

Virologist leads world's first multi-vaccine animal efficacy studies in the fight against COVID-19

April 6 2020, by Julie Gatenby



Professor Vasan. Credit: University of York

A York virologist has established an animal model that is being used as one of the three preclinical models for COVID-19 vaccines and therapies.

Professor Seshadri Vasan, who holds an honorary chair in Health Sciences at the University of York, is leading the Dangerous Pathogens Team at the Commonwealth Scientific and Industrial Research

Organisation (CSIRO).

His team has shown that ferrets could be used as preclinical model for COVID-19 [vaccine](#) and therapies. Professor Vasan, who is currently based in Australia at the Australian Animal Health Laboratory, has found that the [animals](#) are susceptible to SARS-CoV-2, as reported by the journal *Nature*.

Vaccines

The researchers are now studying the course of infection in detail, and started efficacy studies on vaccines that are due to enter Phase 1 clinical trials in UK, U.S. and China.

Ferrets are a popular model for influenza and other respiratory infections because their lung physiology is similar to that of humans, and researchers hope they will mimic aspects of COVID-19 in people, such as its spread.

The preclinical research is funded by a partnership between CSIRO and the global Coalition for Epidemic Preparedness Innovations (CEPI) which is also funding eight vaccine development initiatives.

Clinical trials

Two of these candidates—one from Oxford University and another from Inovio Pharmaceuticals—are due to enter Phase 1 clinical trials with healthy volunteers. But before they can advance to Phase 2, it will be necessary to complete efficacy testing in animals, so CEPI has funded Professor Vasan to run the world's first multi-vaccine efficacy studies in animals.

Oxford's vaccine is currently envisaged as intramuscular injection. Professor Vasan is additionally investigating if giving it through the nose (intranasally) would confer additional protection due to mucosal immunity, and whether one or two doses will be necessary for Oxford's vectored vaccine and Inovio's DNA vaccine.

Professor Vasan said: "We are operating at speed in response to a global public health emergency while adhering to strict attention to detail and regulatory requirements which makes this so challenging. We've grown the virus for our research and have also reconfirmed the genomic sequence published by the Doherty Institute.

"Having demonstrated that ferrets are susceptible to this virus, we have designed a staggered challenge study to get timely information on vaccine efficacy."

Chair of CEPI, Jane Halton, said: "These preclinical trials are very significant. This is world leading technology, and this is the first time that we've done these [animal model](#) tests to look at two candidate vaccines both of which the CEPI coalition has provided funding towards."

Virus

The team are also investigating the physical and molecular characterization of the virus to find differences and similarities with other known coronaviruses. They have worked with bioinformaticians and analyzed the 181 published genome sequences from the current COVID-19 outbreak to understand how changes in the virus affect its behavior and impact.

Professor Vasan added: "The virus strain can be currently organized into three major clusters, with more emerging. Some of the mutations in the

[virus](#) may be significant for the development and evaluation of new diagnostics, drugs and vaccines, so it is very important for us to understand it."

Provided by University of York

Citation: Virologist leads world's first multi-vaccine animal efficacy studies in the fight against COVID-19 (2020, April 6) retrieved 5 May 2024 from <https://medicalxpress.com/news/2020-04-virologist-world-multi-vaccine-animal-efficacy.html>

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