

Lab Report 3: Blood Typing

Abstract: This report discusses an experiment performed to determine the blood types of unknown blood samples. Antibodies A, B, and Rh were applied to the blood samples and observed to see if agglutination occurred.

Introduction: Human erythrocytes, red blood cells, have surface antigens that are detectable by antibodies present in blood plasma. Blood type is inherited and characterized by the presence or absence of surface antigens. There are three alleles that code for blood type. They are A, B, and O and refer to the antigen present on the cell surface or the lack thereof. Alleles A and B can be codominant. Additionally, there is a second class of antigens called Rhesus factor with two alleles that code for Rh factor. Rh is either present (+) or absent (-). There are eight possible blood type combinations.

The specific antibodies present in blood plasma that defend the body against foreign antibodies and can cause agglutination when mixing none complementary blood types. This is particularly important when performing blood transfusions as agglutination leads to death. To avoid transfusion reactions, it is best to match blood types exactly, however, it is possible for certain blood types to donate and receive transfusions without a negative consequence (Gordon Betts et al, 18.6). A blood types have B antibodies, type B blood groups have A antibodies, AB have no antibodies, and type O have both A and antibodies. With this information we know that A+ can donate to A+, AB+ and receive from A+, A-, O+, O-. A- can donate to A+, A-, AB+, AB- and receive from A-, O-. Similarly, B+ can donate to B+, AB+ and receive from B+, B-, O+, O-, while B- can donate to B+, B-, AB+, AB- and receive from B-, and O-. AB+ persons can only donate to other AB+ individuals but can receive from everyone. AB- can donate to AB+, AB- and receive from AB-, A-, B-, O-. O+ can donate to O+, A+, B+ AB+ and receive from O+ or O-. O- is the universal donor able to donate to all

blood types but can only receive from other O- individuals.

Methods: This experiment was done in two parts to obtain sufficient data. In part 1 students working in pair were asked to obtain mixing trays and two unknown blood samples. A drop of the first unknown sample blood was placed into each of three wells labeled A, B, and Rh. This step was repeated in a second tray for the other sample. A drop of Anti A was added to the well A, a drop of Anti B was added to the well labeled B and a drop of Anti D was added to the well labeled Rh. Using the appropriately colored stick the samples were mixed and observed to determine if agglutination occurred. A positive reaction, the occurrence of agglutination, was recorded as 'yes' and is a signifier of that blood type. In part two the same students were asked to repeat the previously illustrated process with three different blood samples. Class data was collected for further analysis.

Data & Results:

<i>Table 1.0</i>		
Blood Group	Total for the Blood Group	Blood Group Frequency %
A+	8	23.5%
A-	6	17.6%
B+	3	8.8%
B-	6	17.6%
AB+	1	2.9%
AB-	2	5.8%
O+	4	11.7%
O-	4	11.7%
Total	34	100%

Discussion: *Table 1.0* shows the distribution of frequency that each of the eight blood types occurred in a sample size of 34 blood samples. The samples were not evenly distributed between the blood types illustrating variation in the population.

References:

1. Gordon Betts, J. et al. (2013). Anatomy and Physiology (18.6 Blood Typing). OpenStax: Creative Commons.