



BANTING
RESEARCH FOUNDATION

Annual Report 2013

Table of Contents

Our mission.....	1
Message from the Chairman	2
Board of Trustees	4
Grant Review Panel.....	5
Grants Awarded 2012-13.....	6
Grants Approved for Funding 2013-14	8
Impact of Our Funding	9
Financial Statements	10
Donors, Partners and Sponsors	12

About our new logo

Our dynamic and forward-looking new design is anchored by the new logo, an icon that shows the characteristic three-pair structure of the insulin molecule with white lines radiating brightly from the centre. By evoking the explosive power of scientific discovery to change our lives profoundly, the stylized molecule and rays serve as a graphic metaphor for the history and contemporary mandate of the Banting Research Foundation.

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.

La Fondation de recherche Banting octroie des fonds d'amorçage dans tous les domaines de la recherche médicale aux nouveaux chercheurs exceptionnels dans les trois premières années de leur nomination indépendante dans une université ou un institut de recherche au Canada.

Message from the Chairman



When the Banting Research Foundation was established in 1925 its inaugural Chairman, Sir Robert Falconer, aspired that with its support “other discoveries will be made, which, like Insulin, will bring alleviation to human suffering”. For a nation seeking international acknowledgment for independent scientific achievement, access to research funding was a particularly urgent imperative. Indeed, “from 1926 to 1938” as reported by the Foundation’s Honorary Secretaries in 1946, the “Banting

Research Foundation was virtually the only organization which offered financial support for Medical Research throughout the country”.

To honour in perpetuity this accomplishment of Sir Frederick Banting, 1923 Nobel Laureate in Physiology or Medicine, the Foundation in recent decades resolved to award, on the basis of merit and through a national competition adjudicated by a volunteer expert Grant Review Panel, seed grants in all areas of medical research to outstanding new investigators within the first three years of their independent appointment to a university or research institute in Canada. The Foundation is deeply grateful to all its reviewers, who are listed later in this Annual Report, for making this possible. Each year they contribute voluntarily time, expertise, and wisdom to identify for funding the most innovative and thoughtful submitted projects.

For the fiscal year July 1, 2012 to June 30, 2013, this panel, chaired by Professor Reinhart Reithmeier, received 45 requests from across the country for such grant support. In this competition, the Foundation was able to award for 2013-2014 a total of \$133,944 to the 7 highest ranked applications. One of these was a unique partnership with the Dr. Charles H. Best Foundation whereby our two organizations shared jointly the stipend of a post-doctoral fellow selected through a competitive international search for further supervised training within the Banting and Best Department of Medical Research.

Since its inception, the Foundation has judged its capacity to support such research based on estimates of the growth of funds raised at its initial subscription. We are therefore extremely grateful to Dr. Catharine Whiteside, Dean of the Faculty of Medicine of the University of Toronto, whose continued endorsement of the Foundation's mission permits us to minimize operating expenses and retain our capacity to fund innovative research through the prudent administration of its founding donations.

The Foundation has not sought in the past to supplement this endowment through public campaigns, but has been from time to time the beneficiary of generous gifts. In this fiscal year we were able to deploy a remarkable \$100,000 bequest specifically for research purposes from the Bluma Appel Community Trust. The Foundation received also a further substantial donation by the William and Nona Heaslip Foundation, a longstanding supporter of the University of Toronto and of the Banting heritage.

The Canadian medical research landscape since has evolved remarkably over the last 9 decades. Investigators now have access to funding from federal, provincial and municipal granting agencies; charitable entities with disease-specific mandates; university, hospital, and research institute resources; and from philanthropic foundations and families. The Foundation's contemporary challenge is to position itself within the scientific community as an organization with unique impact. The Trustees therefore embarked upon a process of self-study culminating in an invigorating retreat, held on March 6, 2013, that established two strategic objectives: to elevate the Foundation's profile and visibility within the Canadian medical research and philanthropic communities, and to augment the scientific impact of its Awards.

The Trustees of the Foundation remain committed to developing future leaders of Canadian medical research. I thank them, once again, for their unwavering support of the Foundation's mission and goal of renewal.

Sincerely,

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

Board of Trustees 2012-2013

Dr John S Floras

Chairman of the Board

Professor, Department of Medicine
Canada Research Chair in Integrative
Cardiovascular Biology
University of Toronto

Dr Aubie Angel

Vice Chairman

Professor Emeritus
Senior Fellow, Massey College
University of Toronto
President, Friends of CIHR

Dr Paul M Cadario

Distinguished Senior Fellow in Global
Innovation
Munk School of Global Affairs/Faculty of
Applied Science and Engineering
University of Toronto

Dr W Raymond Cummins

Professor Emeritus
University of Toronto
Member Science Advisory Committee
Centre of Forensic Sciences, Toronto

Mr John G Ambrose

Honorary Chairman

President, Ambrose Investment Counsel Ltd,
Toronto

Dr Avrum I Gotlieb

Professor, Department of Laboratory
Medicine and Pathobiology
Interim Vice Dean, Graduate and Life
Sciences Education
Faculty of Medicine
University of Toronto

Mr William E Hewitt

Chair, Investment Committee

Independent Financial and Investment
Consultant

Dr D Anna Jarvis

Secretary Treasurer

Chair, Audit Committee

Professor Emerita, Department of Pediatrics
The Hospital for Sick Children
University of Toronto

Mr William Pashby

Retired Partner
Borden Ladner Gervais

Mr John M Burnes

Honorary Chairman

Barrister & Solicitor
Brown & Burnes, Toronto

Grant Review Panel 2013

Dr Reinhart Reithmeier, Chair

Professor
Department of Biochemistry
University of Toronto

Dr Patricia Brubaker, Vice-chair and Scientific Officer

Professor
Departments of Physiology and Medicine
University of Toronto

Dr Dina Brooks

Professor
Department of Physical Therapy
University of Toronto

Dr Robert Chen

Professor
Department of Medicine
University of Toronto

Dr Reginald Gorczynski

Professor
Departments of Surgery and Immunology
University of Toronto

Dr Andras Kapus

Professor
Department of Surgery
University of Toronto

Dr Henry Krause

Professor
Banting and Best Department of Medical Research
University of Toronto

Dr Neil J MacLusky

Professor and Chair
Department of Biomedical Sciences
University of Guelph

Dr Robert Nolan

Clinical Psychologist and Assistant Professor
Department of Psychiatry
University of Toronto

Dr Michael Ohh

Professor
Department of Laboratory Medicine and Pathobiology
University of Toronto

Dr Lucy Osborne

Associate Professor
Department of Medicine
University of Toronto

Dr Michael Ratcliffe

Professor
Department of Immunology
University of Toronto

Dr Robert Tsushima

Associate Professor
Department of Biology
York University

Grants Awarded 2012-13

Banting and Best Department of Medical Research, University of Toronto

High throughput sequencing sample preparation module

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

Alexandre Douplik, PhD, Ryerson University

Surface enhanced Raman fiber sensor for endoscopic early detection of tumor-related biomolecules in gastroenterology

The goal of this project is development of surface-enhanced Raman spectroscopy fiber probes for high-sensitive and rapid non-invasive diagnostics, including malignancy detection. Optical sampling of biological molecules can detect specific Raman "fingerprints" including cancer "signatures" with high accuracy. Traditional Raman spectroscopy has been successfully applied to cancer diagnostics with over 97% accuracy; however, this method is associated with long signal collection time, which makes it impractical for clinical diagnostics in vivo. Meeting clinical needs and employing recent advances in nano-metamaterial technologies is expected to provide molecular detection with high accuracy within fractions of a second.

Carl Ernst, PhD, McGill University

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

Large deletions of DNA on chromosome 16 are associated with Autism Spectrum Disorders (ASD) in about 1% of all Canadians with autism, and many more Canadians with intellectual disability. Dr Ernst has recruited and clinically assessed two independent families carrying the chromosome 16 deletion, and has made, fully characterized, and validated stem cells derived from skin from each family member. He proposes to change these stem cells into brain cells and study how brain cells from subjects with the chromosome 16 deletion differ from subjects with normal chromosomes. These studies are important in understanding how altered brain development can lead to autism, and may provide a single gene target for therapeutic intervention for some people with autism.

Dennis Jensen, PhD, 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)

Chronic obstructive pulmonary disease (COPD) is a progressive disease of the lungs and airways, causing shortness of breath (dyspnea) and exercise intolerance. Conventional efforts to alleviate these symptoms have focused on dilating the airways (bronchodilators),

reducing the drive to breathe (supplemental oxygen), or both of these in combination. Still, many COPD patients remain incapacitated by dyspnea and intolerant to exercise, despite receiving optimal therapy.

Under these circumstances, clinical practice guidelines recommend that pain-relieving (opioid) drugs, such as morphine, be used to help manage symptoms. Indeed, several published studies show that administration of either morphine or codeine improves dyspnea and exercise capacity by up to 20% in patients with COPD. Unfortunately, the physiological mechanisms of these improvements remain poorly understood and largely understudied.

Dr Jensen will test the hypothesis that morphine improves exertional dyspnea and exercise performance in patients with advanced COPD, and examine physiological mechanisms of these improvements. This information is crucial to optimizing management of chronic activity-related dyspnea in COPD, and ultimately improving functional capacity and quality of life in these patients.

Martin Lévesque, PhD, Université Laval

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

Degeneration of midbrain dopaminergic neurons (mDA) is the principal cause of Parkinson's disease. Grafts of dopaminergic neurons newly generated from stem cells represent a promising therapeutic avenue. However, inappropriate re-innervation of the grafted neurons represents a major factor limiting success in transplantation studies. Our previous work has identified PlexinC1 as a potential important candidate that mediates appropriate innervation of dopaminergic axons.

The aim of this project is to investigate the function of PlexinC1 in mDA axons connectivity. Our findings will help efforts to understand the molecular factors contributing to the efficiency of cell replacement therapies in Parkinson's disease.

Michelle Scott, PhD, Université de Sherbrooke

Banting Research Foundation/ Rx&D Health Research Foundation Award

Characterization of a novel function of small RNAs in alternative splicing

The process of alternative splicing allows the production of multiple distinct proteins from a single gene, in a manner that can be cell-type specific. Alternative splicing requires an extensive and complex regulation. Diverse human diseases, including cystic fibrosis, progeria, spinal muscular atrophy, and many forms of cancer, can be caused by mutations resulting in splicing deregulation, highlighting the importance of a comprehensive understanding of this regulation.

Small non-coding RNAs represent a recently described, abundant and diverse group of molecules, now known to regulate essential cellular processes. Preliminary evidence suggests a role for specific types of small RNAs in the regulation of alternative splicing and the deregulation of their expression in cancer. Dr Scott aims to characterize these small RNAs and investigate their regulatory role in alternative splicing by identifying their targets and studying the extent and consequences of their deregulation in ovarian cancer. This will be instrumental in devising and improving methods for the detection and treatment of this disease.

Grants Approved for Funding 2013-14

Banting and Best Department of Medical Research, University of Toronto
The Joint Postdoctoral Fellowship of the Dr Charles H Best and The Banting Research Foundations

Jelena Tomic, PhD

Combining the fields of immunology and biochemistry in order to understand how the resistance to immunotherapies arises in highly glycolytic tumour cells.

Craig Bailey, PhD, University of Guelph

Nicotinic receptor signaling in a mouse model of Fetal Alcohol Spectrum Disorder

David Chatenet, PhD, Centre INRS – Institut Armand-Frappier

Design and synthesis of peptide inhibitors of PqsE as novel antibacterial therapeutics

Margaret K Hahn, MD PhD, Centre for Addiction and Mental Health

Central insulin to prevent olanzapine-induced adiposity: a rodent model

Pierre-Yves Lozach, PhD, Centre INRS – Institut Armand-Frappier

Bunyavirus entry into mammalian cells

Dave Richard, PhD, Université Laval

Protein trafficking to the apical complex of the malaria parasite

Marie-Ève Tremblay, PhD, Université Laval

Microglial relationships with synaptic elements in Alzheimer's disease

Impact of Our Funding

2012 grantee Dr Martin Lévesque finds a piece of the puzzle of Parkinson's disease

Dr Martin Lévesque writes that, with the support of his Banting Research Foundation grant in 2012, he has been able to confirm the involvement of PlexinC1 in dopaminergic neurons development. This brings him a step closer to understanding how potential therapies for Parkinson's disease can be made more effective.

"I would like to express my sincere gratitude for the contribution made by the Banting Research Foundation at the early steps of my career. I strongly believe it made a huge difference in my establishment as new independent investigator. With this grant I have been able to hire a student and generate results that will be published this year. These results also helped in obtaining funding for the continuation of this project. I recently obtained a CIHR grant along with a salary award from FRSQ."

1998 grantee Dr Imogen R Coe named founding Dean of Science, Ryerson University

Dr Imogen R Coe has been named founding Dean of Ryerson University's new Faculty of Science. Dr Coe is internationally recognized for her research in the cell biology and biochemistry of a family of membrane transport proteins.

Dr Coe received a Banting Research Foundation grant in 1998 to study the influence of steroid hormones on the uptake of a class of chemotherapy agents in human cells. She says that, at the time, the BRF grant was "small scale, but high impact." It provided some operating funds and a stipend to support a graduate student. "This is huge for someone just starting out."

The funds enabled the early development of her research program, and allowed her to get bigger grants by providing her with data to back up grant applications to NSERC and CIHR. She noted that a successful grant application also provides positive reinforcement and confidence to early-stage researchers. Her BRF application became the foundation for other successful applications.

1935 archives—Heparin

The Banting Research Foundation funded the first clinical trials of heparin in 1935. Heparin, a powerful anticoagulant that is widely used in open-heart and organ transplant surgery to prevent the formation of blood clots, was purified in the early 1930s in Toronto under the direction of Dr Charles H Best. It was then tested by Dr Gordon Murray, a prominent surgeon at Toronto General Hospital, and his colleagues, in human trials beginning in May 1935. The Banting Research Foundation provided funding to Dr Murray and several of his associates.

BALANCE SHEET

As at June 30

	2013	2012
	\$	\$
ASSETS		
Cash	68,840	22,820
HST recoverable	4,761	2,333
Investments, at fair value	3,777,743	3,460,526
	3,851,344	3,485,679
LIABILITIES AND FUND BALANCES		
Liabilities		
Accounts payable and accrued liabilities	36,085	21,954
Fund balances		
General	331,069	41,192
Restricted	108,229	148,229
Endowment	3,375,961	3,274,304
Total fund balances	3,815,259	3,463,725
	3,851,344	3,485,679

**CONDENSED STATEMENT OF REVENUE AND EXPENSES
AND CHANGES IN FUND BALANCES**

Year ended June 30

	2013	2012
	\$	\$
<hr/>		
REVENUE		
Investment income (loss), net	430,081	(161,302)
Dinner event	—	810
Donations	107,000	47,860
Grants returned	20,000	15,000
	<hr/> 557,081	<hr/> (97,632)
<hr/>		
EXPENSES		
Grants awarded to new investigators	104,860	79,793
Grants awarded to University of Toronto for Banting and Best Department of Medical Research	40,000	20,000
Professional fees	37,158	15,600
Office, general and administrative	13,165	6,680
Accounting and audit fees	10,364	10,260
	<hr/> 205,547	<hr/> 132,333
<hr/>		
Excess (deficiency) of revenue over expenses for the year	351,534	(229,965)
Fund balances, beginning of year	3,463,725	3,693,690
Fund balances, end of year	<hr/> 3,815,259	<hr/> 3,463,725

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

The Banting Research Foundation was established in 1925 by supporters of Frederick Banting in order to fund medical research .

From its endowments and donations, the Foundation is currently able to fund only about one in seven applications received from new investigators during its annual grant competition. As a consequence, many meritorious proposals simply cannot be funded.

In order to support 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 donations from the following individuals and corporations during the 2013 fiscal year:

Mr John Burnes

The William and Nona Heaslip Foundation

Bluma Appel Community Trust

Thank you!

Your donations have supported exciting medical research projects by outstanding early-career investigators.



Frederick Grant Banting
1923 Nobel Prize in Physiology or Medicine,
for the discovery of insulin

“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

Banting Research Foundation

6 Queen's Park Crescent West, Rm 10
Toronto ON M5S 3H2

416.595.9046

banting.foundation@utoronto.ca
info@bantingresearchfoundation.ca

BantingResearchFoundation.ca