

Live Virus Vaccines: Precautions

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Abstract

A live virus vaccine contains a live, weakened (attenuated) virus that aids in the production of an immune response without causing you to experience symptoms of the disease it is supposed to prevent. Your immune system is "taught" by the weakened virus to identify the disease-causing pathogen and launch a pathogen-specific attack. Many of these vaccines have lifetime immunity after just one or two doses.

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Introduction

How live vaccines differ

Live attenuated vaccinations have proved to be one of the most successful prevention strategies in medical history. Smallpox was declared eradicated in 1980 as a result of global vaccination efforts, and polio and measles are almost eradicated in most areas of the world.

There are, however, other forms of vaccines that do not use live viruses or bacteria which have had a positive impact. These include: 1) Inactivated vaccines, also known as killed or whole-killed vaccines, contain a dead virus or bacteria that the immune system still perceives as dangerous, eliciting a pathogen-specific immune response. The yearly flu shot, as well as the rabies and hepatitis A vaccines, are reminders of this. 2) Toxoid vaccines: These vaccines do not provide protection against the infection itself. Rather, they contain a toxin created by the bacteria or virus, which the immune system recognizes and reacts to, preventing the infection's harmful effects. One example of this is the tetanus vaccine. 3) Subunit vaccines: These vaccines contain a protein or a portion of a virus or bacteria that causes an immune response unique to the pathogen. These vaccines protect against diseases such as hepatitis B, human papillomavirus (HPV), and pertussis (whooping cough).

Types of live viral vaccines

While some live attenuated viral vaccines are available as a nasal spray or taken by mouth, most are administered by injection. Vaccines against chickenpox (varicella) are among them. Chickenpox (varicella) vaccines, FluMist (intranasal flu nasal spray), MMR

vaccines (measles, mumps, and rubella), Japanese encephalitis vaccine, Oral polio vaccine (which is now no longer used in the United States), Rotavirus vaccines, Smallpox vaccine (discontinued in the United States), Zostavax shingles (herpes zoster) vaccine. Yellow fever vaccine.

Advantages

Live attenuated vaccines have advantages that other vaccines could not have. Live vaccines are generally more resilient than killed or subunit vaccines, in that the body retains the immune "memory" of a pathogen for longer. As a result, most live vaccines don't need booster shots as often or at all. For example, the hepatitis A vaccine can provide safety for up to 20 years. In the same way that most inactivated viruses need several doses, live virus vaccines (such as the MMR and Zostavax vaccines) only need one. Furthermore, the immune system's reaction to live vaccines is normally similar to that of a natural infection, but without the negative consequences. Researchers are constantly using live virus vaccines as "viral vectors" for gene therapy. Since the weakened viruses are still "programmed" to invade individual cells, they can latch on and insert modified DNA into the cell, possibly treating genetic disorders.

Disadvantages

One disadvantage of live vaccines is that they need refrigeration, which can restrict their use in resource-constrained areas. These vaccinations can become ineffective if not held at the proper temperature, and the immunisation might not be successful. Furthermore, some live virus vaccines are powders that must be reconstituted with a particular diluent (fluid) before being administered. The vaccine's efficacy may also be harmed by administrator error.