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Pseudotyped NDV with Paramyxovirus 8 Surface Glycoproteins and Highly Pathogenic Avian Influenza Virus Hemagglutinin

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The capability of Newcastle disease virus (NDV) as a vaccine vector virus which conveys protection against highly pathogenic avian influenza virus (HPAIV) has already been shown. However, pre-existing NDV antibodies may impair vector virus replication, resulting in a lower immune response also against the foreign protein additionally expressed, like HPAIV hemagglutinin. The development of a pseudotyped NDV which possesses functional surface glycoproteins different from NDV could overcome this problem.

Here, we describe the construction of a pseudotyped vector NDV (PNDV-FHN$_{PMV8}$H5) which carries the fusion protein (F) as well as the hemagglutinin-neuraminidase protein (HN) of avian paramyxovirus type 8 (APMV-8) instead of the corresponding NDV proteins. Additionally, the HPAIV H5 gene was inserted between the APMV-8 F- and HN- genes in a NDV backbone derived from the lentogenic NDV strain Clone 30 as already described for other NDV/AIV recombinants. After successful virus rescue, the resulting pNDVFHN$_{PMV8}$H5 was further characterized. The expression of all three foreign genes was verified by Western blot analyses and indirect immunofluorescence. Furthermore, it could be shown that PNDVFHN$_{PMV8}$H5 replicates comparably to the parental viruses, resulting in high titers *in vitro* and *in vivo* after 96 hours. Animal experiments were carried out to study the protection from a lethal HPAIV infection of SPF chicken without (MDA-) and with maternally derived NDV antibodies (MDA+) after immunization with PNDVFHN$_{PMV8}$H5. MDA- as well as MDA+ chicken were protected from the lethal infection and virus shedding was significantly reduced.

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