OPEN ACCESS Freely available online

Journal of Clinical Chemistry and Laboratory Medicine

Short Communication

Different Types of Vaccine and its Characteristics

Emily R. Smith*

Department of Health, Valencia Government University, Valencia, Spain

DESCRIPTION

Vaccines reduce the risk of contracting disease by working with the body's natural immune system to build defense. Vaccines helps the immune system to make antibodies, which can fight against a certain disease. However, vaccines contain only killed or attenuated forms of bacteria, such as viruses and bacteria, so they do not cause disease or put you at risk for complications. Vaccines are drugs used to give people immunity against certain diseases. They contain disease-causing bacteria and viruses, or parts of bacteria and virus. As vaccines contain bacteria and viruses, the immune system can be trained to recognize them and make antibodies against them when exposed naturally without experiencing symptoms of illness or distress [1]. The main types of vaccines that work in different ways are: live attenuated vaccines, inactivated vaccines, subunit, recombinant, conjugate and polysaccharide vaccines, toxoid vaccines, mRNA vaccines and viral vector vaccines.

Types of vaccine used nowadays

Live attenuated vaccines: Live attenuated vaccines inject into the body a live version of the pathogen or virus that causes the disease. Bacteria are living specimens, but weakened versions that do not cause any signs of infection as they cannot multiply inside the body. These vaccines closely mimic the natural infections they prevent, thus generating strong and long-lasting immune responses. Most live vaccines give only for one or two doses and provide the patient with lifelong protection from the bacteria and the disease it causes. A live attenuated vaccine induces an immune response similar to a natural infection, but the person cannot pass the virus to others and cannot get the disease caused by the virus. Live attenuated vaccines must be kept cool during storage and may not be suitable for use in environments where refrigeration is rarely available.

Inactivated vaccines: Inactivated vaccines use strains of bacteria or viruses that have been killed by heat or chemicals. This dead version of the virus or bacterium is then injected into the body. Inactivated vaccines are the earliest vaccines produced and do not elicit as strong an immune response as live attenuated vaccines. Inactivated vaccines do not provide lifelong immunity and must be replenished over time, but may have fewer side effects than live attenuated vaccines.

Subunit vaccines: Subunit vaccines use specific parts of bacteria or viruses. Because they use specific parts of bacteria, they can create a very strong immune response in the body. This may be suitable for people with weakened immune systems or long-term health problems. Antigens from the surface of bacteria or viruses are responsible for activating immune response in the body [2]. Subunit vaccines isolate specific antigens from bacteria or viruses for use in vaccines. These antigens are specifically selected according to the strength of the immune response they generate. Subunit vaccines are targeted and do not cause many side effects.

Recombinant vaccines: Recombinant vaccines are genetically engineered. A gene that makes a bacterial or viral protein is isolated and placed in another cell gene. When this cell replicates, it produces the vaccine protein. This means that the immune system recognizes the protein and protects the body from it.

Combination vaccines: Combination vaccines use two different components. Conjugate vaccines use parts of the antigenic outer envelope of bacteria and viruses that are not potent enough to cause disease or elicit an immune response in the body. These weaker antigen envelopes are chemically bound to stronger carrier proteins, and the combination of this weaker antigenic envelope and stronger carrier proteins makes the immune system more aggressive against weaker antigens.

Polysaccharide vaccines: Polysaccharide vaccines use sugar molecules (known as polysaccharides) from the outer layer of bacteria or viruses. These sugar molecules are chemically attached to carrier proteins and function in a manner similar to vaccines.

Toxoid vaccines: Toxoid vaccines use toxins produced by bacteria or viruses to create immunity against specific parts of the disease-causing bacteria or virus, rather than the whole bacteria or virus. The immune response is focused on this specific toxin. Toxoid vaccine does not provide lifelong immunity and must be replenished over time. Toxoid vaccine is used to provide immunity against diphtheria and tetanus.

Correspondence to: Emily R. Smith, Department of Health, Valencia Government University, Valencia, Spain, E-mail: smith_emily @gva.es

Received: 10-Nov-2022, Manuscript No. JCCLM-22-20095; **Editor assigned:** 14-Nov-2022, Pre-QC No. JCCLM-22-20095 (PQ); **Reviewed:** 28-Nov-2022, QC No. JCCLM-22-20095; **Revised:** 05-Dec-2022, Manuscript No. JCCLM-22-20095 (R); **Published:** 12-Dec-2022, DOI: 10.35248/JCCLM.22.05.255

Citation: Smith ER (2022) Different Types of Vaccine and its Characteristics. J Clin Chem Lab Med.5:255

mRNA vaccines: This technology has been in development for decades. mRNA vaccines have advantages such as short manufacturing time and low manufacturing cost. However, mRNA is fragile and must be stored at low temperatures. mRNA vaccines work by inducing an immune response from synthesized proteins. They induce both cellular and humoral immunity [3].

Viral vector: Viral vector vaccines modify another virus and use it as a vector to protect against the targeted virus. Viruses used as vectors include adenovirus, influenza virus, measles virus, and Vesicular Stomatitis Virus (VSV). Viral vector vaccines use a modified version of another virus as a vector to provide protection. Several different viruses have been used as vectors, including influenza, Vesicular Stomatitis Virus (VSV), measles virus, and the adenovirus that causes the common cold [4, 5]. Adenovirus is one of the viral vectors used in some COVID-19 vaccines being studied in clinical trials.

CONCLUSION

DNA vaccines contain DNA that produces specific antigens from bacteria. Once injected into the body, the bacterial DNA is replicated in the body and founded by the immune system. The immune response protects the body from further infections and keeps it safe for the future. Recombinant vector vaccines act like natural infections and are great at training the immune system to recognize and attack bacteria. It works by replicating a live virus. Recent vaccine study includes, improve manufacturing processes to deliver vaccine doses faster. Facilitate transport and storage of vaccines to reduce waste and improve access to hard-to-reach communities. Vaccines have led to the eradication of several diseases in developed countries, including polio and measles, but many of these diseases remain endemic in developing countries where vaccines are not available to the poor. Vaccines have dramatically reduced the incidence of infectious diseases that have killed hundreds of millions of people in the past, making a significant contribution to life expectancy. Life expectancy has increased from about 47 years in the developed world to 80 years in the last century.

REFERENCES

1. Berkley S. Improving access to vaccines through tiered pricing. The Lancet. 2014;383(9936):2265-7..
2. Rappuoli R, Pizza M, Del Giudice G, De Gregorio E. Vaccines, new opportunities for a new society. Proc Natl Acad Sci USA. 2014 ;111(34):12288-93.
3. Plotkin S. History of vaccination. Proc Natl Acad Sci USA. 2014;111(34):12283-7.
4. Kazmi S. Vaccine platforms and their effectiveness against COVID-19. 2021
5. Pollard AJ, Bijker EM. A guide to vaccinology: from basic principles to new developments. Nat Rev Immunol. 2021;21(2):83-100.