The MELODY Study

Plain English Summary: **Antibody levels after 3 or more COVID-19 vaccine doses in 23,000 immunosuppressed individuals: first results from MELODY.**

Short summary

COVID-19 can be a serious infection that can lead to treatment in hospital or even death. We know from previous research that people who have a weakened immune system were more likely to catch COVID-19. The MELODY study aimed to find out how well vaccines protect people who have a weakened immune system from COVID-19. We invited people who have had transplants, people with certain types of blood cancer and people with rare autoimmune rheumatic disease to take part.

We found that about 4 in 5 people that took part in MELODY had had antibodies after having 3 or more vaccines. People who had more doses of vaccine were more likely to have antibodies.

We now know that most immunosuppressed people make antibodies after having a COVID-19 vaccine. We also know that the more vaccines you have, the more likely you are to have antibodies. Therefore, we recommend that people have vaccines and booster doses as offered by the UK vaccination programme.

Why was the MELODY Study undertaken?

This research was done in response to the COVID-19 pandemic.

COVID-19 can be a serious infection that can lead to treatment in hospital or even death. We know from previous research that people who have a weakened immune system were more likely to catch COVID-19. They were also more likely to need to go into hospital for treatment or die from COVID-19.

Antibodies protect people by fighting the infection and preventing serious illness. Vaccines trigger the immune system to make antibodies. If your immune system is weak, you may not respond well to the vaccine and produce enough antibodies.

The MELODY study aimed to find out how well vaccines protect people who have a weakened immune system from COVID-19.

We did this first part of the study to find out:

i) how many people in the study have antibodies after having at least 3 COVID-19 vaccines,
ii) what common factors are present in people who don't have antibodies.

This information will help plan better care, treatment and services for people living with these conditions.

There is a second part of the study that aims to find out if the presence of antibodies reduces the chance of having COVID-19 and becoming very ill with it. This part of the study is on-going. We will report these results as soon as they are available.

Who undertook this research?

A team of doctors and researchers from many organisations carried out the MELODY study. These organisations include Imperial College London, The Universities of Nottingham, Southampton, and Cambridge, Nottingham University Hospitals NHS Trust, NHS Blood and Transplant, the National Disease Registration Service at NHS England, and IPSOS MORI (an independent research organisation).

Funding for the MELODY study came from the Medical Research Council and health charities. The charities include Kidney Research UK, Vasculitis UK, Blood Cancer UK, and Cystic Fibrosis Trust.

How was this research done?

We invited three groups of immunocompromised people to take part in MELODY. People who:

i) Are living with a solid organ transplant, or
ii) Are living with a type of blood cancer affecting the lymphocyte blood cells or
iii) Are living with a rare autoimmune rheumatic disease such as lupus, vasculitis, myositis or scleroderma.

Participants were recruited between December 2021 and June 2022.

We invited people who were 18 years or older from the three groups listed above to take part. We identified these people using national patient registers. These registers included the UK Transplant Registry (UKTR), the National Cancer Registration and analysis Service (NCRAS) and the National Congenital Anomaly and Rare Disease Registration Service (NCARDRS). We sent letters to invite 101,972 people to take part. Participants could choose to enrol if they had received at least 3 COVID-19 vaccine doses. Some people who had transplants signed up to take part in the study before invitations were sent out.

Participants gave consent and completed questionnaires on a web portal. People answered questions about themselves like their age, gender and ethnicity. They were also asked about their diagnosis, medicines and their physical and emotional health. People's COVID-19 history, including infection, shielding and vaccination was also collected.

Participants received home blood finger-prick antibody tests with instructions by post. We asked people who had 3 or more COVID vaccines to self-test for antibodies. They reported their test result on the portal system. We used this data to see what factors might be linked to having antibodies, or not having antibodies, after having at least 3 doses of COVID-19 vaccine.

What did we find?

Main results

- About 4 in 5 people with a solid organ transplant, rare autoimmune disease or blood cancer affecting lymphocytes had antibodies after having 3 or more vaccines.
- People who had more doses of vaccine were more likely to have antibodies.

More detailed results

- Of 101,972 people invited to take part in the study, 28,411 enrolled and 23,036 provided their result of the finger prick blood test.
- 9,927 participants had a solid organ transplant, 6,516 a rare autoimmune disease and 6,593 a blood cancer affecting the lymphocytes.
- 29% of participants had 3 vaccines, 62%, 4 vaccines and 10%, 5 or more vaccines at the time of their test.
- Antibodies were found in 77% of people who had a solid organ transplant, 79% of those with a blood cancer, and 86% with rare autoimmune disease.
- People were more likely to have antibodies if they were younger, had more vaccine doses and had previously had COVID-19. Some medications that weaken the immune system reduced the likelihood of having antibodies.

How will these findings help us?

We now know that most immunosuppressed people make antibodies after having a COVID-19 vaccine. We also know that the more vaccines you have, the more likely you are to have antibodies. Therefore, we recommend that people have vaccines and booster doses as offered by the UK vaccination programme.

Taking part in the study provided people with real-time information on their antibody status. In the future, a blood finger prick test may be a useful tool to quickly identify people who have no protective antibodies. This could enable them to have quick access to treatments to prevent infection and if they have a COVID-19 infection.

This is the plain English summary of: Pearce FA, Lim SH, Bythell M et al. *Antibody prevalence after three or more COVID-19 vaccine doses in individuals who are immunosuppressed in the UK: a cross-sectional study from MELODY*, The Lancet Rheumatology 2023, 5(8) e461-e473

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