

Modeling Kidney Function with Concentration Gradients and Selective Permeability (catalog no. 695801)

Create a model of a nephron and observe the movement of molecules through a semipermeable membrane.

Materials

Modeling Kidney Function with
Concentration Gradients and Selective
Permeability (695801)

or

Carolina® Simulated Kidney Blood
Dialysis Tubing, 20 cm
Plastic Cups
Simulated Salt Test Strips
Pipets



Dialysis tubing filled with simulated kidney blood (Step 10).

Make a claim. Based on your knowledge, what will happen to the water in the cup?

Procedure

1. Soak 20 cm of dialysis tubing in the cup of water at your table.
2. Fill your cup half full with water.
3. Dip a simulated salt test strip into the water. Swirl for 3 seconds. Record results after 3 minutes.
4. Tie one end of your dialysis tubing into a knot.
5. Use a graduated pipet to measure 10 mL of simulated kidney blood into your tubing.
6. Carefully tie a knot in the open end of the tubing.
7. Rinse your tubing to remove any simulated blood from the outside into the waste cup.
8. Place the tube in your labeled cup.
9. After 5 minutes, record any observable changes to your cup.
10. After 10 minutes, dip a simulated salt test strip in the cup. Swirl for 3 seconds. Record results after 3 minutes.

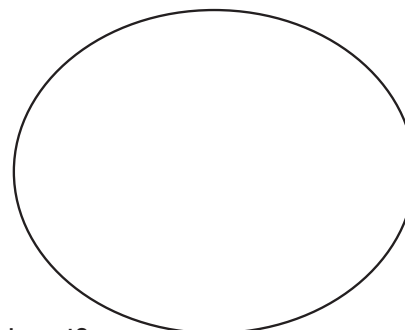
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Discussion Questions

1. Based on your knowledge of semipermeable membranes, what do you think happened in this experiment?

2. If you viewed the simulated kidney blood under a microscope, what would you expect to see?

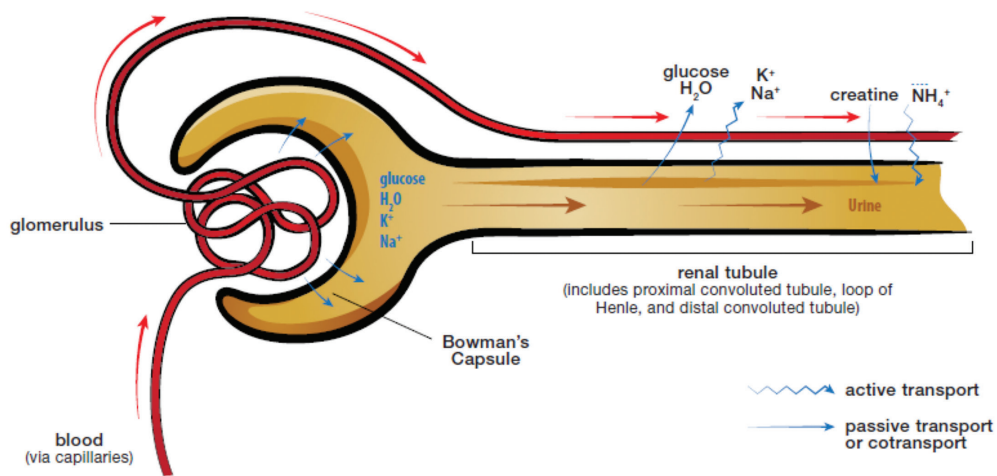
3. Observe the “blood smear” microscope slide that has been prepared for you. Record your observations and draw what you see.



4. Does this support or refute your claim about what happened in the experiment?

Summary

When blood enters the glomerulus through capillaries within the nephron, only molecules small enough will pass through the membranes. Red blood cells are too large to pass through the membrane; therefore, they remain in the bloodstream. Smaller molecules, like salts, can cross the membrane and ultimately end up collecting in the renal tubule to be expelled from the body later as a component of urine.



Additional information

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