Methods To Suppress Viral Infection Of Mammalian Cells

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BACKGROUND

To meet the ever-growing demand for effective, safe, and affordable protein therapeutics, decades of intense efforts have aimed to maximize the quantity and quality of recombinant proteins produced in Chinese hamster ovary (CHO) cells. CHO cells are extensively used to produce biopharmaceuticals and one advantage is their reduced susceptibility to many human virus families. However, there have been a few episodes of animal viral contamination of biopharmaceutical production runs, mostly from trace levels of viruses in raw materials. These infections more often caused by RNA viruses have led to expensive decontamination efforts and threatened the supply of critical drugs. Viral contamination in biopharmaceutical manufacturing can lead to shortages in the supply of critical therapeutics. Therefore there is a need to understand the mechanisms by which CHO cells are infected and how the cells can be universally engineered to enhance their viral resistance.

TECHNOLOGY DESCRIPTION

Researchers at UC San Diego have discovered which key cell regulators contribute to the inhibition of RNA virus replication in CHO cell lines. This was accomplished by evaluating the response of CHO cells to infection by three different RNA viruses including Vesicular stomatitis virus (VSV), Encephalomyocarditis virus (EMCV), Reovirus 3 (Reo) and monitoring for cytopathic effects and gene expression changes related to the type I IFN response. Researchers have shown that they can engineer CHO cells that exhibited increased resistance to RNA virus when knocking out two key repressors of a key molecule in a T cell mediated anti-viral pathway.

APPLICATIONS

The identified genes can be knocked out in mammalian cells to protect CHO cells from viral RNA infection thereby increasing the safety in biotherapeutic protein production.

STATE OF DEVELOPMENT

Researchers have developed CHO cells that are resistant to RNA viruses (a class of particularly concerning viruses due to their potential for long term stable infection and deposition of viral particles into drug products).

INTELLECTUAL PROPERTY INFO

This technology is patent pending and available for licensing and/or research sponsorship.

RELATED MATERIALS

▶ Chiang, A.W.T., Li, S., Kellman, B.P., Chattopadhyay, G., Zhang, Y., Kuo, C.C., Gutierrez, J.M., Ghazi, F., Schmeisser, H., Menard, P., Bjorn, S.P., Voldborg, B.G., Rosenberg, A.S., Puig, M., Lewis, N.E. Combating viral contaminants in CHO cells by engineering STAT1 mediated innate immunity. bioRxiv, (2018). DOI: 10.1101/423590 - 09/21/2018

PATENT STATUS

Patent Pending

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OTHER INFORMATION

KEYWORDS

Viral infection, CHO cells, RNA viruses, mammalian cell culture, biotherapeutic protein production, recombinant proteins, transformed cell lines

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