Novel Cell Line for Hepatitis B Drug Discovery and Research

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Technology description

Researchers in the Department of Molecular Biology at Princeton University have developed a novel cell line that is susceptible to hepatitis B and delta infections (HBV, HDV). This cell culture system will allow the viruses and the host factors that modulate the viral life cycles to be studied. Functional screens can be conducted to identify small molecule and/or biological inhibitors, which will ultimately lead to developing a curative agent for HBV and HDV.

Worldwide, there are about 400 million individuals chronically infected with hepatitis B virus, and of those individuals, 20 million are co-infected with HDV. HDV is a small RNA virus that uses the HBV envelope to form infectious virions. Infected individuals are at risk of developing severe liver disease or hepatocellular carcinoma (HCC). While a prophylactic HBV vaccine and treatments to suppress viremia exist, there is currently no cure for these viral infections. The incidence of hepatocellular carcinoma is increasing, and it is currently the fifth leading cause of cancer-related death worldwide. One main reason no cure has been developed is that there are currently no available laboratory cell lines that are permissive to HBV infection.

Key Words

Hepatitis B and D virus, cell line, viral life cycle, antiviral therapy, hepatocellular carcinoma

Dr. Ploss’ s research focuses on immune responses and pathogenesis to human infectious diseases, including hepatitis viruses, related flaviviruses, and malaria. His group combines tissue engineering, molecular virology/pathogenesis, and animal construction, to create and apply innovative technologies including humanized mouse models for the study and intervention of human hepatotropic infections. In recognition of his work he received a Kimberly Lawrence Cancer Research Discovery Fund Award, the Astellas Young Investigator Award of the Infectious Diseases Society of America and the Liver Scholar Award from the American Liver Foundation. He is a member of the Genomic Instability and Tumor Progression Program at the Cancer Institute of NJ. Dr. Ploss completed his Bachelor’ s and Master’ s degree in biochemistry at the University of Tübingen, Germany including additional training the Howard Hughes Medical Institute at the University of Washington, Seattle, and at the German Cancer Research Center in Heidelberg, Germany. Dr. Ploss completed his Ph.D. in Immunology at Memorial Sloan-Kettering Cancer Center/Cornell University and postdoctoral training at the Rockefeller University. Prior to joining the Department of Molecular Biology at Princeton University in 2013, he was a research associate professor at the Center for the Study of Hepatitis C at the Rockefeller University.

Application area

· Cell culture system that supports HBV and HDV infections
· Understand host factors that modulate viral life cycles
· Screen small molecules and biologics to find curative agent for HBV and HDV infections

Advantages

Susceptible to both HBV and HDV infections
Cells derived from single clone for limited population variability
Unlimited generation of cell supply
Standard media and reagents to grow and maintain cell line

Institution

Princeton University

Inventors

Alexander Ploss
Assistant Professor of Mol Bio
Molecular Biology
Benjamin Winer
Grad student
Molecular Biology

联系我们

叶先生

电 话：021-65679356

手 机：13414935137

邮 箱：yeyingsheng@zf-ym.com