

Blood Typing and Blood Pressure

Introduction:

Blood pressure is the force exerted by the blood against the inner wall of blood vessels. Blood pressure is found in all vessels but for all practical purposes we will be measuring the pressure in the arteries.

We measure pressure in arteries based on two things. You have seen pressure readings such as 120/80 read one-twenty over eighty. The first number is the systolic pressure or the pressure found in the arteries when the ventricles contract. The second number is the diastolic pressure or the pressure left in the arteries after the ventricles relax.

There are four factors which influence your blood pressure. They are:

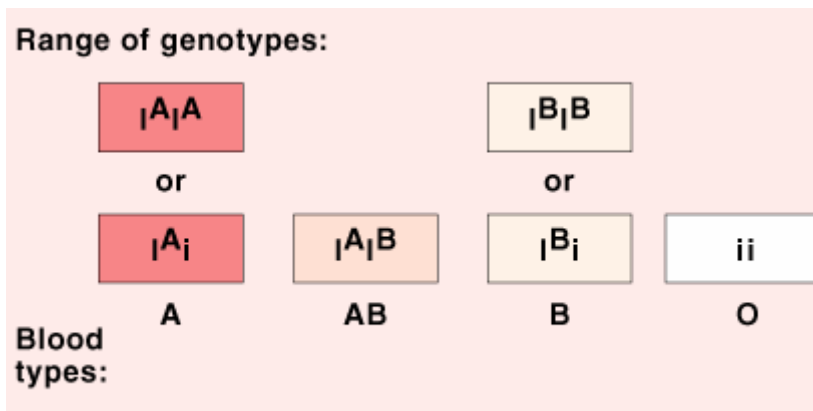
1. Heart action. The heart determines the amount of blood that is pushed into the arteries and how fast it is put there. The more rapid your heart beat or the more forceful the contraction of the ventricles the higher your blood pressure will be.
2. Blood volume. This is equal to the amount of blood cells and fluids in the entire circulatory system. If blood volume goes down then the blood pressure goes down.
3. Viscosity. This is the thickness of the blood. An example of viscosity is that of maple syrup and water. Maple syrup is more viscous than water and is more difficult to push through small openings than water is. Blood viscosity can be like the water or maple syrup and you can say that the thicker the blood (the more viscous the blood), the higher the blood pressure will be.
4. Peripheral resistance. The friction between the walls of the blood vessels and the blood itself will cause pressure to change. Narrowing of blood vessels will cause the friction (peripheral resistance) to go up. This causes the blood pressure to increase. Stress increases peripheral resistance which increases blood pressure. Diseases of the arteries and capillaries will also increase peripheral resistance.

Any of the above factors by themselves will cause blood pressure to change. Most often, though, blood pressure changes because of a combination of many factors.

"Blood Type" generally refers to the ABO blood typing system. There are many different systems for typing blood. All are based on the various

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proteins found or not found in the surface of blood cells. The ABO typing system has been around and utilized for the greatest period of time. Basically, there are two proteins and an associated one that are used. When someone says a person has "A+" blood, that means that they have an "A" surface protein and an Rh surface protein as well. The "+" refers to being either RH + which means that you have the Rh factor or "-" meaning you don't have it. If you have B then you have a B surface protein. The blood type "O" is due to not having either A or B. In the diagram below it uses the symbol I with a superscript to symbolize the allele. The small symbol "i" is used to symbolize the absence of either A or B.



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Use the guidelines below to conduct an investigation of activities which influence blood pressure. Then write the lab up using the factors discussed above to explain why different activities caused your blood pressure to change.

PURPOSE: To determine the effects of different activities of the resting blood pressure, heart rate, and breathing rate collectively known as the vital signs and to determine one's blood type.

MATERIALS: 1 sphygmomanometer
1 stethoscope
colored pencils & graph paper
clock or stopwatch
Blood typing Reagents
Disposaslides
Auto Lancets

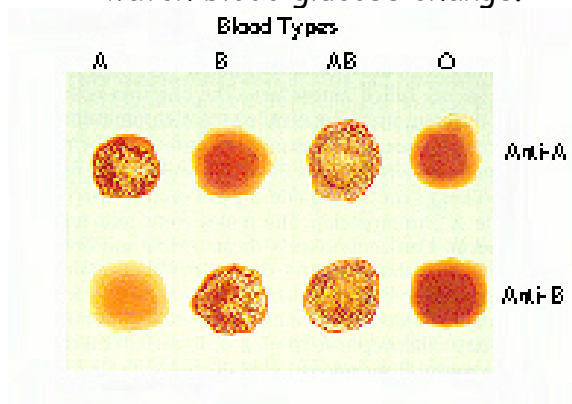
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Blood Glucometer

PROCEDURE:

Part I: Blood Typing

1. Obtain the blood typing Disposaslide
2. Get three toothpicks
3. Get the Antibodies for A B and RH
4. Use an alcohol swab to rub the finger you are going to puncture.
5. Rub for a full minute
6. Load the lancet into the autolet
7. Place against the finger and depress
8. Milk the blood and place three drops (one into each well of the disposaslide)
9. Add one drop of antibodies and mix with the toothpicks
10. Dispose of all materials in the biohazard containers
11. Bleach anything that touched blood. Directed by instructor
12. If you have time, put a drop of blood on the glucometer and read blood glucose. You could also experiment and eat candy afterwards to watch blood glucose change.



Part II: Blood Pressure

1. You will be working in groups of four.
2. One student will be the experimental subject.
3. The other students will be responsible for taking down the data and performing the tasks of the experiments.
4. You will be measuring the following information from the specimen in each of the activities listed in number 5: heart rate (pulse), breathing rate, and blood pressure.

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5. You need to test the individual in the following areas and make a data table with information that you collect.
 - a) sitting and resting (this is your control)
 - b) laying resting
 - c) standing resting
 - d) standing on head
 - e) after 3 minutes of vigorous exercise
 - f) choose two other activities (they have to be legal & moral) and take their vital signs for these

6. Before you conduct any of the above activities predict what will happen to their vital signs. These should be included in your hypothesis section.
7. Record the data in a data table that you construct. Then construct a graph of the results showing the changes that occurred.
8. In your write-up, discuss the changes you observed in each of the activities and use the first page of this lab to try to explain why those changes occurred. This should be included in your conclusions.