



## Recombinant Vaccines - Rise of a New Era of Vaccination

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It has been more than a century since Louis Pasteur presented Rabies Vaccine to humanity, we have come a long way in terms of vaccinations since then. The traditional and established approach for vaccine designing lies in the principle of isolation, attenuation or killing and injection. And most of the vaccines produced followed those basic steps given by Louis Pasteur. However, now as the world is changing with the pace of technological advancements, the modern approach for vaccine construction lies in isolation, attenuation or inactivation and 'Recombination'. In 1986, the first recombinant vaccine Recombivax HB for hepatitis B was approved for human use in several countries. It was the final output of the research initiated in 1979 by William Rutter, Pablo Valenzuela and their colleagues on the cloning of HBV Ag. Since then, recombinant vaccines and its designing are increasing for immunization against number of diseases including tuberculosis.

Recombinant protein vaccines such as HBV, Hepatitis B viral surface Ags are expressed in yeast cells. A more recent recombinant protein vaccine is against Human Papilloma Virus (HPV) that inculcates major capsid protein L1, expressed in yeast cells or insect cell system. Nevertheless, these vaccines are considered as safer compared to live attenuated vaccines, they are proved to be immunogenically weaker and hence require adjuvants.

DNA vaccines includes direct inoculation of plasmid expression vectors that contains DNA insert encoding pathogenic protein antigen. There are veterinary DNA vaccines approved for use since 2005, however, DNA vaccines for human use are still under clinical trials.

Another strategy for modern vaccinology is using suitable genetically engineered viral or bacterial vector that can accommo-

date the genes coding antigenic proteins of pathogens and when injected, can express them in the host successfully. HIV vaccines construction using recombination approach is underway. It is being made using engineered viral or bacterial vector that contain and express HIV 1 gene. Even, studies of developing recombinant BCG vaccine are under process.

Even though, modern medicine promotes the use of recombinant vaccines, all those strategies have their pros and cons. The success of sculpturing new vaccine with its ultimate end application depends on the in-depth knowledge of mechanism of infection caused by the target pathogen and the immune response required to invade that pathogen thereby protecting individual's health.

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