Medical Xpress

COVID-19 vaccine model 'effective' in preventing lung disease

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Credit: Flinders University

A South Australian-developed SARS-CoV-19 vaccine is preparing to progress to final stages of human clinical trials after early animal testing confirmed its safety and effectiveness in preventing COVID-19 lung infection.

Publishing the peer-reviewed early results in the international scientific journal Vaccine, researchers describe how they used artificial intelligence and protein engineering to develop a synthetic spike protein which was then produced in insect cell cultures. Once purified, the protein-based coronavirus vaccine named COVAX-19 incorporates Advax, an Australian developed adjuvant derived from a plant sugar called inulin.

"The key to overcoming the pandemic lies in developing an effective vaccine against SARS-CoV-2 that not only prevents infection and clinical disease but also blocks virus transmission," says research leader Nikolai Petrovsky, Professor of Medicine at Flinders University and Research Director of Adelaide biotech company Vaxine Pty Ltd.

"As countries enter their second, third or even higher waves of cases, the world urgently needs more effective vaccines, particularly ones that can provide robust protection against all of the new variants and potentially block transmission," Professor Petrovsky says.

Results of the initial studies detailed in the new paper provide "critical early data to establish that our adjuvanted protein vaccine is safe and effective in animals (mice and ferrets) and also give a hint that it may also be able to reduce the risk of transmission based on the lack of virus shedding in the noses of ferrets, he says.

After testing in mice, the formula went into US testing in ferrets, one of the animal species that like humans is susceptible to SARS-CoV-2 virus infection. The results were promising, indicating that two doses of the vaccine was able to prevent COVID-19 lung investion and also prevent shedding of the virus from the noses of the infected animals.

"We've now taken this data on lack of nasal shedding and set up a US-based study in the hamster model to specifically test for the ability of

our vaccine to reduce transmission to naïve animals. A transmission-blocking effect would be a game changer as this is what is currently needed to stop further virus outbreaks," says Professor Petrovsky.

The research, conducted in conjunction with the Kirby Institute in Sydney and Centre for Vaccines and Immunology at the University of Georgia, U.S., focuses on producing a safe and effective recombinant protein-based vaccine, able to be manufactured at large-scale and stable under typical refrigerated conditions.

Professor Petrovsky says the new vaccine has completed Phase II clinical trials overseas in partnership with Cinnagen, a pharmaceutical company based in the Middle East. The trial results are being prepared for publication.

The article, "Immunisation of ferrets and mice with recombinant SARS-CoV-2 spike protein formulated with Advax-SM adjuvant protects against COVID-19 infection," is in pre-print in *Vaccine*.

More information: Lei Li et al, Immunisation of ferrets and mice with recombinant SARS-CoV-2 spike protein formulated with Advax-SM adjuvant protects against COVID-19 infection, *Vaccine* (2021). DOI: 10.1016/j.vaccine.2021.07.087

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