

Immunization

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In May 1796, Dr. Edward Jenner successfully developed the first vaccination in history. He discovered that cowpox patients were resistant to smallpox.¹ Since then, immunisation has emerged as a success story in global health and development, saving millions of lives annually.² The development of vaccinations lowers the chance of contracting an illness by bolstering the body's defences against infection. The immune system reacts when a vaccine is given.

There are four types of vaccines: inactivated or weakened viruses, viral vector replicating or non-replicating, nucleic acid-based, and protein-based. Inactivated vaccines contain destroyed or weakened viruses. Viral vector replicating vaccines transfer genetic material into cells, instructing them to generate antigens. Nucleic acid-based vaccines contain DNA or RNA genetic material. Protein-based protein sub-unit, contain the pathogen's purified proteins or protein subunits. (Galiza E, Health P. 2021.)

The process of generating antibodies by the immune system in response to particular antigens is known as active immunisation. Depending on the antigen, the protection resulting from active immunisation might last for months, years, or even a lifetime. Active immunity can be developed through vaccination with antigens specific to the disease or by enduring a spontaneous infection. In contrast to inactivated vaccines that contain killed microorganisms or refined antigen derivatives, vaccine antigens made of live, attenuated microorganisms (such as viruses or bacteria) typically elicit the strongest immune responses. However, compared to inactivated vaccines, live vaccinations have a higher risk of serious adverse vaccine-associated events for example severe allergic reactions and neurological complications. Because live vaccinations are biologically delicate and need to be handled and maintained carefully to maintain their effectiveness, their dissemination in tropical regions is hampered. (Sanford CA and Jong EC, 2016; Galiza E and Health P, 2021)

The method of receiving immune protection through the transfer of antibodies made by another person or animal is known as passive immunisation. Due to the passive transmission of antibodies, this immunisation only offers transient protection. (Galiza E, Health P. 2021.)

¹ World Health Organization (WHO). A brief history of Vaccination. WHO. <https://www.who.int/news-room/spotlight/history-of-vaccination/a-brief-history-of-vaccination> . Accessed March 29, 2024.

² World Health Organization (WHO). Vaccines and immunization. WHO. https://www.who.int/health-topics/vaccines-and-immunization#tab=tab_1 . Published October 29, 2019. Accessed March 29, 2024

Vaccines work by preventing the spread of disease before one is infected, hence it is more time and resource efficient. When most members of a community develop immunity to a disease, this phenomenon is known as herd immunity. The achievement of herd immunity reduces the likelihood of disease transmission from one individual to another. This means that everyone in the community is protected, not just the immune.³

The creation of vaccinations is now a crucial aspect of health care. They play a critical role in both containing and preventing the spread of infectious diseases. Since having access to vaccinations is a human right, efforts are being made globally to promote social fairness. However, since society may not be complying, education is crucial when it comes to vaccination programmes.²

References:

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Sanford CA, Jong EC. Immunizations. *Medical Clinics of North America*. 2016; 100 (2): 247-259. Doi: 10.1016/j.mcna.2015.08.018

³ Mayo Clinic Staff. Herd immunity and COVID-19: What you need to know. Mayo Clinic. <https://www.mayoclinic.org/diseases-conditions/coronavirus/in-depth/herd-immunity-and-coronavirus/art-20486808> . Published November 4, 2023. Accessed March 29, 2024.