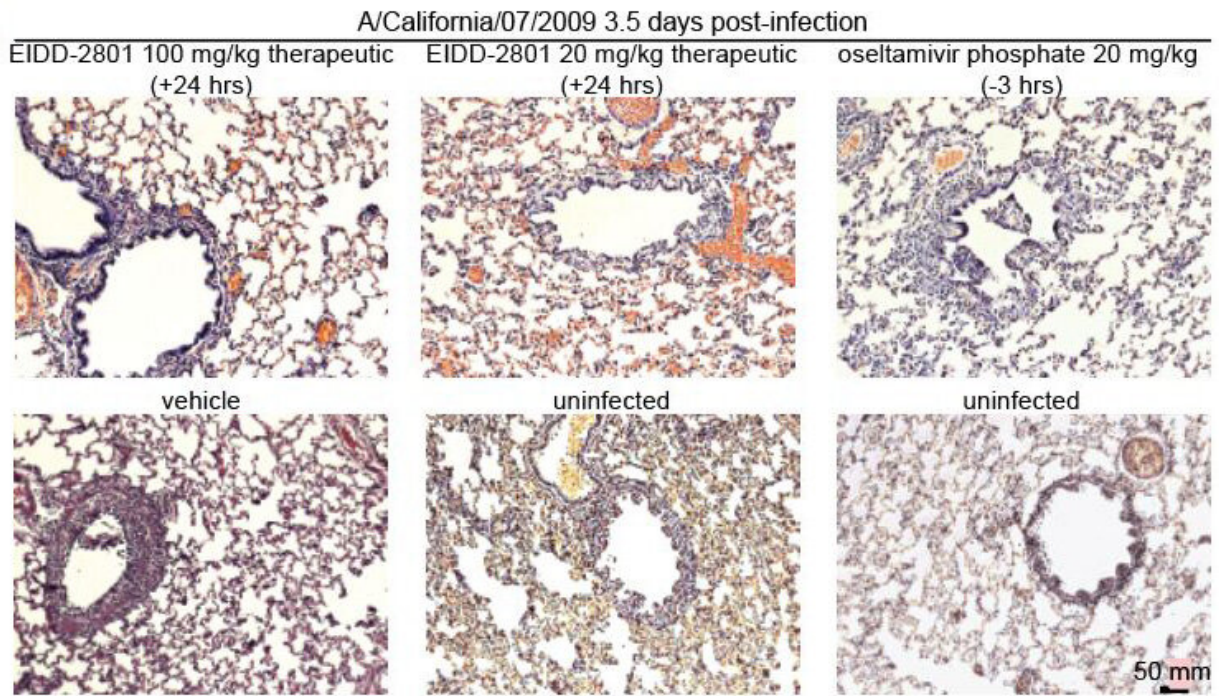


Researchers identify new antiviral drug effectively treats influenza infection

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The researchers created an experimental anti-influenza drug named EIDD-2801, which better reduced airway inflammation compared to the antiviral oseltamivir in a ferret model. Credit: M. Toots et al., *Science Translational Medicine* (2019)

A new antiviral drug that induces mutations in the genetic material of influenza virus is highly effective in treating influenza infection in animals and human airway tissue and could be a groundbreaking advance in influenza therapy, according to a study by the Institute for Biomedical

Sciences at Georgia State University.

The antiviral [drug](#) blocks RNA polymerase, the enzyme that plays a central role in replicating the genome of influenza [virus](#), causing mutations in the [viral genome](#). If enough mutations occur, the genome becomes nonfunctional and the virus cannot replicate. The findings were published online on Oct. 23 in *Science Translational Medicine*.

"The compound is highly efficacious against influenza," said Dr. Richard Plemper, senior author of the study and a professor in the Institute for Biomedical Sciences. "It's orally available, it's [broad spectrum](#) against all influenza virus strains tested, and most important it establishes a high barrier against viral escape from inhibition."

Influenza, caused by a contagious respiratory virus, is characterized by fever, cough, headache, muscle and joint pain, severe malaise, sore throat and sometimes gastrointestinal symptoms. Patients in higher risk groups, such as older adults and individuals with compromised immune systems, frequently require hospitalization. Each year, seasonal influenza results in 30,000 to 80,000 fatalities in the United States. The seasonal flu vaccine is only moderately effective, and licensed antivirals are compromised by rapidly emerging viral resistance to the drugs.

In the study, the new antiviral drug was tested in ferrets, the most informative animal model for human influenza disease, against various strains that include seasonal and pandemic viruses, such as the swine-origin influenza virus responsible for a 2009 pandemic. The researchers found that the antiviral drug efficiently inhibited replication of all of these strains. Virus burden dropped rapidly after treatment, and the duration of fever was significantly shorter in treated ferrets than in control animals that did not receive the drug.

"We think that the next generation of influenza antiviral drugs must not

only be efficacious and safe, but also address the resistance problem," said Dr. Mart Toots, first author of the study and a research assistant professor associated with Dr. Plemper's lab in the Institute for Biomedical Sciences.

That is where the new drug comes in. Through a combination of conventional and ultra-deep sequencing, Toots has demonstrated in collaboration with Dr. Alex Greninger at the University of Washington that it is very challenging for the virus to find a viable way to avoid the compound.

"We have not identified specific resistance mutations yet and are confident to say that the genetic barrier against viral resistance is high," Plemper said. "We believe that this compound has high clinical potential as a next-generation [influenza](#) drug that combines key antiviral features."

More information: M. Toots et al., "Characterization of orally efficacious influenza drug with high resistance barrier in ferrets and human airway epithelia," *Science Translational Medicine* (2019). stm.sciencemag.org/lookup/doi/10.1126/scitranslmed.aax5866

Provided by Georgia State University

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