ISRCTN Lay summary

MERS003 (ISRCTN17936606)

MERS (Middle East Respiratory Syndrome) is an illness caused by a virus that affects the lungs and breathing. It can sometimes cause severe pneumonia and can be life-threatening. The virus that causes MERS was first identified in Saudi Arabia in 2012. Since then, more than 2,300 people have caught MERS and over 800 have died. A small number of cases still occur each year, mainly in Saudi Arabia. There is currently no approved vaccine or specific treatment for MERS.

A vaccine called ChAdOx1 MERS has been developed by researchers at the University of Oxford to help protect people against MERS. It uses the same vaccine technology as the Oxford/AstraZeneca COVID-19 vaccine. However, instead of training the immune system to recognise the virus that causes COVID-19, it teaches it to recognise the MERS virus instead.

In this study, we wanted to find out whether the ChAdOx1 MERS vaccine was safe and whether it could produce a good immune response in older adults. We also wanted to see whether previously receiving the Oxford/AstraZeneca COVID-19 vaccine affected how the immune system responded to the MERS vaccine.

We found that the MERS vaccine was safe and generally well tolerated. Most of the expected side effects were mild or moderate. Four serious adverse events occurred during the study, but none were considered to have been caused by the MERS vaccine.

The vaccine successfully encouraged the immune system to respond to MERS. After vaccination, participants produced a type of protein called antibodies in their blood which can help to protect the body from virus infection. Antibody responses were strongest after the second dose of the vaccine.

The vaccine also produced responses from T cells, another important part of the body's defence against infection. These responses increased following vaccination in people who received the MERS vaccine.

We also measured antibodies that could block, or neutralise, the MERS virus. These increased after vaccination and were strongest after the second dose. Although these antibody levels became lower over time, they were still higher than before vaccination in many participants for up to nine months after the second dose. People who received a placebo, which did not contain the MERS vaccine, showed little or no MERS antibody response.

People who had previously received the Oxford/AstraZeneca COVID-19 vaccine already had higher levels of antibodies against the vaccine backbone itself. These levels increased further after receiving the MERS vaccine.

Overall, the results are highly encouraging and support further investigation of the ChAdOx1 MERS vaccine. The ChAdOx1 MERS vaccine was safe in the people studied and produced immune responses against MERS, particularly after the second dose. Further research will be needed to understand how well these immune responses could protect people from becoming ill with MERS.