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Researchers approaching universal treatment for all strains of influenza

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Researchers at Mount Sinai School of Medicine have discovered a novel component of the influenza virus that may be the key to disabling the virus's ability to replicate itself and to developing a universal anti-viral treatment. The findings were published June 1 online in *Proceedings of the National Academy of Sciences*.

The influenza A virus is encoded by eight individual single-stranded segments of RNA. Each segment must serve as the material for both making protein and new segments, processes called transcription and replication. As each strand must perform both functions, it is imperative that the virus prioritize these processes, starting with transcription and then switching to replication.

Mount Sinai researchers have, for the first time, identified a small-viral RNA (svRNA), derived from the virus, that is integral to the switch from transcription to replication. Inhibiting svRNA from making this switch would stymie replication and thus slow or halt the spread of the virus. Because segment ends and replication strategies used for influenza B and C are similar to those of influenza A, this discovery can lead to a universal treatment for people suffering from the disease. It would also be effective against the H1N1 swine flu virus.

"The implications of this study are very exciting," said Benjamin tenOever, PhD, Assistant Professor of Microbiology at Mount Sinai School of Medicine and corresponding author of the study. "While each segment encodes different viral products, the svRNAs remain consistent,

both between segments and across viral strains. If we can block the availability of svRNA we can inhibit the switch to replication, thereby stopping viral spread. As an added bonus, if the virus remains stuck in transcription, it will continue to produce proteins, ultimately strengthening the antibody response."

The small RNA component was originally identified through a process called deep sequencing. This revolutionary new technique allows scientists to obtain millions of small RNAs from cells in a completely unbiased fashion. The technique was applied to lung cells infected with influenza A virus and ultimately led to the discovery of the first small RNA component ever identified from this family of viruses.

"Questions remain about exactly how the svRNAs function," said Dr. tenOever. "We're also hoping to engineer a means of delivering RNA-based antagonists into the body's system as a means of inhibiting svRNA function. We're still a few years off from solving the entire puzzle. However, by finding this one piece, a universal treatment for all strains of influenza is within reach of becoming a reality."

Provided by The Mount Sinai Hospital

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