

Annual Report 2012

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The Banting Research Foundation awards seed grants in all areas of medical research to outstanding new investigators within the first three years of their independent appointment at a university or research institute in Canada.

Message from the Chairman

Few discoveries have transformed human health and societal recognition of the potential of medical research as that of insulin by Sir Frederick Banting. Few discoveries, as well, have generated so rich a legacy and public resonance.

Established in 1925 to apply donations by the young Banting's friends, patients and supporters for the specific purpose of funding innovative investigation with potential similar to insulin 'to alleviate human suffering', The Banting Research Foundation has as its present unique mandate



the provision of peer-reviewed grants to assist similarly independent faculty initiating their careers at a University or Research Institute in Canada who have modest resources but a passion to pursue imaginative, exciting, yet well grounded new lines of medical research.

In Canada, the transition from post-doctoral fellow to independent investigator is no easier now than it was in Banting's era. However, the resources required to initiate new lines of research are often orders of magnitude greater. With national peer-review granting agencies constrained in their capacity to provide high-risk early career support, an ever-increasing number of young faculty from across the country turn to The Banting Research Foundation for seed funding; 41 such requests were received in 2012. Each project was adjudicated on the basis of merit by The Foundation's newly reconstituted term-limited Grant Review Panel, led ably by Professors Reinhart Reithmeier (Chair) and Patricia Brubaker (Vice-Chair).

For the fiscal year July 1, 2011 to June 30, 2012 the funds available to The Foundation for disbursement were augmented by a generous unrestricted \$40,000 grant from the Rx&D Health Research Foundation. Consequently, we were able to award a total of \$120,000 to the 6 highest ranked applications. Dr Dennis Jensen of McGill University and Dr Michelle Scott of the University of Sherbrooke were designated The Banting Research Foundation/Rx&D Research Foundation awardees.

The Foundation is deeply grateful to all its Panelists for voluntarily contributing each year their time, expertise and wisdom to this vital task. The Grant Review Panel's commitment to select the very best applicants and most innovative of the projects proposed is fundamental to The Foundation's purpose.

In addition to the Rx&D Health Research Foundation, the Trustees acknowledge and thank Mrs Nona MacDonald Heaslip and the Trustees of the Estate of Mrs Bluma Appel for their generous support of The Foundation's mission. Such

spontaneous philanthropy is most welcome and, the Trustees hope, an example and catalyst to others who share our vision.

On November 24, 2011, our sixth "Toronto Evening" dinner in collaboration with Partners in Research, celebrating the accomplishments of both organizations, was held at the University of Toronto's Hart House. The Foundation's activities were profiled, the 2011 Grant competition results were announced, and Dr Tara Moriarty of the University of Toronto described briefly her research into how infectious organisms exploit vascular adhesion to disseminate within the blood stream. She then accepted The Banting Research Foundation Awards for 2011 on behalf of all recipients. The evening's keynote speaker, Dr Brenda Gallie, Professor of Ophthalmology and Vision Sciences at the University of Toronto, now an internationally acclaimed researcher of the rare childhood eye cancer, retinoblastoma, was herself the beneficiary of an early career operating grant from The Banting Research Foundation. Our Trustees thank Mr John Ambrose and all others who volunteered their time, enthusiasm, and expertise to the organization of this event.



For The Foundation, this has been a year of welcome renewal. Our Grant Review Panel has been revitalized, the Foundation's offices have moved to 6 Queen's Park Crescent West, and Ramona Rea has assumed most energetically, capably, and cost-effectively responsibility for The Foundation's day-to-day management. I am grateful to all the members of the Board of

Trustees for their sound advice throughout this process, grounded in a sincere and unfailing belief in the Foundation's continued importance and future promise.

Traditionally, the Foundation has not sought to supplement its endowment through public campaigns. With prudent management of our legacy we have maintained the capacity to fund our commitments at very modest administrative expense. However, it is of concern to the Trustees that our limited resources preclude our supporting many highly meritorious proposals or raising the maximum awarded each individual. To secure The Foundation's long term capacity to fulfill its stated mission, the Trustees are now engaged actively in a process intended to augment our national profile and our financial resources. Please follow our course, over the next few years, as we reinvigorate The Foundation, and please join us, through your charitable support.

Sincerely, John Floras MD DPhil, FRCPC Chairman, Board of Trustees The Banting Research Foundation

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Grant Review Panel 2012

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Professor Department of Pediatrics University of Toronto

Dr Robert Tsushima

Associate Professor Department of Biology York University

Grants Awarded 2011-12

Banting and Best Department of Medical Research, University of Toronto

A high throughput sequencing sample preparation module

Next generation sequencing technology has now matured to the point where it can be shared as a resource with other labs within the BBDMR. To realize these advantages in sample processing, microarray processing and data analysis, and share the technology with all BBDMR scientists, The Foundation supported the purchase of a small suite of sample processing equipment. This suite contains two components: centrifuges and rotors, essential for all sample preparation, and high accuracy pipettors, also essential for all sample preparation protocols.

Marcelo Berlim, MD. McGill University

Remediating decision-making deficits in depressed subjects at high risk for suicide with transcranial magnetic stimulation

Dr Berlim aims to assess whether high frequency repetitive transcranial magnetic stimulation, a safe and non-invasive method for modulating the activity of specific brain regions, when applied over the left region of the forehead (the orbitofrontal cortex) of depressed subjects at high risk for suicide, is able to improve decision-making deficits which may predispose these subjects to suicidal behavior. This study may result in a better understanding of the neurobiological basis of suicidal behavior and could eventually lead to a novel therapeutic method for decreasing vulnerability to suicidality.

Simon J Lees, PhD. Lakehead University

The IL-6 paradox in the development of insulin resistance
Paradoxically, elevated IL-6 is associated with insulin resistance and type 2 diabetes, while at the same time strong evidence supports the notion that IL-6 may facilitate improved insulin signaling as a result of physical activity. Dr Lees' research project will determine the role of IL-6 in response to physical activity in the prevention of type 2 diabetes. The findings will be critical to our understanding of the fundamental mechanisms leading to the development of insulin resistance and ultimately type 2 diabetes. Moreover, these results will provide valuable insight into the development of future therapeutic interventions.

Tara Moriarty, PhD. University of Toronto

Vascular adhesion mechanisms of the Lyme disease spirochete
Blood-borne spread of pathogens is a critical step in the development of serious infectious disease, and is responsible for most of the mortality due to bacterial infection.
The dissemination mechanisms of many bacterial pathogens are largely unknown. A key event in dissemination is pathogen adhesion to vascular endothelium, an event which permits circulating microbes to marginate from the bloodstream and decelerate sufficiently to transmigrate through the vasculature into target tissues. Vascular adhesion is strongly influenced by the significant fluid shear forces present in flowing blood.

Dr Moriarty's research focuses on the mechanisms used by the Lyme disease bacterium *Borrelia burgdorferi (Bb)* to disseminate in the bloodstream of its vertebrate host, a process which can be observed in real time and 3D space in living animals using intravital microscopy. The objective of this project is to determine the mechanism of vascular adhesion regulated by BBK32, a Bb lipoprotein that interacts with target host molecules during shear force-regulated vascular adhesion of *Bb*. These studies will provide the first direct insight into the novel vascular adhesion mechanism of an extracellular bacterial pathogen in real-time and space, and will identify adhesion mechanisms which could be useful for the identification of dissemination-inhibiting therapeutic reagents.

Takako Niikura, PhD. Simon Fraser University

Regulation of amyloid beta metabolism

In Alzheimer's disease (AD), progressive brain atrophy and dementia appear because of neuronal cell death and synaptic dysfunction in brains. Amyloid beta plays a central toxic role in AD pathogenesis. Combination of the direct suppression of neuronal death and removal of amyloid beta is a promising strategy for disease-modifying AD therapy. Recently, Dr Niikura's group found that a novel neuroprotective factor, Humanin, which was originally identified as an anti-neuronal death factor, lowered the level of amyloid beta in AD model mice. In this project, he will investigate mechanisms underlying amyloid beta-lowering activity of Humanin.

Jonathan Perreault, PhD. Centre INRS - Institut Armand Frappier Regulation in the opportunistic pathogen Burkholderia by the MAEB RNA motif

Aside from their role in storing hereditary information, DNA and RNA are now known to have many more functions. Living organisms have a plethora of RNAs that control numerous processes in cells. One such RNA, named MAEB, was recently found by computer-aided searches in the opportunistic pathogen *Burkholderia*. Although MAEB appears to regulate dozens of different cellular functions, we know almost nothing about it. Using computers as well as genetic and biochemical tools, we will decipher the function and mechanism behind that intriguing RNA motif. In the end, a better understanding of MAEB will help evaluate whether it could represent an interesting therapeutic target, therefore providing a means to help cystic fibrosis patients afflicted by these bacteria.

Grants Approved for Funding 2012-13

Banting and Best Department of Medical Research, University of Toronto *A universal development platform for the BBDMR*

Dr Alexandre Douplik, Ryerson University

Surface enhanced Raman fiber sensor for endoscopic early detection of tumorrelated biomolecules in gastroenterology

Dr Carl Ernst, McGill University

Functional analysis of the 16p11.2 locus using patient-derived inducedpluripotent stem cells

Dr Dennis Jensen, McGill University

Banting Research Foundation/ Rx&D Health Research Foundation Award Physiological mechanisms of dyspnea relief and improved exercise tolerance after treatment with oral morphine in patients with advanced Chronic Obstructive Pulmonary Disease (COPD)

Dr Martin Lévesque, Université Laval

Molecular mechanisms of axon guidance mediated by PlexinC1 in dopamine neurons axonal projections

Dr Michelle Scott, Université de Sherbrooke

Banting Research Foundation/Rx&D Health Research Foundation Award Characterization of a novel function of small RNAs in alternative splicing

Impact of Our Funding

Research is an investment in the future, and the progress of our recent grantees is a result of this investment. Here we feature the work of Dr Tara Moriarty, Assistant Professor in the Matrix Dynamics Group, in the University of Toronto's Faculty of Dentistry.



Dr Moriarty received a grant from The Banting Research Foundation to study how Lyme disease-causing bacteria move from the blood stream into tissues. As she says, the grant was "essential to the survival and development of my research lab at a very difficult time of funding, and has enabled us to perform key experiments required to obtain more sustained research support."

Her group deciphered important vascular adhesion mechanisms in

Lyme disease-causing bacteria that may be critical for understanding the dissemination mechanisms of other disease-causing bacteria.

With preliminary data from the project we funded, Dr Moriarty succeeded in obtaining a 5-year operating grant from the Canadian Institutes of Health Research (CIHR). In fact, hers was the highest-ranked new investigator grant in the field of infection and immunity that year, which resulted in her being awarded the Bhagirath Singh Early Career Award in Infection and Immunity for 2011.

Moriarty TJ, Shi M, et al. Vascular binding of a pathogen under shear force through mechanistically distinct sequential interactions with host macromolecules. Mol Microbiol 2012;86:1116-1131.

BALANCE SHEET

As at June 30

	2012	2011
	\$	\$
ASSETS		
Cash	22,820	6,342
HST Receivable	2,333	2,927
Investments, at fair value	3,460,526	3,701,000
	3,485,679	3,710,269
LIABILITIES AND FUND BALANCES		
Liabilities		
Accounts payable and accrued liabilities	21,954	16,579
Fund balances		
General	41,192	235,036
Restricted	148,229	108,229
Endowment	3,274,304	3,350,425
Total fund balances	3,463,725	3,693,690
	3,485,679	3,710,269

CONDENSED STATEMENT OF REVENUE AND EXPENSES AND CHANGES IN FUND BALANCES

Year ended June 30

	2012	2011
	\$	\$
REVENUE		
Investment income (loss), net	(161,302)	415,153
Dinner event	810	11,211
Donations	47,860	760
	(112,632)	427,124
EXPENSES		
Grants awarded to new investigators	64,793	80,000
Grants awarded to University of Toronto for Banting and Best Department of Medical	·	
Research	20,000	20,000
Honorarium of the Executive Secretary	3,100	_
Honorarium of the Executive Director	12,500	25,000
Office, general and administrative	6,680	4,194
Accounting and audit fees	10,260	9,955
	117,333	139,149
Excess (deficiency) of revenue over		
expenses for the year	(229,965)	287,975
Fund balances, beginning of year	3,693,690	3,405,715
Fund balances, end of year	3,463,725	3,693,690

This summarized financial information is derived from financial statements that were audited by Ernst & Young LLP, Chartered Accountants. Complete financial statements are available upon request.

Donors, Partners and Sponsors

From its endowments and donations, The Foundation is able to fund approximately one in eight applications received from new investigators during its annual grant competition.

In order to fund a higher proportion of applicants, The Foundation welcomes new joint initiatives and donations from individual and corporate sponsors. Receipts for income tax purposes will be issued. Although grants are awarded in all fields of medical research, if a sponsor wishes to target a specific disease or area of research, The Foundation will work with the sponsor toward this goal.

The Banting Research Foundation gratefully acknowledges the participation of Partners In Research in a joint initiative, and donations from the following individuals and corporations during the 2012 fiscal year:

Mr John Burnes

Industrial Alliance

Rx&D Health Research Foundation

William and Nona Heaslip Foundation

Thank you!

"The Banting Research Foundation commemorates the discovery of Insulin, and the hope is that through its opportunities other discoveries will be made, which, like Insulin, will bring alleviation to human suffering."

Sir Robert Falconer, KCMG, LLD
First Chairman of The Banting Research Foundation
President of the University of Toronto
June 23, 1925

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