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Juan Manuel Carreño
Icahn School of Medicine at Mount Sinai, USA

Ariel Raskin
Icahn School of Medicine at Mount Sinai, USA

Gagandeep Singh
Icahn School of Medicine at Mount Sinai, USA

Johnstone Tcheou
Icahn School of Medicine at Mount Sinai, USA

Hisaaki Kawabata
Icahn School of Medicine at Mount Sinai, USA

See next page for additional authors

Authors

Juan Manuel Carreño, Ariel Raskin, Gagandeep Singh, Johnstone Tcheou, Hisaaki Kawabata, Charles Gleason, Komal Srivastava, Vladimir Vigdorovich, Nicholas Dambrauskas, Sneh Lata Gupta, Irene Gonzalez, Jose Luis Martinez, Stefan Slamanig, D. Noah Sather, Rama Raghunandan, Ponthip Wirachwong, Sant Muangnoicharoen, Punnee Pitisuttithum, Jens Wrammert, Mehul S. Suthar, Weina Sun, Peter Palese, Adolfo Garcia-Sastre, Viviana Simon, and Florian Krammer

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

Juan Manuel Carreño, Icahn School of Medicine at Mount Sinai, NY, US.
jm.carreno@mssm.edu
Ariel Raskin, Icahn School of Medicine at Mount Sinai, NY, US.
Gagandeep Singh, Icahn School of Medicine at Mount Sinai, NY, US.
Johnstone Tcheou, Icahn School of Medicine at Mount Sinai, NY, US.
Hisaaki Kawabata, Icahn School of Medicine at Mount Sinai, NY, US.
Charles Gleason, Icahn School of Medicine at Mount Sinai, NY, US.
Komal Srivastava, Icahn School of Medicine at Mount Sinai, NY, US.
Vladimir Vigdorovich, Seattle Children's Research Institute, WA, US.
Nicholas Dambrauskas, Seattle Children's Research Institute, WA, US.
Sneh Lata Gupta, Emory University School of Medicine, GA, USA.
Irene Gonzalez, Icahn School of Medicine at Mount Sinai, NY, US.
Jose Luis Martinez, Icahn School of Medicine at Mount Sinai, NY, US.
Stefan Slamanig, Icahn School of Medicine at Mount Sinai, NY, US.
D. Noah Sather, Seattle Children's Research Institute, WA, US.
Rama Raghunandan - PATH, WA, USA.
Ponthip Wirachwong, The Government Pharmaceutical Organization, BKK, TH.
Sant Muangnoicharoen, Vaccine Trial Centre Faculty of Tropical Medicine, BKK, TH.
Punnee Pitisuttithum, Vaccine Trial Centre Faculty of Tropical Medicine, BKK, TH.
Jens Wrammert, Emory University School of Medicine, GA, USA.
Mehul S. Suthar, Emory University School of Medicine, GA, USA.
Weina Sun, Icahn School of Medicine at Mount Sinai, NY, US.
Peter Palese, Emory University School of Medicine, GA, USA.
Adolfo García-Sastre, Emory University School of Medicine, GA, USA.
Viviana Simon, Emory University School of Medicine, GA, USA.
Florian Krammer, Icahn School of Medicine at Mount Sinai, NY, US.

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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.