Dna Vaccine Encyclopedia Article

Dna Vaccine

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Dna Vaccine

DNA vaccines seek to gain protection against a disease-causing microorganism by injecting the DNA coding for a specific component of the organism into the body. Traditional vaccines rely on the injection of the entire organism or of specific structural components.

The DNA is injected in a saline solution via a hypodermic syringe or on DNA-coated gold beads. The latter are propelled into the body using so-called **gene** guns, which are also used to introduce DNA into cells when attempting to genetically alter the cells. The production of the actual immunizing protein occurs in the body following injection. This eliminates the chances of infection, as can occur with some live and attenuated (weakened) viral vaccines.

DNA vaccines hold several advantages over the traditional vaccine methods. First, the immune response produced is very long and so does not require booster injections to maintain immunity. Second, multiple samples of DNA, and so vaccines for multiple diseases, can be administered at the same time. Currently, the full complement of childhood vaccinations by the conventional route can require up to 18 visits to the physician/clinic over a period of years. Third, DNA vaccines are very stable, and can be stored for extended periods at non-refrigeration temperatures. Finally, candidate vaccines can be recovered from diseased tissue.

The technology does have limitations. An important limitation is that immunity can develop only to protein. Also, those microbes which are covered with a coat of polymerized sugars, known as polysaccharides, are poor candidates for a DNA vaccine. All their surface protein is buried under the polysaccharide, and elicits a poor immune response, if any at all.

Despite the limitations, DNA vaccines against diseases show promise. A vaccine against infectious haematopoietic necrosis **virus** in salmon and trout is being tested. In humans, immune responses against diarrhea-causing viruses, malarial parasites and tuberculosis has been achieved using DNA vaccines. Recently, a DNA vaccine against measles was demonstrated to be effective. Protection of monkeys against HIV has been achieved, and human trials are set to begin in Nairobi on a DNA **AIDS** vaccine designed specifically for Africa by 2002.