New published study identifies potential COVID-19 treatment

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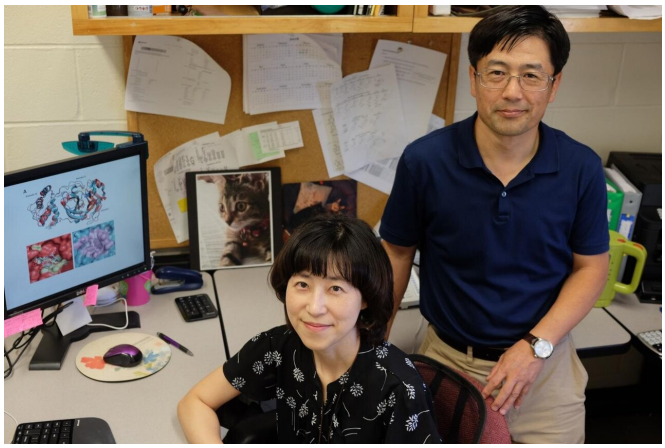

Kansas State University College of Veterinary Medicine virologists Yunjeong Kim, front, and Kyeong-Ok "KC" Chang have joined collaborators at Wichita State University, University of Iowa and University of Kansas in publishing a study on a possible therapeutic treatment for COVID-19. Credit: Kansas State University

Yunjeong Kim and Kyeong-Ok "KC" Chang, virologists in the College of Veterinary Medicine at Kansas State University, have published a study showing a possible therapeutic treatment for COVID-19.

Pathogenic coronaviruses are a major threat to global public health, as shown by severe acute respiratory syndrome coronavirus, or SARS-CoV; Middle East respiratory syndrome coronavirus, known as MERS-CoV; and the newly emerged SARS-CoV-2, the virus that causes COVID-19 infection.

The study, "3C-like protease inhibitors block coronavirus replication in vitro and improve survival in MERS-CoV-infected mice," appears in the Aug. 3 issue of the prestigious medical journal *Science Translational Medicine*. It reveals how small molecule protease inhibitors show potency against human coronaviruses. These coronavirus 3C-like proteases, known as 3CLpro, are strong therapeutic targets because they play vital roles in coronavirus replication.

"Vaccine developments and treatments are the biggest targets in COVID-19 research, and treatment is really key," said Chang, professor of diagnostic medicine and pathobiology. "This paper describes protease inhibitors targeting coronavirus 3CLpro, which is a well-known therapeutic target."

The study demonstrates that this series of optimized coronavirus 3CLpro inhibitors blocked replication of the human coronaviruses MERS-CoV and SARS-CoV-2 in cultured cells and in a mouse model for MERS. These findings suggest that this series of compounds should be investigated further as a potential therapeutic for human coronavirus infection.

Chang and Kim have been using National Institutes of Health grants to develop antiviral drugs to treat MERS and human norovirus infections. Their work extends to other human viruses such as rhinoviruses and SARS-CoV-2.

"The work that this group of collaborators has been doing on antivirals and inhibitors for SARS and MERS at K-State for a number of years has been vital to their ability to quickly pivot to emphasize research on SARS-CoV-2 virus and therapeutics," said Peter K. Dorhout, vice president for research at K-State.

Co-collaborators on the research include teams lead by Bill Groutas at Wichita State University, Stanley Perlman at the University of Iowa and Scott Lovell at the University of Kansas.

"Drs. Groutas, Perlman and Lovell brought decades of experience to our research team," Chang said. "We would not have been able to come this far without important collaborations with our colleagues

at other institutions."

"Getting things published right now is very important for the scientific community," Kim said. "I think we are adding valuable information to the antiviral field."

More information: "3C-like protease inhibitors block coronavirus replication in vitro and improve survival in MERS-CoV-infected mice," *Science Translational Medicine* (2020). DOI: 10.1126/scitranslmed.abc5332 , stm.sciencemag.org/content/ear … scitranslmed.abc5332

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