University of Toronto, Faculty of Medicine

BANTING AND BEST DIABETES CENTRE

ANNUAL REPORT
JULY 1, 2003 – JUNE 30, 2004

Banting and Best Diabetes Centre
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MISSION

To support and advance diabetes research, education, and patient care at the University of Toronto and its affiliated hospitals.

MESSAGE FROM THE DIRECTOR, DANIEL J. DRUCKER, M.D.

The past academic year provided an opportunity to demonstrate the resilience and stability of the BBDC as an important contributor to the ongoing support of diabetes research and clinical activities at the University of Toronto. I am pleased to note that membership in the BBDC continues to increase, and an increasing number of faculty members now provide an overview of their research or clinical activities on our website. Despite external budgetary challenges, the majority of BBDC funding programs were maintained at or close to their traditional funding levels. Indeed, we increased our total expenditure for graduate students this past year, and enhanced the funding provisions for the BBDC Summer Studentship Program. Under the leadership of Dr. J. James, the Diabetes Care and Education Committee designed and implemented a highly successful workshop focused on the use of Intensive Insulin Management in Critical Care Settings. Moreover, the Research Committee chaired by Dr. P. Brubaker handled a record number of funding applications, the results of which are summarized in the enclosed Annual Report. A quick glance at our program results reveals that ~ 75 individuals received funding for one or more awards, with the majority of our funding devoted to assisting individuals at the beginning of their academic career.

As the BBDC is an extra-departmental unit that depends on the assistance of the University of Toronto community to design, implement, and successfully execute BBDC sponsored programs, I am grateful to all those individuals who have served on the BBDC committees who generously donated their time and energy on our behalf. Indeed, this year we thank and acknowledge those individuals who while not serving on a committee, also helped us with peer review of our grant applications. The BBDC is always open to suggestions for new programs, ways to improve our existing programs, or simply general comments that will help us enhance our support for diabetes-related activities at the University of Toronto. Please contact us at any time to share your ideas, or should you wish to become more involved in the activities of the BBDC.

BACKGROUND

The Banting and Best Diabetes Centre was established in 1978 as an extra-departmental unit of the Faculty of Medicine at the University of Toronto. Dr. Edward A. Sellers, a personal friend of the co-discoverer of insulin, Dr. Charles Best, was the first Director of the Diabetes Centre (1978-1981). He was succeeded by Dr. Charles H. Hollenberg who was appointed Director from 1981-1993, followed by Dr. Bernard Zinman who served as Director from 1993-2000. Presently, the Director of the Centre is Dr. Daniel J. Drucker who was appointed in July of 2000.

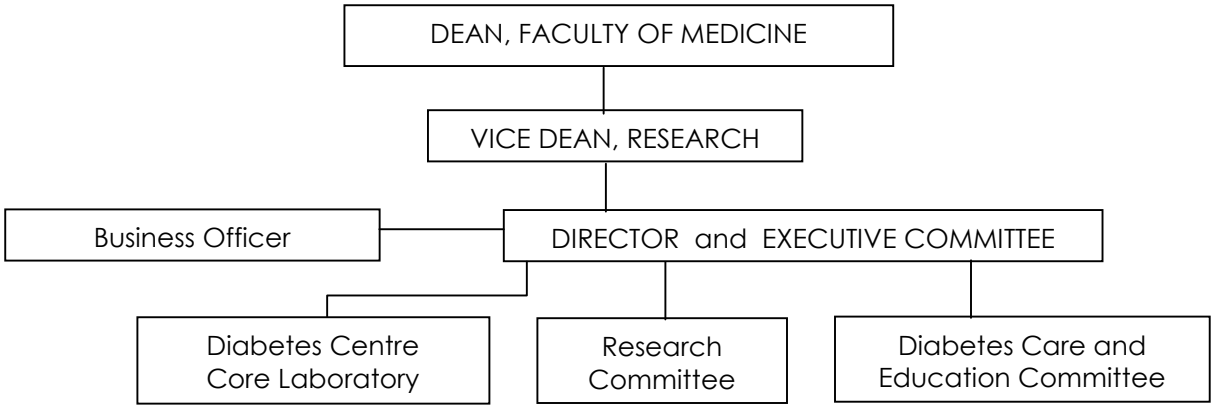
The programs of the BBDC are supported almost entirely from the income on its endowments. The BBDC has also received generous donations from industry which have funded various research programs scientists, students, and fellows. The Centre offers several studentships, fellowships, and other support for qualified individuals involved in diabetes research at the University of Toronto.

MEMBERSHIP

The BBDC membership is derived from various departments at the University of Toronto and its affiliated teaching hospitals. Since the BBDC is an extra-departmental unit of the Faculty of Medicine, members cannot hold a faculty appointment with the Centre, and graduate students must be registered with a graduate department to obtain their degree. To be eligible for membership one must be involved in diabetes-related research and hold a full-time faculty appointment with the University of Toronto. Membership allows University of Toronto investigators and their trainees to become eligible to apply for the Centre's awards. As of June 30, 2004 there are 83 members registered with the BBDC, almost all of whom are profiled on the BBDC's website. The Centre also has an expanded e-mail distribution list of approximately 250 contacts, which not only includes our members, but also individuals with diabetes interests located at other universities, employed by industry, or involved in diabetes health care delivery.

ADMINISTRATIVE STRUCTURE and COMMITTEES

The administrative structure of the BBDC was established to provide both broad based input and an efficient decision making process. The BBDC administrative structure is as follows:



The Director reports to the Dean, Faculty of Medicine. The Director of the Diabetes Centre and the Executive Committee form the principal decision making body of the Centre. The Research Committee and the Diabetes Care and Education Committee serve as the principal working committees. The Diabetes Core Laboratory provides laboratory, analytical, and technical support to the diabetes investigators on a cost recovery basis.

EXECUTIVE COMMITTEE

This is the principal decision making body of the Centre established to ensure that the goals of the Centre are appropriately implemented. The Executive Committee provides leadership and representation for the University of Toronto diabetes community.

Director: Dr. Daniel J. Drucker	Department of Medicine, Division of Endocrinology & Metabolism*
Dr. Patricia Brubaker	Department of Physiology*
Dr. I. George Fantus	Department of Medicine, Division of Endocrinology & Metabolism*
Dr. Avrum Gotlieb	Laboratory Medicine and Pathobiology*
Dr. Jacqueline James	Department of Medicine, Division of Endocrinology & Metabolism*
Dr. Amira Klip	Department of Biochemistry*

Dr. Catharine Whiteside	Department of Medicine, Division of Nephrology*
Dr. Bernard Zinman	Department of Medicine, Division of Endocrinology & Metabolism*

RESEARCH COMMITTEE

Among its many responsibilities, the Research Committee advises the Executive Committee on new research initiatives to be undertaken by the Centre, and implements the scientific review of the BBDC research competitions.

Chair: Dr. Patricia Brubaker	Department of Physiology*
Dr. Michelle Bendeck	Laboratory Medicine and Pathobiology*
Dr. Andrew Boright	Department of Medicine, Division of Endocrinology & Metabolism*
Dr. Harry Elsholtz	Laboratory Medicine and Pathobiology*
Dr. Adria Giacca	Department of Physiology*
Dr. Dominic Ng	Department of Medicine, Division of Endocrinology & Metabolism*
Dr. Robert Tsushima	Department of Medicine*
Dr. Michael Wheeler	Department of Physiology*
Dr. Minna Woo	Department of Medicine, Division of Endocrinology & Metabolism*

DIABETES CARE AND EDUCATION COMMITTEE

This committee develops and publishes standards for the total health care of diabetic patients in Toronto area hospitals, and communicates these standards to health care practitioners nationally. The Diabetes Care and Education Committee organizes continuing medical education in diabetes for the health care team which is comprised of physicians, nurse educators, dietitians, pharmacists, and other health care professionals.

Chair: Dr. Jacqueline James	Department of Medicine, Division of Endocrinology & Metabolism*
Ms. Marianne Beckstead	Clinical Nurse Specialist in Diabetes, Toronto General Hospital
Dr. Gillian Booth	Department of Medicine, Division of Endocrinology & Metabolism*
Miss Jennifer Buccino	Clinical Dietitian, Hospital For Sick Children
Ms. Margaret De Melo	Clinical Dietitian and Diabetes Educator, Toronto Western Hospital
Ms. Carolyn Lawton	Nurse Practitioner Diabetes, Sunnybrook & Women's College Health Sciences Centre
Dr. Lori MacCallum	Clinical Pharmacy Specialist, St. Michael's Hospital
Ms. Heather Munro	Diabetes Nurse Clinician, Scarborough Hospital
Dr. Kusiel Perlman	Department of Medicine, Division of Endocrinology & Metabolism*

** University of Toronto faculty member.*

FINANCIAL REPORT

(Statement of operations for the fiscal year ended June 30, 2004 with comparative figures for the fiscal year ended June 30, 2003)

INCOME	2004	2003
Unrestricted:		
Endowment income*	403,997	588,010
Donations/miscellaneous income	81,745	18,000
Restricted:		
BBDC/Novo Nordisk Studentship endowment fund* (amount available as of May 1/03)	255,910	227,934
Yow Kam-Yuen Scholarship endowment fund* (amount available as of May 1/03)	18,769	19,852
Tamarack Graduate Award endowment fund* (amount available as of May 1/03)	26,172	23,429
Archie Sopman endowment fund – U.H.N.** (amount available as of March 31/04)	37,700	40,479
BBDC fellowship/personnel funds	57,500	76,000
TOTAL INCOME	**881,793**	**993,704**
EXPENSES		
Administration:		
Salary support and benefits	80,208	74,496
Office supplies/miscellaneous (cost recoveries included)	5,108	12,709
Educational Functions:		
BBDC Seminar Series	8,817	4,939
BBDC/T.G.R.I. Diabetes Investigator Seminar Series	712	1,272
Workshop	2,106	0
Annual Scientific Day	14,352	29,474
Trainees:		
Hugh Sellers Postdoctoral Fellowships	57,500	59,650
BBDC/Novo Nordisk Studentships	197,700	198,871
Yow Kam-Yuen Graduate Scholarship in Diabetes Research	15,000	12,000
Tamarack Graduate Award in Diabetes Research	17,000	13,790
Charles Hollenberg Summer Studentship Program (2004)	42,000	22,750
Trainee Travel Awards	21,699	15,569
Faculty Support:		
Reuben & Helene Dennis Scholar in Diabetes Research	20,000	20,000
New Investigator Awards For Diabetes Research	0	40,000
Travel allowance for committee chairs	3,975	3,818
Pilot and Feasibility Projects:		
Pilot and Feasibility funding	75,000	68,220
Pilot Grants for Innovative Activities Related to Diabetes Education, Management, and Care	17,549	20,000
Other Research Initiatives:		
Equipment Grants for Diabetes Research	52,479	76,808
Archie Sopman Diabetes Research Competition (2004 calendar year)	13,000	11,000
TOTAL EXPENSES	**644,205**	**685,366**
INCOME LESS EXPENSES	**237,588**	**308,338**

* Endowment income reflects the return on investment generated by the University of Toronto Long-Term Capital Appreciation Pool. The annual endowment income available to the BBDC may change depending on market conditions and rate of investment return.

** University Health Network, Toronto General and Western Hospital Foundation

DESCRIPTION OF FUNDING PROGRAMS and FUNDING DECISIONS

Most of the BBDC's funding programs are only open to full-time University of Toronto faculty members involved in diabetes research (i.e. BBDC Members) and their trainees with the exception of the following programs:

1) Pilot Grant for Innovative Activities Related to Diabetes Education, Management and Care
2) Archie Sopman Diabetes Research Competition
3) Pilot and Feasibility Funding
4) Reuben & Helene Dennis Scholar in Diabetes Research; and
5) New Investigator Awards for Diabetes Research

ARCHIE SOPMAN DIABETES RESEARCH COMPETITION

This award is only open to full and part-time University Health Network employees (i.e. employees of Toronto General Hospital, Toronto Western Hospital, or Princess Margaret Hospital). To be eligible, the applicant must be either a staff physician, dietitian, nurse, scientist, research technician, or clinical trial coordinator who is involved in diabetes research, diabetes education, or diabetes clinical care. Hence, applicants are not required to be members of the BBDC. Funding can be used for: 1) Travel to a national or international diabetes meeting occurring in the year 2004 or 2) To support a visiting lecturer in diabetes or metabolic disorders in the year 2004. Applications are reviewed by the chair of the Diabetes Care and Education Committee and the BBDC Director. Funding for this program is provided by the Toronto General and Western Hospital Foundation, Archie Sopman Endowment Fund. The 13 funding recipients for the 2004 calendar year are:

Applicant	Position and UHN Site	Purpose	Award
Marianne Beckstead	Clinical Nurse Specialist, Toronto General Hospital	Travel to diabetes meeting	Up to $1,000
Kathy Camelon	Clinical Dietitian, Practice Leader, Toronto General Hospital	Travel to diabetes meeting	Up to $1,000
Ann Cook	Nurse Educator, Toronto Western Hospital	Travel to diabetes meeting	Up to $1,000
Margaret De Melo	Clinical Dietitian, Practice Leader, Toronto Western Hospital	Travel to diabetes meeting	Up to $1,000
Doreen Klar	Clinical Dietitian, Toronto Western Hospital	Travel to diabetes meeting	Up to $1,000
Lorna Lawrence	Clinical Dietitian, Toronto Western Hospital	Travel to diabetes meeting	Up to $1,000
Louisa Li	Clinical Dietitian, Toronto Western Hospital	Travel to diabetes meeting	Up to $1,000
Kitty Mak	Nurse Educator, Toronto Western Hospital	Travel to diabetes meeting	Up to $1,000
Ann Murphy	Clinical Dietitian, Toronto General Hospital	Travel to diabetes meeting	Up to $1,000
Ana Offenheim	Nurse Educator, Toronto Western Hospital	Travel to diabetes meeting	Up to $1,000
Mary Weiland	Clinical Dietitian, Toronto Western Hospital	Travel to diabetes meeting	Up to $1,000
Ewa Wojtan	Nurse Educator, Toronto General Hospital	Travel to diabetes meeting	Up to $1,000
Martha Wright	Nurse Educator, Toronto General Hospital	Travel to diabetes meeting	Up to $1,000

BBDC/TORONTO DIABETES ASSOCIATION ANNUAL TRAINEE AWARDS COMPETITION

Each year graduate students and postdoctoral fellows are invited to submit their abstracts for the BBDC/Toronto Diabetes Association Annual Trainee Awards Competition. To be eligible, the trainee's supervisor must be a member of the BBDC. The abstract must be directly related to diabetes research and the trainee must be first author. Abstracts are reviewed by two members of the Research Committee and two reviewers selected by the Toronto Diabetes Association abstract competition coordinator. Prize winners are invited to present posters of their work at the BBDC Annual Scientific Day held in May. Prizes are provided by and awarded by the Toronto Diabetes Association, therefore, funds for this competition are not included in the BBDC Financial Report on page 6. This year's prize winners as well as those who received honourable mention are as follows:

Award	Supervisor	Title of Abstract
1st Prize: Kristin Beard	Dr. I. George Fantus	Bradykinin (BK) Augments Insulin-Stimulated Glucose Transport in Rat Adipocytes via an Endothelial Nitric Oxide Synthase (eNOS)-Protein Kinase G (PKG)-Dependent Signaling Pathway.
2nd Prize: Wasim El-kholy	Dr. Michael Wheeler	Hyperpolarization-activated currents in pancreatic ß cells modulate insulin secretion
3rd Prize: Jamie Joseph	Dr. Michael Wheeler	Free fatty acid induced ß-cell defects are dependent on uncoupling protein 2 expression
Honourable Mention: Ping Han	Dr. Adria Giacca	Free Fatty Acid-induced Hepatic Insulin Resistance: Evidence for a Protein Kinase C (PKC)-δ, Oxidative Stress and IKK ß (Inhibitor of NF-κB Kinase B) Signaling Pathway
Honourable Mention: Lixin Li	Dr. Patricia Brubaker	Role of GLP-1 and Akt in prevention of cytokine-induced apoptosis in INS-1E cells
Honourable Mention: Gus Sidiropoulos	Dr. Khosrow Adeli	Identification of a novel, insulin-sensitive 110 kDa RNA binding protein mediating translational stimulation of apoB mRNA via cis-trans interactions at the 5'UTR

CHARLES HOLLENBERG SUMMER STUDENTSHIP PROGRAM 2004

Formerly known as the Undergraduate Summer Studentship Program, the BBDC renamed this program in honour of the late Dr. Charles H. Hollenberg, former Director of the BBDC from 1981 to 1993. This program is designed to introduce young undergraduate students to diabetes research. This year the BBDC awarded 15 studentships valued at $4,800 each to qualified undergraduate and/or medical students to carry out full-time summer research in diabetes in the laboratory of a BBDC member. The student's stipend is shared by the BBDC and the supervisor(s). Students are required to participate in the program's *Weekly Seminar Series* and to present their work at the end of the summer in a workshop format at the *Mini-conference*. Applications are reviewed and ranked by members of the Research Committee as well as the Program Coordinator, Dr. David Irwin. The following are the 2004 Summer Studentship recipients:

Student	Supervisor	Title of Research
Diane Ahn	Dr. Patricia Brubaker	Glucagon-like peptide-1 and beta cell growth and survival
Gregory Gaisano	Dr. Robert Tsushima	Effects of Membrane Cholesterol on Insulin Secretion
Adam Hanley	Dr. I. George Fantus	Hyperglycemia and Post-translational Transcription Factor Acetylation.
Janice Kwan	Dr. Catharine Whiteside	Glomerular mesangial cell F-actin disassembly in high glucose - role of reactive oxygen species activation of protein kinase C-zeta
Tiffany Kwok	Dr. Donna Stewart	Qualitative analysis: Examining attrition in diabetes education services: Identifying ways to meet educational needs and improve education services for patients with

		diabetes.
Eric Lam	Dr. Dominic Ng	The role of paraoxonase (PON) 1 in atherothrombosis in diabetes.
Christine Wai-Yun Lau	Dr. Herbert Gaisano	Role of Syntaxin 2 and Syntaxin 3 in Insulin Exocytosis
Amy Wei Lin	Dr. Michael Wheeler	Study of pancreatic beta-cells through preparation of tissue slices.
Apurva Patel	Dr. David Irwin	Isolation and characterization of conserved sequences within intron 1 of mammalian proglucagon genes.
Erin Reich	Dr. Maria Rozakis-Adcock	Characterization of a novel member of the unconventional myosin superfamily in the regulation of GLUT4 trafficking in insulin-responsive L6 muscle cells.
Samuel Silver	Dr. Mladen Vranic	Mechanism of interaction between antecedent increments of corticosterone and insulin to decrease counterregulation.
Stephanie Sai Man Siu	Dr. Qinghua Wang	Role of PI3-kinase gamma in modulating glucagon secretion in pancreatic alpha cells.
Christine Tang	Dr. Adria Giacca	Effect of taurine on beta cell glucotoxicity
Denise Wong	Dr. James Scholey	High Glucose and the Cell Signalling Response to Albumin in Human Kidney Cells
Ming Yang	Dr. Thomas Wolever	Non-invasive measurement of blood glucose.

EQUIPMENT GRANTS FOR DIABETES RESEARCH

A minimum amount of $5,000 and a maximum amount of $30,000 is made available for the one-time purchase of laboratory equipment for diabetes research. To be eligible, the applicant must be a full-time faculty member of the University of Toronto conducting diabetes research. Those who wish to purchase equipment costing over $30,000 are required to obtain the remaining funds from other sources before the BBDC releases the funds to successful applicants. Applications are reviewed and ranked by members of the Research Committee as well as an external reviewer(s). The following are the Equipment Grant recipients for 2003-2004:

Applicant	**Title of Research**	**Award**
Dr. Philip Connelly	Application of functional lipodomics in diabetes research	$30,000
Dr. Michael Wheeler	The role of hyperpolarization-activated cyclic-nucleotide modulated currents on insulin secretion.	$22,479

GRADUATE STUDENTSHIPS:

BBDC/Novo Nordisk Studentships

A collaboration with Novo Nordisk Canada Inc. was established in 1996 to provide long term endowment in support of graduate students who are pursuing a career in diabetes research. As part of the *Ontario Student Opportunity Trust Fund* program *(OSOTF)*, the support obtained from Novo Nordisk was matched by equal contributions from the University of Toronto and the Government of Ontario for a total endowment of 4.2 million dollars. Each year the BBDC invites applications from students who are registered with the Faculty of Medicine, School of Graduate Studies at the University of Toronto. To be eligible for this award, students must demonstrate financial need, and must be carrying out studies in diabetes research. Applications are ranked and reviewed by the Research Committee. This year the BBDC was able to award 13 studentships of up to $20,000. The following are the BBDC/Novo Nordisk Studentship recipients for 2003-2004:

Applicant	**Supervisor**	**Title of Research**
Zeenat Asghar	Dr. Michael Wheeler	Relationship between peripheral insulin resistance and beta-cell dysfunction in mouse model of type 2 diabetes (MKR mouse)

Kristin Beard	Dr. I. George Fantus	Role and Mechanism off Bradykinin on Insulin Action
Holly Douglas	Dr. Mladen Vranic	The Effect of Chronic Stress on Beta-Cell Dynamics and the Development of Type 2 Diabetes in the Zucker Diabetic Fatty (ZDF) Rat
Wasim El-kholy	Dr. Michael Wheeler	The Role of Pacemaker Channels in the Beta Cell
Jennifer Estall	Dr. Daniel Drucker	Analysis of Glucagon-like Peptide Two Desensitization and Signaling
Tanya Irani	Dr. Daniel Drucker	Elucidating Novel Incretin Functions In Vitro and In Vivo
Elaine Li	Dr. Ren-Ke Li	Inflammatory Reaction After Autologous Cell Transplantation into the Infarcted Myocardium of Diabetic and Non-Diabetic Rats
Laura Stavar	Dr. I. George Fantus	The role of tyrosine kinase signaling in the pathogenesis of diabetic nephropathy.
Tanvi Talsania	Dr. Patricia Brubaker	Role of the vagus in the satiety effects of glucagon-like peptide-1.
Hubert Tsui	Dr. Hans-Michael Dosch	Neuronal Elements in the Pathogenesis of Type 1 Diabetes: Investigating Autoimmunity Against Peri-Islet Schwann Cells
Victor Wong	Dr. Gary Lewis	Mechanism of insulin sensitization of vasopeptidase inhibitors
Daphne Yau	Dr. Anne Marie Salapatek	Beta-cell Expansion in a Transgenic Model of Type 2 Diabetes: Development, Dynamics & Molecular Mechanisms
Li Zhou	Dr. David Irwin	Identification and characterization of enhancer elements in the first intron of the human proglucagon gene.

GRADUATE STUDENTSHIPS:
Tamarack Graduate Award in Diabetes Research

This graduate scholarship was made possible by a generous private endowment which was matched by equal funding from the University of Toronto and the Government of Ontario under the *Ontario Student Opportunity Trust Fund* program *(OSOTF).* To be eligible for this award, students must demonstrate financial need, and must be carrying out studies in diabetes research. Applicants must also be registered with the Faculty of Medicine, School of Graduate Studies at the University of Toronto. Applications are ranked and reviewed by the BBDC Research Committee and preference is given to those students whose primary area of study is vascular problems of diabetes. Applications are ranked and reviewed by the Research Committee. This year the income earned on the endowment enabled the BBDC to award two studentships of up to $12,000. The following students are the 2003-2004 Tamarack Graduate Award recipients:

Applicant	**Supervisor(s)**	**Title of Research**
Edwin Kwan	Dr. Herbert Gaisano	Mechanisms of priming insulin exocytosis.
Nicole Liadis	Dr. Pamela Ohashi and Dr. Minna Woo	Essential Role of Caspase-3 in Islet Apoptosis for Diabetes Induction

GRADUATE STUDENTSHIPS:
Yow Kam-Yuen Graduate Scholarship in Diabetes Research

This graduate scholarship was made possible by a generous private endowment which was matched by equal funding from the University of Toronto and the Government of Ontario under the *Ontario Student Opportunity Trust Fund* program *(OSOTF).* To be eligible for this award, students must demonstrate financial need, and must be carrying out studies in diabetes research. Applicants must also be registered with the Faculty of Medicine,

School of Graduate Studies at the University of Toronto. Applications are ranked and reviewed by the Research Committee. This year the income earned on the endowment enabled the BBDC to award one $15,000 studentship. The following student is the 2003-2004 Yow Kam-Yuen Graduate Scholarship recipient:

Applicant	Supervisor	Title of Research
Jean-Paul Morand	Dr. Khosrow Adeli	Proteomic Profiling of Hepatic ER-Associated Proteins in an Animal Model of Insulin Resistance and Metabolic Dyslipidemia

HUGH SELLERS POSTDOCTORAL FELLOWSHIPS

The support of research fellows has been a major priority of the BBDC. Since the inception of the BBDC and through the generosity of the Sellers family, one Hugh Sellers Postdoctoral Fellowship has been awarded annually. Whenever possible, the Centre endeavours to support one or two additional trainees a year if extra funding is available. This program provides one year of funding for an individual holding an M.D. or Ph.D. who is carrying out full-time diabetes research training at the University. Stipends approximate those of the CIHR postdoctoral fellowship program. Applications are reviewed by members of the Research Committee plus an external reviewer(s). The Hugh Sellers Fellowship recipients for 2003-2004 are:

Applicant	Supervisor	Title of Research
Dr. Jacqueline Koehler	Dr. Daniel Drucker	GLP-1 receptor signalling in pancreatic ductal cells
Dr. Lixin Li	Dr. Patricia Brubaker	Glucagon-like peptide-1 regulated beta-cell growth and survival through a PI3-Kinase-Akt signaling pathway.
Dr. Feng-Hua Yi	Dr. Tianru Jin	Wnt signaling pathway and proglucagon gene.

NEW INVESTIGATOR AWARDS FOR DIABETES RESEARCH

This new funding program was established by the BBDC in 2002 to support new University of Toronto diabetes research faculty. An amount of $20,000 for one year is made available to new investigators at the University who are within five years of their first faculty appointment. Applications are reviewed and ranked by members of the Research Committee as well as an external reviewer(s). A competition was not held in 2003-2004 as the BBDC will be merging this competition with the Reuben & Helene Dennis Scholar competition in 2004.

PILOT AND FEASIBILITY FUNDING

This program provides funding of up to $30,000 per applicant, for one year, to enable eligible investigators to explore completely new initiatives in the area of diabetes research. This competition is open to both new and established full-time faculty members of the University of Toronto. Applicants new to the field of diabetes research do not need to be a member of the BBDC, but are encouraged to join the membership. Applications are reviewed and ranked by members of the Research Committee as well as an external reviewer(s). The following are the Pilot and Feasibility Funding recipients for 2003-2004:

Applicant	Title of Research	Award
Dr. Gillian Booth	Validation of Administrative Data Algorithms Related to the Provision of Diabetes Care	$30,000
Dr. Tianru Jin	Tag Proglucagon producing cells in mice.	$15,000
Dr. Minna Woo	The role of PTEN in insulin resistance.	$30,000

PILOT GRANTS FOR INNOVATIVE ACTIVITIES RELATED TO DIABETES EDUCATION, MANAGEMENT, AND CARE

This program provides funding of up to $20,000 per applicant for pilot projects which are one to two years in length. Funding is intended to support new research initiatives in the following general areas: 1) Diabetes care delivery; 2) Evaluation of diabetes education programs; and 3) Practical issues in diabetes management. It is designed to encourage new academic research activities from individuals not usually supported by traditional granting processes, specifically, front line health care professionals working at the University of Toronto-affiliated hospitals or working with U of T-affiliated academics. Therefore, applicants are not required to be members of the BBDC. Applications are reviewed by members of the Diabetes Care and Education Committee. The following are the Pilot Grant recipients for 2003-2004:

Applicant(s)	Title of Research	Award
Dr. Jill Hamilton (PI) Ms. Marcia Frank Ms. Jennifer Buccino	Assessment of Diabetes Knowledge in Children and Adolescents with Type 2 Diabetes	$17,549 for one year

REUBEN & HELENE DENNIS SCHOLAR IN DIABETES RESEARCH

This competition is held once every two years. An amount of $10,000 per year for two years is available to be used for the salary of a researcher and/or research support. To be eligible, the applicant must be involved in diabetes research, and must be a principal investigator who holds a full-time academic appointment with the University of Toronto. Preference is given to those who are within five years of their first faculty appointment. Applications are reviewed and ranked by members of the Research Committee as well as an external reviewer(s). The last competition was held in early 2002 and the next competition is scheduled for early 2004. The recipients of this two-year award were:

Applicant	Academic Title	Award
Dr. Qinghua Wang	Assistant Professor, Department of Physiology, University of Toronto	$10,000 for 2002/2003 $10,000 for 2003/2004
Dr. Minna Woo	Assistant Professor, Department of Medicine, University of Toronto	$10,000 for 2002/2003 $10,000 for 2003/2004

TRAINEE TRAVEL AWARDS

The Trainee Travel Awards are available to postdoctoral fellows and graduate students conducting diabetes research in the laboratory of a BBDC member. Trainees are eligible for a Travel Award of up to $1,000 (CDN) each to defray the expense of attending a national or international meeting. The trainee must be presenting a first-author abstract which has been accepted for presentation at the meeting. Applications are reviewed by members of the Research Committee. The following are the Trainee Travel Award recipients for 2003-2004:

Applicant	Supervisor	Title of Research
Costin Antonescu	Dr. Amira Klip	Inhibition of insulin-stimulated glucose uptake by the p38-MAPK inhibitor SB203580 is independent of p38MAPK: Studies with drug-resistant mutants and siRNA in L6 myotubes.
Zeenat Asghar	Dr. Michael Wheeler	Insulin Resistance Precipitates β-Cell Dysfunction and Hyperglycemia in a Model of Type 2 Diabetes
Kristin Beard	Dr. I. George Fantus	Bradykinin (BK) Sensitizes Rat Adipocytes to Insulin-stimulated Glucose Transport via an Endothelial Nitric Oxide Synthase (eNOS)-Protein Kinase G (PKG)-dependent Signaling Pathway

Kalam Chan	Dr. Adria Giacca	Insulin Inhibits Neointimal Growth by Decreasing Vascular Smooth Muscle Cell Migration *In Vivo*.
Holly Douglas	Dr. Mladen Vranic	Effect of chronic stress on diabetes development in the Zucker Diabetic Fatty rat
Yesmino Elia	Dr. Denis Daneman	Chromatic Mechanisms of Children with Type 1 Diabetes: Relationship to Metabolic Control
Wasim El-kholy	Dr. Michael Wheeler	A novel hyperpolarization-activated current identified in pancreatic β-cells modulated insulin secretion.
Lisa Federico	Dr. Khosrow Adeli	Mechanistic Link Between Intestinal Insulin Signalling and Lipoprotein Production
Enza Gucciardi	Dr. Donna Stewart	Factors Associated with Attrition in Diabetes Education Programs - A qualitative analysis.
Ping Han	Dr. Adria Giacca	Free Fatty Acid-induced Hepatic Insulin Resistance: Evidence for a Protein Kinase C (PKC)-δ Oxidative Stress and IKKβ (Inhibitor of NF-KB Kinase B) Signaling Pathway
Edwin Kwan	Dr. Herbert Gaisano	Munc 13-1 is the diacylglycerol (DAG) receptor in pancreatic islet β-cells which mediates the priming of insulin exocytolsis.
Patrick Lam	Dr. Herbert Gaisano	Transgenic mice over-expressing Syntaxin-1A as a Diabetes mouse model
Lixin Li	Dr. Patricia Brubaker	1. Role of GLP-1 and Akt in the prevention of cytokine-induced apoptosis in INS-1E cells 2. The Essential role of the phosphatidylinositol 3-kinase γ (PI3K γ) in glucagon-like peptide-1 induced expansion of β-cell mass.
Tao Liu	Dr. Tianru Jin	The TALE homeodomain protein PBX-1 as a potential co-factor for the caudal homeodomain protein Cdx-2 in regulating proglucagon gene expression.
Edward Park	Dr. Mladen Vranic	Endurance Training Induced Attenuation of Resting Hypothalamo-Pituitary-Adrenocortical (HPA) Activity is Mediated by Central Mechanisms.
Rafik Ragheb	Dr. I. George Fantus	Evidence for Fatty Acid-Induced Insulin Resistance in a Cultured Muscle Cell Line, C2C12: Differential Effects of Fatty Acid Species on the Insulin Signaling Pathway
Ravi Retnakaran	Dr. Bernard Zinman	Adiponectin and β-cell Dysfunction in Gestational Diabetes: Pathyphysiologic Implications
Gus Sidiropoulos	Dr. Khosrow Adeli	Translational Regulation of Apolipoprotein B mRNA by Insulin Involves a Trans-acting Binding Protein Interacting with the 5' Untranslated Region
Elaine Sinclair	Dr. Daniel Drucker	Activation of glucagon receptor signaling reduces apoptosis in a cell/pathway-specific manner
Farah Thong	Dr. Amira Klip	GLUT4myc internalization in L6 muscle cells does not require an intact cytoskeletal network.
Elaine Xu	Dr. Qinhgua Wang	The Involvement of Akt in Modulating Glucagon Release from INR1-G9 Cells
Fenghua Yi	Dr. Tianru Jin	Cell type specific activation of proglucagon gene expression by Wnt signaling molecules and PKA
Zhiwen Yu	Dr. I. George Fantus	Glucose Transporter 4 (Glut4) Degradation is Accelerated by Hyperglycemia and Hyperinsulinemia via a Proteasome-dependent Pathway

ACKNOWLEDGEMENTS

The BBDC would like to thank the members of the **Research Committee** and members of the **Diabetes Care and Education Committee** for reviewing applications for the Centre's many funding programs.

As an integral part of the application review process, the BBDC also obtains scientific reviews from University of Toronto faculty who are involved in diabetes-related research. The BBDC would like to thank the following faculty for acting as our **external reviewers** this past year for various BBDC funding programs:

Dr. Khosrow Adeli
Dr. Myron Cybulsky
Dr. Sandy Der
Dr. Hans-Michael Dosch
Dr. David Irwin
Dr. Lowell Langille
Dr. Cecil Pace-Asciak
Dr. Gerald Prud'homme
Dr. Maria Rozakis-Adcock
Dr. James Scholey

EDUCATIONAL ACTIVITIES OF THE CENTRE

BBDC SEMINAR SERIES
(In conjunction with City-wide Endocrine Rounds)

An ongoing responsibility of the Centre is to invite researchers within Canada and the United States to present their work on diabetes research at our Seminar Series. To ensure a broad audience, seminars have been incorporated into the University of Toronto City-wide Endocrine Rounds which are held every Friday morning at 8 a.m. in the Private Dining Room at the Mount Sinai Hospital. The presentations for the 2003-2004 year were as follows:

Friday, November 7, 2003

Studying the Role of the Glucagon Receptor in Glucose Homeostasis and Energy Balance With Knockout and Transgenic Mice
Dr. Maureen J. Charron
Professor of Biochemistry
Albert Einstein College of Medicine
Bronx, New York

Friday, December 5, 2003

Molecular Physiology of Energy Homeostasis in Rodents and Humans
Dr. Rudolph L. Leibel
Head, Division of Molecular Genetics
Co-Director, Naomi Berrie Diabetes Center
Columbia University College of Physicians and Surgeons
New York, New York

Friday, March 26, 2004

Applying New Technologies to Diabetes Therapy
Dr. Alan C. Moses
Professor of Medicine, Harvard Medical School
Chief Medical Officer, Joslin Diabetes Center
Boston, Massachusetts

Friday, April 23, 2004

Permanent Reversal of Diabetic Autoimmunity With Islet Regeneration in NOD Mice
Dr. Denise L. Faustman
Associate Professor of Medicine
Harvard Medical School
Charlestown, Massachusetts

BBDC/T.G.R.I. DIABETES INVESTIGATOR SEMINAR SERIES

These monthly seminars provide an opportunity for Toronto General Research Institute (TGRI) investigators associated with the BBDC to exchange diabetes research data. (See page 21 for more information on diabetes investigators associated with the BBDC.) The meetings are usually held on the first Friday of each month from 12 to 1 p.m. at the Toronto General Hospital. Unlike the BBDC Seminar Series described on the previous page, this seminar series is only attended by the seven BBDC associated investigators and their trainees. The 2003-2004 BBDC/T.G.R.I. Diabetes Investigator Seminar Series schedule was as follows:

Friday, October 3, 2003	Dr. Daniel Drucker presenting
Friday, November 7, 2003	Dr. Gary Lewis presenting
Friday, December 5, 2003	Dr. I. George Fantus presenting
January 2004	**No seminar**
Friday, February 6, 2004	Dr. Tianru Jin presenting
Friday, March 12, 2004	Dr. Harry Elsholtz presenting
Friday, April 2, 2004	Dr. Denny Trinh **CANCELLED**
Friday, May 7, 2004	Dr. David Irwin presenting

WORKSHOP

Intensive Insulin Management in Critical Care Settings: An Advanced Workshop for Critical Care Practitioners and Educators

One of the Diabetes Care and Education Committee's many responsibilities is to assess the educational needs of diabetes health care professionals and to design informative workshops to meet their needs. On Friday, April 23, 2004, the BBDC hosted a continuing education workshop for approximately 30 critical care practitioners and educators employed at the downtown Toronto-area teaching hospitals. Using an interdisciplinary team approach, through dialogue and interactive case discussion, the workshop provided those responsible for ICU staff training with information needed to develop protocols to effectively manage the blood glucose of inpatients in perioperative and critical care settings. The BBDC would like to thank the members of the Program Committee and participants who volunteered their time to help organize and speak at the workshop. The BBDC would also like to thank **Novo Nordisk Canada Inc.** for providing an unrestricted grant for partial support of this event. The program was as follows:

INTENSIVE INSULIN MANAGEMENT IN CRITICAL CARE SETTINGS:
AN ADVANCED WORKSHOP FOR CRITICAL CARE PRACTITIONERS AND EDUCATORS
Friday, April 23, 2004
Mount Sinai Hospital, Joseph and Wolf Lebovic Building
60 Murray Street
Leadership Sinai Centre For Diabetes
5th Floor, Classroom L5-038
Toronto, Ontario

8:00 – 8:15 a.m.	**REGISTRATION AND CONTINENTAL BREAKFAST**
8:15 – 8:20	Welcome and Introduction **Jacqueline James, M.D.**
8:20 – 9:00	What are the benefits of tight glycemic control in inpatients? CDA Clinical Practice Guidelines for perioperative and peri-acute coronary care syndrome glycemic control. **Alice Y. Cheng, M.D.**
9:00 – 10:00	Views from the ICUs: The clinical experience to date of implementing tight glycemic control in the ICU. Principles, protocols, progress, perceptions, and pitfalls. **Lisa Burry, BScPhm, PharmD, FCCP** **Cheryl DeGuzman, RN, BScN** **Clarence Chant, PharmD, BCPS**
10:00 – 10:15	**REFRESHMENT BREAK**
10:15 – 10:30	Maintaining appropriate nutrition while receiving intensive intravenous insulin therapy. **Mary Morningstar, RD, CNSD**
10:30 – 11:00	Facilitated Discussion: Putting it to into practice. The practical issues. Who should be doing intensive management, developing the protocol and implementing it? What resources are needed? **Chair and Program Committee**
11:00 – 12:30 p.m.	Small group case studies
12:30 – 1:30	**LUNCH, EVALUATIONS, AND ADJOURNMENT**

PROGRAM COMMITTEE

CHAIR: Jacqueline James, MD, MEd, FRCPC*
Endocrinologist, Mount Sinai Hospital

Marianne Beckstead, RN, MN, CDE
Clinical Nurse Specialist in Diabetes, University Health Network (Toronto General Hospital)

Gillian Booth, MD, FRCPC*
Endocrinologist, St. Michael's Hospital

Lisa Burry, BScPhm, PharmD, FCCP
Critical Care Pharmacist/Education Coordinator/Surgical Team Leader, Department of Pharmacy Services
Mount Sinai Hospital

Alice Y. Cheng, MD, FRCPC*
Endocrinologist, St. Michael's Hospital

Margaret De Melo, RD, CDE, BSc
Clinical Dietitian, Toronto Western Hospital

Diane Donat, MD, FRCPC*
Endocrinologist, University Health Network (Toronto General Hospital)

Carolyn Lawton, RN, MScN, CDE
Nurse Practitioner, Diabetes, Sunnybrook & Women's College Health Sciences Centre

PARTICIPANTS

Clarence Chant, PharmD, BCPS**
Clinical Pharmacy Specialist/Critical Care, St. Michael's Hospital
Assistant Professor, Leslie Dan Faculty of Pharmacy, University of Toronto

Cheryl DeGuzman, RN, BScN
Mount Sinai Hospital

Mary Morningstar, RD, CNSD
Critical Care Dietitian, St. Michael's Hospital

** Faculty of Medicine, University of Toronto*
*** Faculty of Pharmacy, University of Toronto*

15th ANNUAL SCIENTIFIC DAY

Organized by the Research Committee, this annual event is designed to provide an opportunity for BBDC members to exchange scientific information and ideas, and to assist in the development of collaborative diabetes-related research activities. It also provides a valuable opportunity for BBDC trainees to network and present their research. BBDC postdoctoral fellows, graduate studentship recipients, and top three prize winners of the BBDC/Toronto Diabetes Association Abstract Competition present posters of their work. The event focuses on the latest diabetes research topics with both clinical and laboratory applications. In addition, the Director of the Centre has an opportunity to review the activities of the BBDC over the past year with the Centre membership at large. This event is open and free to all BBDC members and their trainees. The program normally includes one internationally renowned guest faculty as well as University of Toronto faculty, equally renowned for their work in diabetes research.

This year, the Annual Scientific Day was held on **Friday, May 14, 2004** at The Estates of Sunnybrook. We gratefully acknowledge partial support of this event by **Eli Lilly Canada Inc.**, **GlaxoSmithKline**, **Merck Frosst**, and **Novo Nordisk Canada Inc.** The program was as follows:

15th ANNUAL SCIENTIFIC DAY
Friday, May 14, 2004
Vaughan Estate, The Estates of Sunnybrook
2075 Bayview Avenue, Toronto

8:30-9:00 A.M. **CONTINENTAL BREAKFAST**

Chair: Dr. Patricia Brubaker

9:00-9:30 Regulation of Glucose Uptake and Metabolism in Skeletal Muscle by Adiponectin
Dr. Gary Sweeney
Assistant Professor, Department of Biology
York University, Toronto

9:30-10:00 The DCCT/EDIC Genetics Study: Investigations Into the Genetic Susceptibility of Complications in Type 1 Diabetes
Dr. Andrew Boright
BBDC New Investigator 2003
Assistant Professor, Department of Medicine
Division of Endocrinology and Metabolism, University of Toronto

10:00-10:30 Inflammatory Mechanisms For Lowering HDL. Relevance to Metabolic Syndrome
Dr. Philip Connelly
Associate Professor, Department of Medicine, University of Toronto
Staff Scientist, St. Michael's Hospital

10:30-11:00 **COFFEE BREAK**

Chair: Dr. Adria Giacca

11:00-11:30 Glucagon-like Peptide-1 and the Regulation of Beta Cell Mass
Dr. Lixin Li
BBDC Hugh Sellers Postdoctoral Fellow (2003-2004)

11:30-12:00 Nervous System Elements Controlling Prediabetes Progression in NOD Mice
Dr. Hans-Michael Dosch
Professor, Departments of Pediatrics and Immunology, University of Toronto
The Hospital For Sick Children

12:00-12:15 P.M.	**Director's Report: Dr. Daniel J. Drucker** Director, Banting and Best Diabetes Centre Professor, Faculty of Medicine, University of Toronto
12:15-1:15	**LUNCH AND POSTER PRESENTATIONS**

Chair: Dr. Michael Wheeler

1:15-2:15	**Charles Hollenberg Lecture** The Physiology of Lipoatrophy: Why Fat is Good and Bad **Dr. Marc L. Reitman** Director, Metabolic Disorders, Merck Research Laboratories Rahway, New Jersey
2:15	**EVALUATION AND ADJOURNMENT**

DIABETES UPDATE

Diabetes Update is a bi-annual continuing education event which is attended by over 600 health care professionals split almost evenly between physicians, nurses, dietitians and pharmacists from across Ontario and beyond. This full-day event usually includes members of the University of Toronto faculty as well as internationally renowned guest faculty. Diabetes Update is organized by the Diabetes Care and Education Committee as well as the Faculty of Medicine, Continuing Education Office. The next Diabetes Update will be held in April 2005 at the Metro Toronto Convention Centre.

LABORATORIES

CORE LABORATORY

Director: Dr. I. George Fantus

The Core Laboratory was established in 1984 to provide analytical and technical support to the University of Toronto diabetes research community. A wide range of research quality assays are provided for investigator initiated clinical/basic research as well as for industry sponsored trials. The Core Laboratory will collaborate with the investigator to establish new assays to carry out and enhance diabetes-related research at the University. A list of the current services provided by the Core Laboratory are provided on the BBDC's website, www.bbdc.org. In 2001, the Core Laboratory partnered with Pathology and Laboratory Medicine at Mount Sinai Hospital and moved its facilities to that location, although it still remains a part of the BBDC.

DIABETES INVESTIGATORS ASSOCIATED WITH THE BBDC (Located at the Toronto General Hospital)

There are seven Toronto General Research Institute (TGRI) scientists associated with the Banting and Best Diabetes Centre: **Dr. Daniel Drucker**, **Dr. Harry Elsholtz**, **Dr. I. George Fantus, Dr. David Irwin**, **Dr. Tianru Jin, Dr. Gary Lewis** and **Dr. Denny Trinh.**

The BBDC has laboratory space in the Max Bell Research Wing at the Toronto General Hospital, University Health Network. All of the scientists' laboratories are located in the Max Bell Research Wing (with the exception of Dr. Tianru Jin). The investigators have shared access to a broad range of specialized research equipment on the 4th floor of the Max Bell Research Wing, and make use of BBDC offices for lab meetings and administrative core activities. The investigators meet as a group monthly at the *BBDC/T.G.R.I. Diabetes Investigator Seminar Series* *(see page 16)* to review research progress, while participating fully in the spectrum of research activities ongoing at the University of Toronto.

Drs. Daniel Drucker, George Fantus, Tianru Jin, Gary Lewis and Denny Trinh hold their primary appointment with the Department of Medicine; and Drs. Harry Elsholtz and David Irwin who hold their primary appointment with the Department of Laboratory Medicine and Pathobiology.

The research activities of the group are focused on:

- Understanding insulin action, lipid metabolism, and signal transduction (Drs. Elsholtz, Lewis and Fantus)
- Regulation of gene transcription (Drs. Elsholtz, Drucker, Irwin, Jin and Trinh)
- Biology of the glucagon-like peptides (Drs. Drucker and Irwin)
- Studying the metabolic control of glucose regulation using gene transfer techniques and metabolic engineering to manipulate metabolic pathways in peripheral tissues essential for insulin action and glucose disposal (Dr. Trinh)

PUBLICATIONS

APPROACH TO THE MANAGEMENT OF DIABETES MELLITUS (Fifth Edition)

This 68-page document is a guide to the current concepts and management strategies practiced by health care professionals at the University of Toronto and its affiliated teaching hospitals in the care of individuals with diabetes. It is meant to provide practical information to help medical students, residents, physicians, diabetes educators and other health care professionals in the management of individuals with diabetes. The BBDC has been publishing and updating this monograph since 1986 as a part of our mandate to promote diabetes education and patient care at the University of Toronto. The fifth edition was updated in early 2002 with the generous help of many diabetes health care professionals at the University of Toronto teaching hospitals. The entire document (in PDF format) or individual chapters can be downloaded from the BBDC's website, www.bbdc.org. See the *"Diabetes Information"* section.

BBDC NEWSLETTER

The Banting and Best Diabetes Centre distributes a quarterly newsletter entitled **BBDC NEWS** by e-mail to those who have joined our e-mail distribution list. Issues are normally distributed in September, December, March, and June of each year. The newsletter highlights upcoming BBDC events, funding opportunities, award results, and BBDC seminars.

WEBSITE www.bbdc.org

Visitors to our site can view detailed information on all of our funding programs, funding decisions, educational activities, membership, diabetes meetings, clinical trials, diabetes research at the University of Toronto, and much more. All application forms for BBDC competitions can be downloaded from the site.

New to the website:

- **2003 RESEARCH HIGHLIGHTS**. This new section was added to facilitate increased public awareness of the many exciting diabetes-related research developments that occur each year at the University of Toronto. The site is intended to provide information for the general public and will describe, in lay language, one or two highlights of diabetes research carried out by University of Toronto faculty members, published during the 2003 calendar year. Links to their publications are provided. The 2003 Research Highlights are located within the '*Research at the University'* section of the website and is updated annually.

SUPPORTERS OF THE BANTING AND BEST DIABETES CENTRE

The Banting and Best Diabetes Centre gratefully acknowledges recent and/or endowed financial support from the following private and corporate contributors:

C. H. Best Memorial Fund
The Estate of Reuben & Helene Dennis
The Estate of Marion Hamilton
The Estate of Miriam Neveren
The Estate of Dr. & Mrs. Edward A. Sellers
The Estate of Mary E. Sharp
The Estate of Archie Sopman
Mr. Arthur Spoerri
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