Bio& 242, Unit 3/ Lab 1
Blood and Hematologic Tests

Hematologic test are routinely done to help determine the general levels of homeostasis as well as gain information about blood type and any pathological conditions. You will be conducting several of the most common tests in the exercise; a hematocrit, blood typing, tallquist test, and preparing a blood slide for microscopic observation of red and white blood cells.

Order the Hematologic Test should be done:

1. **hematocrit**
2. **Blood typing**
3. **Tallquist test**
4. **Microscope Slide preparation**

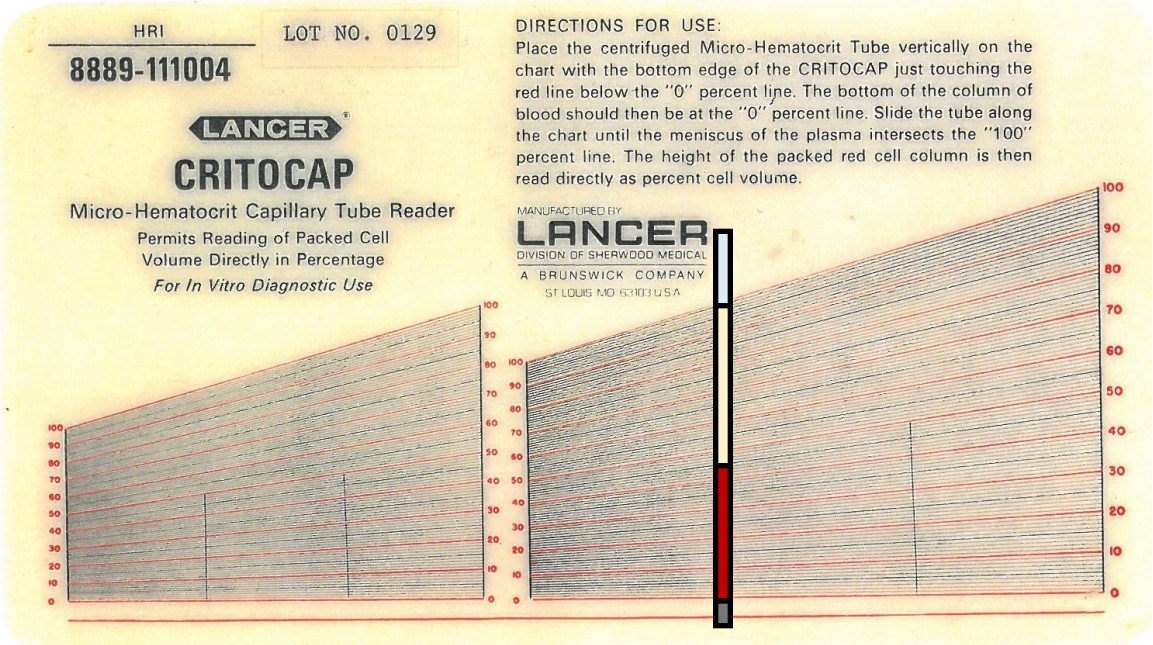
Preparing for and Collecting Blood for Hematologic tests

1. You will be working as a team of two with your lab station partner. You will be role playing with one of you being a "patient" from which blood will be collected and the other will be playing the "clinician" helping collect blood.
2. The "patient" needs to wash their hands and make sure the hand that is being to collect blood is warm.
3. The "Clinician" needs to wear gloves during the entire process.
4. Before collecting blood make sure you have prepared your station with the correct materials for making your blood slide for microscopic observation and for blood typing.
5. Prepare your station for blood collection. You will need:
    - **5A. A couple of Alcohol Swabs**
    - **5B. A Acti-Lance**
    - **5C. A Band-Aid**
6. Clean finger that will be used to collect blood with the alcohol swab.
7. Twist off the purple protective cap and pull it straight out of the Acti-Lance. Do not lay the lance down on counter top after protective cap has been removed.
8. Press lance firmly against the finger where you plan to collect blood and push button to activate the lance.
9. Gently apply pressure near puncture site to help obtain the required blood volume.
10. If you need to repeat puncture to obtain required blood volume use new alcohol swab to wash finger surface and repeat steps 7 and 8.
11. After you have collected all the required blood, place used lance in sharps container and any other items contaminated with blood in Bio-hazard container.
12. Reverse roles and follows these procedures again.

13. When both of you are done collecting blood and doing all the hematologic tests be sure anything contamination with blood has been placed in a bio-hazard container. Do not place any blood contaminated material in any trash cans.
14. Wipe counter top with disinfecting wipes before you leave your station.

Hematocrit Test.

1. Prepare your station for hematocrit text.
    1A. You will need a hematocrit tube for each student.
    1B. Obtain one clay pad from your station kit.
2. After following the directions for blood collection, create a drop of blood on the lanced friger.
3. Hold the hematocrit tube at a downward angle and place into the drop of blood.
4. Continue filling the tube by capillary action until it is 3/4 full.
5. Seal the opposite end of the capillary tube from end you placed in blood by placing it against the clay pad and push into clay to create a clay plug.
6. Place your prepared hematocrit tube in the centrifuge. Be sure to place the clay sealed end against the rubber gasket at the outside edge of centrifuge when laying your tube in the centrifuge groove.
7. Record the number by the groove so you will know which tube is yours.
8. When all the students in the class have their hematocrit tube in the centrifuge ask the instructor to start the centrifuge. Tubes should be centrifuged for 5minutes at 10,000 RPM.
9. When centrifuge is done remove your tube and get the Micro-hematocrit Capillary Tube Reader from your station kit.
10. To read tube place bottom of blood column (top of clay plug) at zero. Slide tube along scale until top of blood column (top of plasma) is at 100%. To read your hematocrit valve, carefully read the top of the formed elements on the scale. Record this value on the data sheet as your hematocrit. See figure below.



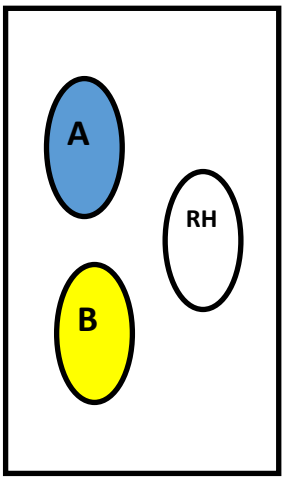
How to Prepare Your Station for Typing Your Blood

1. Each student will need a **blood typing tray**. You will also need **3 toothpicks.**
2. Fill the depressions with the appropriate Antibody Solution. Make sure the bottom of each depression is completely covered with antibody solution. Do not over fill.

2A: **Place Antibody A in depression "A"**

2B: Place Antibody B in depression "B"

2C: Place Antibody D (RH) in depression "RH"



3. Place a large drop of blood in each depression. Quickly mix blood and antibody solution together using the toothpicks. Make sure that you used a different toothpick for each antibody solution.
4. Let typing slide set for a minute and then carefully rock try back and forth to mix typing antibody solution and blood. Be careful not to mixed solution between the 3 depressions.
5. Observe typing slide for blood clumping. The clumping occurs when membrane bound proteins called Antigens or agglutinogens interact with corresponding Antibodies or agglutinins. The reaction that causes the clumping is refer to as agglutination.

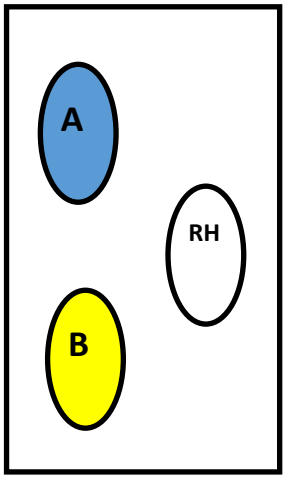
   O type red blood cells lack Antigens

   A type red blood cells have "A" Antigens

   B type red blood cells have "B" Antigens

   AB type red blood cells have both "A" and "B" Antigens
6. You can type your blood by matching the agglutination pattern on your typing tray with the examples provided.
7. Placed used typing slide and tooth picks in Bio-hazard container once you have confirmed your blood type.
8. Write your blood type on the data sheet.

O -



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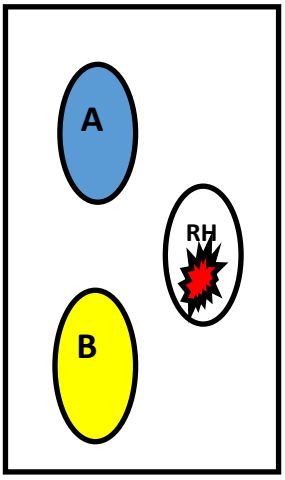
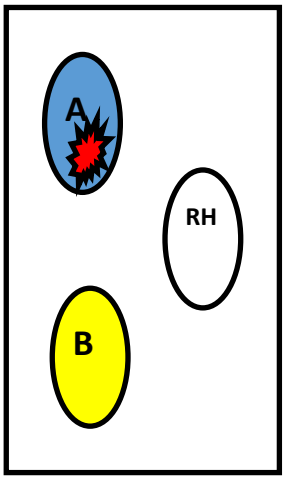


A -



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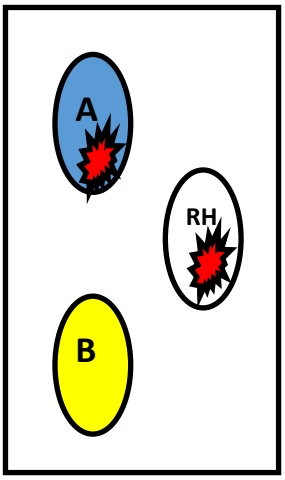

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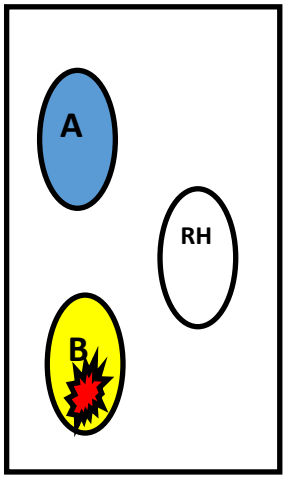

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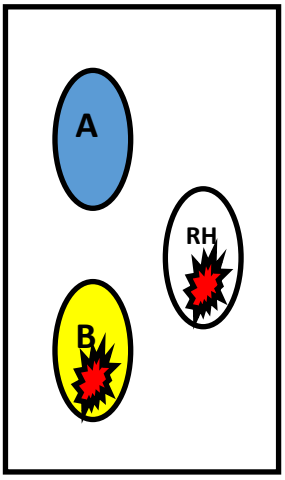

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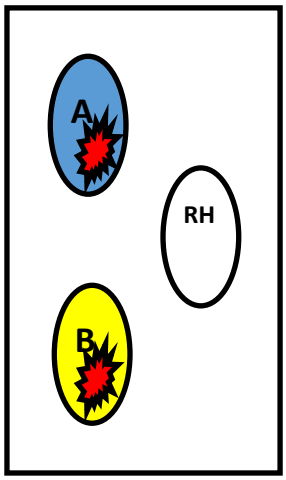

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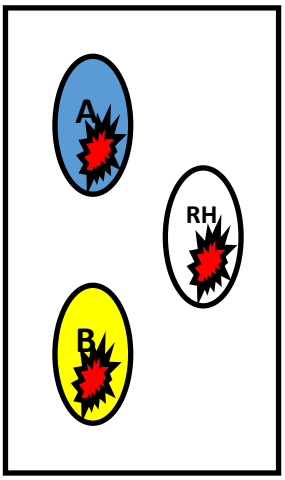


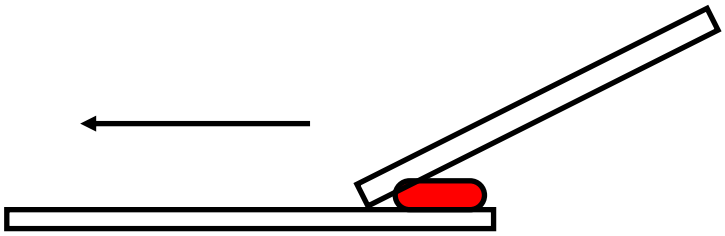
How to Make your Blood Slide for Microscopic Observation of Red and White Blood Cells.

1. Each student will need **2 glass microscope slides.**
2. Write your initials on the left end of one of the slides using a permanent marker.

3. Place a drop of blood on the right end of the same glass slide.

4. Use the second glass slide to quickly draw the blood across the first glass slide.

   Do not let blood drop dry before you try to draw the blood.



5. Place Glass Slide with blood smear on the drying plate. Place the slide used to draw blood in sharps container.
6. After Blood slide has completely dried you may stain the slide.
7. Follow these sliding procedures Meticulously:

   A. Place slide in jar #1 for **45sec.**

   B. Move slide quickly from jar #1 into jar #2 for **6sec.**

   C. Quickly slide from jar #2 and dip repeatedly in jar #3 to rinse.

   D. After slide has been well rinsed place slide into jar #4 for **20sec.**

   E. Quickly slide from jar #4 and dip repeatedly in jar #5 to rinse.

8. Let slide fully dry and examine with microscope. Record the different types of WBC's you find on the data sheet.

Tallquist method of determining Hemoglobin concentration.

Background: Hemoglobin is a complex protein containing iron this is responsible for transporting oxygen in your blood. Several factors can affect the amount of hemoglobin in each RBC. Therefore just knowing the number of RBCs per deciliter of blood is not a accurate way to know the oxygen-carrying capacity of Blood. To accurately understand the oxygen-carrying capacity of blood you need to know the concentration of hemoglobin. Individuals with abnormally low concentration of hemoglobin are anemic. The Tallquist test determines the degree of anemia.

1. Obtain a Tallquist test paper from your station kit.
2. Place one large drop of blood on the test paper. Make sure the blood stain created by the drop of blood is larger than the open window on the Tallquist hemoglobin scale slide.
3. As soon as the blood has dried on the test paper you are ready to get your results. The best by to know if the blood has dried enough is to look for the disappearance of the glossy shine from the blood stain.
4. Match the color of your blood stain with the colors on the Tallquist hemoglobin scale. Please do not contaminate the hemoglobin scale slide with your blood by holding directly against the back of the slide.
5. Record your results on the data sheet. Record your data both as percent hemoglobin concentration and as grams of hemoglobin.

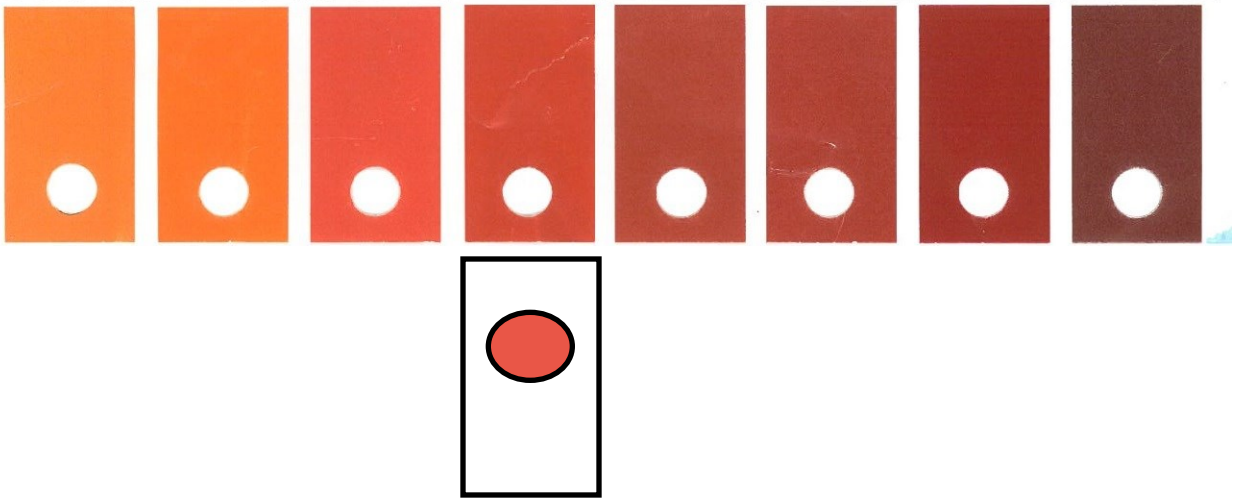
Hemoglobin Scale (after Tallquist)

Directions: After the proper puncture of finger tip or ear lobe, a perforated paper swatch should be placed so that it absorbs the blood evenly and thoroughly. Any excess blood should be blotted with another paper swatch.

Before the blood starts to dry, the comparison should be made under natural light by placing the specimen under the color comparison chart so that it appears at the apertures.

The approximate hemoglobin content of the blood can be read from the figures alongside the color which is the closest match to the specimen.

Actual Anemia				Suggestive Anemia		Normal	
Men and Women Below 70%				Men - 70 to 85% Women - 70 to 80%		Men - Above 85% Women - Above 80%	
30%	40%	50%	60%	70%	80%	90%	100%
4.7 gms.	6.3 gms.	7.8 gms.	9.4 gms.	10.9 gms.	12.5 gms.	14.1 gms.	15.6 gms.



Hematologic Test Lab Report. **Name:**

Hematocrit:

What was your hematocrit value?

Is your value within normal range? If not how could your valued be explained?

Blood Typing:

What was your Blood Type?

How common is your blood type in the US population?

Did the class average blood types agree with the US population? If not how is it different?

If not, why do you think they varied?

Based on the Genetic information provided, what are your parent's possible blood types?

Tallquist Test:

Based upon your Tallquist test results, what was your hemoglobin concentration?

Are your results within normal range? If not how could your valued be explained?

Microscopic observation of your Blood smear slide:

Which type of white blood cells were you able to observe using your slide?