



May 17th, 12:00 PM - 12:30 PM

A mathematical modeling study on HDV RNA, ALT, and HBsAg dynamics reveals dual mechanisms of peginterferon-lambda.

Adquate Mhlanga

The Program for Experimental & Theoretical Modeling, Division of Hepatology, Department of Medicine, Loyola University Medical Center, Maywood, IL, USA, amhlanga@luc.edu


Ohad Etzion

Department of Gastroenterology and Liver Diseases, Soroka University Medical Center, Beer-Sheva 84101, Israel, ohadet34@yahoo.com

Harel Dahari

The Program for Experimental & Theoretical Modeling, Division of Hepatology, Department of Medicine, Loyola University Medical Center, Maywood, IL, USA, hdahari@luc.edu

Follow this and additional works at: <https://scholarscompass.vcu.edu/bamm>

 Part of the [Life Sciences Commons](#), [Medicine and Health Sciences Commons](#), and the [Physical Sciences and Mathematics Commons](#)

<https://scholarscompass.vcu.edu/bamm/2024/fri/11>

This Event is brought to you for free and open access by the Dept. of Mathematics and Applied Mathematics at VCU Scholars Compass. It has been accepted for inclusion in Biology and Medicine Through Mathematics Conference by an authorized administrator of VCU Scholars Compass. For more information, please contact libcompass@vcu.edu.

A mathematical modeling study on HDV RNA, ALT, and HBsAg dynamics reveals dual mechanisms of peginterferon-lambda.

Adquate Mhlanga¹, Ohad Etzion², and Harel Dahari¹

¹The Program for Experimental & Theoretical Modeling, Division of Hepatology, Department of Medicine, Loyola University Medical Center, Maywood, IL, USA

²Department of Gastroenterology and Liver Diseases, Soroka University Medical Center, Beer-Sheva 84101, Israel

Hepatitis D virus (HDV) is the most severe form of chronic viral hepatitis. HDV is considered a satellite virus because it relies on hepatitis B surface antigen (HBsAg) to propagate. Currently, there is no approved FDA therapy for HDV in the USA. The recent LIMT-1 study demonstrated the safety and efficacy of Peginterferon Lambda (Lambda) monotherapy for chronic HDV (Hepatology.2023;77(6):2093-2103). Here we sought to predict Lambda mechanisms of action and efficacy using mathematical modeling of measured HDV RNA, HBsAg and alanine aminotransferase (ALT, which is a surrogate marker of infected liver cells (hepatocytes) death) kinetics.

I will present our efforts to characterize and mathematically model the unique frequent kinetic data of 33 chronic HDV-infected patients participated in the LIMT-1 study of Lambda 120 µg (n=19) or 180 µg (n=14), administered once weekly by subcutaneous injection for 48 weeks, with 24 weeks of follow-up. I will show how a mathematical model that includes hepatocyte proliferation can describe simultaneously HDV, ALT, and HBsAg kinetics using a nonlinear mixed-effects modeling approach. This study provides, for the first time, a comprehensive dynamic description of HDV response under Lambda monotherapy, estimate viral-host parameters and predict Lambda modes of action. Modeling suggests that Lambda blocks HDV viral production and mediates an increase in the death of HDV-infected cells that requires further study.