



## Mutations That Improve Genetic Stability of Influenza Virus for Vaccination, Gene Therapy & More

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**WARF: P140264US02**

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**The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing novel mutations and methods of using them to enhance the stability of recombinant influenza virus, making it better suited for use in research, vaccines and gene therapy.**

### Overview

The influenza virus is a highly contagious respiratory pathogen that causes annual epidemics and occasional pandemics. Although many studies have looked at how a host responds to infection with the virus, the mechanisms of influenza virus-induced pathology are not yet fully understood. To analyze the immune response *in vivo*, viruses that express a fluorescent reporter protein have been created, but such viruses are significantly attenuated and the reporter gene is not stably maintained.

Influenza viruses also show strong potential as vaccine and gene delivery vectors. However, the influenza virus genome is so small that even relatively modest (~1 kb) fragments of foreign genes are unstable.

### The Invention

UW-Madison researchers have identified mutations in influenza virus gene segments that increase the stability and/or replication of the virus, particularly virus that contains a heterologous gene sequence. The mutations are found in the PA, PB1, PB2, NS and HA segments.

Recombinant influenza virus with one or more stabilizing mutations may be used as a vector for vaccines or gene delivery. In addition, the mutations allow influenza virus to stably maintain fluorescent reporter genes, making it possible to visualize the *in vivo*.

### Applications

- Gene therapy
- Vaccines
- Research on influenza virus infection

### Key Benefits

- Enhances stability and/or replication of influenza virus
- Enables additional uses for recombinant influenza virus
- Should be effective for influenza virus with any combination of hemagglutinin (HA) and neuraminidase (NA)

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Stage of Development

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Stability, replication and virulence of influenza virus containing one or more of the mutations have been demonstrated *in vitro* and *in vivo* by intranasal inoculation in murine lung models.

## Additional Information

### Related Technologies

- [WARF reference number P99264US describes the use of recombinant influenza viruses for use in gene therapy and vaccine development.](#)

### Publications

- Hanson H., Imai M., Hatta M., McBride R., Imai H., Taft A., Zhong G., Watanabe T., Suzuki Y., Neumann G., Paulson J. C. and Kawaoka Y. 2016. Identification of Stabilizing Mutations in an H5 Hemagglutinin Influenza Virus Protein. J. Virol. 90, 2981-2992.

### Tech Fields

- [Therapeutics & Vaccines : Vaccines](#)

For current licensing status, please contact Jennifer Gottwald at [jennifer@warf.org](mailto:jennifer@warf.org) or 608-960-9854

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