

COVID-19 Drug Research

Zhang tests defensins' potential in COVID-19 treatment

■ MEDICAL AND HEALTH SCIENCES

▲ INVENTION/DISCOVERY

Liqun Zhang, assistant professor in the department of chemical engineering at Tennessee Tech University, has spent most of her academic career researching human beta defensins. Defensins are small proteins, categorized as host defense or antimicrobial peptides, that serve as part of the human immune response and help in defense against infections. Zhang's lab has spent the last five years studying beta defensins' ability to kill viruses and bacteria.

As the COVID-19 virus became widespread in the United States early in 2020, Zhang questioned how the virus would correlate with her study of beta defensins. She reached out to her former colleagues at Case Western Reserve University, where Zhang was a postdoctoral research associate, and began to run preliminary simulations in her lab. Zhang quickly realized the increasing volume of work would require additional resources, such as high performance computing (HPC), to complete.

During her time at Case Western Reserve, Zhang was introduced to the Ohio Supercomputer Center (OSC). Zhang recognized that its capabilities and COVID-19 provisions would be a perfect match for the caliber of research she was hoping to complete. After teaming up with the Center and receiving a grant from Case Western Reserve for her research project, Zhang and her team began running molecular dynamics simulations to study possible roles beta defensins could play in combating the coronavirus.

"Without the subsidized resources from OSC on our COVID-19 project, we wouldn't have been able to do as much. We wouldn't have been so efficient," Zhang said.

Because of the preliminary findings that Zhang's lab has completed, her team has applied for several more grants to continue to work on designing beta

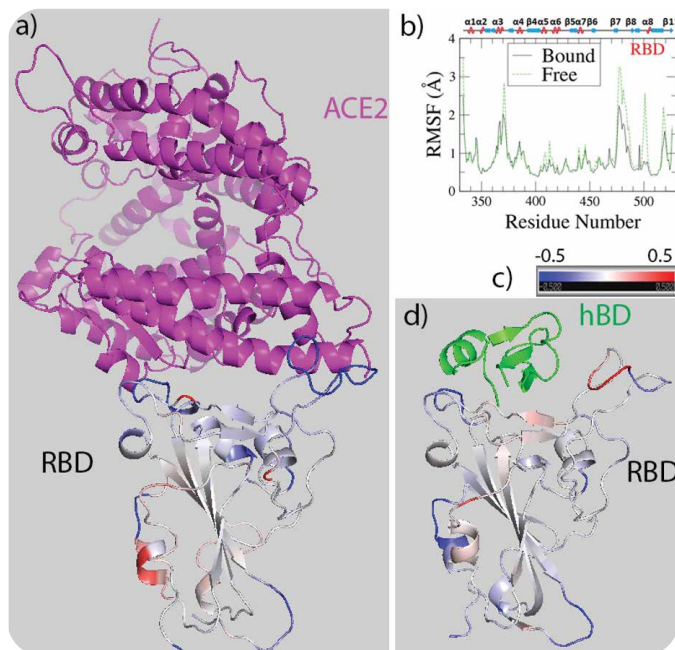


Photo: Liqun Zhang's lab group pictured on Tennessee Tech University's campus.; Figure: Pictured are simulations Zhang's lab has generated in their research of human beta defensins and how they bind to the receptor binding domain on the spike protein of COVID-19.

defensin-based peptides that could be used in drugs to fight the coronavirus.

"Because defensin is secreted from the human immune system, if we were to use it in a drug for COVID-19 it would not cause as many side effects and would be more compatible with the human body," Zhang said. •

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Title: Novel Endogenous Beta Defensin Based Therapeutics to Treat COVID-19 Patients

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Website: ntech.edu/directory/engineering/faculty/liqun-zhang.php