

# Identifying Blood Type in Zombie Blood: *Which sample belongs to each zombie?*

## Background

Our red blood cells have molecules on their surface that determine “blood type”. Some people have a form of the molecule (also known as an antigen) that gives them Type A blood. Others have a form of the antigen that gives them Type B blood. Someone with both forms of the antigen has Type AB blood, and someone missing the antigens has Type O blood. In addition, there is a second type of molecule present on red blood cells called the Rh factor. People with Rh factor have “+” (positive) blood, and people without it have “-” (negative) blood. Finally, we also have antibodies in our blood that attack antigens different than our own. Someone with B-blood will have antibodies that attack the A antigen and the Rh factor.



ABO Blood Groups				
Antigen (on RBC)	Antigen A	Antigen B	Antigens A + B	Neither A or B
Antibody (in plasma)	Anti-B Antibody	Anti-A Antibody	Neither Antibody	Both Antibodies

Type A      Type B      Type AB      Type O

## Protocol

1. Using the dropper vial, place a drop of the Sample 1 synthetic blood sample in each well of the blood typing slide. Close the cap on the dropper vial. To prevent cross contamination, always close the cap on one vial before opening the next vial. *Note: the zombie blood in the bottles has been labeled “synthetic blood” so nobody knows about our experiment!*
2. Add a drop of synthetic anti-A serum (blue) to well A. Do not touch the dropper bottle to the drop of blood on the slide. This serum contains antibodies that will react with the A antigen found in Type A and Type AB blood. Close the cap.
3. Add a drop of synthetic anti-B serum (yellow) to well B. Do not touch the dropper bottle to the drop of blood on the slide. This serum contains antibodies that will react with the B antigen found in Type B and Type AB blood. Close the cap.
4. Add a drop of synthetic anti-Rh serum (clear) to well Rh. Do not touch the dropper bottle to the drop of blood on the slide. This serum contains antibodies that react with the Rh factor on A+, B+, AB+ and O+ blood. Close the cap.
5. Using a different-colored mixing stick for each well (blue for anti-A, yellow for anti-B, white for anti-Rh), gently stir the synthetic blood and serum drops for 30 seconds. Stir gently to avoid splashing. Remember to use a new mixing stick for each sample to avoid contamination of your samples.
6. Examine the resulting liquid mixture in the well. If the liquid is uniform in appearance, there is no clumping, which means the antibodies in the serum did not react with the antigens on the surface of the red blood cells. For example, if no clumping occurred in a blood sample to which anti-A serum was added, then the A antigen is not present, and the sample is not A or AB blood. If the sample has clumps in it, the antibodies in the serum stuck to the antigens on the surface of the red blood cells. For example, if clumping occurred in a blood sample

to which anti-B serum was added, then the B antigen was present, and the sample is either Type B or Type AB blood.

7. Fill in the column for Sample 1 in the following Data Table, answering yes or no as to whether clumping occurred with each serum.

8. Thoroughly rinse and dry the blood typing slide and mixing sticks. Repeat steps 1 through 7 for synthetic blood Samples 2, 3, and 4.

9. Remember that 4 people matching the approximate size of the zombies we got the blood samples from have recently gone missing in Maryland. Unfortunately, the zombies are so badly decomposed, it is impossible to tell from their faces who they used to be. Our job is to match the blood types of the 4 zombie samples with the known blood types of the people that have gone missing. Owen has Type AB- blood, Christina has Type A+ blood, Luis has Type O+ Blood, and Maggie has Type B+ blood.

What individual did each sample come from? Write their names underneath the appropriate column in the data table.

**Data Table**

	Sample 1	Sample 2	Sample 3	Sample 4
Anti-A				
Anti-B				
Rh				
Blood Types				

**Sample plate interpretation:**

