Scientists make step forward in development of COVID-19 animal vaccines

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Credit: University of Plymouth

Scientists have made significant steps in the development of vaccines that could be used to tackle COVID-19 in animals.

The Vaccine Group, a spinout company from the University of Plymouth, has revealed its first two possible vaccines have proved successful in pre-animal trial laboratory testing.

Its aim is to now develop vaccines so as to eliminate SARS-CoV-2 (the virus that causes COVID-19) in existing animal sources.

The vaccines could also be used to ensure cats, which have already been shown to become infected with SARS-CoV-2, and other pets do not become a reservoir for future outbreaks.

The company is also investigating the longer-term potential of human vaccines and the next stage of development will be vital in assessing the technology's safety and efficacy for use in humans.

Dr. Michael Jarvis, Associate Professor (Reader) in Virology and Immunology at the University of Plymouth, is The Vaccine Group's Founder and Chief Scientific Officer. He said, "Like all other human coronaviruses, SARS-CoV-2 emerged originally from animals. There have already been a number of reported cases of human to animal transmissions of the virus and recently what appears to be the first evidence of animal to human transmission from mink."

"Although not from animal sources, the recent re-emergence of SARS-CoV-2 in Beijing underlines the importance of being able to control this virus for the long-term. The ability to control SARS-CoV-2 and prevent COVID-19 re-emerging from animal populations might become a key tool in the fight against this pandemic. Our vaccine platform appears able to induce immunity at sites where SARS-CoV-2 replicates. Whilst we are initially testing the efficacy of our vaccines in animals, positive data would open up the possibility of rapidly moving to a human vaccine."

Developing a range of vaccines will allow The Vaccine Group (TVG) to test different antigens and approaches to stimulating immunity, which is important as it is still unclear which approaches to creating effective and durable immunity will work in practice in both animals and humans.

The current vaccine candidates are two of four for SARS-CoV-2 currently under development, and success with the first vaccine candidate was reached within eight weeks of the company first receiving antigen protein sequences.

In-vitro expression of the SARS-CoV-2 antigens demonstrates they have been successfully incorporated into TVG's vaccine platform, meaning the vaccines should stimulate an immune response once in the target animal. Work is now underway preparing stocks of the first two candidates for animal trials.

The company is also continuing to develop the other candidates, with the anticipation being that initial expression data will be obtained over the coming weeks.

The University of Plymouth spin out and its international partners have so far been backed by than £9million in grant funding from the US, UK and Chinese governments.

The strong progress on the SARS-CoV-2 vaccines mirrors the progress The Vaccine Group has been enjoying with its other vaccines.

In March this year, the company announced work on a bovine mastitis vaccine had revealed significant potential for new intellectual property and demonstrated the technology's ability to deliver strong, targeted immune responses.

It also said vaccines to combat bovine tuberculosis and African Swine Fever Virus were ready for initial animal trials once testing facilities become available, and US-government backed work on Ebola and Lassa fever virus vaccines was proceeding well.

It is developing vaccines based on benign forms of herpesviruses, a

group of viruses found in all animals, including humans. The vaccines are created by inserting a non-infectious region of DNA from the pathogen being targeted into the herpesvirus. This vaccine then stimulates an immune response when delivered into animals.

Other projects underway include developing a vaccine against Streptococcus suis, a disease in pigs which can be fatal in humans. This has so far produced two vaccine candidates for further testing. The project is funded by the UK Department of Health and Social Care and the Chinese government. Other partners in the project include the Shanghai Veterinary Research Institute and Chinese vaccine manufacturer Pulike Biological Engineering Company.

The Vaccine Group is supported by the University's commercialisation partner, Frontier IP, and its Chief Commercialisation Officer Matthew White said, "It is impressive to see the speed with which the team has developed these vaccine candidates. Based on previous work with the same vaccine delivery platform we are hopeful that animal trials will demonstrate positive results."

Provided by University of Plymouth