

VACCINATIONS

PURPOSE OF VACCINATIONS

The purpose of vaccinations is to effort to prevent against infectious disease, it is the process of artificial induction of immunity , works by 'priming' the immune system with an immunogen. Stimulating immune response including the use of an infectious agent is known as immunisation. Vaccinations involve the management of one or more immunogens, in the form of live, but weakened (long and narrow) infectious agents, which normally are either weaker, but closely-related species (as with smallpox and cowpox), or strains weakened by some process. In such cases, an immunogen is called a vaccine.

Some modern vaccines are administered after the patient already has contracted a disease, as in the cases of experimental AIDS, cancer and Alzheimer's disease vaccines are said to reduce the effects of the disease vastly, and vaccination within the first week is known to be beneficial to a degree. The first Rabies immunisation was given by Pasteur to a child bitten by a rabid dog, and then and subsequently post-exposure immunisation to Rabies has generally been followed by survival. The essential philosophies behind such immunisations that the vaccine triggers an immune response more rapidly than the natural infection itself. Most vaccines are given by injection as they are not absorbed reliably through the gut. Live attenuated Polio, some Typhoid and Cholera Vaccines are given orally in order to produce immunity based in the bowel.

History of vaccinations

Vaccination campaigns have spread throughout the globe since Jenner's smallpox vaccine of 1796, sometimes prescribed by law or regulations. Vaccines are now used to fight a wide variety of disease threats besides smallpox. Louis Pasteur further developed the technique during the 19th century, extending its use to protecting against bacterial anthrax and viral rabies. The method Pasteur used entailed treating the infectious agents for those diseases so they lost the ability to cause serious disease. Pasteur adopted the name *vaccine* as a generic term in honour of Jenner's discovery, which Pasteur's work built upon.

Compulsory vaccination and opposition to vaccination

In an attempt to eliminate the risk of outbreaks of some diseases, several governments and other institutions have instituted policies requiring vaccination for all people. For example, an 1853 law required universal vaccination against smallpox in England and Wales, with fines levied on people who did not comply. In the United States, the Supreme Court ruled in the 1905 case *Jacobson v. Commonwealth of Massachusetts* that the state could require individuals to be vaccinated for the common good. Common contemporary vaccination policies require that children receive common vaccinations before entering school. Compulsory vaccination is believed to have greatly reduced the rates of some infectious diseases.

Beginning with early vaccination in the nineteenth century, these policies led to resistance from a variety of groups, collectively called anti-vaccinationists, who objected on ethical, political, medical safety, religious, and other grounds. Common objections are that compulsory vaccination represents excessive

government intervention in personal matters, or that the proposed vaccinations are not sufficiently safe. Many modern vaccination policies allow exemptions for people who have compromised immune systems, allergies to the components used in vaccinations or strongly-held objections.

In 1904 in the city of Rio de Janeiro, Brazil a government program of mandatory smallpox vaccination resulted in the so-called Vaccine Revolt, several days of rioting with considerable property damage and a number of deaths.

Living attenuated microbes: These are mutants of microbes that have lost the ability, either naturally or by treatment in the laboratory, to produce the dangerous disease. Some examples are the cowpox virus, measles, mumps and rubella (MMR vaccine) and polio vaccine virus. A vaccination consists of infecting you with a living microbe which then produces a limited infection. Because these attenuated strains are weak the immune system of normal healthy people quickly kill and eliminate them from the body. During this process the infection elicits a vigorous immune response that protects the host from infection by the related virulent, disease-producing form of the pathogen. Live vaccines produce the best immunisation because they closely imitate the real thing. Immunity lasts for life.

New types of vaccines

Experiments are underway to deliver vaccines through common foods like potatoes and bananas. Genes that make an antigen effective against a microbe are cloned into a common food. The food is eaten by the "patient" and the cloned-antigen stimulates the immune system.

DNA Vaccines

Vaccines consisting of DNA fragments that can be transformed into host tissue. Once in the host tissue, the DNA is transcribed and translated and the protein produced is seen by the specific immune system as foreign material and an immune response is induced.

Are Vaccines safe

It is never possible to prove that any medical treatment is totally safe for all people under every set of conditions, so therefore it cannot be said that vaccines are safe to use. The safety of medical procedures and agents always carry an element of risk.

The live vaccines present the highest risk because it is always possible that a mutation may occur that in the case of smallpox where an occasional person, usually a child, develops a severe, often fatal, disease caused by the smallpox vaccine.

Over-treating infection

Killed vaccines have had safety problems when the lethal treatment failed to kill 100% of the microbes. The problem is that if you over treat the microbe to be certain that all the organisms are dead you can destroy the immunising components and make the vaccine ineffective. So the killing treatments must balance. Also it is difficult to detect the one live organism present in a 1,000

litres of treated material, yet one live organism is sufficient to produce a lethal infection.