Biology drives design of new microscope

BY TOM SPEARS, THE OTTAWA CITIZEN DECEMBER 29, 2009

OTTAWA-It took a biologist to tell the physicists what a microscope needed to do. That told the physicists what to design.

“We were really interested in this together, trying to push both sides, the physics and the biology,” said John Pezacki, a chemical biologist at NRC.

He likens the new microscope to the arrival of machines that decode DNA in a hurry, a task that once took years.

For Pezacki, the microscope is a tool to watch the hepatitis C virus. He has a theoretical model of how the virus infects one cell, then makes many copies of itself and escapes to infect other cells.

The work isn’t finished, but it is attracting attention: It was the cover story in the research journal Virology.

“Over 250,000 Canadians are chronically infected with hepatitis C,” Pezacki said. Treatment is slow and expensive, and causes side effects, just like chemotherapy for cancer.

“Quality of life is really poor with that treatment.”

The virus is good at mutating in ways that allow it to dodge around drug therapy. That means that a target for research is to focus on interactions between aspects of the virus that are not easily changeable.

“This virus has spent ages trying to perfect its entry to and exit from the cell.” It can’t modify those actions quickly, and that makes those two actions excellent targets for future drugs — if someone can first pinpoint how they happen.

Pezacki uses the new microscope to model how these actions take place.

It may not be possible to stop the virus from getting

into a cell and making new viruses, Stolow says, but Pezacki’s research points to where new viruses get ready to move on: their launching pad.

“If you could prevent it from doing the last step, which is to package itself and go on an infect other cells … then you could stop the virus.

“That’s a really significant thing, and it’s having the right set of tools that allows one to ask such a question.”