

## Improved Live Attenuated Flu Vaccine

Novel methodologies to engineer an improved and a more effective live attenuated flu vaccine.

### Problem Solved by this Technology

Current flu vaccinations (injection-based inactivated influenza virus and recombinant influenza virus vaccines) are suboptimal as they generate limited cellular-mediated immune responses. Additionally, particularly vulnerable cohort such as young children, pregnant women, and individuals with compromised immune system cannot receive these vaccines. Live attenuated influenza vaccine (LAIV), also known as nasal spray, is considered better for these populations due to its mode of administration and greater efficacy in eliciting robust cell-mediated and humoral immune responses. However, recent epidemiological data showed relatively lower effectiveness of existing LAIV from 2013 through 2016 prompting CDC to not recommend it for the 2016-2017 flu season.

### Applications of this Technology

Researchers at the University of Rochester sought to improve the fidelity and immunogenicity of LAIV, while alleviating the safety concerns of using LAIV in these groups. In one approach, the researchers used reverse genetics to create recombinant virus with modified M, NS virus segments that exhibited slower growth kinetics making it safer and, more importantly, demonstrated that a single intranasal immunization with this virus conferred complete protection against lethal challenge with wild-type influenza in mice. In another approach, researchers found a point mutation that increases the safety of the existing live vaccine 10,000-fold and has a novel mechanism of action of altering segmental expression. A third approach increases the fidelity of the viral polymerase to increase the safety of the vaccine. Recombinant influenza viruses generated using these approaches could be implemented as a safer and a better LAIV that can potentially replace the existing ineffective LAIV.

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### Intellectual Property Status

U.S. Provisional Application  
*"Rearrangement of Influenza Virus M and NS Segments for the Development of Live Attenuated Vaccines and Uses Thereof"* filed on 20 April 2016.

International Patent Application  
*"Methods and Compositions Related to Increasing the Fidelity of Influenza A virus for a Vaccine Development"* filed on 14 July 2016.

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