Genetically Engineered Syrian Hamster Model for HBV

06/08/2026

Genetically Engineered Syrian Hamster Model for HBV

Biotech & Life Sciences

Abstract

Hepatitis B virus (HBV) is a major global health challenge that infects the liver and can lead to both acute and chronic disease. Approximately 254 million people worldwide live with chronic HBV, with an estimated 1.2 million new infections and 1.1 million deaths annually due to related complications. Although vaccines are available and typically administered in infancy, immunity in adults may wane without booster doses and infant vaccination rates have declined in recent years, highlighting the continued need for effective treatments after infection. However, progress in HBV research has been limited by the lack of suitable animal models. Existing models, including genetically modified mice, nonhuman primates, tree shrews, woodchucks, and ducks, either fail to fully recapitulate natural HBV infection, do not support the complete viral life cycle, rely on surrogate viruses, or present challenges related to cost, regulation, and maintenance. Chimpanzees are the most representative animal model and closely mimic human immune responses, but their use is highly restricted, which limits accessibility for research. To address this unmet need, researchers at Utah State University have developed a novel genetically engineered Syrian hamster model that is immunocompetent and permissive to HBV infection, offering a more practical, cost-effective, and biologically relevant platform for studying HBV and accelerating the development of curative therapies.

What It Is

A small-animal model for HBV research using genetically modified Syrian hamsters.

Value Proposition

Currently, HBV research animal models are not immunocompetent nor convenient, making it difficult to conduct HBV cure research. This innovation provides a convenient and immunocompetent small-animal model for HBV research.

Applicable Markets

Animal Model, HBV research, HBV vaccine research, Viral research, Liver research, Immunotherapy, vaccines, pharmaceutical.

Benefit

Currently, HBV researchers face an impediment to cure research: the lack of a convenient (easy to maintain), cost-effective, and immunocompetent animal model. Current animal models for HBV research include genetically modified mice, monkeys, tree shrews, woodchucks, and ducks. The current animal models are unable to truly model infection, cannot support the entire life cycle of the virus, or use a surrogate virus.

Researchers at Utah State University have developed a novel, small-animal model for HBV research using genetically modified Syrian Hamsters. Due to their size and short lifespan, the use of Syrian hamsters addresses the need of a convenient, cost-effective, and easy to maintain animal model for HBV research. Additionally, the genetically modified Syrian hamster is a fully immunocompetent animal model that is permissive to HBV infection and supports the entire life cycle of the virus.

This technology offers a groundbreaking solution to a longstanding challenge: an accessible, cost-effective, easy to maintain, and immunocompetent animal model for HBV research. This technology provides researchers worldwide with a critical resource to successfully pursue an HBV cure.

Researchers

Zhongde Wang

Yanan Liu

Haitao Guo

Hu Zhang

USU Department: **Animal Dairy & Veterinary Sciences**

Developed in cooperation with:
University of Pittsburgh

Funding

This invention was made with government support awarded by the National Institutes of Health (NIH). The government has certain rights in the invention.

USU Reference No. C24024

Intellectual Property

Pending U.S. Provisional Patent Application Filed September 2025