COVID-19 infection after vaccine may confer 'super immunity,' study indicates

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People who get COVID-19 despite being vaccinated against the disease could develop "super immunity" against future coronavirus infections, Oregon Health & Science University researchers have found.

"This is unusually high, unusually effective," lead researcher Dr. Fikadu Tafesse said of his findings, published Thursday, Dec. 16 in the Journal of the American Medical Association. "You get an extremely, extremely high level of protection."

Tafesse's work comes nearly two years into the pandemic and as health officials and world leaders scramble to react to the latest variant of the virus, the rapidly spreading omicron. The new variant was not included in Tafesse's study but he said he is confident the findings would apply to it, as well.

After the delta variant and low vaccination rates quashed dreams of an end to the pandemic this summer, health officials and the public have been fearful of successive waves of coronavirus variants. More troubling now, early research indicates omicron can effectively evade even vaccinated people's immune systems and that it spreads more rapidly than the delta variant.

For one of Tafesse's colleagues on the project, the OHSU research indicates a potential "end game" for the pandemic.

"It points to where we're likely to land," Dr. Marcel Curlin, associate professor of medicine and a co-author of the study, said in a statement. "Once you're vaccinated and then exposed to the virus, you're probably going to be reasonably well protected from future variants."

Still, it's unclear what concrete, practical implications the study provides, whether for the 2.7 million Oregonians and counting who are fully vaccinated or the 48,000 among them who got infected anyway.

To get his results, Tafesse, an assistant professor of molecular microbiology and immunology at the school of medicine, compared the immune system responses in blood samples collected from 52 fully vaccinated OHSU employees, 26 of whom had a breakthrough infection.

Tafesse's lab exposed samples of the participants' blood to live samples of five variants of the coronavirus — including delta — and measured the volume and effectiveness of the antibodies the blood generated in response.

They found a consistent pattern: The antibodies in the blood from those who had a breakthrough infection were as much as 1,000% more effective than the antibodies generated by those who had only been vaccinated.

Antibodies are one of the immune system's key lines of defense against infection. The first viral infection — or vaccine dose — teaches the immune system what the virus looks like. When there is another exposure or infection, antibodies tailor-made for that specific virus seek out, bind to and neutralize the virus.

"Our study suggests that individuals who are vaccinated and then exposed to a breakthrough infection have super immunity," Tafesse said.

Not only were there more antibodies in the blood of those with infections, but those antibodies were more versatile. They effectively recognized different variants as versions of the same, fundamental virus, and acted accordingly.

The reaction and pattern were so strong, Tafesse said he is confident antibodies would recognize omicron and produce a similarly robust response.

A key question Tafesse is now trying to answer is whether booster shots provide as much protection as breakthrough infections. He said he hopes to release the results of his ongoing research into that question by mid-January. Pfizer-BioNTech said last week blood from people with three doses of their vaccine produced 25 times more antibodies when exposed to the omicron variant than blood from people who got only two doses.

It's a "very, very important" question, Tafesse said, because he would like to be able to advise the public to get booster shots. Even though he expects the two to be comparable, there's a possibility breakthrough infections offer more protection.

Vaccines target only specific portions of the virus, meaning that if those portions mutate, an inoculated immune system might not recognize the mutated variant as the coronavirus.

DISEASE

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But because there is no special hunting season for whitetails — they are legal quarry during seasons, the same as mule deer — Ratliff said the dieoff won't lead to a reduction in hunting tags in the Sumpter unit, which includes Baker Valley.

An outbreak of EHD killed an estimated 2,000 white-tailed deer in Umatilla County during the fall of 2019, resulting in the cancellation of some deer hunts in that area.

The virus poses no threat to people, cats or dogs. Nor can people become ill by eating the meat of a deer or other animal infected with EHD.

Deer are infected only by being bitten by midges; deer can't infect each other through nose-to-nose contact, as with some other diseases.

Oregon Department of Fish and Wildlife/Contributed Photo
A white-tailed deer.

Union County

EHD also spread through white-tailed deer in Union County this summer, including in higher elevation forested areas in the Wenaha and Sled Springs units where the disease has rarely been confirmed in the past, said Phillip Perrine, a wildlife biologist at ODFW's La Grande office.

"It was more prevalent than we've seen," Perrine said.

He didn't have an estimate for how many deer died, although he said there were outbreaks in both the mountains and in the Grande Ronde Valley.

Assessing the extent of the outbreak will be easier once ODFW receives hunter reports and conducts its annual aerial deer census this month, Perrine said.

He said ODFW started getting reports of dead white-tailed deer in early summer, and, as in Baker Valley, tissue samples confirmed EHD.

Both Perrine and Ratliff believe the severe drought contributed to the severity of this year's EHD outbreak.

Deer tend to be most vulnerable to being infected by midges when the animals are concentrated around water sources, the biologists said.

And with fewer of those sources during this dry summer, there were likely larger numbers of deer gathering in places where they were exposed to midges, Perrine said.

It's not clear yet whether the EHD outbreak will prompt ODFW to reduce hunting tag numbers for any 2022 seasons, Perrine said.

He said he hopes that's not the case, particularly with a popular muzzleloader hunt for whitetails.

Ratliff said the EHD outbreak ended quickly once freezing temperatures killed the year's crop of midges.

Both he and Perrine said they stopped receiving reports of dead deer in early fall.

"Once the conditions get colder and these midges are no longer on the landscape, we didn't really have any more losses," Perrine said.

Wallowa County

A total of 12 deer — 11 whitetails and one mule deer — were confirmed by tests as having died from EHD, said Bree Furfey, district wildlife biologist at ODFW's Enterprise office.

The disease is also suspected as the cause in another mule deer's death.

Furfey said she doesn't have an estimated total number of deer deaths due to the outbreak.

She said the virus was most prevalent in and around the city of Wallowa, but it was also confirmed elsewhere in the Wallowa Valley including near Joseph, Lostine and Enterprise, and in the northern part of the county near Troy and the Wenaha country.

Furfey said that although the extent of the EHD outbreak isn't certain, she doesn't believe the death toll among deer was high enough to warrant any reductions in hunting tags for 2022.

Rapid recovery?

Although white-tailed deer are much more susceptible to EHD, the species has an advantage in that whitetail populations tend to grow faster than mule deer herds when conditions are suitable, Perrine said.

White-tailed does typically have twin fawns each year, he said.

"It's difficult to overhunt whitetails because they reproduce so quickly," Perrine said.

Furfey and Ratliff also cited the procreation potential of whitetails as one reason why this year's EHD outbreak likely won't affect next year's hunting season.