

Transcript Details

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Vaccines Versus Variants: Where Do We Stand?

Announcer:

Welcome to *VacciNation* on ReachMD, sponsored by Moderna. On this episode, we're joined by Dr. Cynthia Leifer, Professor of Immunology at Cornell University who will share how vaccines are faring against the COVID-19 variants. Here's Dr. Leifer now.

Dr. Leifer:

So I wanted to start by saying that viruses mutate all the time, so we have lots of different variants arising, and they're not all ones to be concerned about. And actually, we classify them as variants being monitored, variants of concern, variants of interest, and variants of high consequence. Now, the variants of concern and the variants of interests that are out there right now are primarily the Delta variant, which I think we're all very familiar with at this point, although we now have Delta plus coming in, and that's going to be something to be concerned about. But I think the one that we need to keep our eye on the most is an Alpha variant. So, it goes down the Alphabet, right? So Alpha was the very first one that came out. But now we have an Alpha variant they're calling A.30. And the reason why we need to be worried about that one is because it may be evading the vaccines.

What's important to know is those studies were done in vitro. And so, we don't have real-world data yet. But the in vitro studies that were done were published in the *Journal of Cellular and Molecular Immunology* very, very recently. And what they did was they took sera from the blood from individuals who either receive the Pfizer vaccine or AstraZeneca vaccine, and then they tried to block the ability of the virus to invade into the cells in culture. And what they found is unlike some of the other variants, including Delta, the A.30 Alpha variant seemed to evade this neutralization capacity.

Now, one of the things we really need to keep in mind though is that antibodies and antibody neutralization is not the only immune defense mechanism that we have against these viruses. We also have T-cells and other antibody mechanisms that help clear the virus.

So yes, we need to be concerned that there may be variants arising such as this A.30, that may not be completely covered by this vaccine. But generally, to date, the real-world data are showing that the vaccines we currently have in the individuals who are vaccinated are really protected still from serious disease, hospitalization, and death, which are the important points that we want to keep in mind.

What we need to remember is that every time the virus makes a copy of itself, it's going to make mutations. And those mutations can be completely inconsequential, have no effect at all. Some of them will make the virus unable to survive. And then there are some that could make it more infectious, or perhaps cause more pathology. What we don't know at this point is which ones will arise and how they're going to be covered.

What we can say for sure, though, is that the vaccines we have in the way, they're developed to the part of the virus that binds to the receptor in order to be able to infect cells. So, it's hard for the virus to mutate that too much without losing its ability to infect. And so, what we hope is that, in general, the vaccines that we have are generating antibodies that will continue to bind to that, what we call receptor-binding domain, and still offer at least a reasonable level of protection in the long term.

There was a recent study published in *Lancet* that looked at the Pfizer vaccine in an Israeli population. And they looked at if people got two doses, or three doses of that vaccine. And it was a pretty robust study. It had about 728,000 people in it. And although the numbers were quite low, even in people who had the two doses, it still was very protective against serious disease, hospitalization, and death. What they found was, if you had three doses, there was an 85 percent reduction in hospitalization, a 76 percent reduction in severe disease, and a 94 percent reduction in death.

So even though we're still very highly protected by the second dose, a third dose does seem to be warranted and increase protection.

This is expected because anytime we boost, we're going to enhance the amount of antibodies that an individual is producing at any point in time, and potentially also boost that memory T-cell response as well. And so that's going to enhance individual's protection when they get that booster. And it's most important if a virus is circulating at high levels in a population. Once a pandemic is under control, and things are circulating at a much lower level, then the protection level in an individual isn't required to be quite as high to protect to the individual in the population.

And so what we really need to remember is that you're still very well protected if you have two doses of the current vaccines that are out there, Moderna or Pfizer, but they're recommending a third dose, and especially a third dose if you got the Johnson and Johnson vaccine because that one's efficacy does seem to be diminishing faster than the other two.

So there was one other study that was published recently in the *New England Journal of Medicine*. It was looking at a series of individuals that were in England, and they were looking at family members who tested positive and their potential to transmit to other individuals. And so with these variants, especially the Delta, we really need to worry about transmission by not just unvaccinated individuals, but vaccinated individuals.

And the worrisome thing from this particular study was that individuals were as likely to be positive if they were vaccinated or unvaccinated as the primary case. And so we're definitely seeing what we call these breakthrough cases. Now, what's important to know is those individuals who test positive, how likely are they to transmit it to other family members or people in close contact? And so, they did a surveillance testing of all of the family members that were in close contact, and although that it was lower transmission slightly with those individuals who were vaccinated, they were still seeing transmission to people who are vaccinated and unvaccinated. But you are much less likely to have symptoms if you're vaccinated.

And the other thing that's important from this study is that if they looked at the amount of virus that an individual made, the peak amount was similar if you were vaccinated or unvaccinated, and that's the bad news because it seems like you're able to be infected and replicate this virus, similarly, whether you were vaccinated or unvaccinated. But the good news is that if you were vaccinated, that peak dropped precipitously, whereas in an unvaccinated individual, that virus persisted much longer. So, if you look at the overall virus that an individual who's infected can shed over a period of time, that overall amount is going to be way lower if you're vaccinated than if you're unvaccinated.

Announcer:

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