Video: Researcher discusses drug resistance in COVID-19

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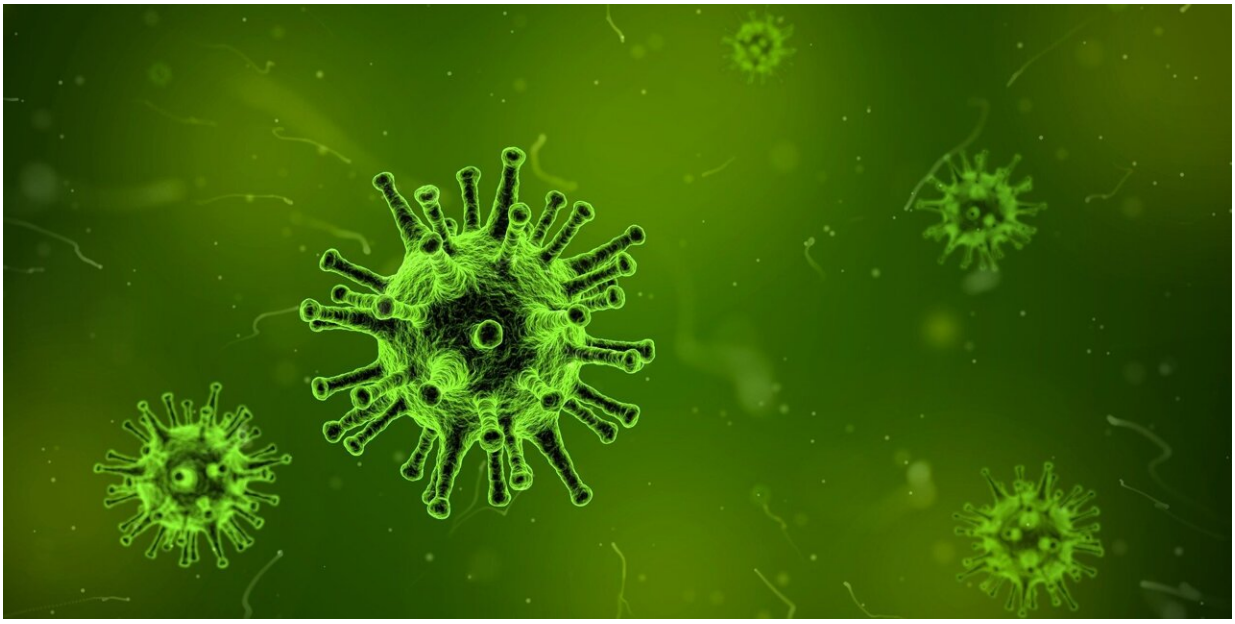

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Yang Wang, MD, Ph.D., professor of medicine and deputy director of product discovery at MassBiologics of UMass Chan Medical School, leads a team of scientists working to discover and develop antibody-based medicines for infectious diseases and to understand drug resistance in those medicines.

"The world is full of viruses that can cause human disease," said Dr.

Wang. "Some of them are well known, such as the flu virus, while others are new, such as SARS-CoV-2, the virus that can cause COVID-19."

"Many viruses can be attacked naturally by the immune system so that we don't get sick," Wang said. "Other times, we take medicines to reduce the symptoms or destroy the virus. Some of these medicines are based on antibodies."

Wang explains that antibodies are proteins that the immune system naturally makes to fight a virus and those that are made in a laboratory can also be used as a treatment to limit the amount of virus in the body; these are called antibody-based antiviral medicines. Wang used COVID-19 as an example.

"The anti-COVID antibody was designed to attach to a protein on the surface of the virus called the spike protein. Antibodies designed for the spike protein may block the virus from attaching to cells, making it more difficult to reproduce and causing harm in the human body," Wang said.

Viruses are uniquely experts at changing their structure to adapt to their new environment, according to Wang. These changes can happen quickly and frequently allow the virus to reproduce and make new copies of itself. The virus could then overcome the natural immune system or become resistant to treatment.

"Of course, we want our antibody medicine to keep the virus at bay," Wang said.

The approach Wang and her team use to combat resistance is to combine several antibodies to create an antibody cocktail. Each antibody in the cocktail connects to its own specific site on the virus. If the virus changes, the other antibodies can still attach to the virus and keep it from infecting human cells.

"In this case, our antiviral medicine will still work even with the new virus variants," Wang said.

To successfully design this type of medicine, Wang works with a team of scientists that includes immunologists, structural biologists, chemists and physicians.

Using libraries of antibodies, the scientists select neutralizing antibodies that bind to different areas of the virus. Once a new cocktail is formulated, it is evaluated by physicians in human clinical trials.

"This approach can be used to resolve drug resistance for antibody-based antiviral medicines," Wang said.

Provided by University of Massachusetts Medical School

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