

Types of Vaccines

A vaccine is a biological preparation that offers active acquired immunity to a specific disease. Generally, a vaccine comprises an agent that has a resemblance to the disease-causing microbe. In this article we will focus on the different types of vaccines in existence.

This article will be of immense help when attempting the Science and Technology segment of the IAS Exam.

Different types of Vaccines

The different types of vaccines are as follows:

1. **Inactivated Vaccine:** Vaccines of this type are created by inactivating a pathogen, typically using heat or chemicals such as formaldehyde or formalin. This destroys the pathogen's ability to replicate, but keeps it "intact" so that the immune system can still recognize it.
2. **Attenuated Vaccine:** Attenuated vaccines can be made in several different ways. Some of the most common methods involve passing the disease-causing virus through a series of cell cultures or animal embryos (typically chick embryos). When the resulting vaccine virus is given to a human, it will be unable to replicate enough to cause illness, but will still provoke an immune response that can protect against future infection.
3. **Toxoid Vaccine:** Some bacterial diseases are not directly caused by a bacterium itself, but by a toxin produced by the bacterium. Immunizations for this type of pathogen can be made by inactivating the toxin that causes disease symptoms. As with organisms or viruses used in killed or inactivated vaccines, this can be done via treatment with a chemical such as formalin, or by using heat or other methods.
4. **Subunit Vaccine:** Subunit vaccines use only part of a target pathogen to provoke a response from the immune system. This may be done by isolating a specific protein from a pathogen and presenting it as an antigen on its own.
5. **Conjugate Vaccine:** Conjugate vaccines are somewhat similar to recombinant vaccines: they're made using a combination of two different components. Conjugate vaccines, however, are made using pieces from the coats of bacteria. These coats are chemically linked to a carrier protein, and the combination is used as a vaccine

6. Valence Vaccine: Vaccines may be monovalent. A monovalent vaccine is designed to immunize against a single antigen or single microorganism. A multivalent or polyvalent vaccine is designed to immunize against two or more strains of the same microorganism, or against two or more microorganisms.

7. Heterotypic Vaccine: Heterologous vaccines also known as "Jennerian vaccines", are vaccines that are pathogens of other animals that either do not cause disease or cause mild disease in the organism being treated.

8. mRNA Vaccine: An mRNA vaccine (or RNA vaccine) is a novel type of vaccine which is composed of the nucleic acid RNA, packaged within a vector such as lipid nanoparticles.

Concerns regarding vaccines

Vaccines are a special cause of concern, the reason being that some vaccines can cause side effects, as is the case with all medications. The side effects may range from soreness to swelling, but are all mild in comparison to the effects of the disease they protect against. But despite the concerns, vaccines are important as they are the best weapons available in the fight against diseases. As disease keeps evolving over time, the vaccines themselves need to keep up.