Research Tools

Bioluminescent Influenza Virions for High Throughput Screening

WARF: P160304US01

Inventors: Andrew Mehle

The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing influenza virions that can be rapidly quantified using standard luciferase assays.

Overview

Assays currently used to detect neutralizing antibodies to influenza virus or measure virion binding to cells, antibodies or receptors require multiple steps. These steps are destructive, low sensitivity and prevent pairing attachment assays with normal infections.

The Invention

A UW–Madison researcher has developed a highly sensitive influenza reporter virus suitable for high throughput assays and *in vivo* imaging. Moreover, this version of the reporter virus produces bioluminescent virions that can be used to quantitate virion production and virion binding to antibodies, target cells or synthetic receptors. These bioluminescent virions are also ideally suited to rapidly test for the presence of neutralizing antibodies resulting from natural infection or vaccination.

The virus was engineered to express the reporter gene (NanoLuc) and to package copies of the NanoLuc protein into virions, making them bioluminescent. This approach is portable and has been applied to multiple influenza A and B virus strains.

Applications

- Quantification of virus progeny
- High-throughput quantification of virion binding to cells, receptors or antibodies
- Rapid detection of neutralizing antibodies in microneutralization assays

Key Benefits

- Enables rapid quantitation using off-the-shelf luciferase assays
- Ideally suited to measure binding kinetics to cells/synthetic viral receptors
- Excellent tool for assessing therapies that block virion attachment
- As the particles are bioluminescent, quantitation can be performed in the absence of infection or gene expression.

Stage of Development

The virus stably maintains the NanoLuc reporter gene and replicates with near wild type kinetics in culture. Bioluminescent virions have been produced and used to quantitate virion attachment and entry.

Additional Information

For More Information About the Invention

- Andrew Mehle

Related Technologies

- For more information about influenza reporter viruses for real-time *in vivo* imaging, see WARF reference numbers:
- P130288US01
- P160032US01

Publications

- Tran V., Poole D.S., Jeffrey J.J., Sheahan T.P., Creech D., Yevtodiyenko A., Peat A.J., Francis K.P., You S. and Mehle A. 2015. Multi-Modal Imaging with a Toolbox of Influenza A Reporter Viruses. Viruses, 7, 5319-5327.
- Tran V., Moser L.A., Poole D.S., et al. 2013. Highly Sensitive Real-Time In Vivo Imaging of an Influenza Reporter Virus Reveals Dynamics of Replication and Spread. J. Virol. 87, 13321–13329.
- Karlsson E.A., Hertz T., Johnson C., et al. 2016. Obesity Outweighs Protection Conferred by Adjuvanted Influenza. mBio. 7, e01144-16.
- Karlsson E.A., Meliopoulos V.A., Savage C., et al. 2015. Visualizing Real-Time Influenza Virus Infection, Transmission and Protection in Ferrets. Nat. Commun. 6, 6378.

Tech Fields

- Research Tools : Detection

For current licensing status, please contact Jennifer Gottwald at jennifer@warf.org or 608-960-9854