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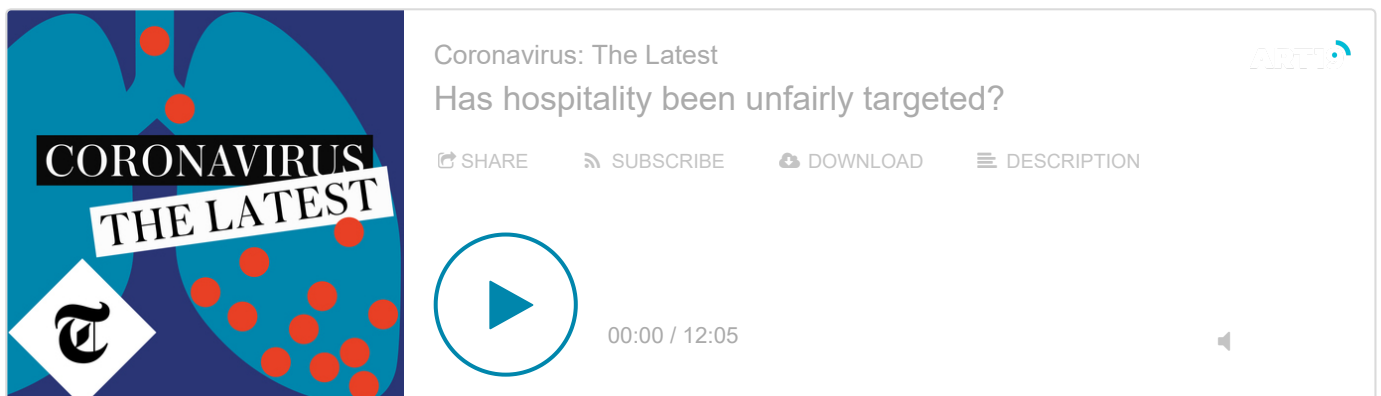
The [Oxford University vaccine](#) tipped as a "front runner" in the race to develop a coronavirus jab does not stop the virus in monkeys and may only be partially effective, experts have warned.

A trial of the vaccine in rhesus macaque monkeys did not stop the animals from catching the virus and has raised questions about the vaccine's likely human efficacy and ongoing development.

The vaccine, known as ChAdOx1 nCoV-19, is [undergoing human trials](#) in Britain. The Government has brokered a deal between Oxford University and the drug company AstraZeneca to produce up to [30 million doses](#) if it proves successful, having ploughed £47 million into the research.

"All of the vaccinated monkeys treated with the Oxford vaccine became infected when challenged as judged by recovery of virus genomic RNA from nasal secretions," said Dr William Haseltine, a former Harvard Medical School professor who had a pivotal role in the development of early HIV/Aids treatments.

"There was no difference in the amount of viral RNA detected from this site in the vaccinated monkeys as compared to the unvaccinated animals. Which is to say, all vaccinated animals were infected," Dr Haseltine wrote in an article on Forbes.



Jonathan Ball, professor of molecular virology at the University of Nottingham, said the vaccine data suggests that the jab may not be able to prevent the spread of the virus between infected individuals.

"That viral loads in the noses of vaccinated and unvaccinated animals were identical is very significant. If the same happened in humans, vaccination would not stop spread," [he said](#). "I genuinely believe that this finding should warrant an urgent re-appraisal of the ongoing human trials of the ChAdOx1 vaccine."

The trials investigating the immune response to the Oxford vaccine in rhesus macaque monkeys were carried out at the National Institute of Health's Rocky Mountain Laboratory in the US, with initial results published in a press release at the end of April.

The results were said at the time to be encouraging, but publication of the [full trial results last week](#) showed the vaccine did not prevent the animals catching the virus, although there was evidence it may reduce the severity.

This is in contrast to a Chinese vaccine trial in April that did appear to stop the development of Covid-19 in monkeys. That trial, by Sinovac Biotech, a privately held Beijing-based company, used a modified version of the full Sars-Cov-2 virus in its vaccine, while the Oxford vaccine uses a common cold virus to try and provoke an immune response.

In the Oxford monkey trial, six monkeys were infected with single doses of ChAdOx1 nCoV-19 and exposed to coronavirus. A control group of three non-vaccinated monkeys were also infected. Both the immunised and non-immunised monkeys were then monitored for seven days for signs of developing Covid-19.

One measure of infection is an increased breathing rate as the virus attacks the lungs – three of the vaccinated animals displayed this symptom. On autopsy, the researchers found the virus in the vaccinated monkeys' lungs.

On the upside, none of the vaccinated monkeys displayed pneumonia which suggests that, while not stopping the virus, it may be partially protective.

Dr Haseltine [said this was](#) "encouraging", but that "experience with other vaccines tells us that is not a firm guarantee that such will be the case for humans".

"It is crystal clear that the vaccine did not provide sterilising immunity to the virus challenge, the gold standard for any vaccine. It may provide partial protection," he said.

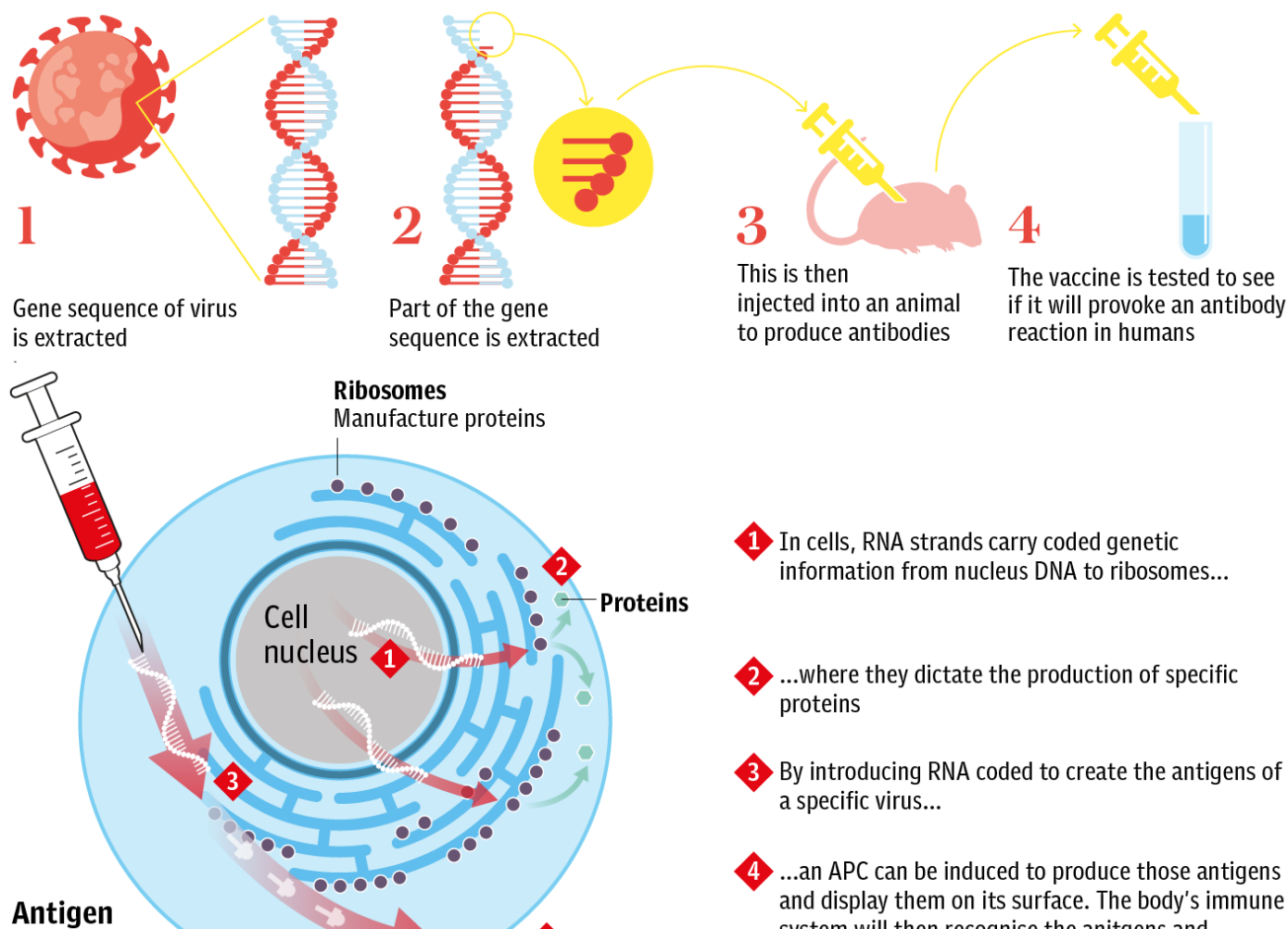
The doubts about the vaccine [come after Alok Sharma, the Business Secretary](#), said that the speed at which Oxford was pushing ahead with development was "genuinely unprecedented" and that the first clinical trials were "progressing well".

Mr Sharma also announced £84 million of additional funding to further accelerate the vaccine research at Oxford University and another UK vaccine candidate being developed by Imperial College. The following graphic shows how scientists are trying to produce a vaccine:

The search for a vaccine

Scientists are not starting from scratch. They are employing an approach called Vaccine Rapid Response Platform. This has been made possible as Chinese scientist were able to upload the genetic sequence of the virus in January 2020.

An RNA vaccine is a novel type of vaccine which is composed of the nucleic acid RNA, packaged within a vector such as lipid nanoparticles.



Separate funding was announced for a UK vaccine manufacturing capacity – the Vaccines Manufacturing and Innovation Centre – in Oxford. This will be able to manufacture a range of vaccines depending on what works.

Despite the findings, there is still "cautious optimism" about the Oxford vaccine among some experts. In the study all of the animals administered with a single shot of the vaccine generated antibodies against the virus within 28 days.

"The most important finding to me is the combination of considerable efficacy in terms of viral load and subsequent pneumonia, but no evidence of immune-enhanced disease," said Stephen Evans, professor of pharmacoepidemiology at the London School of Hygiene and Tropical Medicine.

"It is encouraging to see these results and suggests cautious optimism for the Oxford vaccine trial being done in humans."

Dr Penny Ward, a visiting professor in pharmaceutical medicine at King's College London, said: "Single doses of the vaccine produced high quantities of neutralising antibody in both species.

"It is helpful to see that monkeys vaccinated with this Sars-CoV-2 vaccine did not have any evidence of enhanced lung pathology and that, despite some evidence of upper respiratory tract infection by Sars-Cov-2 after high viral load virus challenge, monkeys given the vaccine did not have any evidence of pneumonia."

But Eleanor Riley, professor of Immunology and Infectious Disease at the University of Edinburgh, said there was both good and bad news in the most monkey trials:

"Whilst the vaccine induced neutralising antibodies and vaccinated animals experienced less severe clinical symptoms than unvaccinated animals (good), the neutralising antibody titres were low and insufficient to prevent infection and – importantly – insufficient to prevent viral shedding in nasal secretions (worrying).

"If similar results were obtained in humans, the vaccine would likely provide partial protection against disease in the vaccine recipient but would be unlikely to reduce transmission in the wider community."

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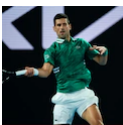
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