Preventing the Next Pandemic: The Potential Role of Antibodies

Announcer:

Welcome to *COVID-19: On the Frontlines* on ReachMD. On this episode, we'll hear from Dr. Jeniffer Hernandez, Associate Professor of Biopharmaceutical Sciences at the Keck Graduate Institute, about where we're headed with emerging vaccination efforts and neutralizing antibodies. Here's Dr. Hernandez now.

Dr. Hernandez:

Future vaccination efforts involve other things, not just vaccines, right? The production of passive antibodies that can neutralize not just COVID-19, but other deadly viruses or the future pandemic.

Viruses aren't the only thing that can cause pandemics. There's strong bacterial infections that are now harder to treat because we have a lot of antibiotic resistance and not a lot of antibiotics are being made. So funding and research for new antibiotics, new vaccines, new antibody treatments to neutralize the viruses is very important. I read that there is over 1.5 million viruses that probably exist, and they could potentially cause a future pandemic. So we need resources to be spent on preventing the next pandemic.

Vaccines aren't the only solution. I mean, it's a great, preventive tool, right, to prevent COVID-19, to prevent death in people that could experience severe COVID-19 symptoms, right? But in the beginning, we didn't have the vaccines, right? The first thing that came out was antibody treatment. Within like three months, I believe it took, to make antibodies that can neutralize the virus, and that means that the immune system can now recognize it with the help of antibodies and they can get removed through the circulatory system. My colleagues and I recently received a grant from NIH, and it's targeted to help prevent future pandemics, like COVID-19, and so the title of our award is, "Rapid Response for Pandemic Single-Cell Sequencing and Deep Learning to Predict Antibody Sequence." So I paired up with another colleague of mine here at KGI named Animesh Ray, and he's very familiar with computer programs, and he asked me to join the project because I'm an immunologist, and I know how to work with mice and immunize mice with peptides and study their immune response. So we want to develop a computer learning program where we can give the computer program the sequence of a virus like SARS-CoV-2 or any future pandemic-causing virus or bacteria. And in a way, the computer can predict the antibody structure, and then we can generate antibodies that will neutralize that pathogen, which could be either a virus or bacteria that is causing a worldwide pandemic. We believe we can generate this program, and within hours, we can have the structure of the antibody and produce it really fast – within hours.

So, yes, vaccines are really crucial in preventing disease, but you have to remember that there are immunocompromised individuals who can't even make antibodies because their B-cells are not functioning properly or they don't even have B-cells. When they get infected, they cannot produce antibodies to neutralize the virus. So for people who are immunocompromised in that way, passive antibody treatment can help save a lot of lives. So the development of vaccines is crucial in preventing infections, but if we don't have those vaccines, another option would be antibody neutralization.

Announcer:

That was Dr. Jeniffer Hernandez from the Keck Graduate Institute. To access more episodes from *COVID-19: On The Frontlines*, visit us at ReachMD.com where you can be Part of the Knowledge. Thank you for listening.