Medical Xpress

Study finds enzyme inhibitors suppress herpes simplex virus replication

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Research authors John E. Tavis, Ph.D., and Lynda A. Morrison, Ph.D., are professors of Molecular Microbiology and Immunology at Saint Louis University. Credit: Maggie Rotermund

Saint Louis University research findings published in the December issue of *Antimicrobial Agents and Chemotherapy* report a family of

molecules known as nucleotidyltransferase superfamily (NTS) enzyme inhibitors are promising candidates for new herpes virus treatments.

The findings could lead to new treatment options for herpes that patients can use in conjunction with or instead of currently approved anti-viral medications like Acyclovir. Researcher Lynda A. Morrison Ph.D., professor of Molecular Microbiology and Immunology at Saint Louis University, likened a combination of treatments for herpes to a cocktail of medications HIV patients take.

"Acyclovir does a good job in suppressing the virus," Morrison said. "But because NTS inhibitors work by a different mechanism than currently approved drugs, we have the potential to have a drug that would work in combination with drugs that are already available to completely suppress the virus."

Lead author John E. Tavis, Ph.D., professor of Molecular Microbiology and Immunology at Saint Louis University, noted the findings, which first appeared online in September, have already received interest from pharmacology firms.

"Within a decade or so, we could have therapies that reasonably improve patient outcomes," Tavis said. "Improved outcomes could range from shorter duration of nuisance outbreaks (including cold sores) to a better treatment for herpetic encephalitis."

Herpes simplex virus (HSV)encephalitis is thought to occur from direct transmission of the virus to the brain via the nerves that transmit one's sense of sight or facial motor functions like chewing or biting.

The study's authors note that more than half of all Americans are impacted by cold sores (HSV-1) and 20 percent suffer from genital herpes (HSV-2). Herpes can be passed from mother to child during

childbirth posing serious health risks to both the baby and the new mother. HSV-2 also increases the risk of human immunodeficiency virus (HIV) acquisition.

The research team at Saint Louis University investigated whether inhibitors of NTS enzymes would suppress replication of HSV-1 and HSV-2. The inhibitors suppressed accumulation of viral genomes and infectious particles and blocked events in the viral replication cycle before and during viral DNA replication.

Five of six NTS inhibitors of the HSVs also blocked replication of another herpes virus pathogen, human cytomegalovirus.

Tavis added that the team is now focused on expanding their original small scale study to identify the exact mechanisms by which each inhibitor suppresses virus replication. He noted that one compound has already proven effective in animals and another is found in a topical antifungal already FDA approved for use.

Researchers will also look at the evolution of the virus as it interacts with the inhibitors identified in the study.

"The hope is that it evolves really slowly," Tavis said. "That gives us a better chance at something that can work for a long time without allowing the virus to mutate as rapidly as currently approved treatments do."

Current treatment of herpes infections relies primarily on nucleoside analog inhibitors of the viral DNA polymerase, according to the article. Several newer agents are in clinical development, but none of them have been shown to fully suppress herpes infections.

More information: *Antimicrobial Agents and Chemotherapy*,