Improved Reverse Genetics Method to Produce Influenza Virus

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The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in improved materials and methods for producing influenza virus for vaccine production.

OVERVIEW

Influenza causes hundreds of thousands of deaths worldwide every year. Two of the genes critical for influenza virus infection are haemagglutinin (HA) and neuraminidase (NA). HA and NA are on the surface of the virus, and are therefore targets for vaccination.

Because classical reassortment methods for producing influenza vaccine are time-consuming and cumbersome, the inventors developed a new method that utilizes “reverse genetics” (see WARF reference number P99264US). For vaccine production, eight plasmids containing the HA and NA genes from circulating or pathogenic influenza strains and six genes from a “harmless” master strain, along with additional plasmids encoding proteins necessary for replication and transcription, are transfected into cell lines. Virus can then be harvested from these cells for the production of inactivated or live attenuated vaccine.

Although this method is faster and more efficient than the classic reassortment method, it requires transfecting cells with 12 plasmids.

THE INVENTION

UW-Madison researchers have developed a set of one to four plasmids that contain all sequences necessary for influenza virus generation. For the efficient production of vaccine, one plasmid might contain cDNAs for the HA and NA genes, while a second plasmid is used for the remaining viral segments. The viral proteins required for influenza virus production are then provided from two additional plasmids.

With this approach, only one plasmid (the one encoding HA and NA) has to be updated annually. Using fewer plasmids increases the efficiency of virus production in cell lines that cannot be transfected efficiently. Vaccine viruses can be generated more quickly, which would be especially important in responding to a pandemic.
APPLICATIONS

• Influenza vaccines

KEY BENEFITS

• Reduces the number of plasmids required for transfection from 12 to one to four
• Increases the rescue efficiency of virus from cell lines with low transfection efficiency
• Enables more consistent generation of influenza virus for vaccine production
• Reduces FDA regulatory issues regarding plasmid history, purity and toxicity
• Applicable to any negative sense RNA virus, including members of the Arena and Bunyaviridae families

ADDITIONAL INFORMATION

Related Technologies
For more information on the inventors’ original reverse genetics system for producing influenza virus, see WARF reference number P99264US.

Publications

Tech Fields
Pharmaceuticals & Vitamin D - Vaccines

CONTACT INFORMATION

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