

Ideas on the Edge



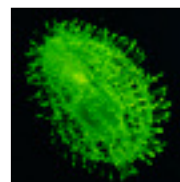
Multiple Insights from Single Cells

RESEARCHERS AT YORK UNIVERSITY ARE DISCOVERING A VARIETY OF APPLICATIONS BY FOCUSING ON THE SIMPLEST OF LIVING THINGS.

It's not much to look at under an electron microscope: *Tetrahymena thermopila* is a simple, single-celled organism covered with hair-like appendages called "cilia." But the study of this humble form of life is leading to important insights in fields as divergent as medicine and environmental science.

"These organisms are good models for

mammalian biology," explains Dr. Ronald Pearlman of



York University, who has been exploring the secrets of *Tetrahymena* for years.

They're much easier than human cells to grow and manipulate, but they have similar components.

Key among those components are the cilia. In humans, cilia perform functions as diverse as providing connections in the nerve cells in our eyes and keeping dust from entering the lungs. And problems with cilia can lead to diseases of the lungs, kidneys and neural system.

Dr. Pearlman and his colleagues are studying *Tetrahymena*—and other single-cell organisms—using the advanced tools of York's Core Molecular Biology and DNA Sequencing Facility, a lab funded in part by an investment from the Ontario Innovation Trust. Employing state-of-the-art techniques that include X-ray crystallography, mass spectrometry, and nuclear magnetic resonance spectroscopy, Dr. Pearlman has isolated and identified

RESEARCH THAT MATTERS REAL-WORLD BENEFITS FOR ONTARIANS:

- potential new treatments for disease, including cancer
- improved environmental quality, due to more rapid testing and more fundamental understanding of environmental factors

many of the key proteins in the cilia of *Tetrahymena thermopila*. The next step is to determine what role these proteins play in how cilia develop and function. This is scientific research at a very fundamental level, but Dr. Pearlman's work is helping to lay the foundations for potential treatments of cilia-related illnesses.

The York facility is delivering dividends in other areas as well.



RONALD PEARLMAN

Researchers working in the lab recently patented a procedure that will help in the development of drugs targeting an essential enzyme, resulting in potential new anti-fungal, anti-viral and anti-cancer therapies.

Recently, Dr. Pearlman's research has also shed light on the potential usefulness of the versatile *Tetrahymena* in a very different context: environmental science. The

traditional approach to environmental research has been to expose species of animals, birds and fish to various compounds, and then monitor for results. But such stud-

ies can take years, and often don't reveal what's happening at the level of the cell.

Dr. Pearlman is now looking at ways to use *Tetrahymena* as a model in this area as well. By working with single-celled organisms, and the kinds of sophisticated tools available at the York facility, scientists may be able to test for adverse environmental effects much more quickly and easily—and understand those effects at a fundamental genetic level.

One cell—many applications!

Project: Core Facility in Genomics, Proteomics and Combinatorial Synthesis

Institution: York University

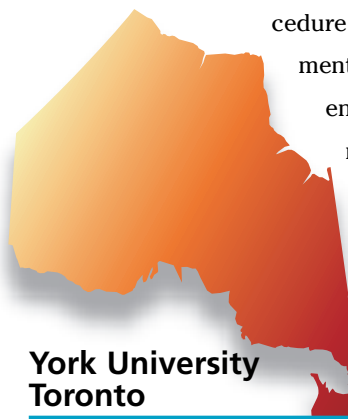
Research Discipline: Life Sciences/Genomics

Principal Investigator: Ronald Pearlman

Trust Investment: \$460,000

CFI Investment: \$460,000

Total research investment from all sources: \$1,150,014



**York University
Toronto**



MaRS Centre, Heritage Building
101 College Street, Suite HL20
Toronto, ON M5G 1L7
416-977-9188 Fax: 416-977-9460
innovation@oit.on.ca
www.oit.on.ca

Infrastructure for Innovation About the Ontario Innovation Trust

The Ontario Innovation Trust was created in 1999 by the Government of Ontario to invest in research equipment and facilities at Ontario's universities, colleges, hospitals and other non-profit research institutions. The Trust is governed by a volunteer Board of Directors, according to the terms of a Trust agreement established by the Ontario government. A small permanent staff looks after day-to-day operations.

Since its inception, the Trust has committed almost \$843 million to strengthen Ontario's position in the global marketplace of ideas. This represents more than a third of the \$2.44 billion in total funding that has been invested in Trust-supported projects.