6-12-2022

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INTRANASAL ADMINISTRATION OF NDV-HXP-S COVID19 VACCINES INDUCES ROBUST PROTECTIVE MUCOSAL AND SYSTEMIC IMMUNITY IN MICE

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Key Words: SARS-CoV-2, mucosal immunity, viral vector, vaccine

With the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) continually changing and no end of this pandemic in sight, a next generation of vaccines preventing transmission and an equitable allocation is needed in order to reduce global disease burden. The NDV-HXP-S vaccine is based on recombinant Newcastle disease virus (NDV) stably expressing a membrane-anchored, optimized (with six proline mutations – Hexa Pro) spike protein[1]. Using the current influenza virus vaccine manufacturing facilities, this vaccine can be produced in embryonated eggs and thereby can meet the demands on a global scale at a low cost.

Here, we report that mice vaccinated intranasally (i.n.) with different designs and regimens of our live NDV-HXP-S induced strong antibody response, displaying good systemic as well as mucosal immunity. Furthermore, the T and B cell responses in the lung were characterized via flow cytometry. It is important to emphasize, that we have been able to quickly adapt the vaccine to newly emerging variants of concern (VOC) of SARS-CoV-2.

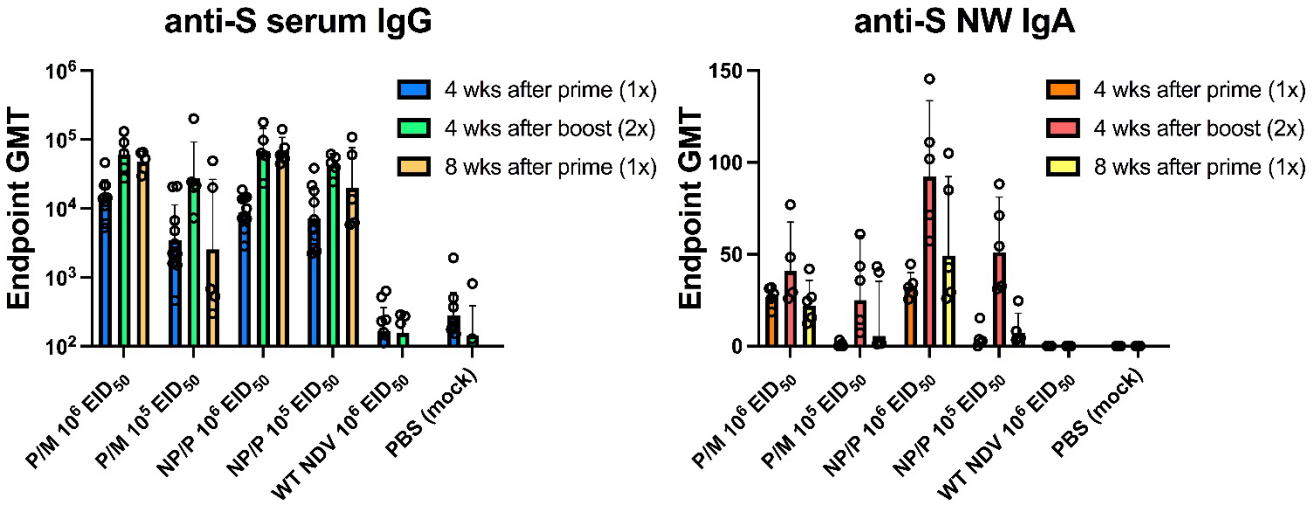

Figure – Intranasal administration of live NDV-HXP-S vaccines induced high antibody levels in blood and nasal washings of mice.
Mice were intranasally vaccinated with EID50 10^5 or 10^6 of live NDV-HXP-S with the transgene inserted between the P and the M gene (P/M) or the NP and the P gene (NP/P), some were boosted after 28 days and 30 days later blood and nasal washings were collected. As negative controls, an empty WT NDV vector and PBS were used. The serum and nasal washings were analyzed via spike-specific ELISA for IgG (left) and IgA (right), respectively.

1. Sun, W. et al. A Newcastle disease virus expressing a stabilized spike protein of SARS-CoV-2 induces protective immune responses. Nat. Commun. 12, 1–14 (2021).