VCU Innovation Gateway
Office of the Vice President for Research and Innovation

Enveloped Virus Inhibitor

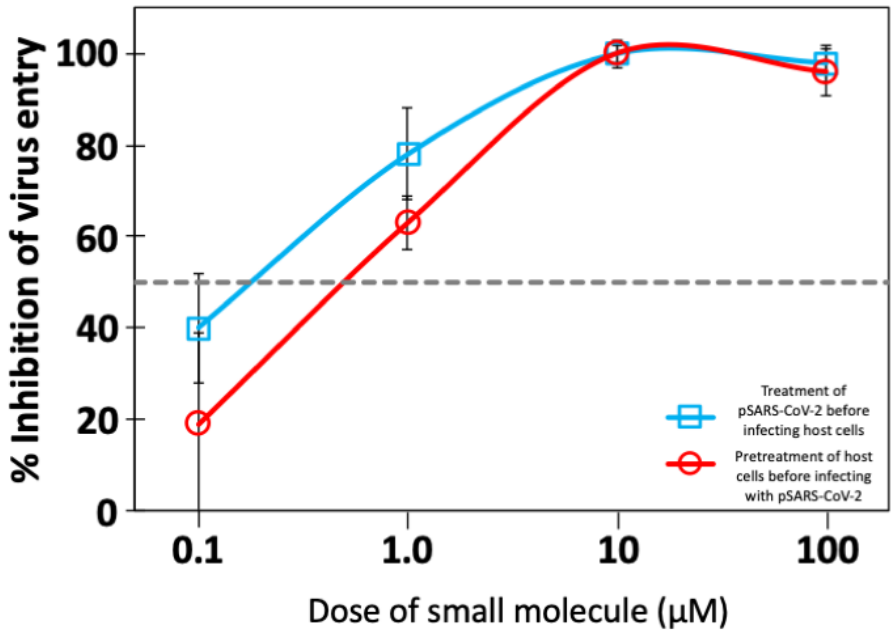
A synthetic, small molecule for the treatment of enveloped viruses like SARS-CoV-2

COVID-19 is the most recent global pandemic caused by SARS-CoV-2, an enveloped virus. In addition to SARS-CoV-2, many viruses have a cellular membrane envelope surrounding their nuclear material, including HIV, CMV, Dengue, and hepatitis. Viral envelops contain key viral glycoproteins that help entry into host cells, increase infectivity and enhance virus spread. The current treatment options against enveloped viruses are limited; reliance is on supportive care to manage symptoms until the host immune system is able to generate its own antibodies. There is a strong clinical need for alternative treatments that can be tailored to target viral glycoproteins of each virus and halt infection in its early phase.

The technology

The SARS-CoV-2's method of action requires the binding of a Spike glycoprotein (SgP) to ACE-2 receptors found on the cellular membrane of the host organism. The current literature shows that this process of virus fusion to host is also mediated by heparan sulfate proteoglycans (HSPGs) that capture and stabilize the virus in order to hijack cellular transport mechanisms and move into the cell. This mechanism is not isolated to SARS-CoV-2 virus and has been shown to be similar with other enveloped viruses.

VCU researchers have developed a unique compound that possesses high affinity for one of the SpG binding domains, which play a role in the entry of SARS-CoV-2 into human host cells. The presence of this compound interferes with SgP recognition of ACE-2 on human host cells, thereby reducing viral infectivity. This profile is associated with positive pharmacological effects in a variety of in vitro efficacy experiments involving cell-to-cell fusion and viral entry using pseudo SARS-CoV-2. Overall, this drug is a potential candidate for COVID-19 treatment and a variety of related enveloped viruses that utilize HSPG receptors in their life cycle. Alternatively, this drug is a highly promising pan-enveloped virus agent.



Benefits

- Potent inhibition of viral fusion
- Sub micromolar doses

Applications

- Cytomegalovirus
- Herpes simplex virus
- Dengue virus
- Hepatitis B, C, E viruses
- SARS-CoV-2
- Coronaviruses

Patent status:
Patent pending: U.S. and foreign rights are available.

License status:
This technology is available for licensing to industry for further development and commercialization.

Category:
Biomedical

VCU Tech #:
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External resources:
Elste et al. 2020

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