



A 'Humanized' MDCK Cell Line For the Efficient Isolation and Amplification of Seasonal Human Influenza Viruses

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The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in a new cell line that supports efficient isolation and amplification of human influenza viruses.

Overview

Most influenza vaccines are produced in embryonated chicken eggs, but increasingly influenza vaccines are produced in other systems. MDCK (Madin-Darby Canine Kidney) cells are one of two mammalian cell lines that have been approved for influenza vaccine production, and rate better than other cell lines for influenza virus production on many criteria. However, seasonal human influenza viruses often replicate inefficiently in MDCK cells.

The Invention

UW-Madison researchers and collaborators have created the new cell line (termed 'hCK' for 'humanized MDCK' cells) by using CRISPR/Cas-mediated gene knock-out methods to down-regulate sialyltransferases that catalyze the synthesis of alpha-2,3-linked sialic acids (to which human influenza viruses do not bind efficiently) in MDCK cells; they also overexpressed a sialyltransferase that catalyzes the synthesis of alpha-2,6-linked sialic acids. The resulting MDCK cells express low levels of alpha-2,3-linked sialic acids and high levels of alpha-2,6-linked sialic acids (similar to human epithelial cells in the upper respiratory tract). hCK allows isolation of H3N2 human influenza viruses 10-100 better than the AX-4 cell line, a prior modified MDCK cell line that overexpress the human β -galactosidase α 2,6-sialyltransferase I (ST6Gal I) gene to improve growth of human influenza viruses, and therefore is potentially good for vaccine production (possibly supporting better replication).

Applications

- Cell line for production of influenza vaccines
- Cell line for purifying influenza virus from clinical samples at clinical labs

Key Benefits

- The novel hCK cell line supports more efficient isolation and amplification of human influenza viruses compared to MDCK and AX-4 cells

Stage of Development

The researchers have made and thoroughly tested the cell line.

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