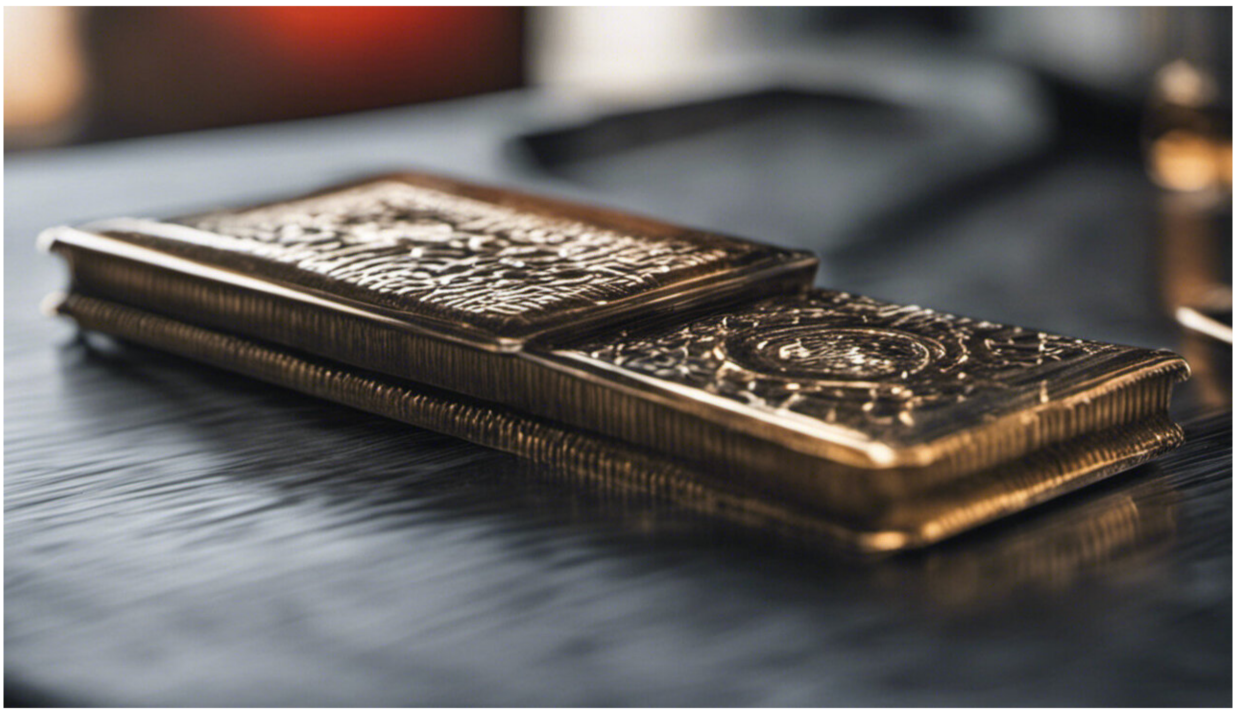
Could the common cold give children immunity against COVID? Our research offers clues

March 27 2023, by Marion Humbert and Annika Karlsson



Credit: AI-generated image (disclaimer)

Why children are less likely to become severely ill with COVID compared with adults is not clear. Some have suggested that it might be because children are less likely to have diseases, such as type 2 diabetes and high blood pressure, that are known to be linked to more severe

COVID. Others have suggested that it could be because of a difference in ACE2 receptors in children—ACE2 receptors being the route through which the virus enters our cells.

Some scientists have also suggested that children may have a higher level of existing immunity to COVID compared with adults. In particular, this immunity is thought to come from memory T cells (immune cells that help your body remember invading germs and destroy them) generated by common colds—some of which are caused by coronaviruses.

We put this theory to the test in a recent study. We found that T cells previously activated by a coronavirus that causes the common cold recognize SARS-CoV-2 (the virus that causes COVID) in children. And these responses declined with age.

Early in the pandemic, scientists observed the presence of memory T cells able to recognize SARS-CoV-2 in people who had never been exposed to the virus. Such cells are often called cross-reactive T cells, as they stem from past infections due to pathogens other than SARS-CoV-2. Research has suggested these cells may provide some protection against COVID, and even enhance responses to COVID vaccines.

What we did

We used blood samples from children, sampled at age two and then again at age six, before the pandemic. We also included adults, none of whom had previously been infected with SARS-CoV-2.

In these blood samples, we looked for T cells specific to one of the coronaviruses that causes the common cold (called OC43) and for T cells that reacted against SARS-CoV-2.

We used an advanced technique called high-dimensional flow cytometry, which enabled us to identify T cells and characterize their state in significant detail. In particular, we looked at T cells' reactivity against OC43 and SARS-CoV-2.

We found SARS-CoV-2 cross-reactive T cells were closely linked to the frequency of OC43-specific memory T cells, which was higher in children than in adults. The cross-reactive T cell response was evident in two-year-olds, strongest at age six, and then subsequently became weaker with advancing age.

We don't know for sure if the presence of these T cells translates to protection against COVID, or how much. But this existing immunity, which appears to be especially potent in early life, could go some way to explaining why children tend to fare better than adults with a COVID infection.

Some limitations

Our study is based on samples from adults (26-83 years old) and children at age two and six. We didn't analyze samples from children of other ages, which will be important to further understand age differences, especially considering that the mortality rate from COVID in children is lowest from ages five to nine, and higher in younger children. We also didn't have samples from teenagers or adults younger than 26.

In addition, our study investigated T cells circulating in the blood. But immune cells are also found in other parts of the body. It remains to be determined whether the age differences we observed in our study would be similar in samples from the lower respiratory tract or tonsil tissue, for example, in which T cells reactive against SARS-CoV-2 have also been detected in adults who haven't been exposed to the virus.

Nonetheless, this study provides new insights into T cells in the context of COVID in children and adults. Advancing our understanding of memory T cell development and maturation could help guide future vaccines and therapies.

Provided by The Conversation