Therapeutics & Vaccines

Neuraminidase-Deficient Live Influenza Vaccine

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WARF: P07044US

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The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing a modified influenza virus that could be used to produce safe but highly effective vaccines.

Overview

Influenza infects up to 20 percent of the world's population every year, causing 500,000 deaths and costing tens of billions of dollars in medical expenses. Influenza A virus, which causes pandemics in humans, possesses two surface spike proteins called hemagglutinin (HA) and neuraminidase (NA) that are critical for infection and replication. Point mutations in these proteins allow the virus to evade the human immune response and provoke seasonal outbreaks.

Two general types of influenza vaccines are available: inactivated and live attenuated vaccines. Inactivated vaccines are safe but not always effective, especially among children and the elderly. In contrast, live attenuated influenza vaccines (LAIVs) are stronger and more efficacious. LAIVs also are more controversial because they involve living virus which is shed by the patient for several weeks. The virus contains mutations so that is can replicate but is not supposed to be virulent (i.e., cause flu). The safety of such vaccines varies.

The Invention

UW–Madison researchers have developed a modified influenza virus that is infectious but completely avirulent. The virus can be used to prepare live attenuated virus stock for vaccines.

The virus was created by reverse genetics and lacks an NA gene segment necessary for functional sialidase activity. For this reason the seven-segment virus is innocuous but can still infect animals to induce the appropriate humoral and cellular immune responses.

Applications

- Generating live attenuated influenza vaccines
- The NA-deficient virus can be used as a gene therapy vector.

Key Benefits

- Safe and highly efficacious
- LAIVS are easier and more patient-friendly to administer.
- NA-deficient virus combines several attractive features
  - High levels of attenuation
  - Easy to generate by reverse genetics
  - Biosafety, because the virus can't revert to the wild-type phenotype

Stage of Development

Promising results have been demonstrated in mice.

Additional Information

Related Technologies

- WARF reference number P99264US describes the researcher's reverse genetics method to efficiently generate fully constructed, artificial influenza virus.
- WARF reference number P09022US02 describes attenuated influenza virus strains with mutations in the influenza A virus nuclear export protein.

Tech Fields

- Therapeutics & Vaccines : Vaccines

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