

ANTIBODIES DEMO

GOAL: Demonstrate to visitors that antibodies help in preventing sickness by destroying antigens that enter the body.

MATERIALS:

Micro-scale: Six test tubes
Test tube rack
500mL squirt water bottle
Borax Solution
Acidic Solution (sprite?)
Phenolphthalein
Acidic Indicator (congo red?)
2 dropper bottles for indicators
2 500mL water bottles for solutions
Disease name labels (for test tube rack)
Paper towels
Waste bucket

Macro-scale: Plexi antibodies
Antigen shapes

PROCEDURE:

Set-up:

1. Fill 4 of the 6 test tubes with water, halfway. Fill test tube number 5 with borax solution. Fill test tube number 6 with acidic solution.
2. Have paper towels, squeeze bottle of water and waste bucket available.

During the presentation:

Micro-scale

1. Discuss with the visitors what antibodies do in the body and how they help to prevent sickness. Explain that when a foreign substance enters a body, it is called an antigen.
2. Explain that the test tubes are filled with “fake” antigens that can get them sick (i.e. influenza, rabies, chicken pox, etc.).
3. Tell the audience that you have antibodies that match with one of the antigens in the test tubes.
4. Have an audience member put 1-2 drops of the antibody (phenolphthalein) into each test tube and then ask the audience if they noticed any changes. The test tube containing the borax solution will turn bright pink.
5. Explain to the audience that the antigen that turned pink (i.e. common cold), changed color because it matched the shape of the antibody.
6. Have another audience member put 1-2 drops of another antibody (acid indicator) into each test tube and repeat steps 4-5.

Macro-scale

1. Explain to the audience that the reason why the antigen and antibody matched is because they were similar in shapes.
2. Have a volunteer make a “Y” by extending their arm out. Place a plexi tube antibody in each hand and ask them to pick up the corresponding antigen on the cart.
3. Have another volunteer do the same demonstration, but with a different shaped antibody.
4. Explain that only certain antibodies will match with certain antigens depending on the shape.

Clean-up

1. Pour contents of test tube into the waste bucket.
2. Rinse the test tubes thoroughly with water before using again.
3. Clean test tubes with soap and water 2-3 days a week.

EXPLANATION

Antigens are large molecules on the surface of cells, viruses, fungi, bacteria, as well as other substances that are considered foreign to the body. Your body recognizes antigens as a threat to health and produces antibodies that attempt to destroy the antigen.

Scientists create vaccines to help you from getting sick. Vaccines contain antigens that are very weak, but won't make you sick. Your body recognizes these antigens and starts making antibodies to help protect your body. So if you do get a particular virus or bacteria, your body will be prepared to kill the antigen with the antibodies that have been created from the vaccine. (i.e. chicken pox vaccination).