

## Vaccine Development for Newcastle Disease Virus in Poultry

**Authors :** Muhammad Asif Rasheed

**Abstract :** Newcastle disease virus (NDV), an avian orthoavulavirus, is a causative agent of Newcastle disease named (NDV) and can cause even the epidemics when the disease is not treated. Previously several vaccines based on attenuated and inactivated viruses have been reported, which are rendered useless with the passage of time due to versatile changes in viral genome. Therefore, we aimed to develop an effective multi-epitope vaccine against the haemagglutinin neuraminidase (HN) protein of 26 NDV strains from Pakistan through a modern immunoinformatic approaches. As a result, a vaccine chimaera was constructed by combining T-cell and B-cell epitopes with the appropriate linkers and adjuvant. The designed vaccine was highly immunogenic, non-allergen, and antigenic; therefore, the potential 3D-structure of multi epitope vaccine was constructed, refined, and validated. A molecular docking study of a multiepitope vaccine candidate with the chicken Toll-like receptor-4 indicated successful binding. An In silico immunological simulation was used to evaluate the candidate vaccine's ability to elicit an effective immune response. According to the computational studies, the proposed multiepitope vaccine is physically stable and may induce immune responses, which suggested it a strong candidate against 26 Newcastle disease virus strains from Pakistan. A wet lab study is under process to confirm the results.

**Keywords :** epitopes, newcastle disease virus, paramyxovirus virus, vaccine

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