E = Health

UHN 2015 RESEARCH REPORT

UHN Research Snapshot

Appointed Researchers	441
Clinical Researchers	828
Total Researchers	**1,269**
Fellows	557
Graduate Students	750
Total Trainees	**1,307**
Research Support Staff	290
Institute Staff	1,788
Total Staff	**2,078**
Research Space	**991,894 sq. ft.**
Publications	**3,402**
Total Funding	**$356,167,532**

University Health Network (UHN) comprises four hospitals: Princess Margaret Cancer Centre, (PM Cancer Centre), Toronto General Hospital (TGH), Toronto Rehab (TR) and Toronto Western Hospital (TWH). It has five research institutes: Krembil Research Institute (Krembil), PM Cancer Centre, Techna Institute for the Advancement of Technology for Health (Techna), Toronto General Research Institute (TGRI) and Toronto Rehabilitation Institute (TRI). The scope of research and complexity of cases at UHN have made it a national and international source for discovery, education and patient care. UHN is a research hospital affiliated with the University of Toronto (UT) and is a member of the Toronto Academic Health Science Network (TAHSN).

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Christopher Paige PhD, FCAHS, Executive Vice President, Science and Research, UHN

Energy Drives Health

The success of the research programs at the University Health Network (UHN) depends on *energy*.

For example, various forms of light energy have been harnessed to better define the margin between healthy tissue and tumour tissue, leading to the development of enhanced surgical techniques. Light at different wavelengths can activate novel, photo-responsive molecules that act as beacons to guide drugs to tough-to-cure cancers. Measurements based on sound waves allow for better assessment of sleep apnea and ultrasound waves convert microbubbles into nanoparticles that significantly enhance multimodal imaging. The energy of extremely short wavelength gamma rays is harnessed to drive clinical research—from better diagnosis to innovative treatments; from imaging blood clots to targeting tumours with precision. The energy field created by magnetism is being used to restore normal brain function in patients with obsessive compulsive disorder.

The list goes on and on as researchers at UHN innovate using the full spectrum of energy to take on difficult medical problems and to find novel answers. In some cases, energy-driven insights lead to new treatments, providing our patients with first-time advances; in other cases we discover new facts about the molecular pathways that keep cells (and people) healthy. In still other cases, our researchers find critical

Justine Jackson, Chief Financial Officer, UHN (Interim CEO, June 2014 - January 2015)

Peter Pisters MD, FACS, President and Chief Executive Officer (CEO), UHN

information that can be used to improve our health care system—better ways to use the energy around us to provide care that is more efficient, more effective and more economical.

But perhaps the most important type of energy is that which emanates from the thousands of individuals who work at UHN. Every hour of every day UHN staff are thinking of new and better ways to accomplish our goal of understanding disease and improving health. This takes a lot of connective energy too—energy that brings individuals together into teams; teams that harness expertise from different disciplines to focus on a common target or goal. And teams that reach across not only our four hospitals and five research institutes, but to the hospitals of the Toronto Academic Health Science Network and the University of Toronto, and across the world to our global partners.

Another critical source of energy fuelling our success is found in the thousands of donors working with our four foundations (The Princess Margaret Cancer Foundation, Toronto General & Western Hospital Foundation, Toronto Rehab Foundation and the Arthritis Foundation). They enable UHN to recruit and retain some of the best researchers in the world and to help build an environment that allows their dreams to take shape and materialize into medical advances that change the world.

So here at UHN, it's all about energy and how we harness it to improve health for patients. I invite you to read further to see more examples of how *E = Health*.

Stand to Gain Health

Standing regularly may be key to preventing chronic disease

We are often told to exercise more. However, spending less time sitting may be just as important. That is one of the key insights gained through research that was published by Dr. David Alter.

His research team selected 41 of the most rigorous studies from around the world that measured the effect of sedentary time on health. Sedentary activities include sitting at work or at home, in front of a computer, television, book or screen.

Combined, these sedentary activities are the fourth leading risk factor for death worldwide.

To counteract the effect of sedentary time, the World Health Organization (WHO) recommends that adults participate in at least 150 minutes of moderate physical activity, such as walking or cycling, per week. What the WHO campaign does not address is an issue that is being raised by a growing body of evidence: prolonged sitting may still harm your health regardless of other healthy lifestyle choices.

Dr. Alter's study adds to this body of evidence, but goes further by definitively asking, for the first time, whether exercise can offset the health risks associated with prolonged sitting.

Through careful statistical analysis, the research team specifically looked at heart disease, type II diabetes and cancer, as well as death by other causes, and confirmed that sedentary time is strongly associated with greater risk levels.

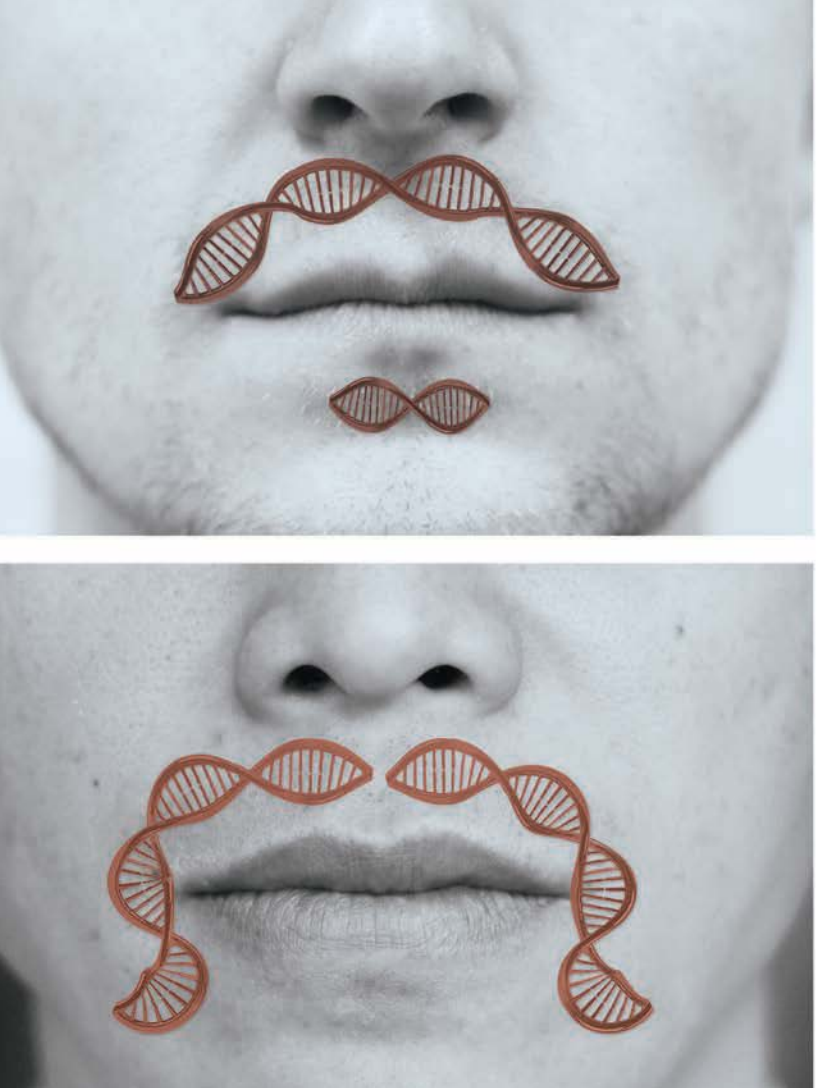
Regarding the effect of exercise, Dr. Alter comments, "While we did notice that health risks generally decreased for those who exercised the most, the harmful health effects associated with sedentary time remained. Thus, while exercising may help for some, regular breaks from sedentary time could prove to be just as important for staying healthy.

"Our results and others reaffirm the need for greater public awareness about the hazards linked to physical inactivity and call for further research to explore the effectiveness of new approaches to minimize it."

While the World Health Organization is recommending exercise to stay healthy, simply standing more often could be another important path to good health

Image: Dr. David Alter, the lead author of the study, is pictured above right. On the left is Dr. Craig Daniels.

Biswas A, et al. Ann Intern Med. 2015 Jan. This work was supported by the Heart and Stroke Foundation of Canada, the Canadian Institutes of Health Research, the Public Health Agency of Canada and the Toronto Rehab Foundation.



Medicine as Unique as You

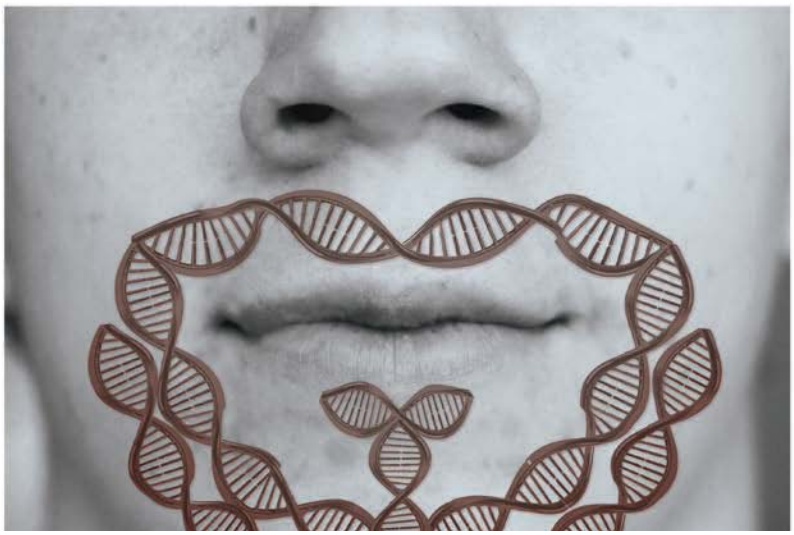
A new genetic test predicts the recurrence of prostate cancer

Every moustache is different. From the pencil moustache to the handlebar, they come in a variety of styles, sizes and colours. Through the annual *Movember* fundraising event, the moustache has been transformed into a symbol for the fight against prostate cancer, and serves as a fitting analogy for the unique way in which each patient responds to treatments.

Personalized medicine leverages the very essence of what makes individuals unique: their DNA. By examining the genetic features of individuals, clinicians are able to customize treatment plans to maximize the chances of success.

Personalized medicine tests would be particularly helpful for men with prostate cancer because aggressive tumours can recur in up to 50% of patients despite treatment with radiation or surgery. To address this issue, Dr. Robert Bristow (pictured above reviewing genetic changes in tumours) initiated a study to identify which prostate cancers are more likely to recur.

Dr. Bristow and his team, including co-lead investigator Dr. Paul Boutros and lead author Emilie Lalonde (both at the Ontario Institute for Cancer Research), measured genetic and physiologic information in prostate tissue samples from men with prostate cancer. The



team found that the likelihood that a tumour would recur depended on two factors: the sample's unique genetic information and the oxygen levels present in the tissue. The tumours with the greatest chance of recurrence after radiation or surgery had high levels of genetic abnormalities and low oxygen levels.

Thus, the study revealed a more personalized way to treat prostate cancer: tumours identified as more agressive should be treated using more intensive therapies, such as chemotherapy, hormone therapy or therapies that target the genetic abnormalities, as part of a personalized treatment plan.

The Canadian Cancer Society acknowledged the importance of Dr. Bristow's findings by naming the study among the "Top 10 Canadian Cancer Society-funded research of 2014".

Research findings help to mitigate the ongoing problem of over- or under-treating men with prostate cancer

Lalonde E, et al. Lancet Oncol. 2014 Dec. Supported by Prostate Cancer Canada, the Movember Foundation, the Ontario Institute for Cancer Research, the Canadian Institutes of Health Research, the NIHR Cambridge Biomedical Research Centre, the University of Cambridge, Cancer Research UK, the Cambridge Cancer Charity, Prostate Cancer UK, Hutchison Whampoa Limited, the Terry Fox Research Institute, the Canadian Cancer Society, the PMH-Radiation Medicine Program Academic Enrichment Fund, the Motorcycle Ride for Dad (Durham) and The Princess Margaret Cancer Foundation.

Extinguishing the Inflamed Brain

Defining the underlying mechanisms of brain inflammation

Inflammation in the brain is mediated by microglia—a type of immune cell that resides in the brain and spinal cord.

While inflammation is the body's protective response that helps to clear damaged cells and invaders, such as viruses and bacteria, it can also be harmful: inflammation can kill healthy brain cells.

This is particularly true for neurological conditions that are associated with inflammation, including stroke, multiple sclerosis and Alzheimer disease.

Specialized potassium channels, which reside on the surface of microglia, are known to be involved in controlling inflammation. They act like a gate: when open, they allow potassium to exit microglia, which become rapidly 'activated'. These activated microglia trigger inflammatory processes.

Understanding how potassium channels are regulated could provide potential therapeutic targets for controlling the harmful aspects of inflammation. However, these regulatory mechanisms are not well understood.

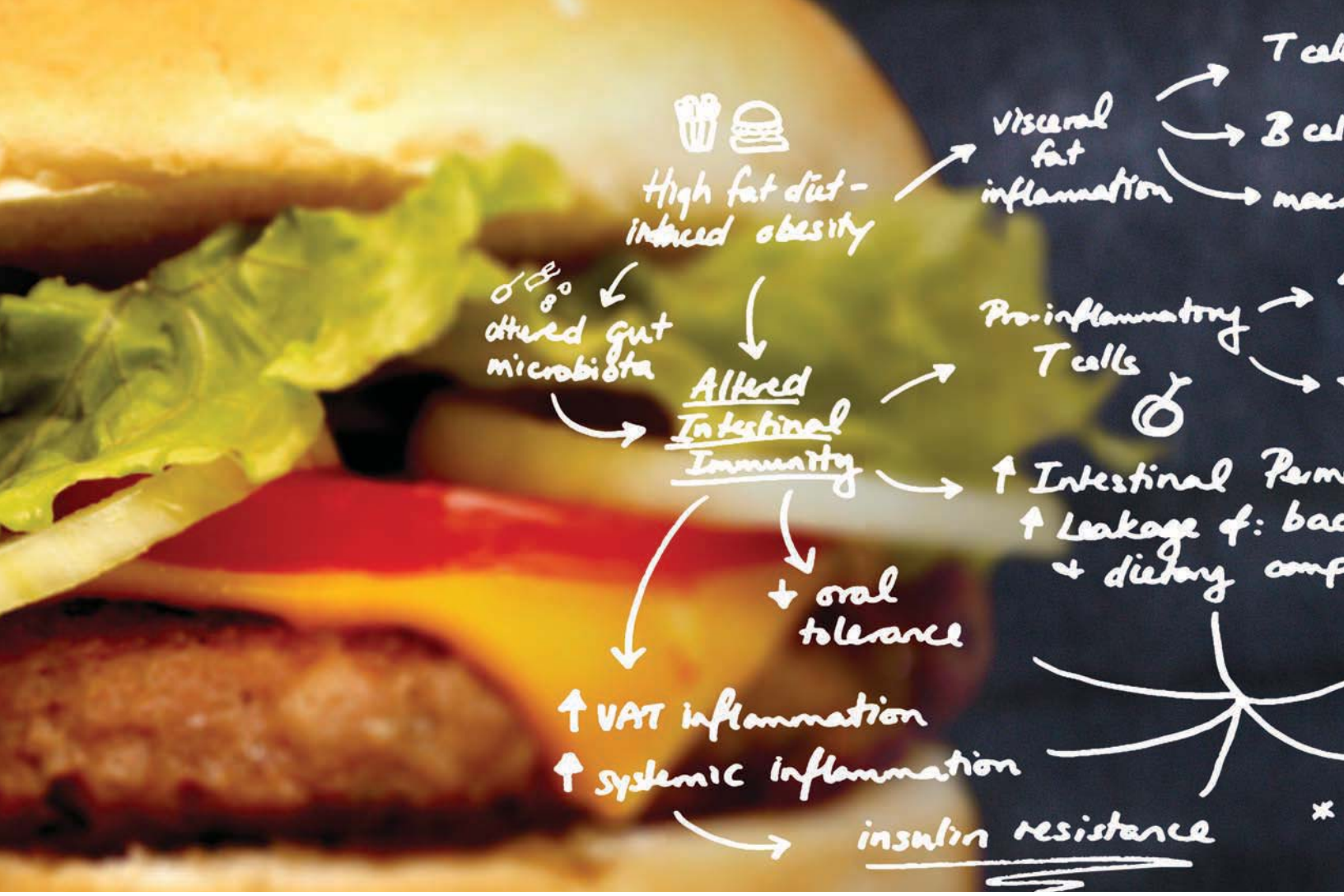
A study by Dr. Lyanne Schlichter sheds light on the molecular pathways that control potassium channel activation. Using molecular biology and biochemistry techniques, as well as electrical and optical recordings, Dr. Schlichter and her graduate student examined how a particular potassium channel (called KCa3.1) functions in microglia. Their study revealed that PKA—a protein that is critical for many cell functions—is able to affect how this channel behaves.

When exposed to PKA, the probability of the KCa3.1 channel opening was reduced, thereby preventing potassium from exiting microglia. As a result, microglial activation and subsequent inflammation would be inhibited.

Explains Dr. Schlichter, "Both the PKA protein and the KCa3.1 channel are involved in a variety of human diseases. Although inhibiting KCa3.1 is beneficial in several disease models, its interaction with PKA was controversial until now. Our study confirms that KCa3.1 is regulated by PKA, an interaction that might represent an important therapeutic target."

Image: Dr. Lyanne Schlichter is shown extinguishing a fire that represents microglia-mediated inflammation. Her research efforts have helped to identify a potential new target to help stop harmful inflammation.

Wong R, Schlichter LC. J Neurosci. 2014 Oct.
This work was supported by the Heart and Stroke Foundation and the Toronto General & Western Hospital Foundation.



New Target to Treat Diabetes

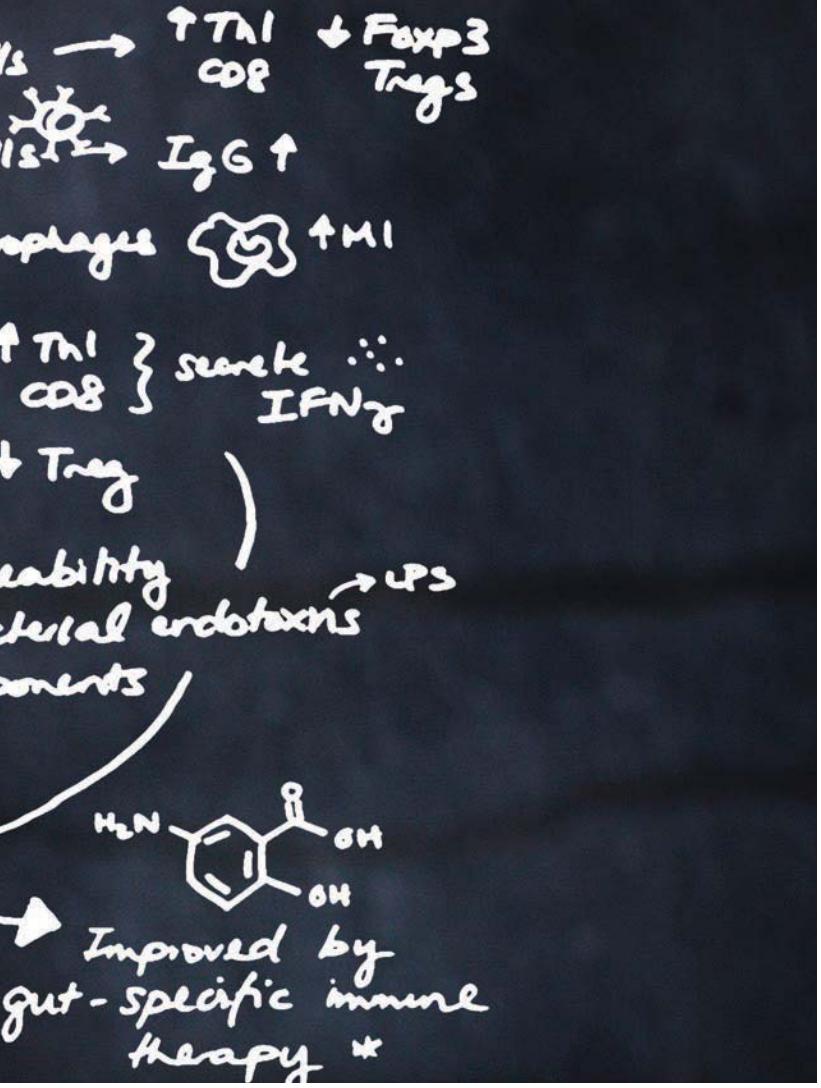
Immune cells contribute to high blood sugar levels in obesity

Type II diabetes develops later in life and is more likely to affect people who are overweight. While increasing exercise, reducing sedentary time and eating a healthy diet can reduce the chances of developing diabetes, rates of the disease continue to climb.

In type II diabetes, the body becomes unresponsive to a hormone known as insulin. In turn, this leads to high blood sugar levels that can damage organs, blood vessels and nerves. Despite the global health threat posed by this form of diabetes, few therapies exist that address the underlying loss of insulin sensitivity.

A recent study led by Drs. Daniel Winer and Shawn Winer (St. Michael's Hospital) provides a novel treatment strategy by pinpointing a new therapeutic target: the immune cells that reside in the gut.

Using an experimental model, the researchers found that diet-induced obesity leads to the activation of the immune cells residing in the intestine. Next, they explored whether there might be a link between activated immune cells and diabetes. By disabling these immune cells, they were able to lower blood sugar levels and restore insulin sensitivity. Moreover, the researchers found that 5-aminosalicylic acid,



a drug that dampens the immune response, reduced the number of activated immune cells in the intestine and improved blood sugar levels.

Recently, a team of French scientists confirmed the Winers' findings in a large-scale human study. By examining tissue samples taken from the small intestine of 185 obese and 33 lean participants, they found that the intestine of obese people was insensitive to insulin and displayed a heightened immune response (Monteiro-Sepulveda M, *et al. Cell Metab*. 2015 Jul 7).

Taken together, these studies strongly support the idea that the gut immune system is an important player in the development of type II diabetes—an insight that provides researchers with a new approach in the fight against diabetes.

Left image: A schematic showing the molecular and cellular pathways activated by a high fat diet (prepared by Helen Luck, one of the two lead authors of the article).

Right image (L-R): Drs. Daniel and Shawn Winer shopping for food as part of a healthy diet, which represents an important way to reduce the chances of developing type II diabetes.

Luck H, et al. Cell Metab. 2015 Apr 7. This work was supported by the Canadian Institutes of Health Research, the Canadian Diabetes Association and the Toronto General & Western Hospital Foundation. TK Lam and M Woo hold Tier 2 Canada Research Chairs in Obesity and in Signal Transduction in Diabetes Pathogenesis, respectively.

Orphans No Longer

Powerful tool predicts how proteins fit in interaction puzzle

Knowing how proteins interact with each other is critical to understanding disease and normal processes in the body. However, it is estimated that only 10% of human protein-protein interactions (PPIs) have been discovered so far, with a third of proteins existing as 'orphans' with no known interacting partners.

To enhance the rate of PPI discovery, Dr. Igor Jurisica (pictured above) and his team developed a new computational tool for the accurate identification of PPIs. The method, called FpClass, uses multiple types of evidence to predict interactions. Some are based on straightforward information directly related to how proteins connect, like structural features and physical properties. But FpClass also uses features that tend to simultaneously occur in known interacting pairs even when the mechanism of interaction is unknown. The prediction is further refined by including features that may reduce the chances of interactions occurring.

This innovative tool identified over 10,000 interactions for proteins that were formerly orphans. For example, FpClass predicted six interactions between p53—a protein often mutated in cancer—and orphan proteins. Five of these interactions were verified using biological

assays, thus revealing previously unknown PPIs with potential relevance to cancer.

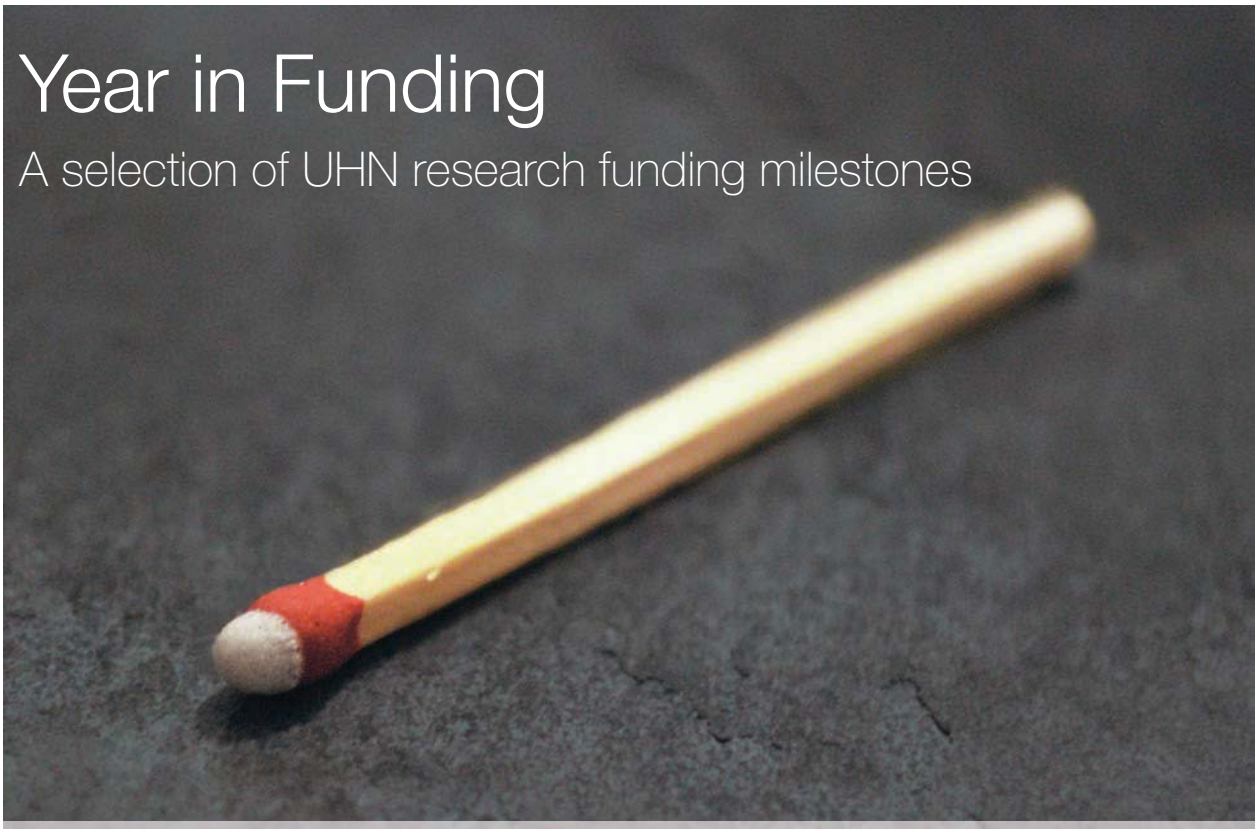
Orphan proteins are not a random subset of all the proteins in the body. For example, many orphan proteins are only expressed in specific tissues, which means that they may have been absent from the cell types used in PPI screening assays. Ninety percent of primate-specific proteins—those with a higher rate of evolution—are orphan proteins, yet these may be some of the most relevant proteins to human disease.

"We're trying to put the puzzle together, but we don't know what the final picture will be. The PPI data is just the first step—we also have to ask if these predicted interactions form a regular part of a cell's life, or if they are only seen under certain conditions, like in disease," says Dr. Jurisica. "FpClass is a robust tool that will help accelerate research by predicting that first step." Like many of the computational tools he has developed, FpClass is publicly available.

Kotlyar M, et al. Nat Methods. Jan 2015. This work was supported by Genome Canada, the Ministry of Research and Innovation, the Canadian Institutes of Health Research, the Natural Sciences and Engineering Research Council of Canada, the US Department of Defense, the Italian Association for Cancer Research, the Friuli Venezia-Giulia and CRO 5xmille Intramural Grant, the Friuli Venezia-Giulia Exchange Program, Ontario Genomics, the Canadian Cystic Fibrosis Foundation, the Canadian Cancer Society, Genentech, the National Institutes of Health, the National Cancer Institute, the Canada Foundation for Innovation, IBM, the University of Toronto McLaughlin Centre, the Ontario Ministry of Health and Long-Term Care and The Princess Margaret Cancer Foundation. I Jurisica holds a Tier 1 Canada Research Chair in Integrative Cancer Informatics.

Year in Funding

A selection of UHN research funding milestones



Funding, represented as a match, serves as the fuel for research innovation

New Network for Innovations in Aging

In early 2015, the federal government announced the creation of the pan-Canadian AGE-WELL (Aging Gracefully across Environments using Technology to Support Wellness, Engagement and Long Life) network. This new research initiative, which will receive $36.6 million over five years as part of the Networks of Centres of Excellence program, is hosted by the Toronto Rehabilitation Institute and co-led by UHN's Dr. Alex Mihailidis and Simon Fraser University's Dr. Andrew Sixsmith.

AGE-WELL brings together 26 universities and over 70 industry and not-for-profit organizations to build a hub of research and innovation focused on technology and aging.

The network will use world-class facilities—including Toronto Rehab's iDAPT Centre for Rehabilitation Research and Simon Fraser University's IRMACS Centre—and its strong research and industry partnerships to establish Canada as a leader in designing and implementing technology that contributes significantly to the well-being of older people.

AGE-WELL launched its Core Research Program in August with $5 million of funding for projects focused on developing robots that can assist in home care and physical therapy, smart wheelchairs and sensor networks that can help improve safety in the home, among other innovations.

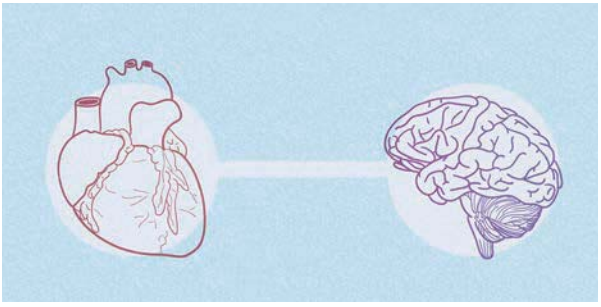
AGE-WELL will create real-world solutions that improve the lives of seniors

Canada Enhances UHN's Research Ecosystem

On May 29, 2015, a large investment was made in research infrastructure across the country through the Canada Foundation for Innovation's competitive Innovation Fund program. This initiative provided UHN with $8.82 million to strengthen state-of-the-art research facilities and capabilities. The funding will enhance research focused on advancing safer vehicle design for older and at-risk drivers; build a new centre to advance regenerative therapeutics for diabetes; build a new lab to advance integrated systems-level imaging, quantitative imaging, image-guided interventions and dynamic, feedback-driven medicine; enhance proteomics, structural biology and optical microimaging capabilities for multi-dimensional tumour phenotype analysis; and build a new lab for improving the quality and availability of donor lungs and livers for transplantation.

Using Genomics to Improve Patient Outcomes

UHN's Drs. Suzanne Kamel-Reid and Shaf Keshavjee were collectively awarded $12 million through Genome Canada's GAPP Program and industry partners. Dr. Kamel-Reid will partner with LifeLabs Medical Laboratory Services to develop a national framework for the large-scale genomic analysis of tumours. Dr. Keshavjee will partner with Lung Bioengineering Inc. to develop a genomic-based test for donor lungs to be used for transplants. These two projects, which represent half of all awards granted nationally, will leverage cutting-edge genomic technologies to improve patient outcomes.



Ontario Funding for Fixing Hearts and Brains

New funding was awarded this year to innovative research projects through the competitive Ontario Research Fund Research Excellence program. Dr. Jonathan Brotchie will partner with Junaxo Inc. to find new treatments for non-motor problems in Parkinson disease through the development of new models of the disease; this project was awarded over $1.4 million. Dr. Ren-Ke Li's project, in partnership with CReATe Program Inc., will focus on producing clinical-grade umbilical cord tissue-derived perivascular cells to repair the damaged heart, and was awarded over $1.2 million.

Year in Discovery

A selection of research publications from UHN

Research discoveries spark new insights into health and disease

Treatment Slows Emphysema

Emphysema is a chronic and progressive disease that affects the lungs and leads to severe shortness of breath; it has limited treatment options and a poor prognosis. Augmentation therapy is one long-standing option for hereditary emphysema treatment, but it has been used sparingly because of a lack of evidence supporting its effectiveness; however, the results of a clinical trial conducted by Dr. Kenneth Chapman and his team provides compelling evidence that augmentation therapy indeed slows the progression of hereditary emphysema. Specifically, Dr. Chapman and his colleagues found that two years of augmentation therapy significantly reduced emphysema-associated lung damage. *Chapman KR, et al. Lancet. 2015 Jul.*

From Stem Cells to Livers

Bile ducts are structures in the liver that secrete bile to help with digestion. The ducts are lined with cells called cholangiocytes; when these cells malfunction, liver damage occurs and a transplant is usually needed. Although bile duct disorders are a well-known cause of liver disease, the events that lead to the malfunction of these cells are not fully understood. A team led by Drs. Anand Ghanekar, Gordon Keller, Shinichiro Ogawa and Binita Kamath (SickKids) recently discovered how to turn stem cells into bile duct cells. Equipped with this new method, the team will be able to uncover what leads to cholangiocyte malfunctioning and develop new therapies for liver diseases. *Ogawa M, et al. Nat Biotechnol. 2015 Jul.*

Mini-Strokes Cause Dementia

White matter is the communication highway of the brain. The progressive loss of white matter, known as leukoaraiosis, is associated with dementia. Despite being an important factor in the disease, little is known about how white matter degeneration occurs. Using magnetic resonance imaging brain scans, Dr. Daniel Mandell and his team discovered that the location of a series of otherwise undetectable mini-strokes perfectly predicted where loss of white matter later occured in study participants. Accordingly, the research team concluded that mini-strokes may cause dementia. Tracking how quickly mini-strokes occur could improve physicians' diagnostic abilities and allow them to provide preventative treatments before dementia develops. *Conklin J, et al. Ann Neurol. 2014 Oct.*

Tumour Stop-and-Go Signal

Tumour growth and metastasis are dependent not only on the properties of the tumour itself, but also on the features of the surrounding normal tissue. For instance, cells in the normal tissue environment can transform into a type of cell that supports cancer growth, known as a cancer-associated fibroblast (CAF). How a normal cell becomes a CAF cell has been poorly understood until now. Dr. Rama Khokha and her team found that the TIMP family of proteins holds the key: removing TIMPs from normal cells encouraged tumour development. This study suggests that restoring TIMP function in the normal tissue environment may restrict tumour growth and prevent it from spreading to other body parts. *Shimoda M, et al. Nat Cell Biol. 2014 Sep.*

Antioxidants Aid Tumour Growth

The role of antioxidants in cancer is highly controversial: some studies show that antioxidants benefit health, while others show that they are harmful. New findings from Dr. Tak Mak add to this controversy. He and his team promoted cancer cell death by inhibiting the production of two antioxidants. Dr. Mak explains that when cells grow and divide, they produce harmful oxidative byproducts; as cancer cells grow very quickly, they produce high levels of these byproducts. If cancer cells need antioxidants to survive and grow, then turning off antioxidant production may provide a new target for anti-cancer drug development. *Harris IS, et al. Cancer Cell. 2015 Feb.*

New Lungs Benefit Older Patients too

A lung transplant involves a surgical procedure whereby a damaged lung is replaced with a healthy one. Unfortunately, there is limited availability of donor lungs for transplant, so it is critical to identify patients who are most likely to benefit. Older patients are less likely to be eligible for transplantation because they may have other health problems and a shorter life expectancy after the procedure. However, Dr. Lianne Singer and her team recently found that young and old patients' quality of life improved similarly after the procedure. Dr. Singer's research will also enable physicians to better inform transplant candidates about what they can expect post-transplant. *Singer LG, et al. Am J Respir Crit Care. 2015 Jul.*

Discoveries to Reality

Real-life applications born from UHN research

The application of research advancements leads to improved health care

Northern Biologics Strikes a Deal

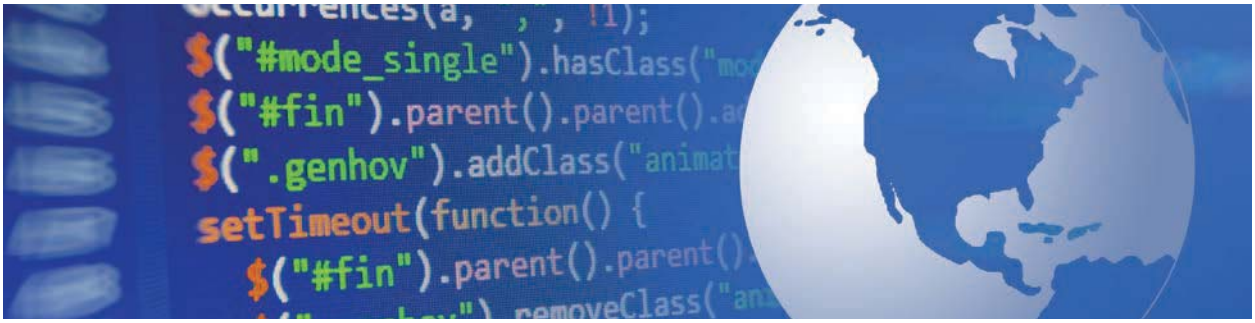
Northern Biologics, a privately held company founded in 2014 by scientists at UHN (Drs. Bradly Wouters, Robert Rottapel and Benjamin Neel) and the University of Toronto (Drs. Sachdev Sidhu and Jason Moffat), entered into a strategic collaboration with Celgene Corp., a multinational biopharmaceutical company headquartered in New Jersey.

The deal includes a $30 million up-front cash payment to Northern Biologics, which will fund the discovery and development of first-in-class therapeutic antibodies for oncology and fibrosis. Celgene will have options to license the work and the right to acquire Northern Biologics upon the conclusion of the collaboration.

Dr. Wouters comments, "Celgene's investment will accelerate the development of targeted biologics for personalized cancer medicine. This support highlights the commercialization opportunities that derive from direct investments in basic research as well as the synergy within the founding team of scientists."

Northern Biologics was launched by Blueline Bioscience, a Canadian biotechnology incubator backed by venture capital firm Versant Ventures.

This is the type of innovative company that can be built when world-class science is supported by entrepreneurial venture capital investors



AQUA set for Global Distribution through Eleckta Ltd.

UHN and its spin-off company, Acumyn Inc., secured an exclusive development and global distribution agreement with Elekta Ltd., one of the world's largest radiation therapy companies.

The agreement will see UHN's award-winning AQUA software platform developed into a marketable product by Acumyn and then offered to cancer clinics around the world by Elekta Ltd. AQUA coordinates and centralizes the quality assurance tests that need to be performed in a radiotherapy clinic, helping to manage the complexity of these testing requirements.

In use for the past two years at the PM Cancer Centre, AQUA is a vendor-neutral product that has successfully connected, calibrated and managed over 20 of UHN's radiation therapy machines. It was originally developed and clinically implemented by Drs. David Jaffray and Daniel Létourneau.

Hitting the Target with DART

Techna's Health Informatics Research team has successfully licensed the Distress Assessment Response Tool (DART) to the Rossy Cancer Network as part of the Improving Patient Experience and Health Outcomes Collaborative (iPEHOC) project. DART, which is a computer-based survey that assesses a patient's overall well-being, has been fully translated into French. Translation capabilities were built into its platform for ease of extending it later to support other languages. It is now the standard of care at PM Cancer Centre, and will be incorporated into iPEHOC to collect a standardized set of patient-reported outcome measures to help improve clinical practice.

UHN's 2014 Inventor of the Year

Dr. Milos Popovic was selected as the recipient of the 2014 UHN Inventor of the Year. Dr. Popovic received the award for his groundbreaking rehabilitation research, which led to the creation of a new medical therapy called MyndMove™. This innovative product, which is now licensed by the Mississauga-based biotech company MyndTec, helps patients to regain their ability to control voluntary arm and hand movements after stroke or spinal cord injury. MyndMove™ has been approved for use in Canada and is available at designated clinics across Ontario.

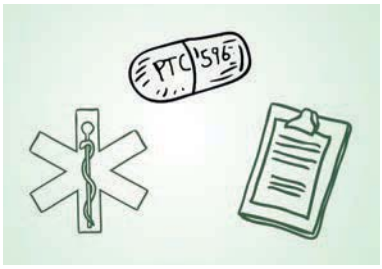
Research Events

Partnering for Better Care

PM Cancer Centre and the Vall d'Hebron Institute of Oncology, Barcelona signed an agreement to share information about patient care, research and education. The partnership is meant to stimulate cancer research innovation by encouraging academic collaborations and facilitating exchange visits.

New Health Care Cloud

UHN and SickKids joined forces to create HPC4Health, a service that provides secure cloud-based high performance computing to researchers and clinicians, while protecting patient privacy. This dynamic computational resource is designed to support the translation of huge volumes of data into better health care for patients.



Canada-First Clinical Trial

PTC Therapeutics launched a trial at PM Cancer Centre to evaluate the safety of a drug developed by Dr. John Dick and his collaborators, called PTC596, which specifically targets cancer stem cells. The trial is a critical first step in the effort to bring this innovative and potentially life-saving treatment to the clinic.

UHN Joins NCI Network

Dr. David Jaffray's research team was selected to join the US National Cancer Institute's Quantitative Imaging Network, which is designed to promote the development of quantitative imaging methods for measuring tumour response to therapies. Dr. Jaffray's group is one of only two Canadian teams to receive such an honour.

Award for Global Impact

Dr. Jenny Heathcote, former Senior Scientist at the Krembil Research Institute, was the recipient of the 2015 UHN Global Impact Award. The award recognizes her seminal research on viral hepatitis, liver disease and cirrhosis as well as her dedication to building a world-renowned liver treatment and research centre at UHN.

The Power of Three

A new partnership was formed between UHN, the University of Toronto and SickKids to enable development of treatments for a rare disease known as Rett syndrome. Dr. James Eubanks will serve as the UHN lead investigator and will provide valuable experimental models of Rett Syndrome that were developed in his lab.

Research Distinctions

Selected honours bestowed upon UHN researchers

Dr. Dina Brooks
International Service Award, World Confederation for Physical Therapy

Dr. Angela Colantonio
2015 Robert L. Moody Prize, University of Texas Medical Branch, School of Health Professions

Dr. Michael Farkouh
2015 Jan J. Kellermann Memorial Award, International Academy of Cardiology

Dr. Michael Fehlings
2015 Thomas Whitecloud Award, Scoliosis Research Society

Dr. John Floras
Fellow, Canadian Academy of Health Sciences

Dr. Brenda Gallie
Member, Order of Canada

Dr. Mary Gospodarowicz
2014 American Society of Therapeutic Radiation Oncology Gold Medal

Officer, Order of Canada

Dr. Patrick Gullane
Member, Order of Ontario

Dr. Susan Jaglal
Fellow, Canadian Academy of Health Sciences

Dr. Shaf Keshavjee
Officer, Order of Canada

Dr. Jay Keystone
Member, Order of Canada

Dr. Rama Khokha
Robert L. Noble Prize, Canadian Cancer Society

Dr. Tony Lam
Tier 2 Canada Research Chair in Obesity (renewal)

Dr. Gary Levy
Member, Order of Ontario

Dr. Tak Mak
Tier 1 Canada Research Chair in Inflammation Responses and Traumatic Injury (renewal)

Dr. Hans Messner
Member, Order of Ontario

Dr. Kieran Murphy
2015 Leaders in Innovation Award, Society of Interventional Radiology Foundation

Dr. Benjamin Neel
Tier 1 Canada Research Chair in Signal Transduction and Human Disease (renewal)

Dr. Linda Penn
Tier 1 Canada Research Chair in Molecular Oncology (renewal)

Dr. Leonardo Salmena
Tier 2 Canada Research Chair in Signal Transduction and Gene Regulation in Cancer

Dr. Michael Sefton
Member, National Academy of Medicine

Dr. Frances Shepherd
2015 Claude Jacquillat Award, International Congress on Anti-Cancer Treatment

Dr. Elise Stanley
Tier 1 Canada Research Chair in Molecular Brain Science (renewal)

Member, Johns Hopkins Society of Scholars

Dr. Ming-Sound Tsao
Mary J. Matthews Pathology/ Translational Research Award, International Association for the Study of Lung Cancer

Dr. David Urbach
2014-15 CIHR-IHSPR Article of the Year Award, CIHR Institute of Health Services and Policy Research

Dr. Padraig Warde
Honorary Fellow, Faculty of Radiologists of the Royal College of Surgeons in Ireland

Dr. David Warr
President of the Multinational Association of Supportive Care in Cancer

UHN Foundations

Arthritis Research Foundation

The Princess Margaret Cancer Foundation

Toronto General & Western Hospital Foundation

Toronto Rehab Foundation

UHN Foundations

Arthritis Research Foundation

The Power of Movement

On March 8, 2015, the Arthritis Research Foundation hosted Canada's largest yoga fundraiser—with 15 locations participating nationwide, including yoga studios, fitness clubs, ballrooms and school gyms. Participants of all ages and walks of life came together to enjoy special yoga sessions and raise funds to support the Arthritis Research Foundation, as well as increase the awareness of arthritis and related autoimmune diseases.

Arthritis has an enormous impact on quality of life, with extended periods of pain and suffering that can last a lifetime. Arthritis and autoimmune conditions account for over 10% of the economic burden of disease in Canada, one of the drivers behind the Arthritis Research Foundation's commitment to support research.

Participants in events like the *Power of Movement* donate with the hope that one day there will be a cure to this debilitating group of diseases, as well as for the experience of the event itself.

"What an amazing day! We heard inspiring and motivational speeches from people whose lives were affected by arthritis and autoimmune disease. The instructors did an incredible job at helping us to bend in ways we didn't know we could. My friend and I are new to the yoga scene and we will definitely be bringing more people back next year," said one of the participants in Ottawa.

Since its inception, *Power of Movement* has raised close to $2 million to support leading-edge research for arthritis and related autoimmune diseases like rheumatoid arthritis, lupus, psoriatic arthritis and scleroderma, to name a few. Through events like this, the Arthritis Research Foundation will continue to support priority research areas—such as personalized medicine, imaging inflammation and finding out why women get these diseases more often than men.

Photo: Participants at the annual Power of Movement fundraising event.

The Princess Margaret Cancer Foundation

Fundraising Campaign Focused on WHY

On June 25, 2015, The Princess Margaret Cancer Foundation launched a $50 million campaign to accelerate biomedical research that seeks to understand *WHY*. The five pillars of the campaign (listed below in italics) highlight the breadth of research programs led by PM Cancer Centre researchers who are:

- Finding the root of cancer by studying *stem cells in cancer*;
- Priming the immune system to fight cancer through *immunotherapy*;
- Getting the complete picture of cancer through *tumour biology and imaging*;
- Breaking the code of cancer through *cancer genomics, epigenetics and bioinformatics*; and
- Digging deeper in *bio discovery and drug development*.

The *WHY* campaign is part of the Foundation's *Billion Dollar Challenge* to raise the funds needed to be a global leader in advancing research and patient care in personalized cancer medicine. The Foundation and PM Cancer Centre researchers are working together to raise $1 billion through philanthropy and research grants over five years. In April 2015, marking the end of the third year of the *Challenge*, they had secured over $656 million.

To date, the philanthropic support provided by the *Billion Dollar Challenge* has helped PM Cancer Centre to recruit some of the best and brightest minds in cancer research from around the globe. Their expertise, combined with that of the Centre's world-leading researchers, will shed further light on the complexities of cancer in the newly named Princess Margaret Cancer Research Tower.

"Though our work is far from over, we remain optimistic because we have the expertise to lay the groundwork for important progress in the years ahead," says Dr. Bradly Wouters, Interim Research Director of the PM Cancer Centre.

Left photo: Dr. Tak Mak speaking during the WHY campaign launch. Right photo: Staff and campaign supporters standing outside of the PM Cancer Research Tower (photos courtesy of Michael T Photography & Design Inc.)

Toronto General & Western Hospital Foundation

Every Promise Comes from the Heart

On November 20, 2014, the Rogers Family made an incredible $130 million commitment to UHN, SickKids and the University of Toronto. This gift—the largest single gift ever towards a Canadian health initiative—was used to create the Ted Rogers Centre for Heart Research: a first-of-a-kind centre that brings together research in individualized genomic medicine, stem cells, bioengineering and cardiovascular treatment.

The landmark gift was announced by Loretta Rogers, wife of the late Ted Rogers. "We're thrilled to be able to bring the Centre to life. It's a testament to Ted's drive for innovation and his commitment to leaving the world a better place." Ted Rogers' personal experience with cardiac disease and his interest in finding new therapies to advance heart health make the Ted Rogers Centre for Heart Research a fitting legacy for a true Canadian pioneer.

TGRI Director Dr. Mansoor Husain was appointed Interim Executive Director of the Centre. He will set a roadmap to ensure that the Centre moves forward with its goal of reducing hospitalizations from heart failure by 50 percent within the next 10 years. "We need to consider whether earlier detection and prevention of heart failure is possible," he explained. "This means deeper enquiry into the underlying causes and precipitants. For example, why is a person alright on Sunday and then sick on Monday? What set off their episode of heart failure?"

Approximately $47 million of the Rogers' gift will come through the Foundation, making it the largest single gift in the Foundation's history. Tennys Hanson, President and CEO of the Toronto General & Western Hospital Foundation, says, "This announcement is wonderful news not only for our clinicians and researchers within the Peter Munk Cardiac Centre and the McEwen Centre for Regenerative Medicine, but also for Canada."

Photo (L-R): Martha Rogers, Dr. Bernie Gosevitz (TGWHF Board Member), Alan Horn (Rogers Communications Board Chair), Loretta Rogers, Dr. Barry Rubin (Medical Director, Peter Munk Cardiac Centre) and Edward Rogers. Photo courtesy of Ryan Emberley.

Toronto Rehab Foundation

Online Tools for Healthy Living

Research at the Toronto Rehabilitation Institute (TRI) is focused on helping people live active, healthier and more independent lives. This aim has driven TRI to create a wealth of health-related knowledge for Canadians, who are facing more health challenges than ever before.

As Canada's aged population increases, the leading causes of death are shifting from infectious and acute diseases to chronic and degenerative diseases.

This change demands a global focus on encouraging healthy lifestyles. With generous donor funding, TRI is addressing this issue by developing an online platform known as *Health E-University* to share knowledge with the world.

Health-E University will share best practices for the management and prevention of chronic diseases and will include interactive e-learning modules with webcasts, videos and blogs, as well as social and expert forums. Under the umbrella of the *Health-E University*, TRI is developing three digital 'Colleges'. The first of these, known as Cardiac College (www.cardiaccollege.ca), has already been launched and represents a world-first approach to empower people to adopt heart-healthy lifestyles.

"We firmly believe that individuals with chronic illness have the power to take control of their own health through lifestyle changes," says Dr. Paul Oh, Medical Director of the UHN Cardiovascular Prevention and Rehabilitation Program.

Cardiac College was launched through support from the annual *On Track to Cardiac Recovery* event, which has raised over $1.5 million to date. Longo's Family Charitable Foundation has also generously partnered with TRI to develop the Cardiac College Healthy Eating program, which helps people make better nutritional choices.

These initiatives demonstrate how the generosity of donors and corporate partners enable TRI researchers to translate important findings into powerful health tools for Canada and the world.

Photo (L-R): Rosanne Longo, Chair, Longo's Family Charitable Foundation and Dr. Paul Oh.

UHN Research Institutes

Krembil Research Institute

Princess Margaret Cancer Centre

Techna Institute

Toronto General Research Institute

Toronto Rehabilitation Institute

Krembil Research Institute*

*formerly the Toronto Western Research Institute

Research Space	**161,396 sq. ft.**
External Funding	**$44,528,119**
Publications	**855**
Senior Scientists	36
Scientists	10
Affiliate Scientists	21
Emeritus	2
Total Appointed Researchers	**69**
Clinical Researchers	208
Total Researchers	**277**
Fellows	59
Graduate Students	90
Total Trainees	**149**
Total Staff	**275**

Research Council

Director and Chair, Krembil Research Council Donald Weaver
Division Head, Brain, Imaging & Behaviour – Systems Neuroscience Karen Davis
Division Head, Fundamental Neurobiology Peter Carlen
Division Head, Genetics & Development James Eubanks
Division Head, Health Care & Outcomes Research Elizabeth Badley
Division Head, Patient-based Clinical Research TBD
Division Head, Vision Science Valerie Wallace
Clinical Representative, Krembil Neuroscience Program Vera Bril
Clinical Representative, Musculoskeletal Health & Arthritis Program Robert Inman
Clinical Representative, Musculoskeletal Program Nizar Mahomed
Chair, Trainee Affairs Committee Frances Skinner
Executive Director, Research Operations Lisa Alcia
Senior Vice President, UHN and Executive Lead, TWH Katherine Sabo
Executive Vice President, Science and Research Christopher Paige

Researchers

Brain, Imaging & Behaviour-Systems Neuroscience

Senior Scientists
Jonathan Brotchie
Robert Chen
Karen Davis
William Hutchison
Sidney Kennedy
Andres Lozano
Mary Pat McAndrews
David Mikulis
Antonio Strafella
Scientists
Jonathan Downar
Mojgan Hodaie
Affiliate Scientists
Jonathan Dostrovsky
Mark Guttman
Walter Kucharczyk

Fundamental Neurobiology

Senior Scientists
Peter Carlen
Frances Skinner
Shuzo Sugita
Michael Tymianski
Donald Weaver
Scientists
Jérémie Lefebvre
Ivan Radovanovic
Affiliate Scientists
Herbert Gaisano
Magdy Hassouna
Taufik Valiante
Liang Zhang
Georg Zoidl

Genetics & Development

Emeritus
Charles Tator
Senior Scientists
Cathy Barr
James Eubanks
Michael Fehlings
Robert Inman
Philippe Monnier
Lyanne Schlichter
Elise Stanley
Florence Tsui
Joan Wither

Scientists
W Mark Erwin
Lorraine Kalia
Suneil Kalia
Mohit Kapoor
Armand Keating
Affiliate Scientists
Nigil Haroon
Arjun Sahgal

Health Care & Outcomes Research

Emeritus
Murray Urowitz
Senior Scientists
Elizabeth Badley
J David Cassidy
Aileen Davis
Dafna Gladman
Nizar Mahomed
Affiliate Scientists
Vinod Chandran
Cheryl Cott
Paul Fortin
Monique Gignac
Rosemary Martino

Patient-based Clinical Research

Senior Scientists
Anthony Lang
Colin Shapiro

Vector Core

Senior Scientist
Jeffrey Medin

Vision Science

Senior Scientists
Christopher Hudson
Martin Steinbach
Graham Trope
Valerie Wallace
Agnes Wong
Scientist
Jeremy Sivak
Affiliate Scientists
Moshe Eizenman
John Flanagan
Brenda Gallie
Elizabeth Irving
Frances Wilkinson

Clinical Researchers

Ronit Agid
Jamil Ahmad
Zareen Ahmad
Sabrina Akhtar
Dimitrios Anastakis
Danielle Andrade
Kyle Anstey
Rena Arshinoff
Brian Baker
Carol Banez
Mark Bernstein
Anuj Bhatia
Ruth Bittorf
Jeff Bloom
Claire Bombardier
Arthur Bookman
Rod Bremner
Michael Brent
Natasha Briggs
Vera Bril
Richard Brull
Leslie Buckley
Esther Bui
Yvonne Buys
Simon Carette
Aleesa Carter
Leanne Casaubon
Saulo Castel
Rodrigo Cavalcanti
Jas Chahal
Clara Chan
Sylvia Chan
Vincent Chan
Kenneth Chapman
Caroline Chessex
Angela C Cheung
Angela M Cheung
Ki Jinn Chin
Bryan Chung
Frances Chung
Sharon Chung
Maria Cino
Natalie Clavel
Melanie Cohn
Adrian Crawley
Paula Cripps-McMartin
Michael Cusimano
Timothy Daniels
Sherry Darling
J Roderick Davey
J Martin del Campo
Marie Dennis
Robert Devenyi
Nicholas Diamant
Marc Doucet
Aaron Drucker
Catharine Duncan
Dean Elterman
Richard Farb
Alfonso Fasano
Susan Fox
Steven Friedman
David Frost
Kenneth Fung
Rajiv Gandhi
Frederick Gentili
Alberto Goffi
Eyal Golan
Ewan Goligher
Esther González
Allan Gordon
Robert Gordon
Brent Graham
Clement Hamani
Raed Hawa
Christopher Hawke
Jennifer Hou
R Mark Iwanochko
Timothy Jackson
Cheryl Jaigobin
Harry Janssen
Sindhu Johnson
Benjamin Kaasa
Sukhvinder Kalsi-Ryan
Rita Kang
Moira Kapral
Patti Kastanias
Hans Katzberg
Ron Keren
Edward Keystone
Kyle Kirkham
Matthew Klingenberg
Paul Kongkham
Timo Krings
Richelle Kruisselbrink
Debbie Kwan
Jeffrey Kwong
Jan Lackstrom
Robert Lam
Wai-Ching Lam
Carolina Landolt-Marticorena
Johnny Lau
Jason Lazarou
Stephen Lewis
Joel Lexchin
Reuven Lexier
Louis Liu
Jodi Lofchy
Charles Lynde
Kirk Lyon
Angela Mailis
Efrem Mandelcorn

Mark Mandelcorn
Daniel Mandell
Pirjo Manninen
Katie Marchington
Samuel Markowitz
Connie Marras
Theodore Marras
K Wayne Marshall
Eric Massicotte
Lakshmi Matmari
Steven McCabe
Heather McDonald-Blumer
Roger McIntyre
Rebecca Moga
Rakesh Mohankumar
Sharon Munawa
Renato Munhoz
Ali Naraghi
Ahtsham Niazi
Christine Novak
Ivy Oandasan
Darrell Ogilvie-Harris
Allan Okrainec
Daniel Panisko
Sagar Parikh
Laura Passalent
Philip Peng
Todd Penner
Vitor Pereira
Anahi Perlas
Anthony Perruccio
Aleksandra Pikula
Atul Prabhu
Arun Prasad
Fayez Quereshy
Sidney Radomski
Yoga Raja Rampersaud
Sapna Rawal
Joyce Reardon
Lisa Richardson
Sandra Robinson
David Rootman
Cheryl Rosen
David Salonen
Jorge Sanchez-Guerrero
Paul Sandor
Chanth Seyone
Hemant Shah
Mohammed Shamji
Maureen Shandling
Abdu Sharkawy
Satyendra Sharma
Sushil Sharma
Sanjay Siddha
Frank Silver
Martin Simons
Jeffrey Singh
Allan Slomovic
Elizabeth Slow
Roger Smith
Sumeet Sodhi
Andrew Sparrow
Peter St George-Hyslop
Matthew Stanbrook
Amanda Steiman
Khalid Syed
Peter Tai
David Tang-Wai
Susan Tarlo
Carmela Tartaglia
Maria Tassone
Marlene Taube-Schiff
Karel terBrugge
Kelvin Tomas
Diana Toubassi
Zahi Touma
Karen Tu
Christian Veillette
Andrea Veljkovic
Lashmi Venkatraghavan
Jason Volling
Herbert von Schroeder
Wei Wang
Richard Wennberg
Mary Wilcox
Marianne Williams
Robert Willinsky
David Wong
David T Wong
Jean Wong
Erin Yeates
Colina Yim
Eric Yu
Gelareh Zadeh
Noe Zamel
Mateusz Zurowski

Princess Margaret Cancer Centre

Research Space	**388,588 sq. ft.**
External Funding	**$148,134,228**
Publications	**1,185**
Senior Scientists	50
Scientists	17
Affiliate Scientists	14
Assistant Scientists	3
Total Appointed Researchers	**84**
CCRU Members	315
Total Researchers	**399**
Fellows	238
Graduate Students	212
Total Trainees	**450**
Total Staff	**832**

Research Council on Oncology (RCO)

Director, PM Cancer Centre; Chair, RCO; Chair, Executive Committee Bradly Wouters (interim)
Executive Committee Mitsuhiko Ikura, Rama Khokha, Pamela Ohashi, Gary Rodin, Aaron Schimmer, Vuk Stambolic, Ming-Sound Tsao, Brian Wilson, Gang Zheng
Chair, Appointments Committee Rama Khokha
Medical Director, Cancer Program Mary Gospodarowicz
Medical Director, Laboratory Medicine Program TBD
Head, CCRU Amit Oza
Head, Medical Oncology and Hematology Amit Oza (interim)
Head, Radiation Medicine Fei-Fei Liu
Chief, Surgical Oncology Jonathan Irish
Executive Director, Research Operations Lisa Alcia
Senior Vice President, UHN and Executive Lead, PM Cancer Centre Marnie Escaf
Executive Vice President, Science and Research Christopher Paige

Researchers

Senior Scientists
Kenneth Aldape
Cheryl Arrowsmith
Sylvia Asa
Norman Boyd
Robert Bristow
David Brooks
Avijit Chakrabartty
Gerald Devins
John Dick
Shereen Ezzat
Lucia Gagliese
Razqallah Hakem
David Hedley
Richard Hill
Naoto Hirano
Doris Howell
Mitsuhiko Ikura
Norman Iscove
David Jaffray
Igor Jurisica
Gordon Keller
Rama Khokha
Thomas Kislinger
Lothar Lilge
Fei-Fei Liu
Geoffrey Liu
Mathieu Lupien
Tak Mak
Tracy McGaha
Jeffrey Medin
Mark Minden
Senthil Muthuswamy
Benjamin Neel
Pamela Ohashi
Emil Pai
Christopher Paige
Linda Penn
Gilbert Privé
Brian Raught
Gary Rodin
Robert Rottapel
Aaron Schimmer
Vuk Stambolic
James Till
Ming-Sound Tsao
I Alex Vitkin
Brian Wilson
Bradly Wouters
Gang Zheng
Camilla Zimmermann

Scientists
Laurie Ailles
Scott Bratman
Steven Chan
Ralph DaCosta
Daniel De Carvalho
Kim Edelstein
Benjamin Haibe-Kains

Housheng Hansen He
Michael Hoffman
Jennifer Jones
Marianne Koritzinsky
Nadeem Moghal
Catherine O'Brien
Trevor Pugh
Michael Roehrl
Rodger Tiedemann
Gelareh Zadeh

Assistant Scientists
Toshiyuki Araki
Zhenyue Hao
Lakshmi Muthuswamy

Affiliate Scientists
Eric Xueyu Chen
Mary Jane Esplen
Anthony Joshua
C Anne Koch
Malcolm Moore
Michael Moran
Michael Reedijk
Paul Ritvo
Leonardo Salmena
Michael Sherar
Suzanne Trudel
Jean Wang
Julia Wang
Wei Xu

Cancer Clinical Research Unit (CCRU)

Ayman Al Habeeb
Hamideh Alasti-Hamed
Zishan Allibhai
Dominick Amato
Eitan Amir
Susan Armel
Mostafa Atri
Michael Baker
Lynda Balneaves
Subrata Banerjee
David Barth
Eric Bartlett
Andrew Bayley
Nathan Becker
Philippe Bedard
J Robert Beecroft
Akbar Beiki-Ardakani
Meaghen Beresford
Hal Berman
Marcus Bernardini
Lori Bernstein
Mark Bernstein
Andrea Bezjak
Jean-Pierre Bissonnette
Ivan Blasutig
Scott Boerner
Jette Borg
Penelope Bradbury
Anthony Brade
Donald Branch
Stephen Breen
William Brien
James Brierley
Dale Brown
John Bryson
Ronald Burkes
Peter Burns
Marcus Butler
Marco Carlone
Angela Cashell
Charles Catton
David Cescon
Hong Chang
William Chapman
Tanya Chawla
Christine Chen
Terry Cheng
Douglas Chepeha
Runjan Chetty
Carol Cheung
Frederick Cheung
Charles Cho
John Cho
Young-bin Cho
James Chow
Caroline Chung
Peter Chung
Tae Bong Chung
Tulin Cil
Blaise Clarke
Sean Cleary
Tatiana Conrad
Catherine Coolens
Timothy Craig
Andrea Crespo
R Michael Crump
Pavel Crystal
Christine Cserti-Gazdewich
Bernard Cummings
Marcelo Cypel
Gilda da Cunha Santos
Norma D'Agostino
Andrei Damyanovich
Gail Darling
Laura Dawson
John de Almeida
Marc de Perrot
Jan Delabie
Rochelle Demsky
Neesha Dhani
Eleftherios Diamandis
Colleen Dickie
Robert Dinniwell
Catherine Dirks
Jason Dodge
Susan Done
James Downar
Hemi Dua
Alexandra Easson
Saibishkumar Elantholi Parameswaran
Mary Elliott
Christine Elser
Jaime Escallon
Andrew Evans
Hannaneh Faghfoury
Ronald Feld
Louis Fenkell
Peter Ferguson
Sarah Ferguson
Carina Feuz
Antonio Finelli
Peter Fitzgerald
Neil Fleshner
Jeremy Freeman
Audrey Friedman
Anthony Fyles
Steven Gallinger
William Geddie
Frederick Gentili
Sandeep Ghai
Sangeet Ghai
Danny Ghazarian
Ralph Gilbert
Caitlin Gillan
Connie Giordano Ziembicki
Meredith Giuliani
Rebecca Gladdy
David Goldstein
Mary Gospodarowicz
Rashmi Goswami
Anand Govindarajan
David Grant
David Green
Paul Greig
Robert Gryfe
Patrick Gullane
Abha Gupta
Vikas Gupta
Sara Hafezi-Bakhtiari
Sarah Hales
Robert Hamilton
Kathy Han
Anthony Hanbidge
Breffni Hannon
Aaron Hansen
Robert Heaton
Aaron Hendler
Mostafa Heydarian
David Hodgson
Stefan Hofer
David Hogg
Andrew Hope

Lorraine Hulley
David Hwang
Elizabeth Hyjek
Jonathan Irish
Mohammad Islam
Hyun-Jung Jang
Raymond Jang
Jeffrey Jaskolka
Michael Jewett
Kartik Jhaveri
John Kachura
Suzanne Kamel-Reid
Zahra Kassam
Edward Kassel
Ebru Kaya
Harald Keller
Erin Kennedy
Vicki Keov
Shaf Keshavjee
Korosh Khalili
Tim-Rasmus Kiehl
Dennis Kim
John Kim
Raymond Kim
Tae Kyoung Kim
Jennifer Knox
Hyang Mi Ko
Vickie Kong
Paul Kongkham
Hatem Krema
Monika Krzyzanowska
Vishal Kukreti
Vathany Kulasingam
Girish Kulkarni
Supriya Kulkarni
Kevin Kuo
John Kuruvilla
Stéphane Laframboise
Catarina Lam
Normand Laperriere
Michelle Lau
Dorothy Lazinski
Natasha Leighl
Wey-Liang Leong
Daniel Létourneau
Wilfred Levin
Madeline Li
Winnie Li
Patricia Lindsay
Jeffrey Lipton
Christopher Lo
Helen Mackay
Miller MacPherson
Ernie Mak
Myles Margolis
Warren Mason
Andrew Matthew
Taymaa May
J Andrea McCart
David McCready
Ian McGilvray
Michael McLean
Andrea McNiven
Maurene McQuestion
Tatiana Melnyk
Cynthia Ménard
Ozgur Mete
Ur Metser
Barbara-Ann Millar
Kim Miller
Naomi Miller
Michael Milosevic
Chantal Morel
Lyndon Morley
Douglas Moseley
Carol-anne Moulton
Anna Marie Mulligan
K Joan Murphy
Kieran Murphy
Rumina Musani
Alice Newman
Pamela Ng
Rinat Nissim
Nancy Olivieri
Martin O'Malley
Anne O'Neill
Brian O'Sullivan
Amit Oza
Sophia Pantazi
Demetris Patsios
Charles Pavlin
Jacob Pendergrast
Bayardo Perez-Ordonez
Stephanie Phan
Andrew Pierre
Anna Porwit
Anca Prica
Thomas Purdie
Fayez Quereshy
Graeme Quest
Albiruni Razak
Donna Reece
Julia Ridley
G Jolie Ringash
Alexandra Rink
Heidi Roberts
Patrik Rogalla
Barry Rosen
Tara Rosewall
Lorne Rotstein
Marjan Rouzbahman
Anabel Scaranelo
Andre Schuh
Matthew Seftel
Jack Seki
Stefano Serra
Michael Sharpe
Patricia Shaw
Nadine Shehata
Frances Shepherd
Lillian Siu
Boraiah Sreeharsha
Srikala Sridhar
Teodor Stanescu
Alexander Sun
D Robert Sutherland
Carol Swallow
Joan Sweet
Eva Szentgyorgyi
Tony Tadic
Jeffrey Tanguay
Ian Tannock
Mojgan Taremi
Bryce Taylor
Santhosh Thyagu
Anne Tierens
Elisabeth Tillier
Ants Toi
Emina Torlakovic
John Trachtenberg
Richard Tsang
Hubert Tsui
Rajkumar Vajpeyi
Theodorus van der Kwast
Monique van Prooijen
Thomas Waddell
John Waldron
Richard Ward
Padraig Warde
David Warr
Alice Wei
Ilan Weinreb
Woodrow Wells
Xiao-Yan Wen
Kirsten Wentlandt
Daniel Winer
Ian Witterick
Jason Wong
Jiahui Wong
Rebecca Wong
Robert Wood
Jay Wunder
Heng (Helen) Yang
Kazuhiro Yasufuku
Karen Yee
Erik Yeo
Ivan Yeung
Bruce Youngson
Eugene Yu
Beibei Zhang
Toni Zhong
Alexandre Zlotta
Juan Carlos Zúñiga-Pflücker

Techna Institute

Research Space	**12,484 sq. ft.**
External Funding	**$11,959,743**
Publications	**275**
Core Leads	9
Scientists	4
Affiliated Faculty	38
Total Researchers	**51**
Fellows	31
Graduate Students	36
Total Trainees	**67**
Total Staff	**37**

Techna Leadership Team

Director, Techna Institute David Jaffray
Director, Clinical Faculty Kieran Murphy
Director, Clinical Processes Howard Abrams
Director, Commercialization Mark Taylor
Director, Knowledge Transfer Nicole Harnett
Director, Operations & Engineering Luke Brzozowski
Director, Research Faculty J Paul Santerre
Executive Vice President, Science and Research Christopher Paige

Researchers

Design & Engineering for Health

Core Lead
Joseph Cafazzo
Affiliated Faculty
James Drake
Anthony Easty
Emily Seto
Patricia Trbovich
Leonard Tse

Guided Therapeutics

Core Leads
Jonathan Irish
David Jaffray
Walter Kucharczyk
Scientists
Margarete Akens
Arash Zarrine-Afsar
Jinzi Zheng
Affiliated Faculty
Dionne Aleman
Jean-Pierre Bissonnette
Timothy Chan
Catherine Coolens
Jonathan Downar
James Drake
Gabor Fichtinger
Justin Grant
Mojgan Hodaie
Andrew Hope
Mohammad Islam
Daniel Létourneau
Andres Lozano
Claire McCann
Cynthia Ménard
Narinder Paul
Thomas Purdie
Dheeraj Rajan
Alexandra Rink
Mohammed Shamji
Michael Sharpe
Michael Sherar
Teodor Stanescu
Robert Weersink
Bernd Wintersperger
Kazuhiro Yasufuku

Informatics & Communications Technology

Core Leads
Igor Jurisica
Peter Rossos
Affiliated Faculty
Brenda Gallie
Alejandro Jadad
Michael Jewett
Gordon Tait
Christian Veillette

Nanotechnology & Radiochemistry

Core Leads
Ur Metser
Gang Zheng
Affiliated Faculty
Shyh-Dar Li
John Valliant

Photonics

Core Lead
Brian Wilson
Scientist
Ralph DaCosta
Affiliated Faculty
I Alex Vitkin

Toronto General Research Institute

Research Space	**237,839 sq. ft.**
External Funding	**$66,533,834**
Publications	**1,394**
Senior Scientists	61
Scientists	34
Affiliate Scientists	46
Assistant Scientist	1
Total Appointed Researchers	**142**
Clinical Researchers	353
Total Researchers	**495**
Fellows	169
Graduate Students	245
Total Trainees	**414**
Total Staff	**496**

Research Council

Director, TGRI; Chair, TGRI Research Council; Division Head (Acting), Experimental Therapeutics Mansoor Husain
Division Head, Advanced Diagnostics Myron Cybulsky
Division Head, Support, Systems & Outcomes David Urbach
Program Medical Director, Peter Munk Cardiac Centre Barry Rubin
Program Medical Director, Transplantation Atul Humar
Surgeon-in-Chief; Program Medical Director, Surgical & Critical Care Shaf Keshavjee
Physician-in-Chief; Program Medical Director, Medical & Community Care Edward Cole
Chair, TGRI Appointments Committee Thomas Waddell
Group Lead, Cardiovascular Douglas Lee
Group Lead, Communities of Health Shabbir Alibhai
Group Lead, Infection & Immunity TBD
Group Lead, Metabolism Michael Wheeler
Group Lead, Respiratory & Critical Care Mingyao Liu
Executive Director, Research Operations Lisa Alcia
Senior Vice President, UHN and Executive Lead, TGH Scott McIntaggart
Executive Vice President, Science and Research Christopher Paige

Researchers

Advanced Diagnostics

Senior Scientists
Johane Allard
Peter Backx
Stuart Berger
Daniel Cattran
Myron Cybulsky
I George Fantus
Eleanor Fish
Joseph Fisher
John Floras
Reginald Gorczynski
Tony Lam
Gary Lewis
Mingyao Liu
Kelly MacDonald
Kumaraswamy Nanthakumar
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Toronto Rehabilitation Institute

Research Space	**64,515 sq. ft.**
External Funding	**$11,696,283**
Publications	**449**
Senior Scientists	24
Scientists	21
Affiliate Scientists	77
Total Appointed Researchers	**122**
Clinical Researchers	4
Total Researchers	**126**
Fellows	60
Graduate Students	167
Total Trainees	**227**
Total Staff	**148**

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Kidney Foundation of Canada
Lawson Health Research Institute
Leidos Biomedical Research
Leukemia & Lymphoma Society
Leukemia & Lymphoma Society of Canada
Li Ka Shing Foundation
Lundbeck Canada
Lung Biotechnology
Lutonix
March of Dimes
MaRS Innovation
Massachusetts General Hospital
Mayo Clinic
McGill University
McGuire Research Institute

McLaughlin-Rotman Centre for Global Health
McMaster University
Medical Council of Canada
MedImmune
Medivation
Medpace
Medtronic
MEI Pharma
Merck
Merrimack Pharmaceuticals
Meso Foundation
Michael J. Fox Foundation for Parkinson's Research
Millennium Pharmaceuticals
Ministry of Health and Long-Term Care
Ministry of Labour
Ministry of Research and Innovation
Mitacs
MolecuLight
Montreal Heart Institute
Mount Sinai Hospital
Movember Australia
MultiCell Technologies
Multiple Myeloma Research Consortium
Multiple Myeloma Research Foundation
Multiple Sclerosis Society of Canada
National Institute of Mental Health
National Institutes of Health
National Multiple Sclerosis Society
National Parkinson Foundation
Natural Sciences and Engineering Research Council of Canada
Nektar Therapeutics
Networks of Centres of Excellence of Canada
NeuroDevNet
New England Research Institutes
Northern Biologics
Northwestern University
Novartis Canada
Novartis Institutes for BioMedical Research
Novo Nordisk
Olympus
OncoEthix
Ontario Brain Institute
Ontario Centres of Excellence
Ontario Clinical Oncology Group
Ontario HIV Treatment Network
Ontario Institute for Cancer Research
Ontario Institute for Regenerative Medicine
Ontario Lung Association
Ontario Mental Health Foundation
Ontario Neurotrauma Foundation
Ontario Stroke Network
Ontario Thoracic Society
Onyx Pharmaceuticals
Ophthotech
Osteoporosis Canada
Otsuka Pharmaceutical
Ottawa Hospital Research Institute
Pancreatic Cancer Canada
Paralyzed Veterans of America Education Foundation
PAREXEL
Parkinson Society Canada
Parkinson's UK
Partners HealthCare
Perimeter Medical Imaging
Perrigo Company
Pfizer
Pharmaceutical Product Development
PharmaNet
Phonak
Physicians' Services Incorporated Foundation
Physiotherapy Foundation of Canada
PKD Foundation
Population Health Research Institute
PRA Health Sciences
Pro Rett Ricerca
Promedior
Promobilia Foundation
Prostate Cancer Canada
Proteomic Methods
Prothena
Queen's University
Quintiles
RaySearch
Research Institute of the McGill University Health Centre
Revalesio
Rick Hansen Foundation
Rick Hansen Institute
Roche Diagnostics
Royal College of Physicians and Surgeons of Canada
Royal College of Surgeons of Edinburgh
Rutgers University
Samuel Waxman Cancer Research Foundation
Sanofi
Seattle Children's Hospital
Sequana Medical
Shire
Sideris Pharmaceuticals
Siemens
Simon Fraser University
SIR Foundation
Smiths Medical
Sogang University
Spina Bifida & Hydrocephalus Association
St. Joseph's Healthcare Hamilton
St. Jude Medical
St. Michael's Hospital
State University of New York
Stem Cell Network
Stem Cell Therapeutics
StemCells
Sunesis
Sunnybrook Health Sciences Centre
Susan G. Komen
Technology Evaluation in the Elderly Network
Terry Fox Research Institute
Terumo Cardiovascular Systems
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The Systemic Lupus International Collaborating Clinics
The W. Garfield Weston Foundation
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Therapure Biopharma
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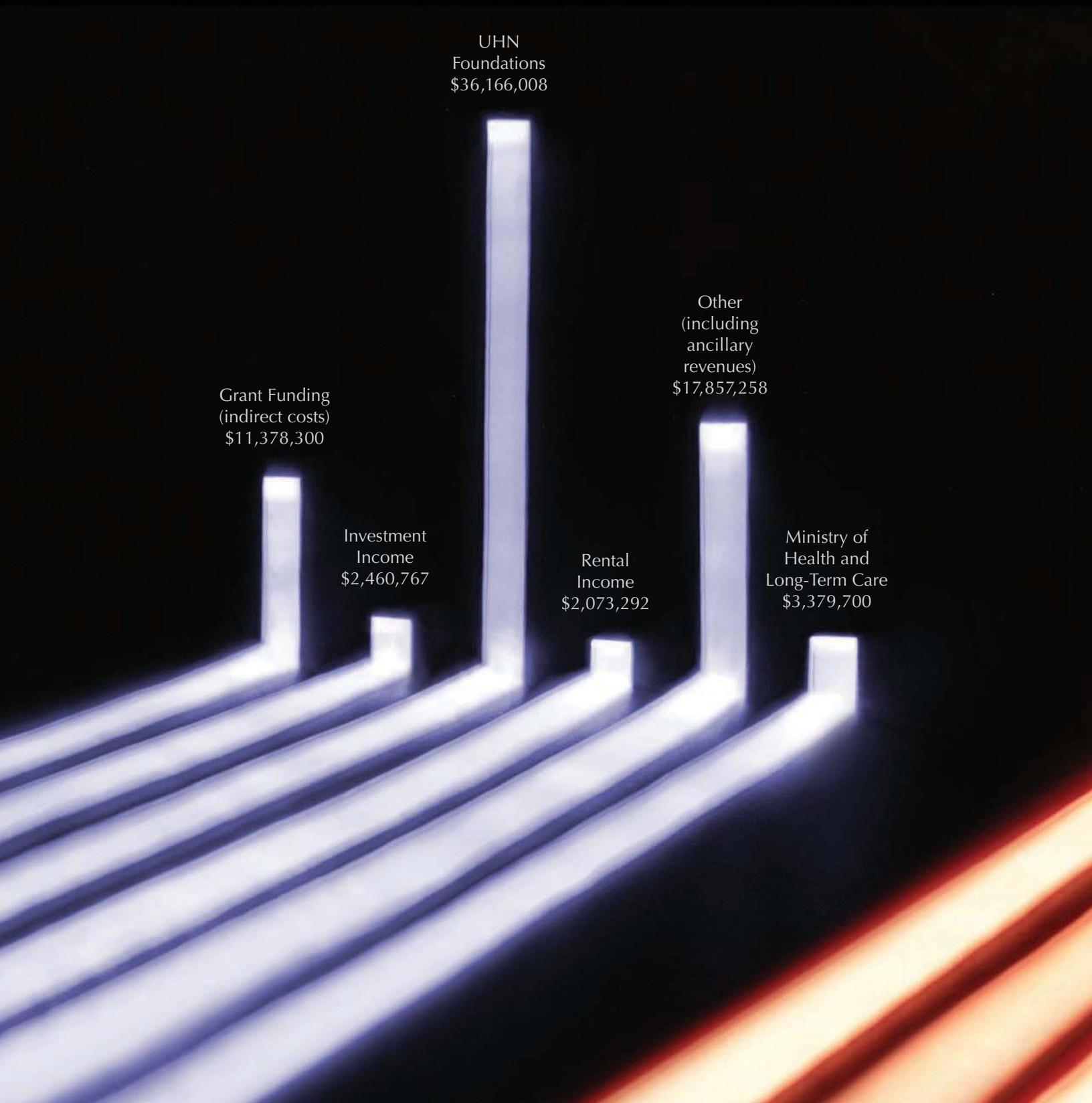
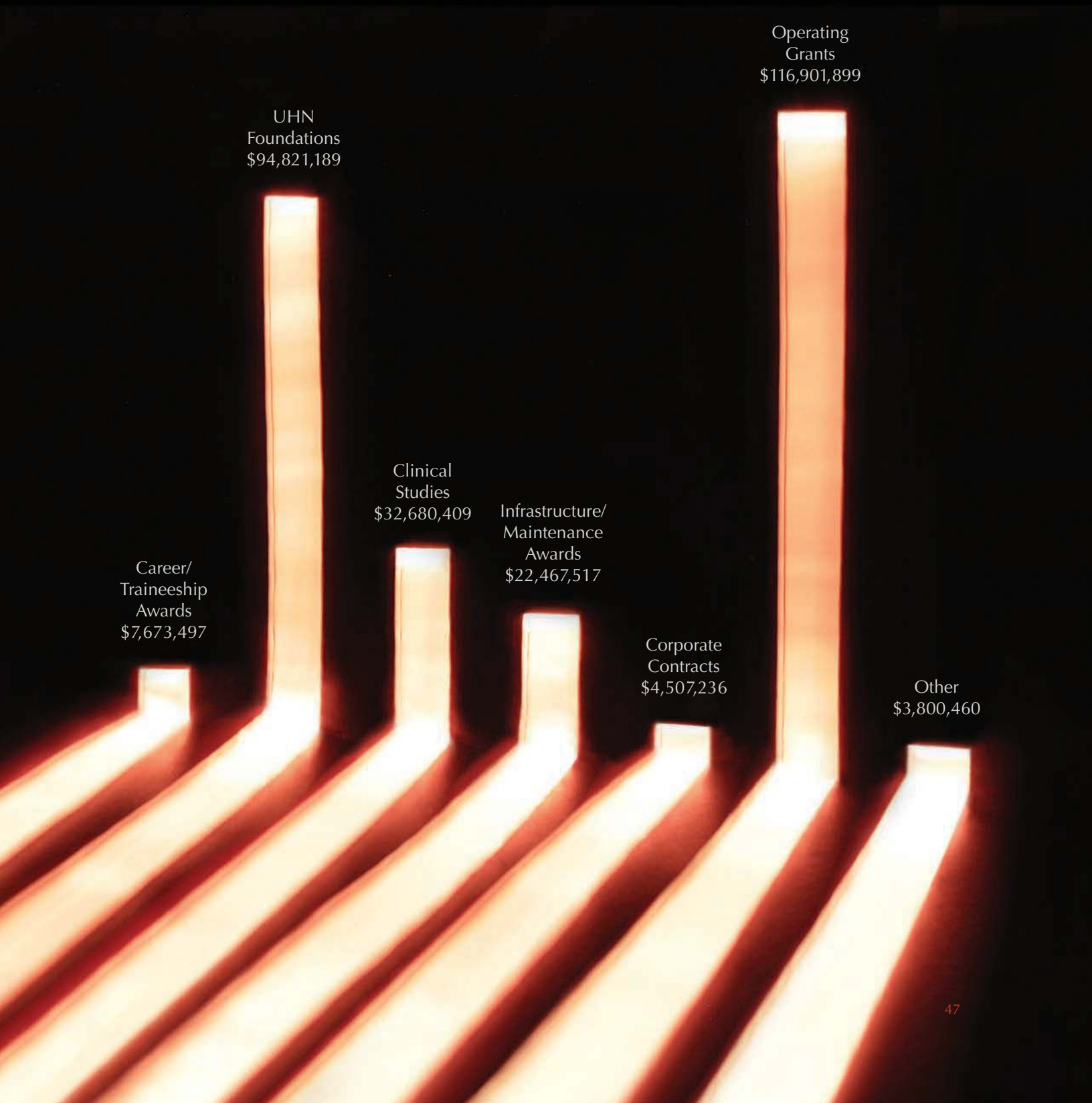
Vertex Pharmaceuticals
Virginia Commonwealth University
VistaGen Therapeutics
Wings for Life
Women's College Hospital
Workplace Safety and Insurance Board
World Scleroderma Foundation
YM Biosciences

Financials 2014/2015

Total Core Research Funding $73,315,325



Total External Project Funding $282,852,207



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On the Cover: This Report's cover features a photograph of a light painting at Cherry Beach, Toronto that captured ignited steel wool as it was spun around (8 second exposure, F9, ISO1000, wide angle lens). The photograph was a collaborative effort of Alexander Knight, Helen Chan, Craig Daniels and Benjamin Pakuts. Shown above are alternative versions of the same process.

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