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Vaccine-Strategies, Benefits and Challenges in Global Health

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A vaccine is defined as it is a biological preparation that gives immunity against particular infections. A vaccine typically defined as it contains an agent that with disease-causing microorganism and is prepared from weakened or killed forms of the particular microbe, its toxins, or it may be surface proteins. Generally Vaccines contain either live or it may be killed germs, or it may be components of germs. But Live vaccines causes more side effects but it produce better, longer lasting protection against particular infections. Another type of vaccine is Non-live vaccines it needs additional components like adjuvants [1]. A vaccine enhances the sufficient number of memory T and B lymphocytes to produce effector T cells and antibody-producing B cells.

The first type of vaccine is attenuated vaccine. This type of vaccine is prapared by attenuated naturally by some agents and they can use for immunization. For example immunity to smallpox. This type of attenuationprocess can be done by growing a pathogenic bacterium or specific virus for long periods under suitable culture conditions [2,3]. This type of subunit vaccines contain antigens purified from the specific microbes which can be administered with adjuvant. GenerallyVaccines are composed of bacterial polysaccharide antigens and such type vaccines are used against pneumococcus and Haemophilus influenzae. These polysaccharides are T-independent antigens, and they tend to produce low-affinity antibody responses.

Now a days advanced techniques are using for vaccine preparations like Instead of using entire microorganisms, only the antigens are using an agent for vaccine preparation to stimulate the immune response and used in vaccine preparation. Vaccine are specific and purified derived from specific pathogen are called as subunit vaccine. These subunit vaccines are currently using such as capsular polysaccharides, inactivated exotoxin, recombinant microbial antigen. Vaccination with toxoid stimulates anti-toxoid antibodies, they can bind the toxin and neutralizing its effect with antigen [4,5]. But while praparing the such type of vaccines carefull examination should be done to achieve detoxification without excessive modification of the epitope structure. An examples for toxoid vaccines are diphtheria and tetanus.

The Efficiency of vaccines can be measured by decreasing the incidence of a disease in the vaccinated population whencompared with the incidence of the disease in unvaccinated population. Presently, DNA vaccine is using for immunization. DNA sequence is used as vaccine for such type of vaccine prepration.The DNA sequence codes of antigenic protein of particular pathogen is using as an agent. When the genes for a specific microbe's antigens are introduced into the host, cells will take up that DNA. Then cells secrete the antigens and their surfaces. In another term, the body's own cells act as vaccine-making macines, for the antigens necessary to stimulate the immune system of infected person. An Examples for DNA Vaccine are West Nile Virus, Herpes virus and Influenza. The advantage is, DNA is relatively cost is very low and easier to produce than other vaccines and such type of technology may increase the availability of vaccines to under developed countries. The development of DNA vaccine is relatively take less time than other vaccine against immunization against emerging infectious diseases.

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