

Review Questions for RBC Tests topic

Review questions will not be collected and are not worth any points. Doing them will, however, help you prepare for the midterms and quizzes in this course. Furthermore, some of these review questions will appear on the final exam (although the numbers within the questions may be changed).

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- 1) The liquid part of the blood is the
 - A) Plasma
 - B) Formed elements
 - C) Blood cells
 - D) Tissue fluid

- 2) All blood cells are called
 - A) Erythrocytes
 - B) Osteocytes
 - C) Formed elements
 - D) Hemostasis

- 3) Which of the following cells is the most abundant of the formed elements?
 - A) erythrocytes
 - B) platelets
 - C) white blood cells
 - D) plasma

- 4) Erythrocytes
 - A) lack a nucleus
 - B) are the blood cell that is responsible for fighting bacteria.
 - C) are produced in the heart and muscles.
 - D) carry glucose in the blood

- 5) Which blood cell type carries oxygen?
 - A) Platelets
 - B) Leukocytes
 - C) White blood cell
 - D) Red blood cell

6) Lack of iron in the diet can cause the disease

- A) Atherosclerosis
- B) Low blood pressure
- C) Hypertension
- D) Anemia

7) define the following terms as they were defined in class

- a) Hematocrit
- b) Anemia
- c) Hemocytometer

8) Of the four major tissue types of the body, blood is classified as a type of _____ tissue.

9) Blood consists of two major parts: Living cells, called the _____, and a straw-colored fluid matrix (consisting of water with many dissolved solutes) called _____.

10) Which takes up the greater volume in most people's blood, the formed elements or the plasma? _____

11) The three formed elements of the blood are _____, _____, and _____.

12) _____ are blood cells that are round and flat, with indented centers. They lack nuclei and most other organelles. These cells are also called _____ cells. Their major function is to carry the _____ using a protein called _____.

13) The percentage of the total blood volume that is erythrocytes is called the _____.
(Hint: You measured this in lab by centrifuging a blood sample in a thin glass capillary tube).

14) Comparing men and women, it is men/women (circle one) that usually have a higher hematocrit.

15) Each hemoglobin protein contains atoms of _____, which is a metal that binds oxygen.

- 16) Which is the most numerous of the three formed element types? _____
- 17) What is the name of the needle used to puncture the skin? _____
- 18) What is always done to the skin before taking a blood sample?
- 19) Weakness due to the inability of the blood to carry sufficient oxygen is called _____.
- 20) Anemia may be due to an insufficient number of _____ (e.g., after a loss of blood), or an insufficient amount of _____ metal in the diet, or _____ (often as a treatment for cancer), or _____ diseases, such as sickle-cell anemia or malaria, that cause RBCs to burst.
- 21) In RBCs, each iron ion is held in a ring of carbon and nitrogen atoms. What is the term for the ring that holds an iron ion? _____
- 22) Explain why RBCs need iron.
- 23) One hemoglobin molecule contains _____ (a number) of heme groups; each heme group contains _____ (a number) iron ion. Each iron ion that binds to _____ (a number) of oxygen gas molecules.
- 24) In lab, you performed a test on a blood sample. You put the blood in a thin glass test tube and then centrifuged it. After being centrifuged, the blood separated into two major layers: _____ on top and _____ on the bottom.
- 25) For males, what are the normal values of the following blood tests? Include the number range and the proper units.
- a) Hematocrit
 - b) Hemoglobin concentration
 - c) RBC count

26) For females, what are the normal values of the following blood tests? ? Include the number range and the proper units.

- a) Hematocrit
- b) Hemoglobin concentration
- c) RBC count

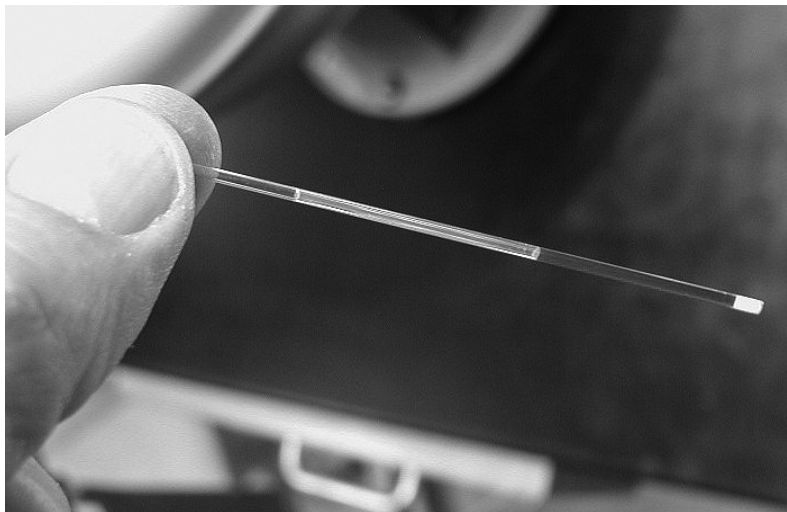
27) List the common causes of anemia that were given in class.

28) On your list of anemia causes for the problem above...

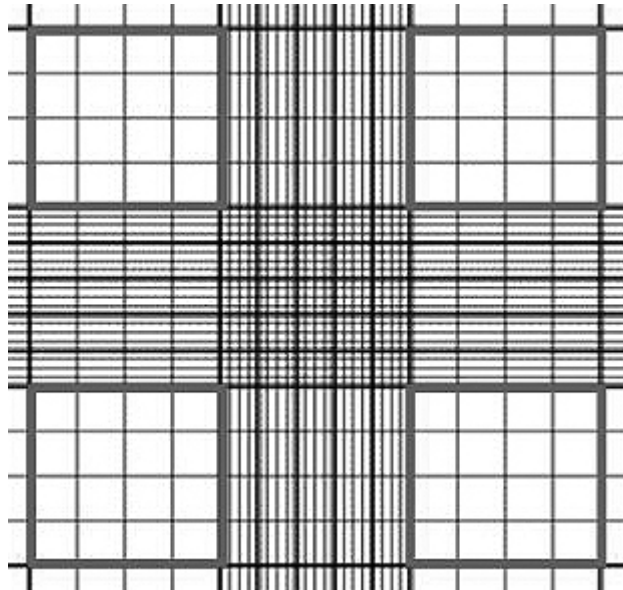
- a) Circle all those that would lead to a low hematocrit test
- b) Put a box around those that would lead to a low hemoglobin concentration test
- c) Put a star on those that would lead to a low RBC count test

29) Describe briefly how you performed the hemoglobin concentration test.

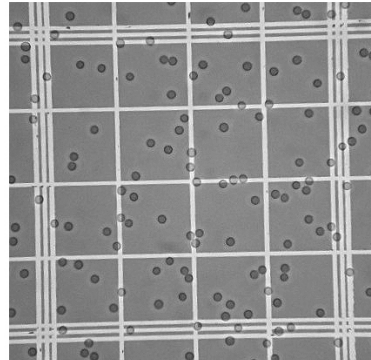
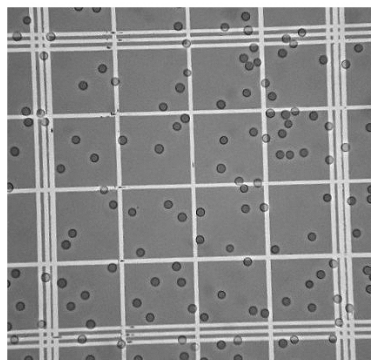
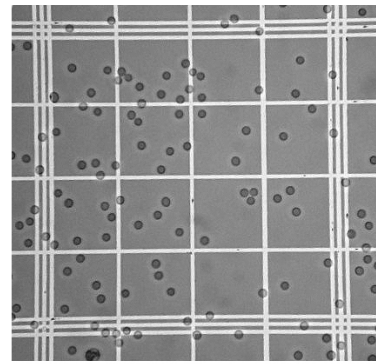
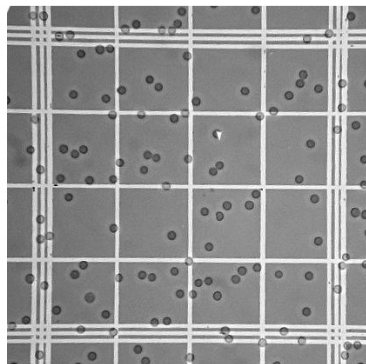
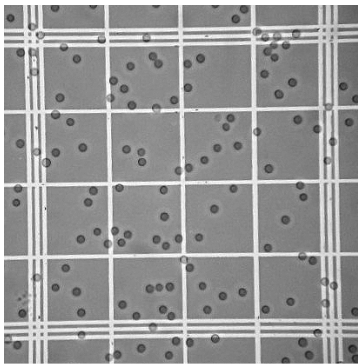
30) The photograph below shows a blood sample in a capillary tube. The sample has just been centrifuged. Using a ruler and the photograph below, calculate the hematocrit of the blood sample: _____. If this were a female's blood, would her hematocrit be within the normal range? _____. If this were a male's blood, would his hematocrit be within the normal range? _____.



31) The figure on the right shows the entire grid on the hemocytometer. Draw an X on all square regions within the figure that you count to do a RBC count.



32) Each of the five figures below shows one of the squares that were counted in an RBC count. Using the same methods of counting and calculation that you used in lab for the RBC count, calculate the RBC count for the blood sample. Be sure to include the correct units in your answer _____. Would this RBC count be within the normal range for a female patient? _____. For a male patient? _____.



Answers for Review Questions for RBC Counts topic:

1) A

2) C

3) A

4) A

5) D

6) D

7) a) The percent of the total blood volume that is RBCs

b) Weakness due to the inability of the blood to carry sufficient oxygen

c) A special microscope slide with a grid for counting blood cells

8) Connective

9) Formed elements

Plasma

10) The plasma (usually about 55% of the blood's total volume).

11) Erythrocytes (Red Blood Cells)

Leukocytes (White blood cells)

Platelets

12) Red blood cells (RBCs)

Erythrocytes

Oxygen

Hemoglobin

13) Hemoatocrit

14) Men

15) Iron

16) Erythrocytes

17) Lancet

18) Sterile the skin (usually with an alcohol pad)

19) Anemia

20) RBCs

Iron

Chemotherapy

Hemolytic diseases

21) Heme group

22) The iron carries the oxygen for the RBC

23) Four

One

One

24) Plasma

RBCs

25) a) 40% - 54%

b) 13 – 16 grams/100 ml

c) 4.5 million – 6.0 million RBCs/mm³

26) a) 37% - 47%

b) 12 – 15 grams/100 ml

c) 4.0 million – 5.5 million RBCs/mm³

27) Low iron in diet (circled, boxed)

Bleeding (circled, boxed, starred)

Hemolytic disease (sickle cell anemia, malaria, etc.) (circled, boxed, starred)

Chemotherapy (circled, boxed, starred)

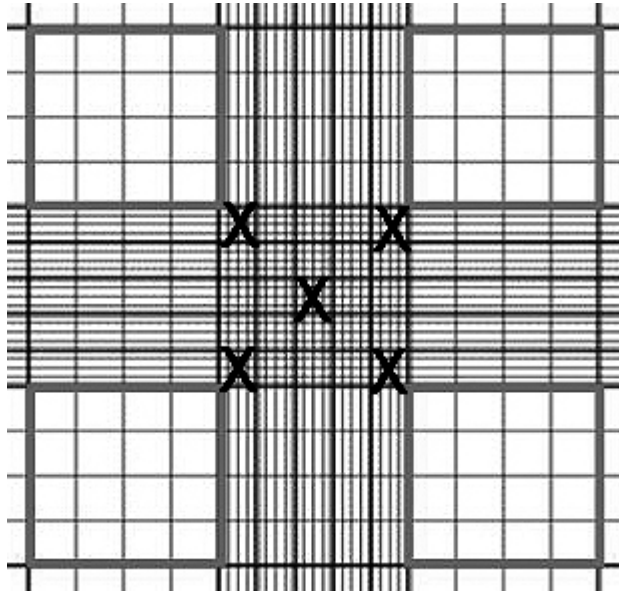
Low vitamin B₁₂ (circled, boxed, starred)

28) (see above answer)

29) A blood drop is blotted onto a piece of Talquist paper. The exact shade of red of the blood drop on the paper differs depending on the hemoglobin concentration in the blood drop. The color of the blood drop on the paper is compared to colored squares on a calibrated color scale. The square color that matches the color of the blood sample on the Talquist paper is found. The color scale shows the hemoglobin concentration (in grams per 100 ml of blood) above each square. The hemoglobin concentration for the matching square gives the hemoglobin concentration of the blood sample.

30) Measuring from the photograph, the RBC volume is 22 mm. The total blood volume (RBCs plus plasma) is 48 mm. The hematocrit is the percent of RBC volume compared to the total blood volume. $22 \text{ mm} / 48 \text{ mm} \times 100 = 46\%$. [Your measurements may be different depending on your computer settings, but whatever your measurements are, you should calculate a hematocrit of 46%]. This hematocrit percentage is within the normal range for both a female and of a male patient.

31)



32) These are the approximate counts for each of the five counting squares shown. Your counts may differ slightly from the counts given below, but they should agree within ± 3 RBCs in each square. (Remember to not count RBCs that are touching the right or bottom of each counting square).

- a) 95
- b) 78
- c) 80
- d) 81
- e) 77

The RBC count is calculated by adding the five counting squares then multiplying by a factor of 10,000.

$$95 + 78 + 80 + 81 + 77 = 411$$

$$411 \times 10,000 = 4.1 \text{ million RBCs/mm}^3$$

An RBC count of 4.1 million RBCs/mm³ is within the normal range for a female but is slightly below the normal range for a male.