

Friday, May 7, 2010

New Assistant Professor Libin Rong studies hepatitis C

The **hepatitis C virus** causes **liver** damage, and spreads by blood-to-blood contact. Unfortunately, the standard drug treatment for **hepatitis C** is only successful in about 50% of patients. In order make progress against this disease, researchers need to know why treatment fails in half the patients, and how to make treatment more successful.

Assistant Professor **Libin Rong**, of the **Department of Mathematics and Statistics**, is the lead author on a just published an article about Hepatitis C in the May 5 issue of **Science Translational Medicine**. In his paper **Rapid Emergence of Protease Inhibitor Resistance in Hepatitis C Virus** (Volume 2, Page 30ra32), Rong and his colleagues use mathematical modeling to show that the high failure rate during drug treatment is caused by **drug-resistant** forms of the **virus**, and suggest that one way to improve the treatment is to use multi-drug combinations that can block the mutations leading to drug-resistance.

Rong arrived at Oakland University in January 2010. He was hired as part of the **Core Center in Quantitative Biology** recently established at OU and funded by the **National Institutes of Health**, with the goal of building bridges between the biological and mathematical sciences. Before coming to OU, Rong worked with **Alan Perelson** at the **Los Alamos National Laboratory**. **Bloomberg Businessweek** recently **interviewed Perelson about the hepatitis C study**. **Science Daily** also **published an article about this research**.

The abstract to Rong's paper is presented below:

About 170 million people worldwide are infected with hepatitis C virus (HCV). The current standard therapy leads to sustained viral elimination in only ~50% of the treated patients. **Telaprevir**, an HCV **protease inhibitor**, has substantial antiviral activity in patients with chronic HCV infection. However, in clinical trials, drug-resistant variants emerge at frequencies of 5 to 20% of the total virus population as early as the second day after the beginning of treatment. Here, using probabilistic and viral dynamic models, we show that such rapid emergence of drug resistance is expected. We calculate that all possible single- and double-mutant viruses preexist before treatment and that one additional **mutation** is expected to arise during therapy. Examining data from a clinical trial of telaprevir therapy for HCV infection in detail, we show that our model fits the observed dynamics of both drug-sensitive and drug-resistant viruses and argue that therapy with only direct antivirals will require drug combinations that have a genetic barrier of four or more mutations.

SUMMARY

Assistant Professor Libin Rong, of the Department of Mathematics and Statistics, studies hepatitis C drug treatment.

Created by Brad Roth (roth@oakland.edu) on Friday, May 7, 2010
Modified by Brad Roth (roth@oakland.edu) on Friday, May 7, 2010
Article Start Date: Friday, May 7, 2010