

What Vaccines Are Made Of

When you get vaccinated, your immune system makes protective antibodies that fight viruses or bacteria to keep you from getting sick if you are exposed to them in the future. The vaccine trains your immune system to attack the virus or bacteria. In the case of measles, for example, if you have been vaccinated against measles and are later exposed to someone with the disease, your body remembers how to fight it off.

Despite the benefits, the thought of having a vaccine injected into our bodies may still be scary for a lot of people. When it comes to vaccines, what many people really want to know is: What's in these things?

Vaccines contain ingredients, called antigens, which help the body to develop immunity (protection) against specific diseases. Vaccines also contain very small amounts of other ingredients that are necessary to make the vaccine and protect it from spoiling before it is used. Below is a list of the ingredients in vaccines.

Vaccine Ingredients		
Type of Ingredient	Examples	Purpose
Preservatives	Thimerosal (not contained in any vaccines routinely recommended for children except multi-dose vials of flu vaccine)	To prevent contamination
Adjuvants	Aluminum salts	To help stimulate the body's response to the antigens
Stabilizers	Sugars, gelatin	To keep the vaccine potent during transportation and storage
Residual cell culture materials	Egg protein	To grow enough of the virus or bacteria to make the vaccine
Residual inactivating ingredients	Formaldehyde	To kill viruses or inactivate toxins during the manufacturing process
Residual antibiotics	Neomycin, Kanamycin, Streptomycin	To prevent contamination by bacteria during the vaccine manufacturing process

Some people are concerned about the first ingredient on the list, thimerosal, because it contains mercury. The concern has been that vaccines that contain thimerosal might harm the babies of pregnant women or young infants. Research has shown that in vaccines containing thimerosal, the amount is not harmful. Thimerosal acts as a preservative in many medicines, including some vaccines, and has a record of being very safe.

Mercury is a metal found naturally in the environment. People can be exposed to some types of mercury; methylmercury, for example, is the type of mercury found in certain some foods. If a person is exposed to a large amount of methylmercury, it can be dangerous. People can also be exposed to elemental mercury, such as when an old thermometer breaks and the mercury spills out. Thimerosal

contains ethylmercury, a different kind of mercury, which does not stay in the body very long. There is no evidence of harm caused by the low doses of thimerosal in vaccines.

In 1999, the Food and Drug Administration (FDA) was required by law to assess the amount of mercury in all the products the agency oversees, including vaccines. In an abundance of caution, the U.S. Public Health Service decided that as much mercury as possible should be removed from vaccines, and since thimerosal was the only source of mercury in vaccines, they recommended removing thimerosal to reduce mercury exposure.

One concern has been that the thimerosal might be linked to autism in young children. However, based on a thorough review in 2004 of clinical and epidemiological studies by the National Academy of Medicine concluded that neither thimerosal, nor the measles-mumps-rubella (MMR) vaccine, is associated with autism. Even after thimerosal was removed from almost all childhood vaccines, autism rates continued to go up, which is the opposite of what would happen if thimerosal caused autism.

The measles, mumps, and rubella (MMR) vaccine has never contained thimerosal. Today, the only childhood vaccines that contain thimerosal and are routinely used in the United States are flu vaccines in multi-dose vials (vials containing more than one dose). Multi-dose vials have very tiny amounts of thimerosal as a preservative to prevent the growth of dangerous microbes. When each new needle is inserted into a multi-dose vial, it is possible for bacteria from the needle to enter the vial. Receiving a vaccine contaminated with bacteria can be deadly. Thimerosal prevents contamination in the multi-dose vial when individual doses are drawn from it. Vaccines that do not contain thimerosal are in single-use vials and in pre-filled syringes.