

## Recent Approaches for Vaccine Development: Reverse Vaccinology

Vaibhav Sharma\*, Ajay Kumar Sharma, Sonali Sharma, Nitin Garg,  
Suman Singh

*Meerut Institute of Engineering and Technology, Meerut*

---

**Abstract** In conventional methods of vaccine development biochemical, serological and microbiological methods have been used to study pathogens and identify the desired immunogenic components useful for vaccine development. Although successful in many cases, this approach is time-consuming and fails when the pathogens cannot be cultivated *in vitro*, or when the most abundant antigens are variable in sequence as in case of HIV. Now-a-days genomic approaches allow prediction of all antigens, independent of their abundance and immunogenicity during infection, without the need to grow the pathogen *in vitro*. This allows vaccine development using non-conventional antigens and exploiting non-conventional arms of the immune system. Many vaccines impossible to develop so far will become a reality. Since the process of vaccine discovery starts in-silico using the genetic information rather than the pathogen itself, this novel process can be named reverse vaccinology.