



## Innovative Molecular Pathology Centre opens at Segal Cancer Centre

Taking a major step forward in the development of personalized medicine in Quebec, the Molecular Pathology Centre, a 12,000-square-foot facility opened at the Segal Cancer Centre. It was entirely funded through private donations—notably, from the Dubrovsky family, Banque Nationale and the Adelis Foundation—to enable the development of targeted therapies. Much of the research underway in the LDI's cancer axis is focused on developing personalized therapies for patients.

Molecular pathology is re-inventing cancer treatment by opening the door to personalized medicine. Instead of attacking the cancer with an all-purpose treatment such as chemotherapy, doctors begin by examining the tumor at the molecular level to identify unique characteristics—known as biomarkers—that reveal the tumor's vulnerabilities.

Armed with this information, doctors can prescribe a specific drug that is effective against a tumor with a particular biomarker. At the same time, patients avoid toxic exposure to—and the debilitating side-effects of—drugs that have been determined not to be effective against this particular type of tumor.

“This Centre will place the JGH at the cutting edge of this exciting new era of personalized medicine, and it will help us offer our patients the best possible treatments by customizing healthcare to the specific molecular characteristics of the disease,” says **Dr. Alan Spatz**, Director of the Molecular Pathology Centre and JGH Chief of Pathology.

Dr. Spatz notes that molecular pathology – a cornerstone of any major development in modern medicine - is devising targeted treatments based on a tumor's specific molecular characteristics, as opposed to its location of the disease within the body. For this reason, Dr. Spatz says, “it's becoming extremely important to identify precisely the particular genetic signature that determines what will happen to a cancer, anywhere in the body.”

**Dr. Leon van Kempen**, Chief Operating Officer of the Molecular Pathology Centre, added, “This Centre will considerably reinforce our capacity to discover and validate new actionable targets and to design new effective treatments. The identification of multiple gene abnormalities that, in the past, was done one gene at a time, will all be done in one step with higher speed and accuracy than ever before.”

In addition to benefiting from the expertise of internationally renowned clinicians and researchers, the Molecular Pathology Centre will capitalize on its integration with the Segal Cancer Centre. This multi-disciplinary approach will allow researchers, pathologists, and clinicians to work closely to evaluate specific types of cancer and help guide treatment decisions customized to a patient's particular genetic type.

“This Centre will help usher in a new age of cancer treatment where the key to the cancer-fighting strategy is genetics,” says **Dr. Gerald Batist**, Director of the Segal Cancer Centre. “It will enable us to save and extend many lives by matching the best therapy to each patient, while providing us with the chance to significantly contribute to the current revolution in the treatment of cancer here in Quebec and globally.”

Looking to the future, Dr. Spatz sees the potential of this Centre going beyond just the treatment of cancer.

“While its impact will initially be felt most strongly in cancer treatment and research, the JGH's sophistication in personalized medicine continues to grow, and the Centre will apply its expertise to other fields, such as cardiovascular disease and the neurology of aging.”

In pursuing this promising line of therapy as early as 2004, the JGH became one of the first hospitals in Canada to use molecular analysis to help guide diagnosis and treatment. It has also been playing a prominent role as one of the academic organizers of the WIN Consortium—Worldwide Innovative Networking in Personalized Cancer Medicine—along with global experts from leading institutions in such cities as Houston, Stockholm, Jerusalem, Munich, and Mumbai.

## JGH Foundation Gala raises more than \$1 million for research

Thanks to the generosity of donors and supporters, the JGH Foundation's 2013 Gala raised nearly \$1.1 million, the proceeds of which will benefit medical research at the LDI. In addition, this marked the second year of a ten-year commitment from Groupe Desjardins to sponsor the JGH Foundation's annual gala.

The Gala honoured former Quebec Premier Jean Charest and his wife, Michèle Dionne, both of whom have been long-time and enthusiastic supporters of the JGH. A video that elegantly captures the contributions and promise of research was screened and is now available [on-line](#). For more details about the gala and to view photos and video, visit the [JGH Foundation website](#).

The LDI wishes to express sincere gratitude to everyone who donates to research at the JGH. In an increasingly challenging economic environment, the support of individual donors is essential to the scientists and clinicians who are pursuing advances against cancer, the diseases of aging, hemovascular disease, HIV/AIDS, new insights through epidemiology, and investigations into the psychosocial aspects of disease, and better outcomes and quality of life for patients.

### New chair of Research Ethics

**Vasiliki Bessy Bitzas** has been appointed Chair of the Research Ethics Committee. She has been a member of the Research Ethics Committee and Science Review Committee since 2007. A nurse at the JGH since 1998, Ms. Bitzas is currently a PhD candidate at McGill's School of Nursing.

### Dr. Chertkow on *The Nature of Things*

**Dr. Howard Cherkow**, head of the Aging Axis and Director of the JGH Memory Clinic, appeared on CBC's *The Nature of Things*, in an episode called "[Untangling Alzheimer's](#)." The documentary examines the latest investigations into the science of Alzheimer's disease.

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## Compression stockings do not prevent post-thrombotic syndrome, study reveals

A CIHR-funded, multi-centre clinical trial led by **Dr. Susan Kahn** revealed that patients who used elastic compression stockings for two years after suffering a deep vein thrombosis (DVT) were no less likely to experience post-thrombotic syndrome (PTS) than patients given a placebo stocking. [The results were published in \*The Lancet\*](#).

PTS is a chronic complication experienced by as many as half of all patients who have suffered a DVT. It causes a range of symptoms from minor swelling and discomfort to disabling leg pain, accumulation of fluid, irreversible changes to the skin and leg ulcerations. Elastic compression stockings have been employed on the theory that the pressure they exert on the veins had a preventive effect.

"Nobody had ever subjected these stockings to a placebo-controlled trial that would allow us to measure their effectiveness objectively," explained Dr. Kahn, Director of the Centre of Excellence in Thrombosis and Anticoagulation Care at the JGH.

Existing practice guidelines, based on positive results of earlier, but much smaller studies, advised doctors to prescribe elastic compression stockings to patients following a DVT. Because the evidence of their efficacy was less than convincing, Dr. Kahn and her colleagues enlisted 24 centres across North America to follow more than 800 patients for two years in what is by far the most extensive study of its kind ever undertaken. The study found no benefits whatsoever from the active stockings as compared with the placebo stockings.

"Our results should have an immediate impact on how physicians practice. Those who were prescribing the stockings will reconsider," she said. "While it remains to be seen whether stockings improve symptoms in patients who have already developed PTS, we have disproven the theory that every patient with a DVT needs to purchase and wear a stocking for two years."

This study further emphasizes the importance of implementing measures to prevent DVT, which remain the standard of care for at-risk patients. The JGH was among the first hospitals in Canada to implement a systematic, hospital-wide prevention program to reduce the incidence of this potentially serious complication of hospitalization. It is also important for further research to identify which patients are most likely to develop PTS, as this could guide physicians in their treatment of those who experience DVT.

## National initiative to discover cure for HIV

**Dr. Andrew Mouland** was named one of nine principal investigators on the Canadian HIV Cure Enterprise (CanCURE), a collaboration of leading HIV/AIDS researchers designated to seek effective new approaches to cure HIV-1 infection. CanCURE received \$8.7 million in funding from the Canadian Initiative for HIV-1 Cure Research, a partnership between the Canadian Institutes of Health Research, the Canadian Foundation for AIDS Research, and the International AIDS Society.

Ultimately, CanCURE aims to enhance understanding of how HIV-1 remains latent despite antiretroviral therapy, to develop new research infrastructure relevant to the search for a cure, and to establish therapeutic strategies that will advance progress toward a cure for HIV.

“We know that the virus can hide in reservoirs in a latent state and this virus is impervious to targeting by currently available antiretroviral therapy,” Dr. Mouland explains. “Our challenge is to identify the mechanisms by which the virus becomes latent and to devise strategies for attacking and eliminating these latent pools from the body.”

To date, government and private organizations have dedicated significant resources to fundamental and clinical research on HIV-1/AIDS. Prevention strategies include education as well as efforts to develop a safe and effective vaccine against HIV-1. While additional efforts will be required in prevention research, so is the development of new strategies focusing on the targeting of latent reservoirs in infected patients.

Dr. Mouland, a member of the CanCURE Steering Committee, leads a team doing fundamental research to define mechanisms governing HIV-1 latency and persistence. Specifically, he is endeavoring to identify those transcriptional and post-transcriptional mechanisms that may be suppressed or activated during the establishment and maintenance of latent HIV-1 reservoirs.

The CanCURE grant brings together an expert group of 26 basic and clinical investigators, among whom are **Drs. Mark Wainberg** and **Anne Gatignol** from the LDI. The overall project leader and coordinator is Dr. Éric Cohen of the *Institut de recherches cliniques de Montréal*.

“Finding a cure is very much in the mind of scientists, as reflected by major investments like CanCURE,” Dr. Mouland said. “While current treatments are effective, they are expensive and not available to everyone, so the need for a cure remains urgent.”

## Critical signaling mechanism revealed in cellular metabolism

Survival of the cell depends on a balance between energy production and energy consumption. Disrupting this balance has proven to be an effective, if uncertain, way to attack cancer. **Michael Pollak, Ivan Topisirovic** and their colleagues from the Goodman Cancer Centre, Julie St-Pierre and Nahum Sonenberg have been trying to identify how cancers determine their particular energy needs.

Because cancer demands an extremely high energy level, factors that maintain a balance between production and consumption could prove to be its Achilles heel. mTOR is the protein that regulates many aspects of energy metabolism and its activity is frequently elevated in cancer. A significant number of existing cancer therapies are mTOR inhibitors, designed to kill cancer cells by inducing changes in their metabolism. However, they have not been as successful as hoped. In a [Cell Metabolism](#) paper (distinguished as the LDI Paper of the Month for January 2014), the authors reveal that the protein 4E-BP acts as a break on production and consumption of energy when mTOR signaling is abnormal and could, therefore, be a key target in efforts to interfere with a cancer’s capacity to generate and consume energy.

Since mTOR and energy metabolism are dysregulated in other diseases, including diabetes and heart disease, this discovery could prove to have wide ranging implications.

Dr. Topisirovic is quick to point out that this study resulted from a broad collaboration of researchers with a variety of expertise. This, he insists, is critical for scientific achievement and explains why the LDI is such a unique place to do top quality research.

“This is the way to develop effective data while maximizing the return on increasingly scarce funding,” he said. “Our work would not have been accomplished without inter-institutional collaborations, as well as discussions I had with Michael Pollak, one of the champions in exploiting the relationship between nutrition, energy metabolism and cancer. Finally, my colleagues, including Michael Witcher, Mark Trifiro, Josie Ursini-Segal, Stéphane Richard, and Antonis Koromilas were unselfish enough to dedicate a lot of their time to discussing our findings and also to help me get on the right track. Advances in science are most often the outcome of sharing and building upon one another’s ideas.”

## Link-N as possible repair mechanism for intervertebral disc degeneration

Drs. **Fackson Mwale** and **John Antoniou** were awarded best paper for 2013 from the North American Spine Society for their most recent research on the peptide Link-N and its potential to promote disc repair in those suffering from intervertebral disc degeneration, the most common cause of back pain which, in turn, is one of the leading chronic illnesses requiring physician intervention. [The paper has been published in \*European Cell and Materials\*.](#)

Link-N is found in cartilage and intervertebral discs. When functioning properly, it signals cells to repair damage as part of the normal process of cellular regeneration. As people age, or in cases of disease such as arthritis, this process is disrupted. After years of *in vitro* experimentation, Dr. Mwale has now demonstrated that the injection of Link-N into degenerated discs *in vivo* results in significant repair within two weeks. Moreover, it brings a halt to the process by which the natural function of the peptide is impaired.

“This moves us closer to trials in humans,” said Dr. Mwale, who runs an orthopedics research lab at the LDI and is President of the Canadian Connective Tissue Society. “We can culture a degenerating human disc, into which we inject Link-N, and we observe stimulation of repair and the arrest of further damage.”

As of now, the only treatment option for intervertebral disc degeneration is surgery. The drawback is that it changes the biomechanics of the spine by reducing flexibility at the site of the surgery, causing adjacent discs to degenerate. Consequently, the success rate is not high.

“Because Link-N occurs naturally, there is little or no toxicity associated with injecting it into the body, and it inhibits calcification,” he explains. “Furthermore, peptides are very inexpensive to manufacture. We are ready to work with partners to embark on clinical trials.”

Not only does Link-N hold great promise for treating intervertebral disc degeneration and, perhaps, arthritis, but it may be possible, eventually, to prescribe it prophylactically in pill form to stave off age-related deterioration.

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## Dr. Gornitsky wins dental research award

**Dr. Mervyn Gornitsky**, Research Director and Chief Emeritus of the JGH Department of Dentistry, who also conducts research in the Aging Axis at the LDI, is the recipient of the 2012-13 Micheline-Blain Award from the Network for Oral and Bone Health Research, whose scientific committee bestows the honour on a scientist or clinician for lifetime achievements and exceptional involvement in oral health research.

## World AIDS Day

To commemorate the 25th [World AIDS Day](#), December 1, [JGH-TV](#) produced a video on the current state of HIV research. The video features **Dr. Mark Wainberg** and **Dr. Bluma Brenner**.

## Research integrity

In keeping with its commitment to the highest levels of research integrity, the LDI has made it mandatory for all new students and trainees to view a lecture on the subject by Dr. David Bazett-Jones, Senior Scientist and Research Integrity Advisor at the Hospital for Sick Children, Toronto. The lecture was delivered at the LDI in 2011. It will be the responsibility of each trainee to attend a session at which the video will be screened

The objective of this initiative is to ensure that everyone at the LDI is aware of how to avoid the pitfalls of scientific misconduct or questionable research practices. Integrity is not a simple or straightforward issue, but involves nuances about which scientists need to be conscious. Viewings will be scheduled in January and at intervals thereafter. For further information on when you can watch the video, check the graduate studies bulletin boards for the next dates and times or contact Dr. Lorraine Chalifour, Associate Director for Graduate Studies, at [lorraine.chalifour@mcgill.ca](mailto:lorraine.chalifour@mcgill.ca), or 514-340-8222, ext. 4295.

## SAVE THE DATE!

5th Annual LDI Scientific Retreat  
Friday May 30, 2014  
Holiday Inn—Midtown Montreal  
Keynote Speaker: Dr. Morag Park,  
Director, Goodman Cancer Centre,  
McGill University