JANE HEFFMAN, York University, Toronto, Ontario

The influence of a backward bifurcation in a model describing HBV or HCV infection in-host

Failure of liver transplantation to cure chronically infected hepatitis B or hepatitis C patients suggests that a second compartment of infection may exist for both of these diseases, namely the blood. We have developed a mathematical model describing hepatitis B virus (HBV) or hepatitis C virus (HCV) and immune system dynamics in-host that incorporates two compartments of infection: the liver and the blood. Analysis of the model shows the existence of a backward bifurcation, which depends on the production term of new virus particles and the death rate of infected cells in both compartments. Extending the model to include drug therapy, we find that, if drug therapy is highly effective in one compartment of infection, but not very effective in the other, the backward bifurcation exists and virus clearance is difficult to achieve. This result has important implications for the development of new drug therapies against HBV and HCV for chronically infected and liver transplant patients.