PhysioEx Lab Report

Exercise 11: Blood Analysis

Activity 3: Hemoglobin Determination

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Pre-lab Quiz Results

You scored 100% by answering 3 out of 3 questions correctly.

1 A protein found in red blood cells, _____, is necessary for the transport of oxygen from the lungs to the cells of the body.

You correctly answered: hemoglobin (Hb).

2 Anemia results when

You correctly answered: There is inadequate hemoglobin in the red blood cells, and insufficient oxygen is carried in the blood.

3 How much hemoglobin does normal adult human blood contain?

You correctly answered: 12–18 g/100 ml.

Experiment Results

Predict Question

1 Predict Question: How will the hemoglobin levels for the female Olympic athlete (sample 5) compare with the hemoglobin levels for the healthy female (sample 2)?

Your answer: The hemoglobin levels for the female Olympic athlete will be greater than those for the healthy female.

Stop & Think Question

1 Why is the average hematocrit higher in males than in females?

You correctly answered: Higher testosterone levels in males promotes more RBC production.

Experiment Data

Blood sample	gm Hb per 100 ml blood	Hematocrit (PCV)	Ratio of PCV to Hb
1	16	48	3:1

2	14	44	3.14:1
3	8	40	5:1
4	20	60	3:1
5	22	60	2.73:1

Sample 1: healthy male

Sample 2: healthy female

Sample 3: female with iron-deficiency amenia

Sample 4: male with polycythemia

Sample 5: female Olympic athlete

Post-lab Quiz Results

You scored 100% by answering 3 out of 3 questions correctly.

1 To determine the amount of hemoglobin in a blood sample

You correctly answered: All of these answers are correct.

2 Which of the following diseases is known to increase hemoglobin levels in an individual?

You correctly answered: polycythemia.

3 Which of the following is known to decrease hemoglobin levels in an individual?

You correctly answered: cirrhosis of the liver.

Review Sheet Results

1 Is the male with polycythemia (sample 4) deficient in hemoglobin? Why?

Your answer:

The amle in sample 4 does not have hemoglobin deficiency. He had higher than normal hemoglobin levels and people with polycythemia have an increased RBC's count which increases the amount of hemoglobin.

2 How did the hemoglobin levels for the female Olympic athlete (sample 5) compare with the hemoglobin levels for the healthy female (sample 2)? Is either person *deficient* in hemoglobin? How well did the results compare with your prediction?

Your answer:

The female olympic athlete has a higher hemoglobin level than a healthy female. Neither had any deficiencies though.

3 List conditions in which hemoglobin levels would be expected to decrease. Provide reasons for the change when possible.

Your answer:

Hemoglobin levels decrease in patients with anemia, hyperthyroidism, cirrhosis of liver, renal disease, systemic lupus erythematosus and severe hemorrhage.

4 List conditions in which hemoglobin levels would be expected to increase. Provide reasons for the change when possible.

Your answer:

Hemoglobin levels increase in patients with polycythemia, congestive heart failure, chronic obstructive pulmonary disease and in people living at high altitudes.

5 Describe the ratio of hematocrit to hemoglobin for the healthy male (sample 1) and female (sample 2). (A normal ratio of hematocrit to grams of hemoglobin is approximately 3:1.) Discuss any differences between the two individuals.

Your answer:

Healthy male had 3:1 ratio of PCV to HB and aa healthy female had a 3. 14:1 ration of PCV to HB. The ration for the female was bith higher than the males.

6 Describe the ratio of hematocrit to hemoglobin for the female with iron-deficiency anemia (sample 3) and the female Olympic athlete (sample 5). (A normal ratio of hematocrit to grams of hemoglobin is approximately 3:1.) Discuss any differences between the two individuals.

Your answer:

Sample 3 has a 5:1 ratio, sample has 5 has a 3:1 ratio. The ratio for sample 3 is 5:1, which is abnormal compared to the ratio for a healthy female. In iron-deficiency anemia, the RBCs are smaller so as a result there is less overall hemoglobin, causing the ratio to be larger. The Olympic athlete is accustomed to greater amounts of oxygen so her red blood cells most likely have more hemoglobin in them than average, resulting in the slightly lower than average ratio of 3:1. Samples 3 has more red blood cells and less grams of hemoglobin compared to sample 5, who has less red blood cells and more grams of hemoglobin.