

# What we know now about COVID immunity after infection, including omicron and delta variants

January 31 2022, by Stephen Kent

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Credit: AI-generated image ([disclaimer](#))

COVID is rampant in Australia and many parts of the world right now. Some people battling or recovering from infection may wonder if catching COVID will give them longer term immunity for when the next wave comes.

Since the early days of the pandemic we've known COVID induces a wide range of [immune responses](#) and one [infection](#) provides [partial protection from future infections](#).

Unfortunately, immunity wanes over time—[people lose half their immunity every three months](#). Further, new variants continue to emerge that are partially resistant to key immune responses—[antibodies](#) that neutralize earlier strains—[this is especially true of omicron](#).

We're starting to get a more detailed understanding of COVID immunity across variants. Here's what we know so far ...

## **Breakthrough infection happens but vaccines are still a must**

Since around [95% of Australians over 16](#) have had at least two COVID vaccines, most people catching COVID now have previously been vaccinated—this is called "breakthrough infection."

The vaccines are effective at substantially reducing severe COVID illness. They are less effective, particularly over time, [at preventing infections, including with new variants](#). A third vaccine dose [helps maintain immunity](#), and everyone eligible should get a booster as soon as possible.

Because the Astra-Zeneca vaccine is [less effective](#) than the Pfizer or Moderna vaccines, it's critically important for vulnerable older Australians immunized with two Astra-Zeneca vaccinations to be boosted with a third vaccine dose as quickly as possible.

The good news is people first vaccinated with Astra-Zeneca and subsequently boosted with Pfizer or Moderna [develop](#) high levels of

protective immune responses.

Recent work shows [a nice boost in antibody immunity](#) after breakthrough infection. This boost in antibody immunity [may not be as fast or strong as getting a vaccine](#), but it has a big advantage in that the immunity is [more specific to the infecting strain](#) such as delta.

The current vaccines are still based on the original strain isolated in Wuhan, China in early 2020. Several vaccine manufacturer's are racing to update their vaccines for the omicron [variant](#) (much as we do with the yearly flu vaccines), but these [vaccine](#)-with-initial-results-expected-in-the-first-half-of-the-year">variant-specific vaccines are still some months away.

## **Infection immunity builds where COVID strikes first**

Another potential advantage for immunity derived by infection (acquired in the respiratory tract) compared to vaccination (given into the muscle) is that immunity is better focused to the surfaces of the nose, throat and eyes. This is where COVID is first encountered.

Surface antibodies (termed [immunoglobulin A](#)) and specialized tissue "resident" immune cells (B and T-cells) are induced by infection but [not intramuscular vaccination](#).

The level of protection offered by these "local" or "mucosal" responses is not yet clear in people, but [some studies in animal models](#) suggest they are helpful.

## **Delta infection offers a little protection against omicron**

The omicron variant is slowly replacing the delta variant around the world. It is more transmissible and avoids antibodies more effectively.

Do people who have been infected with the delta variant have an advantage in terms of protection from the omicron variant? The two strains share some sequence changes, but omicron has many more mutations than delta.

Only a minority of neutralizing antibodies that fight [delta can also neutralize the omicron variant](#). That said, neutralizing antibodies against delta are better at fighting omicron than previous strains. This is particularly true for people who have [caught delta and been previously vaccinated](#).

The reverse is also true—people who have caught omicron have [some improved antibody protection against delta](#). This may not be much use as delta is disappearing from prevalence, but the knowledge could be useful for future variants.

## **T-cells might be key to cross-variant protection**

There is considerable interest in a type of immunity called [T-cells](#) and their potential ability to fight COVID infection.

Theoretically, T-cells could assist in protecting against severe infection with new strains because [T-cells usually cross react to all variants of SARS-CoV-2](#), the virus that causes COVID.

However, the evidence to date points to the [central role of neutralizing antibodies](#) obtained from infection or vaccination in protection from both getting an infection and preventing severe disease. A recent unpublished study suggests neutralizing antibodies are [boosted by breakthrough infections but not T-cells](#). We know T-cells are very

important in protecting from other infectious diseases and many cancers, but perhaps have a lesser role in COVID.

Overshadowed by antibodies since the start of the pandemic, T cells are beginning to take center stage in the fight against COVID-19 <https://t.co/fYz9ZsX3d5>

— Harvard Medical School (@harvardmed) [January 27, 2022](#)

## Gaining immunity isn't the end of the story

Overall, infections with [delta](#) and omicron provide a boost in immunity against these strains. Infection will probably help protect individuals from reinfection with the same variant. Infection may offer a small amount of protection from different variants and potentially from future variants.

However, immunity will not be enduring and it is still possible to get severe infections and ongoing symptoms (termed "Long COVID") from breakthrough infections. They are best avoided. Current booster vaccines along with social measures are our best way to stay healthy while we wait for [omicron](#)-specific vaccines.

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