Drug Repurposing Screens Reveal Nine Potential New COVID-19 Treatments

PASADENA, CALIFORNIA, UNITED STATES, April 12, 2021 /EINPresswire.com/ -- Coronaviruses represent a large group of medically relevant viruses that were historically associated with the common cold. However, in recent years, members of the coronavirus family have emerged from animal reservoirs into humans and have caused novel diseases. Although SARS was in the end eradicated, MERS continues to cause infections in the Middle East. Beginning in December 2019, SARS-CoV-2 created a worldwide pandemic.

Identification of broadly acting SARS-CoV-2 antivirals is essential to clinically address SARS-CoV-2 infections. A potential route to candidate antivirals is through the deployment of drugs that show activity against related viruses. Previous studies found that the antiviral drug remdesivir, which was developed against the RNA-dependent RNA polymerase of Ebola virus, was also active against SARS-CoV-2 in vitro, with promising results in clinical trials. Recently a team led by scientists in the Perelman School of Medicine at the University of Pennsylvania has identified nine potential new COVID-19 treatments, including three that are already approved by the Food and Drug Administration (FDA) for treating other diseases.

The research team developed a specific and sensitive assay to quantify viral infection using a cell-based high-content approach. They screened thousands of existing drugs and drug-like molecules for their ability to inhibit the replication of SARS-CoV-2. The screens tested the molecules for anti-coronaviral activity in a variety of cell types, including human airway-lining cells that are similar to the ones principally affected in COVID-19.

Of the nine drugs found to reduce SARS-CoV-2 replication in respiratory cells, three already have FDA approval: the transplant-rejection drug cyclosporine, the cancer drug dacomitinib, and the antibiotic salinomycin. These could be rapidly tested in human volunteers and COVID-19 patients. The experiments also shed light on key processes the coronavirus uses to infect different cells and found that the antiviral drug remdesivir, which has an FDA Emergency Use Authorization for treating COVID-19, does appear to work against the virus in cell-culture tests on

respiratory cells, whereas hydroxychloroquine does not.

The study highlights cyclosporine as particularly promising, as it appears to works against SARS-CoV-2 in respiratory and non-respiratory cells, and via two distinct mechanisms: inhibiting cell enzymes called cyclophilins, which the coronavirus hijacks to support itself, and suppressing the potentially lethal inflammation of severe COVID-19.

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