



Questions and Answers about Vaccine Ingredients

Q. What ingredients are in vaccines?

A. All vaccines contain antigens, the active ingredients that prompt the body to create immune cells that will protect against a future infection. Antigens come in several forms:

- Weakened viruses: The measles, mumps, rubella and chickenpox vaccines contain weakened viruses. Weakened viruses don't replicate well enough in the body to cause disease, but still prompt an immune response.
- Inactivated (or killed) viruses: The polio, hepatitis A, influenza and rabies vaccines contain inactivated viruses, which cannot cause even a mild form of the disease. Because the body still recognizes the virus, it produces immune cells to protect itself.
- Partial viruses: Some vaccines contain just part of the virus, such as a specific protein, that will prompt an immune response. The hepatitis B and HPV vaccines are made this way.
- Partial bacteria: The Hib, pneumococcal and meningococcal vaccines are made using part of the sugar coating (or polysaccharide) of the bacteria. The vaccine creates immunity against this sugar coating, providing protection against the bacteria. Bacterial vaccines against diphtheria, tetanus and pertussis (whooping cough) are made by inactivating the protein in the bacteria that causes harm.

Vaccines also contain inactive ingredients, which help make them safer and more effective. They include:

- Preservatives to prevent contamination with germs.
- Adjuvants, including aluminum salts, which help your body create a better immune response.
- Additives, including gelatin, albumin, sucrose, lactose, MSG and glycine, which prevent vaccine deterioration.
- Residuals of the vaccine production process. They include tiny amounts of formaldehyde, antibiotics (neomycin), egg protein and yeast protein.

Q. Why are these other ingredients in vaccines? Are they safe?

A. Each additive serves a specific function in a vaccine. These ingredients have been found to be safe in humans in the quantities given in vaccines, which is much less than children are exposed to in their environment, food and water.

- Aluminum salts – Aluminum salts help your body create a better immune response to vaccines, making the vaccine more effective. Without an adjuvant like aluminum, people could need more shots or face lower immunity. Vaccines are not the only source of aluminum exposure to infants. Because aluminum is abundant in the earth's crust, it is present in our food, air and water, including breast milk and formula. The aluminum contained in vaccines is similar to that found in 33 ounces of

- infant formula. Aluminum has been used in vaccines for 75 years and has been found to be safe.
- Formaldehyde – Small amounts of formaldehyde in some vaccines sterilize the vaccine fluid to prevent harmful germs from infecting your child. It is used to detoxify the tetanus toxin, thus making a toxoid that will produce immunity without toxicity. Vaccines are not the only source of formaldehyde your baby is exposed to. Formaldehyde is also in products like paper towels, mascara and carpeting, and is a byproduct of human metabolism. All humans have formaldehyde in their blood stream at levels higher than that which an infant receives in vaccines. The amount of formaldehyde in vaccines is safe.
 - Antibiotics – Antibiotics, such as neomycin, are present in some vaccines to prevent bacterial contamination during the manufacturing process; the antibiotics are added to the culture media that is used to grow the viruses. The trace quantities of antibiotics in vaccines rarely, if ever, cause allergic reactions.
 - Egg protein – Influenza and yellow fever vaccines are produced in eggs, so egg proteins are present in the final product and can cause allergic reaction. Measles and mumps vaccines are made in chick embryo cells in culture, not in eggs. The much smaller amount of residual egg proteins found in the MMR vaccine is not sufficient to cause allergic reactions.
 - Gelatin – Some vaccines contain gelatin to protect them against freeze-drying or heat. People with severe allergies to gelatin should avoid getting gelatin-containing vaccines.

Q. Do vaccines contain antifreeze?

A: No. A component of antifreeze called polyethylene glycol is used to inactivate the flu virus in some flu vaccine. It is also used to purify other vaccines. This chemical is also widely used in personal care products including skin creams and toothpaste.

Q. Do vaccines contain mercury?

A: Thimerosal, a mercury-based preservative, was removed from childhood vaccines in 2001. It is still present in some influenza vaccines. Valid scientific studies have shown there is no link between thimerosal and autism. Since thimerosal was removed from childhood vaccines, autism rates have actually increased, supplying further evidence that thimerosal does not cause autism. The American Academy of Pediatrics (AAP), the American Medical Association (AMA), the CDC, and the Institute of Medicine (IOM) agree that science does not support a link between thimerosal in vaccines and autism. For the IOM report, go to <http://www.iom.edu/CMS/3793/4705/4717.aspx>

Q. Should vaccines be “greener”?

A. Additives like aluminum are in vaccines in extremely small amounts, but each is included for a specific reason. We are exposed to significantly higher levels of these chemicals in our everyday lives. In vaccines, these ingredients serve to make the vaccine safer and more effective at preventing disease. Each vaccine product is extensively tested for efficacy (does it protect the person from the infection?) and safety. It is not known if changing the make up of a vaccine would affect the ability of that vaccine to protect a person.

