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Editorial Note on Different Types of Vaccines

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Editorial

There are several different types of vaccines. When scientists develop vaccines, they consider how your immune system responds to the germ, who needs to be vaccinated against the germ and the best technology or approach to create the vaccine. Based on a number of these factors, scientists decide which type of vaccine they will make. There are several types of vaccines such as inactivated vaccines, live-attenuated vaccines, messenger RNA (mRNA) vaccines, subunit, recombinant, polysaccharide, and conjugate vaccines, toxoid vaccines and viral vector vaccines.

The first way to make a vaccine is to take the disease-carrying virus or bacterium, or one very similar to it, and inactivate or kill it using chemicals, heat or radiation. This approach uses technology that's been proven to work in people. It requires special laboratory facilities to grow the virus or bacterium safely to have a relatively long production time.

A live-attenuated vaccine uses a living but weakened version of the virus or one that's very similar. This approach uses similar technology to the inactivated vaccine. Viral vector type of vaccine uses a safe virus to deliver specific sub-parts called proteins of the germ of interest so that it can trigger an immune response without causing disease. To do this particular parts of the pathogen of interest are inserted into a safe virus. The safe virus then serves as a platform or vector to deliver the protein into the body. The protein triggers the immune response.

Instead of the entire pathogen subunit vaccines include only the components or antigens that best stimulate the immune system. Although this design can make vaccines safer and easier to produce, it often requires the incorporation of adjuvants to elicit a strong protective immune response because the antigens alone are not sufficient to induce adequate long-term immunity.

DNA plasmid vaccines comprise a small circular piece of DNA called a plasmid that carries genes encoding proteins from the pathogen of interest. The manufacturing process for DNA plasmid vaccines is well-established, allowing experimental vaccines to be quickly developed to address emerging or re-emerging infectious diseases.

Recombinant protein vaccines are made using bacterial or yeast cells to manufacture the vaccine. A small piece of DNA is taken from the virus or bacterium against which we want to protect and inserted into the manufacturing cells. Outer Membrane Vesicles (OMVs) vaccines are naturally produced by bacteria and are essentially a bleb of the bacterial outer cell membrane. This contains many of the antigens found on the cell membrane but is a non-infectious particle.

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