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## Viral vaccines: From jenner to genes

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Though a lot of efforts have been made to design antiviral therapeutic agents, barring few diseases like HIV and H1N1 infections, these efforts are not uniformly successful. Preventive vaccination is the main strategy even today for many important viral infections. Viral vaccines have come a long way since the first discovery of small pox vaccine by Edward Jenner in 1796. The earlier viral vaccines developed were based on traditional approaches of growing the virus in animals or cell culture, purifying and inactivating. With the rapid advances in genetics, molecular biology and biotechnology in the later part of 20<sup>th</sup> century an entirely new approach was used to modify existing viral vaccines or develop new viral vaccines. It was possible to produce sub-unit vaccines containing only the immunogenic protein of the virus. This was possible by both chemical synthesis or by expressing the protein of interest in suitable substrate cells by recombinant DNA technology. A highly effective recombinant vaccine for hepatitis B became available in early 1980s. Expressing the desired antigen in viral vectors like vaccinia, adenovirus etc paved way for many vaccines including rabies vaccine for wild animals. An entirely new concept evolved in early 1990s of using a plasmid DNA containing the desired gene to express the protein of interest directly in the inoculated animals. The concept of this DNA vaccination picked up lot of interest and efforts were made to develop DNA vaccines for several viral diseases, most importantly for HIV/AIDS. Simultaneously, efforts are underway to increase the immunogenicity and efficacy of DNA vaccine with a variety of adjuvants including genetic adjuvants. New and more effective ways of delivering the DNA into cells using nano formulation has improved the efficacy of DNA vaccines significantly. Efforts are underway to produce Vaccines for emerging and reemerging viruses like Chikungunya, Dengue and Nipah. Thus viral vaccines will continue to play a significant role in medicine for many more years to come.

### Biography

Dr. Shampur N Madhusudana did his MD (Microbiology) in 1985 and worked at Central Research Institute, Kasauli, India for ten years where he headed Rabies division. Presently he is Professor of Neurovirology at the National Institute of Mental Health and Neuroscience (NIMHANS), Bangalore, India and heads a WHO collaborating centre for rabies. He is a national and international expert on rabies. He has authored one book on rabies and published more than 100 papers in the field of rabies vaccines, diagnosis, pathogenesis and pathology. He is currently developing an improved nano formulated DNA vaccine for rabies.