

Vaccinology Services Section Front Page

Vaccinology is the branch of medicine concerned with the development of vaccines. Vaccines are biological preparations that are helpful in improving the immunity of a person against a particular disease. Vaccines can be prepared by various means depending on the pathogenicity of microbes. The use of genomic information with aid of computer for the preparation of vaccines without culturing microorganism is known as reverse vaccinology. The first revolution in field of vaccination is the use of genetic engineering to produce vaccines. The genome sequences provide at once all protein antigens that the pathogen can express at any time. This approach contains- Genome sequences, Computer analysis, Prediction of epitope / antigen and Candidate vaccine. There are many ways to induce a protective immune response to a pathogen. They vary in their levels of relative safety and effectiveness, and the vaccines in use today make use of all the different types - Live attenuated, Killed/inactivated, Toxoid, Subunit. The use of reverse vaccinology has enabled identification of numerous promising vaccine candidates against meningococcus, GBS, group A streptococcus, pneumococcus, pathogenic E. coli, and also for antibiotic-resistant bacteria such as Staphylococcus aureus. election of the best candidates will largely depend on the use of novel approaches, such as structural vaccinology to engineer optimal antigens, and systems biology to gain a better understanding of signatures of immunogenicity and correlates of protection. Structural vaccinology - Structural biological studies enable the atomic resolution of an antigen, and structure-based design allows the engineering of multiple immunodominant epitopes in one molecule to induce broad immune responses against different protein variants. System vaccinology - Systems vaccinology can be used to define the signatures of protection that are required to elicit a protective immune response, which will increase our knowledge of the mechanisms of action of currently successful vaccines, as well as enable the improved identification, rational design, and testing of novel vaccine antigens.