# PhysioEx Lab Report

Exercise 11: Blood Analysis

Activity 1: Hematocrit Determination

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## Pre-lab Quiz Results

You scored 100% by answering 4 out of 4 questions correctly.

1. Hematocrit

   You correctly answered: of 40 means that 40% of the volume of blood consists of RBCs.

2. A buffy coat layer

   You correctly answered: is all of the above.

3. The diagnosis of anemia indicates

   You correctly answered: a lower-than-normal hematocrit.

4. Polycythemia refers to

   You correctly answered: a significant increase in RBCs.

## Experiment Results

### Predict Question

1. Predict Question: Predict how the hematocrits of the patients living in Denver, Colorado (approximately one mile above sea level), will compare with the hematocrit levels of the patients living in Boston, Massachusetts (at sea level).

   Your answer: The hematocrits of the Denver residents will the same as those of the Boston residents.

### Stop & Think Question

1. Why would the hemoglobin levels of an anemic patient be lower than the hemoglobin levels of a normal, healthy individual?

   You correctly answered: Because hemoglobin resides in RBCs, you would anticipate a low hematocrit level to coincide with a low hemoglobin level.

### Experiment Data

| Blood sample | Height of column of blood | Height of red blood cell layer | Height of buffy coat (white blood cells) | Hematocrit | % WBC |
|---|---|---|---|---|---|
| 1 | 100 mm | 48 mm | 1 mm | 48 | 1 |
| 2 | 100 mm | 44 mm | 1 mm | 44 | 1 |
| 3 | 100 mm | 55 mm | 1 mm | 55 | 1 |
| 4 | 100 mm | 53 mm | 1 mm | 53 | 1 |
| 5 | 100 mm | 19 mm | 0.5 mm | 19 | 0.5 |
| 6 | 100 mm | 32 mm | 1 mm | 32 | 1 |

Sample 1: healthy male living in Boston
Sample 2: healthy female living in Boston
Sample 3: healthy male living in Denver
Sample 4: healthy female living in Denver
Sample 5: male with aplastic anemia
Sample 6: female with iron-deficiency anemia

## Post-lab Quiz Results

You scored 100% by answering 4 out of 4 questions correctly.

**1** Anemia refers to

You correctly answered: a lower-than-normal hematocrit.

**2** To complete the blood test to measure hematocrit, you must seal the blood-containing capillary tubes on one end with a clay material so that

You correctly answered: the blood sample can be centrifuged without having the blood spray out of the tube.

**3** Possible causes of polycythemia include

You correctly answered: living at high altitudes.

**4** You would expect anemia to develop in a person

You correctly answered: who has abnormally shaped hemoglobin in their RBCs.

## Review Sheet Results

1 List the hematocrits for the healthy male (sample 1) and female (sample 2) living in Boston (at sea level) and indicate whether they are normal or whether they indicate anemia or polycythemia.

Your answer:

A healthy male hematocrit was 48% and a healthy female was 44%. They were both normal for their respective gender.

2 Describe the difference between the hematocrits for the male and female living in Boston. Why does this difference between the sexes exist?

Your answer:

The hematocrit for the female living in boston was lower than the male. The difference is because males have more testosterone which promotes RBC production.

3 List the hematocrits for the healthy male and female living in Denver (approximately one mile above sea level) and indicate whether they are normal or whether they indicate anemia or polycythemia.

Your answer:

The hematocrits for the male and female living in Denver are 55% and 53%. Both values indicate anemia or plycythemia.

4 How did the hematocrit levels of the Denver residents differ from those of the Boston residents? Why? How well did the results compare with your prediction?

Your answer:

The hematocrits for the Denver residents were higher as predicted. This is because there is less oxygen in the air at higher elevation.

5 Describe how the kidneys respond to a chronic decrease in oxygen and what effect this has on hematocrit levels.

Your answer:

The kidneys respond to a decrease in oxygen by releasing more EPO which stimulates the production of red blood cells.

6 List the hematocrit for the male with aplastic anemia (sample 5) and indicate whether it is normal or abnormal. Explain your response.

Your answer:

THe hematocrit for the male with aplastic anemia is 19% below the acceptable range. Aplastic anemia can result from the destruction of RBCs for the inhibition of red marrow.

**7** List the hematocrit for the female with iron-deficiency anemia (sample 6) and indicate whether it is normal or abnormal. Explain your response.

Your answer:

Iron deficient female as a hematocrit of 32%, abnormally low. Iron deficiency is often accompanied by a low hematocrit. Possible cause being a menstrual cycle.