

## Potential recombinant vaccine against influenza A virus based on M2e displayed on nodaviral capsid nanoparticles

### Abstract

Influenza A virus poses a major threat to human health, causing outbreaks from time to time. Currently available vaccines employ inactivated viruses of different strains to provide protection against influenza virus infection. However, high mutation rates of influenza virus hemagglutinin (H) and neuraminidase (N) glycoproteins give rise to vaccine escape mutants. Thus, an effective vaccine providing protection against all strains of influenza virus would be a valuable asset. The ectodomain of matrix 2 protein (M2e) was found to be highly conserved despite mutations of the H and N glycoproteins. Hence, one to five copies of M2e were fused to the carboxyl-terminal end of the recombinant nodavirus capsid protein derived from *Macrobrachium rosenbergii*. The chimeric proteins harboring up to five copies of M2e formed nanosized virus-like particles approximately 30 nm in diameter, which could be purified easily by immobilized metal affinity chromatography. BALB/c mice immunized subcutaneously with these chimeric proteins developed antibodies specifically against M2e, and the titer was proportional to the copy numbers of M2e displayed on the nodavirus capsid nanoparticles. The fusion proteins also induced a type 1 T helper immune response. Collectively, M2e displayed on the nodavirus capsid nanoparticles could provide an alternative solution to a possible influenza pandemic in the future.

**Keyword:** Matrix 2 ectodomain; Nodavirus capsid; Virus-like particle; Fusion protein; Subunit vaccine; Immunogenicity