



LAB EXERCISE 7.5.1

Inquiry Skills

- Questioning
- Hypothesizing
- Predicting
- Planning
- Conducting
- Recording
- Analyzing
- Evaluating
- Communicating

Comparing Solutes in the Plasma, Nephron, and Urine

Micropipettes were used to draw fluids from the Bowman's capsule, the glomerulus, the loop of Henle, and the collecting duct. Solute in the fluids were measured. The resulting data are displayed in the table below. Some of the data were not taken, as indicated in **Table 1**.

Analysis

- (a) Which of the solutes was not filtered into the nephron? Explain your answer.
- (b) The test for glucose was not completed for the sample taken from the glomerulus. Predict whether glucose would be found in the glomerulus. Provide reasons for your prediction.
- (c) Why do urea and ammonia levels increase after filtration occurs?
- (d) Chloride ions, Cl^- , follow actively transported Na^+ ions from the nephron into the blood. Would you not expect the Cl^- concentration to decrease as fluids are extracted along the nephron? What causes the discrepancy?
- (e) Is it correct to say that veins carry blood with high concentrations of waste products and arteries carry blood with high concentrations of nutrients? Explain.
- (f) Compare the blood found in a renal artery and a renal vein with respect to urea and glucose.

Table 1

Solute	Bowman's capsule	Glomerulus	Loop of Henle	Collecting duct
protein	0	0.8	0	0
urea	0.05	0.05	1.50	2.00
glucose	0.10	no data	0	0
chloride	0.37	no data	no data	0.6
ammonia	0.0001	0.0001	0.0001	0.04
substance X	0	9.15	0	0

Quantities are in g/100 mL.



INVESTIGATION 7.6.1

Inquiry Skills

- Questioning
- Hypothesizing
- Predicting
- Planning
- Conducting
- Recording
- Analyzing
- Evaluating
- Communicating

Do Sports Drinks Really Work?

Sweating helps to cool the body while exercising. Drinking water during and after exercising helps to restore water balance, but does not, according to many sports drinks advertisers, enable the body to continue operating at peak athletic performance. Sugar and electrolyte levels must be restored. Sugars provide the fuel for cellular respiration. Electrolytes, such as K^+ and Ca^{2+} , are essential for nerve and muscle action.

Nerve and muscle reaction can be measured by monitoring changes in reaction time. In this investigation, you will design ways to test the effects of a sports drink on reaction time.

Question

How do sports drinks affect reaction time?

Hypothesis/Prediction

- (a) Before the investigation, predict the effects of the sports drink on reaction time and formulate a hypothesis to explain your prediction.
- (b) What criteria did you use to make your prediction? ▶