

Scientists developing COVID-19 vaccine nasal spray

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Lancaster University researchers have successfully engineered a COVID-19 vaccine which can be administered through the nose.

The researchers administered two doses of the vaccine via a nasal spray in animal trials which are the first stage in [vaccine development](#).

This elicited robust antibodies and T cell responses which were enough to be able to neutralize SARS-CoV-2. There was also a significant reduction in lung pathology, inflammation and clinical disease in the rodents who received the vaccine.

The vaccine is based on a common poultry virus called the Newcastle Disease Virus (NDV), which can replicate in humans but is harmless. The scientists engineered NDV to produce the spike proteins of the SARS-CoV-2 virus which causes COVID-19, tricking the body into mounting an immune response against SARS-CoV-2.

Virologist Dr. Muhammad Munir and immunologists Dr. John Worthington and Dr. Lucy Jackson-Jones from Lancaster University collaborated with researchers at the Biomedical Research Institute in Texas to investigate how effective their NDV-based

vaccine was against SARS-CoV-2.

Dr. Munir said: "We found that administering this vaccine through a nasal spray completely protected the animals from shedding the virus which causes transmission of the virus. This means the immunization of the upper respiratory tract through a nasal spray can prevent individuals from spreading the virus and developing infections elsewhere in the body".

"Though the vaccine showed promising safety and efficacy in this animal model, [human trials](#) are still required to determine its applicability and to obtain regulatory approvals."

A vaccine [nasal spray](#) offers several advantages over conventional approaches including non-invasive administration, the induction of local immunity as well as being an alternative for people afraid of needles or with blood clotting co-morbidities.

There is currently an intranasal influenza vaccine registered for human use so administering a vaccine in this way has already been proven to be effective.

This vaccine could also provide a low-cost alternative for the [developing world](#), as it can be scaled up using the existing global infrastructure currently in use for influenza [virus](#) vaccines, offering the most economical vaccine supply worldwide.

Dr. Mohammed Rohaim of Lancaster University said: "The scalability and economical production make this vaccine candidate suitable for low and [middle income countries](#)."

The Lancaster University team, led by Dr. Muhammad Munir, has world leading experience in the "reverse genetics" of NDV, a process to convert DNA into safe and infectious viruses.

"This method has provided us with a way to insert the genes of other viruses into the NDV to make a [vaccine](#) against literally any pathogen."

More information: Immunogenicity and Protective Efficacy of an Intranasal Live-attenuated Vaccine Against SARS-CoV-2 in *Preclinical Animal Models*. doi: doi.org/10.1101/2021.01.08.425974

Provided by Lancaster University

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