The inactivated NDV-HXP-S COVID-19 vaccine induces a significantly higher ratio of neutralizing to non-neutralizing antibodies in humans as compared to mRNA vaccines

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THE INACTIVATED NDV-HXP-S COVID-19 VACCINE INDUCES A SIGNIFICANTLY HIGHER RATIO OF NEUTRALIZING TO NON-NEUTRALIZING ANTIBODIES IN HUMANS AS COMPARED TO mRNA VACCINES

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NDV-HXP-S is a recombinant Newcastle disease virus based-vaccine against severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), which expresses an optimized (HexaPro) spike protein on its surface. The vaccine can be produced in embryonated chicken eggs using the same process as that employed for the production of influenza virus vaccines. Here we performed a secondary analysis of the antibody responses after vaccination with inactivated NDV-HXP-S in a Phase I clinical study in Thailand.

The SARS-CoV-2 neutralizing and spike binding activity of NDV-HXP-S post-vaccination serum samples was compared to that of matched samples from mRNA BNT162b2 (Pfizer) vaccinees. Neutralizing activity of sera from NDV-HXP-S vaccinees was comparable to that of individuals vaccinated with BNT162b2. Interestingly, the spike binding activity of the NDV-HXP-S vaccinee samples was lower than that of sera obtained from individuals vaccinated with the mRNA vaccine. This let us to calculate ratios between binding and neutralizing antibody titers. Samples from NDV-HXP-S vaccinees had binding to neutralizing activity ratios similar to those of convalescent sera suggesting a very high proportion of neutralizing antibodies and low non-neutralizing antibody titers. Further analysis showed that, in contrast to mRNA vaccination, which induces strong antibody titers to the receptor binding domain (RBD), the N-terminal domain, and the S2 domain, NDV-HXP-S vaccination induces a very RBD focused response with little reactivity to S2. This explains the high proportion of neutralizing antibodies since most neutralizing epitopes are located in the RBD. In conclusion, vaccination with inactivated NDV-HXP-S induces a high proportion of neutralizing antibodies and absolute neutralizing antibody titers comparable to those after mRNA vaccination.