

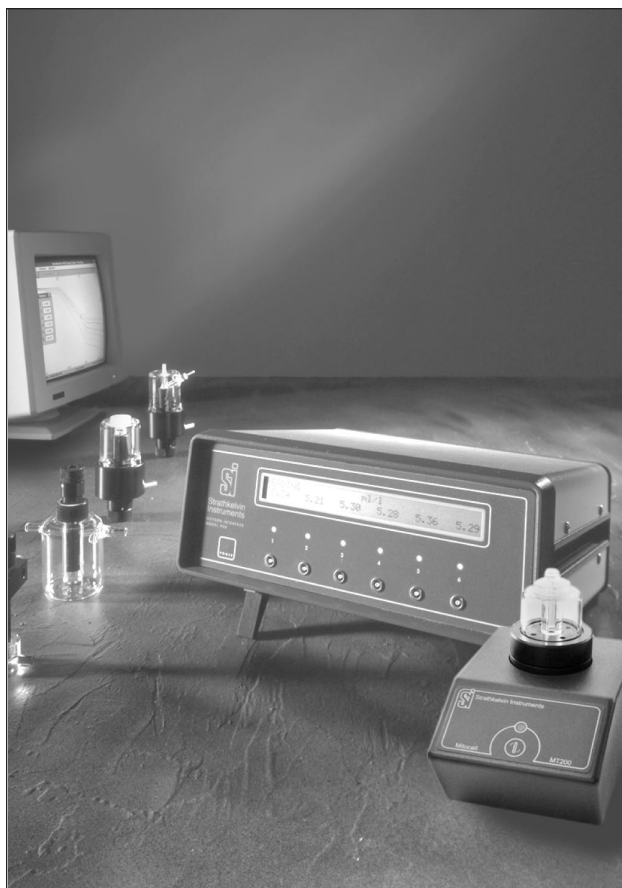
# Bulletin



The Canadian Society of  
Biochemistry, Molecular &  
Cellular Biology /  
La Société canadienne de  
biochimie, de biologie  
moléculaire et cellulaire

# 2003

[www.csbmcb.ca](http://www.csbmcb.ca)



# Precision Respirometry

- All recording and analysis in software
- For mitochondria, cell suspensions and other respiring preparations
- Sample volumes 50  $\mu$ l to 3 ml
- Microcathode oxygen electrodes

 **Strathkelvin Instruments**  
[www.strathkelvin.com](http://www.strathkelvin.com)

## COVER PHOTO:

Genetic interaction network representing the synthetic genetic interactions determined by Synthetic Genetic Array (SGA) analysis (see page 44).

---

# Contents

<b>CSBMCB Board for 2003-2004 .....</b>	<b>4</b>
<b>CSBMCB President's Report .....</b>	<b>5</b>
<b>Incoming Members of the CSBMCB Executive Board 2003-2004</b>	
Joe Casey, Vice-President .....	8
Albert Clark, Secretary .....	9
Vincent Duronio, Treasurer .....	10
Guy Poirier, Councillor .....	11
Frances Sharom, Councillor .....	12
<b>Retirement of Gene Tustanoff and Fred Palmer from the CSBMCB Executive .....</b>	<b>15</b>
<b>Minutes of the 46th CSBMCB Annual General Meeting .....</b>	<b>17</b>
<b>CSBMCB/SCBBMC Financial Statement for 2003 .....</b>	<b>25</b>
<b>Final report on the 19th International Congress of Biochemistry and Molecular Biology — Joel Weiner .....</b>	<b>26</b>
<b>Personal Reflections on the joint 2003 HUPO/IUBMB meeting — David Andrews .....</b>	<b>28</b>
<b>Scenes from the HUPO/IUBMB Montreal Congress .....</b>	<b>31</b>
<b>Travel award recipients for the 2003 HUPO/IUBMB Montreal Congress .....</b>	<b>33</b>
<b>Program for the 47th Annual Meeting of the CSBMCB, Mont Tremblant, Quebec .....</b>	<b>36</b>
<b>Reflections: E. Reno Tustanoff, Secretary of the CSBMCB, 1991-2003 .....</b>	<b>39</b>
<b>Dr. Kevin Keough appointed as President and CEO of AHFMR .....</b>	<b>41</b>
<b>Ross Hume Hall — Obituary .....</b>	<b>42</b>
<b>Abram Herman Neufeld — Obituary .....</b>	<b>43</b>
<b>William O. Thompson — Obituary .....</b>	<b>45</b>
<b>The 2003 CSBMCB's Merck Frosst Prize Lecture - Charles Boone Global Mapping of the Yeast Genetic Interaction Network: Discovering Gene and Drug Function .....</b>	<b>47</b>
<b>A History of the Department of Biochemistry at McGill University — Rose M. Johnstone .....</b>	<b>56</b>
<b>How I became a biochemist — Bibudhendra Sarkar .....</b>	<b>63</b>
<b>The Canadian Society of Biochemistry, Molecular &amp; Cellular Biology .....</b>	<b>66</b>
<b>2004 Society Award Designates .....</b>	<b>68</b>
<b>News from Member Departments</b>	
Memorial University of Newfoundland .....	71
Queen's University .....	71
Université de Sherbrooke .....	73
Université Laval .....	76
University of British Columbia .....	77
University of Calgary .....	78
University of Guelph .....	83
University of Lethbridge .....	85
University of Toronto .....	86
University of Victoria .....	90
University of Western Ontario .....	93

---

# CSBMCB Board for 2003-2004

## **PRESIDENT**

Dr. John Orlowski  
Department of Physiology  
McGill University  
3655 Promenade Sir-William-  
Osler, Room 1112  
Montreal, Quebec H3G 1Y6  
Tel: (514) 398-8335  
FAX: (514) 398-7452  
E-mail: john.orkowski@mcgill.ca

## **PAST-PRESIDENT**

Dr. David W. Andrews  
Department of Biochemistry  
McMaster University  
1200 Main St. W  
Hamilton, Ontario L8N 3Z5  
Tel: (905) 525-9140 Ext. 22075  
FAX: (905) 522-9033  
E-Mail: andrewsd@mcmaster.ca

## **VICE-PRESIDENT**

Dr. Joseph R. Casey  
Department of Physiology  
University of Alberta  
Edmonton, Alberta T6G 2H7  
Tel: (780) 492-7203  
FAX: (780) 492-8915  
E-Mail: joe.casey@ualberta.ca

## **TREASURER**

Dr. Vincent Duronio  
Department of Medicine, UBC  
Jack Bell Research Centre  
2660 Oak St  
Vancouver, British Columbia  
Tel: (604) 875-4707  
FAX: (604) 875-4497  
E-mail:  
vduronio@interchange.ubc.ca

## **SECRETARY**

Dr. Albert F. Clark  
Department of Biochemistry  
Queen's University  
Kingston, Ontario K7L3N6  
Tel: (613) 533-2975  
FAX: (613) 533-2022  
E-Mail: clarkaf@post.queensu.ca

## **COUNCILLOR**

Dr. E. Bruce Waygood  
University Coordinator of  
Health Research  
209 Kirk Hall,  
University of Saskatchewan  
117 Science Place  
Saskatoon, Saskatchewan S7N  
5C8  
Tel: (306) 966-8745  
FAX: (306) 966-4737  
E-Mail: bruce.waygood@usask.ca

## **COUNCILLOR**

Dr. Caren Helbing  
Department of Biochemistry  
and Microbiology  
University of Victoria  
Victoria, British Columbia V8W  
3P6  
Tel: Office (250) 721-6146  
Tel: Lab: (250) 721-7086  
FAX: (250) 721-8855  
E-mail: chelbing@uvic.ca

## **COUNCILLOR**

Dr. Linda Penn  
Ontario Cancer Institute  
610 University Avenue  
Toronto, Ontario M5G 2M9  
Tel: (416) 946-2276  
FAX: (416) 946-2840  
E-mail: lpenn@uhnres.utoronto.ca

## **COUNCILLOR**

Dr. George Chaconas  
Biochemistry and  
Molecular Biology  
The University of Calgary  
3330 University Drive, NW  
Calgary, Alberta T2N 4N1  
Tel: (403) 210-9692  
FAX: (403) 270-2772  
E-mail: chaconas@ucalgary.ca

## **COUNCILLOR**

Dr. Guy Poirier  
Health and Environment Unit  
CHUL Research Centre  
2705 Boul. Laurier  
Ste-Foy, Quebec G1V 4G2  
Tel: (418) 654-2267  
FAX: (418) 654-2159  
E-mail: guypoirier@crchul.ulaval.ca

## **COUNCILLOR**

Dr. Frances Sharom  
Department of Microbiology  
University of Guelph  
Guelph, Ontario N1G 2W1  
Tel: (519) 824-4120 Ext. 52247  
FAX: (519) 837-1802  
E-mail: fsharom@uoguelph.ca

## **CHAIR, NOMINATING COMMITTEE**

Dr. David Andrews

## **BULLETIN EDITOR**

Dr. Frances Sharom

## **CFBS HEAD OFFICE**

Mrs. Wafaa Antonius  
Office Manager, CFBS  
305- 1750 Courtwood Crescent  
Ottawa, Ontario K2C 2B5  
Tel: (613) 225-8889  
FAX: (613) 225-9621  
E-Mail: wantonious@CFBS.org

---

# CSBMCB President's Report

Dr. John Orlowski

## Foreword

Without a doubt, this past year has been a roller coaster ride for the Society, filled with some nail-biting moments during the near death experience of our Annual Meeting planned for Toronto, and poignant farewells to several long-standing members of our Board. However, for every yin there is a yang, and our spirits rose with the rebirth of our Annual Meeting in Montreal, the recruitment of several enthusiastic members to the Board, and the launching of new initiatives including our Society newsletter, *The Link*. The intent of *The Link* is to highlight the activities of the Society, to broadcast scientific achievements of our members, and to serve as a platform for science policy and lobbying. This latter effort is a constant challenge, particularly in light of recent fiscal restraints and uncertainty at CIHR as well as other agencies, but one which must be vigorously pursued if we are to advance science in Canada. In addition, our Conference Organizing Committee has been very busy planning our next Annual Meeting which will be held in Mont Tremblant (Quebec) this Spring and is truly shaping up to be a top-notch event that should not be missed (see more below). As always, the priority of the Society continues to be the vigorous promotion of biological sciences in Canada by organizing cutting edge scientific conferences and by supporting science advocacy and policy initiatives at the political level. I believe that CSBMCB is making significant strides in both these areas, and I encourage those of you who are so inclined to join the CSBMCB in achieving these goals. Summarized below are some of the activities the Society has undertaken this past year.

## Annual Meeting 2003

Scientists are usually not prone to believing in fairy-tales, but this year's highly successful resurrection of our 46th Annual Meeting, held jointly with the 19th Congress of the International Union of Biochemistry and Molecular Biology (IUBMB) and

the 2nd Congress of the Human Proteome Organization (HUPO) in Montreal (October 8-11th), was truly one flight of fancy that became reality. While the Ontario medical community was struggling to contain the outbreak of Severe Acute Respiratory Syndrome (SARS) in Toronto, bio-scientists within Canada and internationally grappled with saving the IUBMB/CSBMCB Meeting originally slated for that beleaguered city during the height of the epidemic. Regrettably, the fear of SARS proved overwhelming as many prominent speakers and registrants withdrew, fatally crippling the Toronto meeting. Years of hard work, planning & organization, and some serious coinage, seemed to go up in smoke. However, thanks to the vision and tenacity of several CSBMCB members, notably Dr. Joel Weiner (U. Alberta; President - 2003 IUBMB Congress), Dr. Mike Walsh (U. Calgary; Chair - IUBMB Scientific Program), Dr. John Bergeron (McGill U., Chair 2003 HUPO Congress), and our Past-President Dr. David Andrews (McMaster U.), the idea of merging the IUBMB-CSBMCB Meeting with the HUPO meeting scheduled for Montreal later that autumn materialized. Despite the brief time available to restructure and advertise the joint meeting, the scientific community responded positively as registration and industrial exhibitions exceeded expectations. Combined with a thoughtful blend of the various scientific sessions from each society, the meeting was a wonderful success. Highlights of the conference activities sponsored by CSBMCB included the award lectures of two prominent Canadian scientists, Dr. Charles Boone (CSBMCB's Merck Frosst Prize)



---

and Dr. Victor Ling (Roche Diagnostics Award for Biomolecular & Cellular Research) in recognition of their exceptional research accomplishments. The Society also awarded a large number of travel grants to member graduate students and postdoctoral fellows to attend the joint Congress and sponsored a large reception for all Canadian registrants to mingle in an informal setting. We sincerely thank Dr. Eugene Tustanoff, Secretary CSBMCB, and his team for all their hard work in organizing the CSBMCB events. Kudos are also extended to our former Treasurer, Dr. Fred Palmer, who resuscitated the IUBMB Young Scientist Program that included 90 participants from 44 different countries. Lastly, the National Research Council (NRC) of Canada should also be gratefully acknowledged for their major financial contributions as they absorbed much of the monetary loss for the Toronto Meeting, and for facilitating the transfer of some resources to the joint meeting. We owe a great debt of gratitude to these aforementioned individuals who successfully spearheaded this Herculean effort and preserved Canada's scientific image on the world stage.

### Upcoming Meetings

The Society's 47th Annual Meeting is fast approaching, so mark it on your calendars (May 27-29, 2004). This year's theme is "Cellular Signalling: From the Membrane to the Nucleus" and will be held in scenic Mont Tremblant (Quebec) which offers exceptional accommodation and meeting facilities in the picturesque ski village of Mont Tremblant - the best of Quebecois and European charm in a single package! The organizing committee under the leadership and energy of Dr. Terry Hebert (Institut de Cardiologie de Montreal/Montreal Heart Institute) has done a remarkable job of assembling an outstanding lineup of speakers from both academia and the pharmaceutical industry from within Canada and internationally. Sessions include: (1) Ion Channels/Transporters: Roles in Cellular Signalling and Gene Regulation; (2) Tyrosine Kinase Receptor Signalling Interplay Between Kinases and Phosphatases; (3) Large Scale Approaches and Model Systems for Cellular Signalling; (4) G Protein-Coupled Receptors; (5)

Scaffolding Proteins/Adaptors and Signalling Networks; and (6) Apoptosis (more information can be found at: <http://www.csbmcb.ca/2004meeting/index.html>). This is likely to be a well-attended event, so register early to guarantee yourself a front-row seat! Planning for our Annual Meeting in 2005 has already begun and will return to the spectacular setting of Banff, Alberta. The topic of the meeting is "Organelle Biogenesis and Intracellular Trafficking" and is being organized by Drs. Richard Wozniak and Richard Rachubinski (U. Alberta). Details of the program will follow in the months ahead.

### Communication

A significant effort has gone into increasing our visibility with our membership and the broader scientific community in Canada. At the forefront of this change was a major overhaul in the maintenance and management of the CSBMCB Web site. In the past, the Web site was managed largely in-house; however the upkeep of the site suffered due to the annual turnover of Board members responsible for this task. To create some stability, we have now taken advantage of new contractual services offered by CFBS to maintain our Web site. The services include an E-mail List Server so that we can rapidly communicate with our membership, and the invoicing and processing of membership applications over the internet using a secure server. This new arrangement will also facilitate the management of registrations for our Annual Meetings. Our Web site contains notices of upcoming meetings and special events, as well as a poster board for employment opportunities - so check it out!

Another initiative was the first publication of our Society newsletter *The Link* which appeared in October. This is intended as a community newsletter, so your valued input regarding the content is most welcome! I encourage you to send in short news & views articles regarding research accomplishments of your colleagues, upcoming conferences of interest, or opinion pieces on science advocacy and policy in Canada. The plan is to publish on a quarterly basis. Accolades go to Dr. David Andrews who spearheaded this project from concept to design, and Dr. Caren Helbing who did a marvellous job of editing and producing

---

the first issue (send articles to Caren at: chelbing@uvic.ca).

## The CSBMCB Board

The day-to-day running of the society rests largely on the shoulders of our Treasurer and the Secretary. Thus, it was with some sadness and trepidation that we bid farewell to two longstanding Board members; Dr. Fred Palmer, who retired as Treasurer at our 46th Annual Meeting after six years of dedicated service, and more recently Dr. Eugene Tustanoff who has served diligently as Secretary for the past 12 years. Both individuals are adept managers and invaluable sources of information about Society's affairs, and they will be hard acts to follow. Also stepping down after 3 years of valued contributions are Dr. Leon Browder, who served as Vice-President/President/Past-President, and councillors Drs. Claude Lazure and David Litchfield. Thankfully, we have been able to recruit some enthusiastic individuals to fill the void. Dr. Vincent Duronio (U. British Columbia) has taken up the post of Treasurer, and Dr. Albert Clark (Queen's U.) will soon be joining us as Secretary. In addition, we are thankful to have Dr. George Chaconas (U. Calgary), and Dr. Guy Poirier (U. Laval) come aboard as councillors. Dr. Joe Casey (U. Alberta) was elected Vice-President after serving for the last few years as councillor. Joe has been very active in lobbying the federal government for increased funding of Canadian science and will continue to promote this agenda. Last, Dr. Linda Penn has been very busy implementing new strategies to increase our membership which has languished of late. I urge you to cajole your colleagues who are not members to join the Society - the more voices the better! Thanks to the hard work of these and other individuals on the CSBMCB Board, the Society remains fiscally well managed and continues to function as a non-profit organization for the promotion of science in Canada.

## Future Goals

Lobbying the federal government for increased and stable funding is an ongoing priority of CSBMCB. While in past years we have been successful in accessing the decision makers in Ottawa, our

efforts this year were stymied by the upheaval on the Hill as few politicians were in a listening mood while the leadership game dragged on and on..... Now that Prime Minister Paul Martin is firmly at the helm, we intend to pick up where we left off. The upcoming election will certainly be a good time to bring our issues to the forefront of the political debate. We are continuing to voice our concerns in a unified manner through our association with CFBS. An issue of utmost concern is the dire financial situation of the CIHR. We will continue to emphasize the necessity of core funding and greater flexibility in training programs for graduate students and postdoctoral fellows.

In closing, CSBMCB remains a vibrant organization that speaks on behalf of the biochemistry, molecular and cellular biological communities in Canada. We warmly welcome all ideas to make this organization a more effective voice for your interests!

---

# Incoming Members of the CSBMCB Executive Board 2003-2004

## Dr. Joe Casey, Vice-President

I was born in 1963 in Lansing Michigan, while my father completed his Ph.D. in Psychology at Michigan State University. Having been born into



a university environment may explain why to this day I am still at university. I immigrated to Canada with my family in the heady days of the summer of 1967. As an immigrant I think I have developed a very strong appreciation for Canada and what it stands for.

I spent my primary school days in Kingston, Ontario and went to high school in downtown Toronto. I loved chemistry

even then, and believed it was in my blood since my maternal grandfather was a paint chemist. Before starting university I read a Scientific American article on biotechnology that convinced me that biochemistry was the future.

From 1983-1987 I studied biochemistry at Queen's University, Kingston. During those years I had many influences as a nascent biochemist. I worked two summers in the plant physiology laboratory of Ken Budd, Department of Biology. Those summers were a dream for me, since Ken gave me a huge amount of latitude for a summer student. I learned about biochemistry as a lifestyle by coming into the lab at all hours to take readings of cyanobacterial growth. I also got my first exposure to protein chemistry, doing some crude purifications of pyruvate dehydrogenase from cyanobacteria and characterizing its kinetic properties on a massive Cary 210 spectrophotometer. My last summer as an undergraduate was spent with John Elce, Department of Biochemistry. There I further honed my protein purification skills on calpain and

learned a lot about immunochemistry. My first exposure to molecular biology was in the laboratory of Peter Davies, where I completed my B.Sc. thesis on antifreeze gene chromatin. At the Queen's Outdoors Club I also met my wife, Rachel Wevrick.

In 1987, with a fresh B.Sc., I knew I wanted to study protein chemistry. It was the advice of Allan Mak and Peter Davies that lead me to the Department of Biochemistry, University of Toronto to work with Reinhart Reithmeier, and fateful advice that was! Little did I know it was membrane proteins that were to be my focus, which it has stayed to this day. I spent five fantastic years working with Reinhart, a superbly generous and insightful supervisor. After trying my hand at just about every protein chemical and biophysical technique that could be thrown at the erythrocyte membrane anion exchanger, Band 3, I decided that for postdoctoral work I would like to combine molecular biological approaches with protein chemical techniques.

So off I went to work with Ron Kopito at Stanford University. Ron had cloned the genes for all the family members of the anion exchanger family. I dove back into molecular biology for the first time since working with Peter Davies. Things had changed. There were a lot more kits and everything had become easier to do. I continued to study anion exchangers, developing a yeast expression system to facilitate expression and developing the tools to use introduced cysteine mutants and cysteine-specific protein chemistry to study anion exchangers. My three years at Stanford taught me how to tackle big research problems and added to my tool kit a new set of cell biological and molecular biological approaches. I also discovered that I love mountains, which contributed to my decision to move to University of Alberta, to join Jim Young's Membrane Transport Group in the Department of Physiology.

Since 1996 I have been on faculty in the

---

Department of Physiology, initially as an Assistant Professor and as an Associate Professor since 2002. Since 2002 I have been cross-appointed to the department of Biochemistry. I have had the good fortune to receive salary support awards from MRC and Alberta Heritage Foundation for Medical Research (AHFMR) and am currently a Senior Scholar of AHFMR. With funding from CIHR and Heart and Stroke Foundation my lab has focused on the study of structure, function and regulation of plasma membrane bicarbonate transport proteins. Since 1997 I have been a member of the CIHR group in Molecular Biology of Membrane Proteins, headed by Marek Michalak. The group has provided an exciting research environment for me and the people in my laboratory. Marek and Jim have been a huge help in guiding my early independent career.

Outside the lab I keep busy with my family and outdoor activities. We now have two children, Sierra (8) and Adam (5). Whenever possible we visit the Rockies for hiking, mountaineering and skiing

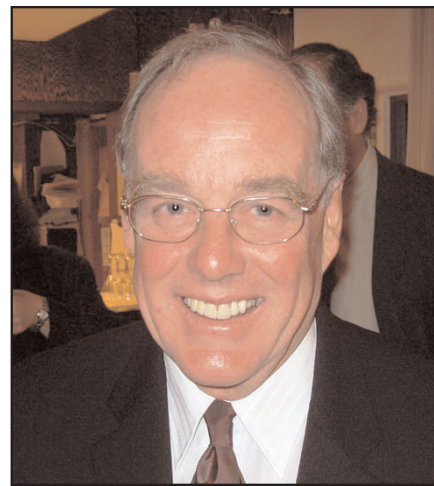
### **Dr. Albert F. Clark, Secretary**

Albert Clark was born in Meiklefield, Nova Scotia, a farming community of approximately 50 people, 20 km from New Glasgow. For the first 9 years of his education he attended the one room school in Meiklefield (one year there were 4 students – all different grades – for several months.) At the beginning of Grade 10, a rural high school (East Pictou Rural High School) opened which required a daily bus trip of 20 km each way.

On completion of high school, he pursued a B.Sc. degree in Chemistry at Acadia University. Following graduation in 1958, he undertook M.Sc. degree studies in the Biochemistry Department at Dalhousie University. Working under the supervision of Dr. William Morse of the Department of Medicine, he was one of the first people to study in vivo estrogen metabolism in humans using  $^3\text{H}$ -labelled compounds; radioactivity measurements were achieved by first oxidizing the metabolites to gaseous products and feeding the resulting tritium into a detector. In 1960, he moved on to the Biochemistry Department at McGill University where he pursued Ph.D. studies under the supervi-

sion of Dr. Samuel Solomon working on C19-steroid metabolism using labelled steroids but with a scintillation counter for detection. One part of the project involved a collaboration with Dr. James Raeside at the University of Guelph, which helped establish the pig testes to be a major producer of C19-steroids, in particular, dehydroepi-androsterone sulfate. In 1964, after completion of his Ph.D., he began a post-doctoral period with Dr. Howard Ringold at the Worcester Foundation for Experimental Biology in Shrewsbury, Mass. The research was on enzymes which metabolized steroids – kinetic and substrate specificity studies. Interesting studies were performed on liver alcohol dehydrogenase indicating that certain parts of the substrate molecule were more important than others in fitting into the active site.

In 1966, Dr. Clark moved to Kingston for a “couple of years” as Clinical Chemist at Kingston General Hospital and Assistant Professor in the Department of Biochemistry at Queen’s University. He is still in Kingston! For many years, much of his research was in collaboration with Dr. Charles Bird of the Department of Medicine. Dr. Bird had taken a Ph.D. at McGill University at the same time as Dr. Clark – also under the supervision of Dr. Solomon. The research focussed on the in vivo regulation of androgen metabolism in humans using the metabolic clearance rate and other kinetic parameters as endpoints. The effects of estrogens, especially through their influence on sex hormone binding globulin to decrease androgen clearance, were significant findings at the time. The human studies were complemented by studies in rats – in vivo and in vitro – carried out by a number of graduate students including Dr. John Orlowski. A number of these experiments were directed at the prostate where androgen levels and metabolism were related to expression of androgen activity which was measured through the levels of



secretory acid phosphatase. The laboratory received continuous support for its research for many years from the Medical Research Council, Ontario Cancer Research and Treatment Foundation and the National Cancer Institute of Canada.

With time, Dr. Clark assumed administrative duties, becoming Associate Dean for Research in the Faculty of Medicine and then the Faculty of Health Sciences and Director of Research at Kingston General Hospital in 1981, positions he held for 16 years. He gave up his position as Clinical Chemist in 1989. In 1995 he became Acting Head of the Department of Biochemistry while Geoff Flynn was on sabbatical; this appointment continued for a second year when Dr. Flynn became Vice Dean of the Faculty. In 1997 he was appointed Head for a five year term. On completion of his term in 2002, he had one year to go until his retirement in 2003. He continues to do some teaching, looks after the COOP Program for the Department, and the research elective component of the medical students curriculum, and chairs the Human Research Ethics Board for the Health Sciences, a carryover from his days as Associate Dean.

Dr. Clark served on several grants committees with the Medical Research Council, Ontario Cancer Research and Treatment Foundation, and the Ontario Ministry of Health. During 1994-95 he served for 9 months as an interim Director of the Programs Branch at the Medical Research Council on a part-time basis. He has been a long-

time supporter of the Canadian Society of Biochemistry and Molecular Biology, and still remembers his first presentation at the Canadian Federation meeting at the University of Guelph in 1961.

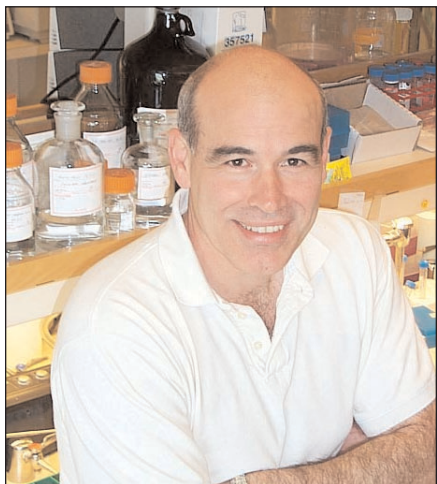
### **Dr. Vincent Duronio, Treasurer**

I was raised in the working

class area of Windsor, Ontario, that was best known as "Little Italy". As sons of Italian immigrants, my two brothers and I were given strict instructions on how to be good citizens (or else!) and to work hard in school. My parents were proud of having made sacrifices to make sure our lives were better than theirs, and we can be thankful for the dedication they had to their family. My earliest recollections of being interested in science began with backyard investigations into all kinds of phenomena involving everything from chemicals to insects, but I must admit that I was fortunate to have had many science teachers through high school that really tried to impart their excitement for the subjects. Two in particular stand out - my biology teacher Mr. Eid, who gave us the memorable "how a hamburger becomes you" lecture, and especially my chemistry teacher, Mr. McGorman, who was a scientific researcher far beyond what one would think of in any high school. He tested out his special teaching aids on us, which became McGorman Science Charts, and made chemistry a lot easier to learn. I can remember being allowed to do a full term chemistry project that would likely rival what might be done in some 4th year honours projects.

Thus, the combination of chemistry and biology was what I pursued at the University of Windsor - they didn't offer an undergrad biochem degree, so you had to take a double major in those days. Again, I was fortunate to have a lot of excellent instructors and the added benefit of having small classes and a lot of good lab experiences. The honours biochemistry graduating class had a fair bit of attrition after the third year and only three of us ended up sticking it out to the end - one went on to chemical engineering and my other fellow grad is David Clarke who's now a well known biochemist at U. of T. Not a bad graduating class.

I was able to immerse myself in a true biochemistry program when I went to graduate school at U. Western Ontario under the supervision of Ted Lo. When I started, Ted had only had a couple of graduate students and I ended up being his first Ph.D. student. Our studies of membrane transport systems now seems pretty rudimentary, but at the time we really felt we were making some



---

great advances. I must admit that being closely associated with the larger group of Bill Sanwal was a great advantage. Dr. Sanwal was the department head then (Ted Lo is the current head of biochemistry) and he offered his wisdom to all of the students in the department. Also, I was fortunate to be surrounded by dozens of fellow graduate students who have all gone on to hold faculty positions or senior positions in the private sector. The mood in the early 80's was quite positive and we all looked forward to exciting post-doctoral positions to further our academic training.

After writing dozens of letters, and being turned down by at least three different labs of scientists that later earned Nobel prizes, I moved south to the innovative and progressive Research Triangle in North Carolina. Despite of a lot of remnants of backward thinking, the state had made a very progressive move in setting up a massive high tech park fed by three major universities, UNC, Duke and NC State. One of the first companies to move there was Burroughs Wellcome. They recruited Pedro Cuatrecasas as their VP Research, and he was allowed to have a Molecular Biology department (so named long before the beginnings of recombinant DNA work) that kept to the study of what was then a completely uncharacterized receptor family would be a good move. I think it was a good decision, as that field has advanced tremendously in the past 15 years, and we've been able to make some important contributions. I spent my first several years as a research associate at the BRC before obtaining an independent position in the department of Medicine, with my lab at the Jack Bell Research Centre. That was again a fortunate move, since as my department head said at the time, it was one of the few places in Vancouver where a lot of growth would be happening, and that was certainly the case. We now are in a very vibrant setting as part of the newly christened "Vancouver Coastal Health Research Institute". While my group still concentrates on hemopoietic systems and responses to cytokines, we are most interested in the pathways that regulate cell survival and apoptosis, and have recently begun to forge into the regulation of the cell cycle. The journey that has taken me to my current position

at UBC has been an interesting one. I always tell any potential graduate students that I would not change a thing about what I've done during my career since I've always been able to do work that was of interest, and I've never felt like I've just been doing a job. After all, who would go through the years of being under-paid and spending long hours in the lab if you weren't doing exactly what you wanted to?

I began my membership in the old CBS over 20 years ago as a graduate student, and I think our executive has made a good decision to try to increase the number of student members as a means of expanding our membership. I have kept my interest in the CSBMCB as a way to keep in touch with the community across Canada, and I see a bright future with the current leadership and an emphasis on hosting excellent scientific meetings. I have some pretty big shoes to fill as treasurer since Fred Palmer has kept the ship running pretty smoothly, and I feel privileged to be put in charge of the funds that have been built up over many years. I hope we will wisely use those funds to help make ours the strongest scientific society in Canada.

### **Dr. Guy Poirier, Councillor**

Guy Poirier completed his B.Sc. in Biochemistry and his Ph.D. in Physiology at Laval University, Québec, in 1970 and 1973 respectively. After one year as a postdoc at Sussex University, England, he followed his supervisor, Dr. Gordon Dixon, to the University of Calgary to pursue his studies on micromodification of proteins. In 1975, he became Assistant Professor in the Department of Biology at the University of Sherbrooke, where he contributed greatly to the teaching of basic biochemistry, being eventually coordinator of the whole emerging biochemistry program in the biology department. At the same time, he also joined the research group on



---

Mécanismes de Sécrétion with Jean Morisset, Adrien Beaudoin and Jacques Dunnigan.

His interest in poly(ADP-ribose) metabolism took him to IBMC in Strasbourg, France in 1981 as an invited research scientist, where he worked with the late Professor Paul Mandel. He studied the role of poly(ADP-ribose) polymerase (PARP) in the maintenance of the structure and function of chromatin. In 1983-84, as a research fellow of IUCC (Eleanor Roosevelt Award), he spent a year in Dr. Peter Cerutti's laboratory at ISREC, in Switzerland. His studies focused on the molecular mechanisms implicated in DNA repair. This research allowed him to further clarify the role of PARP in DNA repair.

In 1985, he became professor in the Biochemistry department of the Faculty of Medicine at Laval University; his laboratory was at the Centre de recherche en Cancérologie de l'Université Laval à l'Hôtel-Dieu de Québec and, since 1988, it has been at the CHUL Research Center. In 1991, Dr. Poirier was awarded for the second time the Eleanor Roosevelt fellowship. This performance is unique in Canada and only one other researcher in the world received this honour twice. He then spent a year working at the bench, this time with Dr. Tomas Lindahl at ICRF, in London UK doing more work on DNA repair. More recently, Dr. Poirier has gained international recognition in the field of apoptosis by his contribution to the discovery of caspases, the apoptotic proteases that cleave the PARP. The PARP enzymes play an important role in maintaining the integrity of the genome when DNA is damaged and repaired.

Dr. Poirier is frequently invited to the United States and Europe to give seminars about his research findings. He has worked for several months in California and France over the past few years. Dr. Poirier is co-author of more than 200 scientific publications. In October 2000, he was recognized as co-author of 4 of the 1000 most cited papers in molecular biology and genetics between 1994 and 1999. He has been involved in the organization of many meetings such as the International Poly(ADP-ribose) Meeting, and the Winter International and CFBS in Quebec. He is an active member of scientific committees, at national

(CIHR, NSERC, CRS, CFI), provincial (FRSQ), and University Laval levels, to evaluate grants, fellowships, and manuscripts.

Since 1990, Dr. Poirier has developed a unique expertise in the field of proteomics. He is the person in charge of proteomics at the CHUL Research Center, and he is also associate researcher at the Burnham Institute in San Diego CA. In 2002, Dr. Poirier obtained a Canadian Research Chair in targeted proteomics. The same year, he was also awarded a grant from Genome Prairie-Genome Canada in order to establish a collaboration with the company MDS Sciex. Developing high technology and making it available for the scientific community is one of Dr. Poirier's highest priorities.

## **Dr. Frances J. Sharom, Councillor**

I was born in Newcastle-upon-Tyne, UK, and lived in several different cities and villages in the north of England over the course of the next 18 years. After completing A levels in Physics, Chemistry and Biology, I emigrated to Canada with my parents and four siblings in 1971. By this time, I had already developed a keen interest in chemistry, especially its biological aspects, fuelled in large measure by completion of a Special Level paper in chemistry/biochemistry during my final year of school. My father took up the position of Chair of the newly formed Department of Computing and Information Science at the University of Guelph, while I enrolled in an Honours Chemistry program at the University of Guelph, and graduated with a degree with Distinction in 1975. During the three summers spent at Guelph, I was fortunate to work in the research laboratory of Dr. Allan Colter, then the Chair of the Department, where I carried out kinetic experiments on redox reactions of nicotinamide derivatives with quinones. This experience was extremely positive, and provided an impetus to continue on to graduate research.

During my first year at university I met my future husband, Sharom, who was an M.Sc. student in Environmental Biology, and we were married after I completed my B.Sc. degree in 1975. We both moved to the University of Western Ontario, where I started a Ph.D. degree in the

---

Department of Biochemistry with Dr. Chris Grant. Sharom also began his Ph.D. at the Agriculture Canada labs on Richmond Street with Dr. Ron Harris. I was supported by an MRC Studentship, which actually allowed one to live quite well in those days of low tuition fees! Chris had arrived at Western only 9 months earlier as an Assistant Professor, and I was his first graduate student. I greatly appreciated the time and attention that Chris was able to give me in those early years, and fondly remember the scientific discussions frequently conducted in his office, and his great sense of humour! My project involved using spin-labelling to study the biophysical and biochemical behaviour of neutral glycolipids, gangliosides and integral glycoproteins (human erythrocyte glycophorin and Band 3) in reconstituted lipid bilayer systems. The required ESR spectroscopy was actually carried out in the Chemistry department, in the laboratory of Jim Bolton, whose research group I came to know well over the years. These spin label studies were the first of their kind to be carried out on glycosylated membrane components, and led to some unique insights into their behaviour in membranes. I defended my thesis in a very pregnant state, and my son Jeffrey was born a week afterwards.

Later that summer, I moved back to Malaysia with Jeffrey to join Sharom, who had returned earlier to a staff scientist position at MARDI (Malaysian Agricultural Research and Development Institute). Despite the offer of a faculty position at the University of Malaya, the difficult political situation in Malaysia made it impossible for me to obtain a work permit, and after over a year of frustration, we returned to the University of Guelph to take up post-doctoral positions. My next year was spent in the laboratory of Alan Mellors, working on the effects of various hydrophobic toxicants on the membrane-bound enzyme 5.-nucleotidase. A once-in-a-lifetime opportunity arose during that year; I was nominated for, and awarded, an NSERC University Research Fellowship (URF), which provided salary support for a 5-year term as an Assistant Professor.

Things got off to a good start on the research front, with operating funding from both NSERC

and the National Cancer Institute of Canada in place during the first year. I was successful in obtaining a regular tenure-track Assistant professor position in the department in 1984, and was promoted to Associate professor with tenure in 1987. On the home front, the arrival of daughter Sofia in February 1983 completed the family picture, and made life considerably more hectic. Sadly, Sharom died in 1991 from a viral infection arising from chemotherapy treatment for a recurring tumour. We, and his extended family in Malaysia, still miss his lively spirit and sense of humour.

I was promoted to full Professor in 1994, and run a busy research laboratory, with operating funding from the National Institute of Canada, NSERC and the Ara Parseghian Medical Research Foundation. From 1991-1994, I served a term as Director of the Guelph-Waterloo Centre for Graduate Work in Chemistry and Biochemistry, the jointly run graduate program of the two universities, and the largest of its kind in Canada. In January 2003, I took over as Director of the Biophysics Interdepartmental group (BIG) at Guelph, an interdisciplinary graduate program that attracts graduate students from around the world. I have served regularly on Grants Panel G at the National Cancer Institute of Canada, and Biochemistry and Molecular Biology Panel A at CIHR, as well as being a member of the ORDCF Medical Review Panel.

Current research projects in my laboratory focus in three areas. I became interested in the P-glycoprotein multidrug transporter in the late 1980's, after spending a sabbatical leave in the laboratory of Victor Ling at the Ontario Cancer Institute, and starting actively working in this area soon afterwards. My research group was the first to achieve functional reconstitution of both ATPase



---

activity and drug transport by P-glycoprotein in reconstituted lipid bilayer systems. In 1996, we reported the first fluorescence experiments on purified P-glycoprotein labelled at cysteine residues at the catalytic sites. This spectroscopic approach has proved extremely fruitful, and is continuing to provide many important insights into the interaction of both nucleotides and drug substrates with the transporter, as well as the role of the lipid matrix in these interactions. NSERC provides funds for another project on GPI-anchored proteins. Members of the lab are examining the biophysical and biochemical behaviour of GPI-anchored proteins (5'-nucleotidase, Thy-1 and alkaline phosphatase) in reconstituted lipid bilayer systems, their cleavage by PI-specific phospholipases, as well as the association of these proteins with lipids rafts, and their involvement in signal transduction. I am also involved in a collaborative project of long-standing with Jim Davis in Physics at Guelph, who is developing magic angle spinning

(MAS) NMR techniques for determination of the 3D structure of membrane spanning segments of integral proteins, especially members of the EGF receptor family. My group has recently embarked on a new project (funded by the Ara Parseghian Medical Research Foundation) to explore the structure and function of the NPC1 protein, a defect in which causes Niemann-Pick Type C disease. This enigmatic protein is thought to be involved in intracellular cholesterol or lipid trafficking, although its role at the molecular level is not at all clear.

In October 2003, I was appointed to the Canada Research Chair in Membrane Protein Biology at the University of Guelph. The year 2003 was also a very good one on the personal front. In July 2003, I married John Chapman, who also lost his first spouse to cancer. We are greatly enjoying life together, and our two sets of children and their significant others are making for wonderful large family gatherings on special occasions

---

# Retirement of Fred Palmer and Gene Tustanoff from the CSBMCB Executive

The coming year will mark a very significant shift for the CSBMCB as our long time Treasurer and Secretary, Fred Palmer and Gene Tustanoff, begin well-earned retirements from the organization. Fred and Gene have been the backbone of CSBMCB, working hard for its success. The current executive can barely imagine the organization without them. The fact that both Fred and Gene have made long-term commitments to the Society has provided continuity than most organizations can only dream of. Both Fred and Gene have made a strong impact on those who have worked with them.

Past CSBMCB presidents were asked for their comments about Fred and Gene, which are included below along with a little information about each of them.

Fred Palmer is Chair of the Department of Biochemistry & Molecular Biology, Dalhousie University. He has been treasurer of CSBMCB for many years. Fred has acted as a reliable accountant for us, although trained as a biochemist! Past CSBMCB Presidents have said of Fred's contribution:

"Fred is a great guy and the most conscientious treasurer I have ever known or could hope to know. At every CSBMCB meeting Fred presented a most careful and thoughtful financial report complete with graphs and dire predictions. I'm sure that the excellent financial shape of the society is due to Fred's stewardship. As well, Fred was very much the champion of students, as exemplified by his involvement with the Young Scientist event at the recent HUPO-IUBMB 2003 joint meeting. I will miss him."

"Fred has diligently and effectively managed the assets of the Society. I have been amazed at how well we managed through the market meltdown. He has always been fair and responded to requests for reimbursement. Importantly, he has

enabled the Society to shift to electronic dues payment."

Gene Tustanoff has been secretary of CSBMCB since 1991, and is a Professor Emeritus at the University of Western Ontario, Department of Biochemistry. Gene is most known for his dedication. He is simply always at CSBMCB events, standing out with his height and usually with a camera in hand to record the event for the Bulletin. At CSBMCB board meetings Gene acted as the institutional memory for CSBMCB, with a binder full of past minutes and correspondence and an encyclopedic memory for the history of CSBMCB. Gene has put tremendous energy into the CSBMCB and his passionate belief in the organization has been an inspiration for those who have worked with him.

Comments from past CSBMCB Presidents summarize what he has meant to the organization:

"He made my job very easy, as I am sure he has done for many other presidents. On my wall hangs a beautiful and treasured "Certificate of Merit" thanking me for my service to the CSBMB for the years 1992-1995. Gene made the certificate himself and signed it. It is typical of his devotion to his job. Gene is a warm and generous person and I love him dearly. I wish him health and happiness for many years to come."

"Gene was terrific. He kept us organized and always had the welfare of the Society in his heart. He is going to be a tough act to follow."

"Gene has been the living, breathing embodiment of the Society. I haven't always agreed with Gene on policy matters, but there has never any doubt that his views were based on his perception of what was best for the Society. He has been particularly successful in soliciting funds to support travel awards for trainees. His ability to cajole funds from his contacts is legendary. Another term to describe Gene is "persistent". His persistence

---

was particularly valuable in enabling us to weather the storm over the IUBMB Congress. In the end, this was a highly successful venture, and our financial liability was kept to a reasonable level.”

The comments of one past CSBMCB President encapsulate the feelings of all of us on

the departure of Fred and Gene from CSBMCB, “Both of these men are true gentlemen; we are fortunate that they have allowed us to benefit from their generosity of time, effort and spirit over many years. I wish them all the best.”



The CSBMCB executive in council in 1999; right to left, Gene Tustanoff, Secretary; Fred Palmer, Treasurer; David Litchfield, Councillor; Bruce Waygood, Councillor; Marlys Koschinsky, Councillor; Frances Sharom, Vice-President; Leon Browder, Councillor and future President.

---

# Minutes of the 46th Canadian Society of Biochemistry, Molecular and Cellular Biology Annual General Meeting

Intercontinental Hotel, Montreal, Quebec

Thursday, October, 9, 2003, 8:00 pm

Chair: Dr. David Andrews, President, CSBMCB

## 738. Approval of Agenda

The agenda was approved as circulated on a motion from Dr. Browder which was seconded by Dr. Orlowski.

## 739. Approval of Minutes of the 45th AGM

The minutes of the Society's 45th Annual General Meeting as published in the 2003 issue of the BULLETIN were approved after the Chair received a motion from Dr. Palmer which in turn was seconded by Dr. Sharom.

## 740. Business Arising from the Minutes

Dr. Andrews stated that any matters arising from the minutes of the last AGM meeting would be addressed in his presentation.

## 741. President's Report

### a) HUPO/IUBMB Congress

Dr. Andrews stated that despite all the ominous disappointments that had begotten the planned Toronto IUBMB Congress, a lot of people stepped up to the plate and literally helped to pulled a rabbit out of a hat in order to stage this present meeting in Montreal. Dr. Andrews reviewed the developments that affected the planning of the Congress over the past year. The spread of SARS in Toronto in the late Spring has had a dire effect on the economy and well being of Toronto. One of the fallouts of this occurrence was the cancellation of the IUBMB Congress which was slated to be held in July. Since a significant number of symposia speakers opted out, and the number of registrants had fallen far short of expectation, the

meeting was destined for a financial disaster and was therefore cancelled. This had a dramatic effect on our Society's programme. It appeared that all the hard work and industry that had been expended over the past six years in the planning and organization the Toronto Congress was to come to naught. However, Dr. Weiner, in concert with Dr. John Bergeron, the Chairman of the 2003 HUPO Congress, was able to resurrect the Toronto Meeting. Melding of its structure into the HUPO Congress' footprint joint HUPO/IUBMB venue was achieved. This now gave the Society a platform to hold its Annual General Meeting in Montreal at the Palais des Congrès, October 8-11, 2003.

The Society will not be responsible for the large debts that have resulted from the contractual obligations of the Toronto Congress, since the NRC financially backed this meeting. The Federal Government now stands to lose between \$2,000,000 and \$2,500,000. As a result of this loss, NRC Conference Services has refused to transfer the \$25,000 that the Society originally contributed to the IUBMB Toronto Congress, which the Society now wants to have transferred to the HUPO/IUBMB organization. This matter has still to be resolved. The Society is still obliged to repay NRC the \$25,000 that they lent the Society in 2000 to cover the Society's contribution to the Toronto Congress. It was hoped initially that the Society would recoup this seed money from the profits generated from the Toronto IUBMB Congress.

Dr. Andrews reported that the initial enrollment for the Montreal Congress was very disap-

---

pointing with less than a thousand registrations, and only a handful of commercial booths being leased. However, at the last moment there was a groundswell and the registrations to date have substantially increased, with all booths being sold. This augers well for both the scientific and commercial success of the Congress. There is a good possibility that the Society now may realize between \$20,000 and \$25,000 from this Congress' profits, and may help offset our monetary commitments to the two meetings.

As a result of the number of scheduled Toronto symposia speakers opting out from the Montreal meeting, and compounded with financial restraints that faced this meeting, only 130 of the 264 speakers originally slated to speak in Toronto will participate in Montreal. The HUPO programme will contribute 75 speakers to the programme. There were 1,300 abstracts submitted, and as of the last count there were more than 2,500 registrants of whom almost 600 were Canadians.

Dr. Andrews applauded Dr. Palmer for resurrecting the Toronto IUBMB Young Scientist Programme on such a short timeframe. The conference will be held this weekend in an abridged form over one day instead of the original two days as part of the main HUPO/IUBMB programme. Of the 120 participants stated to attend the Toronto meeting, only 90 have elected to attend the Montreal meeting, representing 44 different nations. Dr. Palmer was able to maintain the original \$230,000 pledged for this undertaking, which included the Society's \$20,000, however PABMB has clawed back \$7,500 from their original \$30,000 donation.

Dr. Andrews stated that the Society has a prominent presence in the exhibit area of the Congress in the form of a booth from which distribution of Society literature and recruitment has taken place. Posters advertising the Mount Tremblant meeting have been displayed along with registration forms and programme. Copies of the LINK, the "Join Us" pamphlet and the 2003 BULLETIN are being handed out, as well as registration forms for new membership. It is important to have strong Society representation at the booth, especially during the times of the poster sessions, and to this end, several members of the Society's

Executive are posted to man the CSBMCB booth along with a group of student volunteers.

Due to the logistics of the meeting, Dr. Andrews stated that the Society's Roche Diagnostics Graduate Student Poster Competition was placed in abeyance this year, and the funds will be used to reward the three students who help man the Society's Congress booth. The Competition will be remounted for next year's Mount Tremblant meeting.

Dr. Andrews reported that he was able to obtain a sponsor to underwrite the cost of a T-shirt Society promotion campaign. MBI Fermentas has supplied 300 T-shirts which have a Society design emblazoned on the front side of the shirt and Fermentas' logo on the back. The Society logo has been designed with the thought that these T-shirts will also be made available for the 2004 Mount Tremblant meeting, and therefore have not been characterized specifically for the Montreal meeting. 150 T-shirts have been distributed at the Society's reception this evening to students who had registered for membership at the Society's congress booth.

Dr. Andrews then thanked Dr. Tustanoff for arranging the successful Society reception which was held this evening in the Maisonneuve Ballroom, Intercontinental Hotel. Invitations were restricted to Canadian registrants due to budgetary limitations. The budget of \$8,000, which was garnered from four contributors each donating \$2,000 (MBI Fermentas Inc., New England Biolabs, University Medical Discoveries, and CSBMCB), was planned to provide food and drink for 250 guests, and as a safety valve if required, additional drinks for a further 250 people. The menu for the reception included a Deli bar with two stations attended by chefs carving smoked meat and supplemented with appropriate garnishes and in addition waiters passed around 36 dozen varied canapés. Each attendee was given a ticket for one drink of their choice, and a cash bar was made available for additional libations. The cost for the reception will only be \$6,302.32, since attendance did not exceed the planned 250 people. During the reception, presentations were made to Dr. Weiner and Dr. Walsh for their leadership and work in organizing both the IUBMB Toronto Congress and the HUPO/IUBMB World Congress.

---

A gift and a plaque were presented to Dr. Palmer, who is retiring as Treasurer after six years of diligent service to the Society, and plaques to Dr. Lazure and Litchfield, retiring councillors, were also presented.

### **b) The Link**

At the last AGM meeting in Banff, Dr. Andrews described a plan for publishing quarterly a Society newsletter which could be used to recruit new members and act as a clarion for science policy and lobbying. He said that he hoped to enlist three other societies so that each would be responsible for editing one issue each year, however to date, this has not happened. Caren Helbing has done a bang up job in turning out the first issue of the newsletter called "The Link", which appeared in October, and is to be congratulated. Because of cost considerations, it was only printed in two colours instead of the four originally proposed. The cost for the multicoloured printing would have been \$2,000, whereas we were able to print 1,000 blue and white copies for \$600 in a 11 x 15 inch format. The Link will be distributed by e-mail to the membership as a PDF file, and the hard copies will be available for science advocacy. It was decided that English articles should have a sidebar containing a French summary and French articles should have the corresponding English sidebar. The first four-page issue included articles on SARS, Advocacy Report, Bugs, Genes and Chemicals, Gradlink, and Découvrir des protéines dans les pièces de la maison cellulaire, with a bilingual touch. In order to keep the impetus rolling behind "The Link", Dr. Andrews asked the Board and Society members to pitch in behind Caren and either submit or encourage articles for publication. Articles for the next Link should be submitted by December 1.

### **c) Membership Recruitment Strategies**

Dr. Penn has been very active in setting up and implementing new strategies in membership recruitment. She has put together a very colourful "Please Join Us" pamphlet, 4" x 10" folded into three sections, outlining the following articles: What the Society Does, How we Support Bioscience in Canada, Advocacy in 2002, Recent CSBMCB Meetings, and How to join the Society.

The "Join Us" pamphlet was placed in each Congress registrant's bag. Dr. Andrews stated with the circulation of this pamphlet, and with the recruiting efforts that are being expended at this Congress meeting, there hopefully will be an increase in our membership rolls. He then suggested it would be necessary to twist arms and give potential members some substantial reasons for joining. It is important to keep the Society's activities before the membership as often as possible in order to reinforce the idea that the Society is working on their behalf, whether in Ottawa, or from the scientific bench.

### **d) 2004 AGM**

Dr. Andrews reported that Dr. Terry Hébert, Montreal Heart Institute, the chair of the organizing committee for the Society's 2004 Mount Tremblant scientific meeting has matters well in hand. The meeting "Cell Signalling: from the Membrane to Nucleus" will be held at the Fairmont Tremblant Hotel, Mount Tremblant Quebec, May 27-29, 2004. The scientific programme is complete, with gender balanced speakers from Europe, United States and Canada. Efforts have been made to have representative speakers from the pharmaceutical industry on the programme as well. The meeting will open Thursday evening with a keynote address given by Dr. Sylvio Gutkind, NIH. There will be three sessions on Friday: 1) Ion channels/transporters: roles in cellular signalling and gene regulation (five speakers), 2) Tyrosine kinase receptor signalling-interplay between kinases and phosphatases (3 speakers), 3) Large scale approaches and model systems for cellular signalling (five speakers) and an evening keynote speaker, Dr. Gary Johnston, University of Colorado. There will be three sessions on Saturday 1) G protein-coupled receptors (five speakers), 2) Scaffolding proteins/adaptors and signalling networks, (three speakers), 3) Apoptosis (five speakers). More than a hundred letters have been sent out soliciting funds to help finance the meeting. To date, \$20,000 has been collected from five sponsors. The registration for the meeting has been set: Single occupancy, member \$1,470, nonmember \$1,545 and student/PDF \$1,395, double occupancy, member \$1,150, nonmember \$1,225 and student/PDF \$1075. These

---

prices include three nights accommodations, meals from supper May 27 to breakfast May 30, and registration charges, \$250 for members, \$325 for non-members and \$175 for students and postdoctoral fellows. Dr. Andrews stated that a new innovation will be introduced at the meeting, one of the evening meals will be served in the poster area in the hope of garnering more interplay between the poster presenters and the registrants. The maximum number of attendees will be limited to 300. Dr. Hebert has presented a preliminary budget with the Society contributing \$5,000 in seed money. There will be space for 20 commercial booths at the meeting for which Dr. Hébert suggested there would be a \$2,000 charge. Posters have been prepared both in English and in French advertising the meeting and these will be sent to all university and institutional departments of biochemistry, molecular biology, genetics and cell biology in Canada. In addition, registration forms, the preliminary scientific programme and meeting information have been prepared and are now in the hands of Mrs. Antonious at the CFBS office for posting on the Society's web page.

#### **e) 2005 Banff Meeting**

Dr. Andrews stated that he has contacted Dr. Richard Wozniak and Dr. Richard Rachubinski, Department of Cell Biology, University of Alberta, to organize the 2005 April Banff meeting on the topic of organelle biogenesis and intracellular trafficking. He further stated that negotiations were well underway with the Canadian Genetic Society to piggyback our meeting with theirs, so that there will be one day overlap between both meetings. For that day, a common session will be planned to the mutual interest of both Societies. It is hoped to entice Dr. Guthrie Blobel to be the keynote speaker.

Dr. Andrews reported that the CFBS is rethinking their mandate. They are proposing to start a new initiative called "Northern Lights Conferences" in which they will act as sponsors and meeting coordinators for various scientific organizations. This approach will reflect the changing nature of the Federation's scientific meetings and their desire to attract a larger international audience in addition to international speakers. He suggested that some day our Society's

future meeting could fall under the Northern Lights umbrella.

#### **f) CFBS Contractual Services**

Last May the Society received a proposal from CFBS outlining managerial services that they could provide our Society on a contractual basis. With the retirement of our Treasurer, Dr. Palmer, the search for his replacement has proved to be very difficult because of the commitment of time and effort that the Office now requires. This CFBS proposal was very timely. By redirecting the bulk of the Society's operational responsibilities and duties, it was pointed out that this would add stability to the Society and it would be easier to recruit a new treasurer since the "hassle factor" would be removed from this Office, however, at an extra cost. After fine tuning CFBS's contractual terms, the Society's Board agreed to sign a one year agreement with CFBS for managerial services. CFBS is now responsible for the following Society matters: 1) Invoicing and Membership Processing, 2) Website Setup and Maintenance, 3) E-mail List Server, 4) Book Keeping, and 5) Office Expenses, at a yearly charge of \$6,666. It was also decided to extend the lobbying contract with CFBS for another year.

#### **g) Time of Change of Office**

Dr. Andrews addressed the timing that the new Executive took office each year. Traditionally, this change occurred at the Society's June AGM, however since the Society severed its affiliation with CFBS, the scheduling of the Society's annual meeting has varied. He cited the fact that the 2003 AGM this year did not occur until October, which meant that his term of Office has been extended an extra four months. Since the 2004 AGM is scheduled for May, his successor would now only hold the office of the President for seven months. To correct this inconsistency, the Executive Board approved the following "That beginning July 2004, the term of the new Society Executive each year will run concurrently from July 1st to June 30th of the succeeding year."

#### **742. Past President's Report.**

Dr. Browder had no report.

---

### 743. Vice-President's Report

Dr. Orłowski stated that since Dr. Casey was spending his sabbatical leave in Ottawa last year, he took over the responsibility of science advocacy for the Society. Dr. Casey felt that Dr. Bruce Sells, Executive Director of CFBS was an important cog in the Society advocacy programme. Dr. Sells has over the past number of years developed important ties with many civil servants and politicians which now affords the Society access to Parliament Hill. As a result of these inroads, Dr. Casey strongly feels the Society is getting its money's worth with our association with CFBS's advocacy programme. Over the past year, Dr. Casey has had the opportunity on four occasions to meet with and lobby a number of Members of Parliament and Senators. According to Dr. Casey, the Health Research Society is dead in the water even though he personally has established a unit in Edmonton. Dr. Andrews stated that he has been to the Hill three times and his effectiveness has been worn out and new faces have to appear to reinforce our Society's lobbying for more research support. Dr. Casey stated that Friends of CIHR and HRAM have put forward strong and effective lobbying efforts.

Dr. Orłowski stated it was important this Fall to mount a letter writing campaign to the politicians and government leaders in Ottawa supporting science advocacy. The Executive is in the process of constructing a form letter that could easily be used by the membership this purpose. This could be sent to the Society's membership by e-mail and they in turn could dispatch this letter to their member of Parliament in Ottawa. Even though they are form letters, they still would have an impact, but not as great as a personal letter which would have more clout.

### 744. Treasurer's Report

Dr. Palmer presented his 2003 interim financial statement which was current to September 6. Total receipts to date were \$194,001.90 with expenses paid out of \$95,771.89 resulting in a net balance of \$8,230.01. Dr. Palmer stated that the Society was obligated to repay the \$25,000 NRC

loan which the Society obtained as its contribution to the Toronto IUBMB Congress. The Special Fund at the end of August stood at

\$350,537.26. He stated that he would have to withdraw \$24,000 from the Special Fund to cover the Society's 2003 obligations. Dr. Palmer moved that his report be accepted. The motion was seconded by Dr. S. Brosnan.

### CARRIED

Dr. Palmer stated that he has had discussions with Dr. Duronio regarding transferring the Office of the Treasurer to Vancouver, and that he and Dr. Duronio plan to visit the CFBS office in Ottawa to meet with Mrs. Antonious in order to organize her contribution to our Society's management. The Society's bank account will be transferred to Ottawa and the Treasurer and/or the Secretary of the Society will have signing authority on this account. Dr. Bruce Sells, the Executive Director of CFBS will be authorized to sign cheques on this account only with the approval of the Treasurer.

### 745. Secretary's Report

#### a) Society's Award Programme

Dr. Tustanoff reported that Dr. Victor Ling, Vice President, British Columbia Cancer Agency, is the 2003 recipient of the Roche Diagnostics Prize for Biomolecular and Cellular Research, and that Charles Boone, Banting and Best Department of Medical Research, University of Toronto, is the 2003 CSBMCB's Merck Frosst Award designate. Thirty-six student travel grants totalling \$26,000 were awarded for the HUPO/IUBMB World Congress, 10 to Alberta, 10 to Quebec, 7 to Ontario, 3 to Nova Scotia and 1 each to Saskatchewan and Manitoba. These funds were donated by Merck Frosst Canada (\$16,000), Amgen Inc (\$7,500) and John Robarts Research Institute (\$1,500).

#### b) BULLETIN

The 2002 BULLETIN has taken a prolonged time to see the light of day. There were two reasons for this delay. Dr. Reithmeier had run into some technical problems with the editing of the BULLETIN and secondly, he was waiting to get a fix on the number of registrations at the Toronto IUBMB congress, since this had a bearing on the number of copies that were to be printed for circulation at that meeting. Dr. Reithmeier, with Dr. Sharom's and Dr. Tustanoff's assistance, were commended by

---

the Board for the excellent product that was produced. Due to Dr. Reithmeier's heavy university departmental responsibility it would not be wise to saddle him with the editing the journal again, consequently Dr. Sharom will take over the responsibility of the BULLETIN with Dr. Tustanoff's assistance. It is intended to have 2003 issue ready to sent to the press by mid January.

#### **c) Nominations to the IUBMB Executive**

Dr. Tustanoff informed the Board that Dr Carol Cass' nomination to the IUBMB Executive as Chair of Congresses and Conferences was unsuccessful. Dr Weiner's nomination for second term on the IUBMB Nominating Committee is still pending.

#### **d) Society Article in IUBMB Life**

The Society was asked to submit an article on the history of the Society for publication in the commemorative IUBMB Toronto Congress issue of IUBMB Life. Dr. Tustanoff submitted the requested article which appeared in their April-May Issue, 55, 181-182.

#### **e) CNC-NRC**

Dr. Tustanoff attended the Ciset & NRC/ Partners Joint Meeting held in Ottawa at the NRC complex on Montreal Road on May 26-27, 2003. Representatives of the NRC Partners, who consist of the 30 Canadian National Committees(CNC) that NRC represents at the International Council for Science (ICSU), met with members of the Committee on International Science, Engineering and Technology (Ciset) to discuss their relationships and mandates. The first afternoon session dealt with the topic of "Access to publicly funded Scientific Data", with talks from the presidents of NRC, NSERC and SSHRC. The next day the Director of ICSU, Dr. Osswall spoke on the Role of ICSU and this was followed by Dr. Ian Smith's, Ciset Chair, talk on the role of Ciset and CNCs and the interface between CNCs. The afternoon was devoted to submissions both written and verbal from CNC representatives on their activities and mandates. Discussions were then held on what the CNCs can expect from NRC, and what the future holds for Canada on the international scientific scene.

#### **f) Hall of Fame**

Dr. Tustanoff suggested that the Board should give consideration in establishing a biochemistry hall of fame where Canadian scientists living and dead could be enshrined to honour and commemorate their scientific contributions to our discipline.

#### **g) Relationship with PABMB**

Dr. Tustanoff reported that the Society Board had moved a motion that the Society should withdraw its membership from PABMB. Dr. Tustanoff then presented the background for this action. He stated that he served as the Secretary-General of PABMB for the past two years and had witnessed at first hand the apathy of this organization. He and had grave concerns about the interest that the South Americans had in sustaining the Association's viability. The basic problem from Dr. Tustanoff's point of view was the general indifference that the national societies that make up the Association had. PABMB constitutes the following biochemical societies; , Division of Biological Chemistry of the American Chemical Society, American Society of Biochemistry and Molecular Biology, CSBMCB, Argentina, Brazil, Chile, Mexico, Panama, Peru and Uruguay, with Cuba, Portugal and Spain as Associate members. He cited a few examples of the lack of interest which predominates PABMB. One of the first orders of business that Dr. Tustanoff was to carry out, was to have the PABMB Board ratify the amended Association's bylaws and vote for a new Treasurer. After sending out three urgent requests, he said he received only four responses, three of which were from the Executive, which in effect meant that these new bylaws have never been ratified. The most telling event occurred when Dr. Tustanoff tried to organize the annual Board meeting this past November in Brazil, which was important in order to get the Association back on its rails. Initially, he stated that there was almost no response, or he was informed that travel funds were unavailable from some of the national societies to send delegates. A second request was sent out on two different occasions asking whether if supplemental travel funds from the Association were made available would they attend, and again either no answer or little positive response. As the last straw, funds were authorized to pay the entire trav-

---

el and accommodation costs for those societies who could not afford sending their delegates to this meeting. Due to lack of support, the meeting was finally cancelled after several tries. Dr. Tustanoff, then hoping to light a fire under the Board's Executive, threatened to recommend to CSBMCB's Board that they should withdraw from PABMB unless there was a change in attitude in the overall support of PABMB. He asked the Vice-President of PABMB, who is becoming President on January 1st, on at least three different occasions to prepare a document which could be circulated to CSBMCB's Board outlining the reasons why CSBMCB should remain in PABMB. No reply was received. Dr. Tustanoff reminded the Board that CSBMCB is paying \$1,000 annually in dues to PABMB, and if the South Americans are not interested in supporting their own Association, he could not see why CSBMCB should, as these funds can better be used by our Society. Furthermore, on reviewing past Society AGM minutes he found that this is not the first time the Society had doubts about its participation in PABMB. After discussing the pros and cons, the Board decided to withdraw its membership from PABMB, even after Dr. Tustanoff cautioned the Board to consider the long term ramifications of this action before withdrawing. The Board's decision to withdraw from PABMB was hotly debated from the floor. Dr. Poirier stated it was the Society's obligation to financially support PABMB. Dr. Duckworth presented vigorous arguments in favour of continuing the Society's participation in PABMB citing his uplifting experiences in organizing the CBS-PAB meeting at the CFBS Winnipeg Meeting in the 1980's. Furthermore he stated that he was prepared to contact PABMB to try to resolve the Board's difficulties. Dr. Duckworth moved that further consultations with PABMB take place before any action to withdraw from that organization take place. This was seconded by Dr. S. Brosnan.

#### **CARRIED**

Dr. Andrews then appointed Dr. Duckworth to be the Society's PABMB representative.

#### **h) New Society Officers**

Dr. J. Casey, University of Alberta, has been elected to the Office of Vice-President, Dr. V. Duronio, University of British Columbia is now the Treasurer, and the two councillors are Dr. Frances Sharom, University of Guelph and Dr. G. Poirier, Laval University.

#### **746. Councillors' Reports**

Dr. Litchfield submitted a written report on his activities dealing with graduate student support during the past year. The Litchfield distribution of student support is appended as Appendix G. For those aware of past practices, prior to 2002, a total of \$2000 was allotted for student activities (each event up to \$500). However, response to this opportunity was inconsistent. Therefore, at the beginning of 2002, Dr. Litchfield sent a message to the CSBMCB membership to raise awareness of the opportunity. Following this message, the response exceeded the resource so that the allotment was increased to \$3000. Even with the increased resource, a number of inquiries were turned away. At the start of 2003, no request was sent to the student community other than the website to promote the opportunity again. It is evident that to this point in the year, the demand for the resource has returned to its old levels (i.e. \$2000). In light of fiscal pressures related to this event, this may not be a bad thing for this particular year. However, it does demonstrate that the CSBMCB continues to struggle with a problem of visibility.

#### **747. New Business**

There was no new business.

#### **748. Change of Chair**

Dr. John Orlowski assumed the Chair as President of the Society. Dr. Orlowski expressed both his and the Society's gratitude to Dr. David Andrews for his outstanding and steadfast dedication to the Society during his term of office. The Society has undergone a great number of changes which were spearheaded by Dr. Andrews and his steady hand helped smooth out the many problems the Society encountered as a result of the cancellation of the Toronto IUBMB Congress.

---

### **749. Approval of Signing Officers for 2003-2004**

Dr. Palmer moved that the President, Treasure and Secretary be appointed as the signing officers for the Society for the period 2003-2004. The motion was seconded by Dr. Andrews.

**CARRIED**

### **750. Adjournment.**

The meeting was adjourned at 9:30 p.m. on a motion from Dr. Duronio which was seconded by Dr. Poirier.

**CARRIED**

# CSBMCB/SCBBMC Financial Statement for 2003

## BALANCE BROUGHT FORWARD (Jan 1, 2002)

Secretary's Account	4494.12	
Treasurer's Account	50473.71	
		54967.83

## RECEIPTS

Award Sponsors		
BD-Bioscience	500.00	
Merck Frosst	13000.00	
Roche	2250.00	
Total Award Sponsors		15750.00
Corp. Sponsors		1000.00
CSBMCB Dues (GST incl.)		36363.45
Exchange		98.27
Interest Earned		30.61
List sale (foreign)		1166.85
NRC loan (IUBMB 2003)		25000
Subscriptions:		
Ann. Reviews	1152.54	
Bulletin	86.54	
Cell biology Soc.	90.00	
Elsevier	1326.00	
NRC	339.80	
Total Subscriptions		2994.88
Winternat'I 01 Organizer's Surplus Funds		20057.42
Winternat'I 02 Meeting Income:		
Exhibitor Fee	3000.00	
Organizer's Surplus Funds	6819.62	
Sponsor	12750.30	
Total Winternat'I 02 Income		22569.92

## TOTAL RECEIPTS

**125031.4**

## EXPENDITURES

Awards:		
Award plaques & Certificates	749.79	
J. Manery-Fisher 02 (travel incl.)	2,102.73	
Merck-Frosst 02 (travel incl.)	1898.20	
Student/PDF Travel Awards	13500.00	
Total Awards		18250.72
Board Meeting- Nov 01		94.78
Board Meeting-Nov 02		6556.13
Bulletin (2001):		
Editing	1170.00	
Mail	660.03	
Printing	3269.04	
Total Bulletin		5099.35
Can. Dev. Biol. Conference		2500.00
CFBS		12240.80
Councilor's Travel		53.00
Credit Card System:		
MasterCard discount	144.92	
Itech Terminal Payment	5082.50	
MasterCard Service Fee	55.00	
Set-up Cost	250.00	
Visa Discount	378.68	
Total Credit Card		1093.47
Digital Camera		1588.09

## GST-HST (2001 + 2002 quarterly payments)

2214.26		
Industry Canada	30.00	
Int. Fed. Cell Biol.	481.91	
IUBMB 2003 initial Payment	15000.00	
PABMB	957.12	
PENCE INC. Conference	5000.00	
President's Expenses	2504.2	
Secretary's Expenses:	500.00	
Computer Service	329.36	
Office Supplies	281.84	
Postage-Phone-Fax-Courier	1273.00	
Travel	1065.30	
Total Secretary's Expenses		2949.45
Special Fund Deposit		40000.00
Student Symposia		2900.00
Subscription Payment:		
Ann. Reviews	946.39	
Elsevier	1734.29	
NRC	338.04	
Rockefeller press	92.28	
Total Subscription Payment		3111.00
Summer-01 Meeting Expenses		
GST (Registration)	2679.63	
Speaker Travel	1471.71	
Total Summer-01 Meeting Expenses		4151.34
Treasurer's Expenses:		
Office Supplies	229.40	
Postage-Phone-Fax-Courier	1440.95	
Travel	2317.30	
Total Treasurer's Expenses		3993.92
Vice-President's Expenses		103.96
Web Site (02) & Server (5 yr) Maintenance		2750.00
Web Site Installation (Itech)		4815.00
Winternat'I 02 Expenses		3750.00
Refunds	370.00	
Speaker Travel	27086.88	
Meeting Web Site	250.00	
Total Winternat'I 02 Expenses		27706.90
Winternat'I 05 Venue Deposit		1000.00

## TOTAL EXPENDITURES

**167139.10**

2002 YEAR END BALANCE	12860.10
SPECIAL FUND (market Value, 12/31/02)	363071.49

## TOTAL ASSETS

**375931.62**

## OBLIGATIONS CARRIED FORWARD

IUBMB Second Payment	10000.00
Young Scientist Program	20000.00
NRC loan Repayment	25000.00
GST/HST (2002 final payment)	268.35
Winternat'I 2004 Advance	5000.00
Newsletter Design	2140.00
2002 Bulletin (estimated)	6000.00
<b>TOTAL OBLIGATIONS</b>	<b>73490.90</b>

---

# Final Report on the 19th International Congress of Biochemistry and Molecular Biology

Joel H. Weiner, Congress President

The 19th International Congress of Biochemistry and Molecular Biology is now history. It was truly a case of the phoenix rising from the ashes. As you all know, we were not at all certain that a Congress would occur. The SARS situation in Toronto made the final stages of planning difficult. We hoped that the scare would subside and travel to Toronto would pick up, however the second flurry of cases in May proved too much, and we had to cancel the Toronto Congress. Many of our key speakers expressed concern about travel to Toronto and many institutions around the world would not let their scientists travel to Toronto. At the time it seemed like 6 years of work by a very dedicated group would come to naught. In addition the National Research Council was straddled with a serious debt resulting from all the monies expended in planning and advertising the Congress that would not be recovered. At this time I received a call from John Bergeron and Sean Taylor who were planning the 2nd Human Proteomics Congress in Montreal in October. They had the Montreal Convention Center booked and capacity to handle a joint meeting. How lucky could we be! In a very short period of time we were able to negotiate a contract between CSBMCB, NRC, IUBMB, HUPO and Events International, the company organizing the Montreal Congress. Amazingly Mike Walsh, Chair of our Program Committee, and Wehbeh Barghachie, Chair of the HUPO Program Committee were able to mould an outstanding and seamless scientific program in a matter of days. They were able to put together an IUBMB Congress program of 35 symposia and 133 speakers that would mesh and complement the HUPO scientific program. Mike designed the scientific program to appeal to a very broad range of biochemists, molecular biologists and cell biologists

and we all owe him our gratitude. We were also able to schedule most of our plenary and award lectures and the poster sessions. This, coupled with the proteomics symposia and poster sessions organized by HUPO, provided an outstanding scientific program for over 2000 participants. An excellent social program, including a concert at Notre Dame Cathedral and a "Taste of Montreal" in the old Windsor Station, added to the outstanding menu of science enjoyed by the participants. In addition we were even able to host a Young Scientist Program organized by Dr. Fred Palmer. About 100 young investigators received travel and financial support to attend the Congress.

I would like to take this opportunity to publicly thank the National Research Council, Hamid Jorjani, Pierre Lamoureux and Laurier Forget for all their efforts in organizing the original Toronto meeting, for accepting full financial responsibility for the cancelled Congress and for forgiving the debt owed to NRC by the CSBMCB.

Staging an International Congress of Biochemistry and Molecular Biology is a labour of love involving the volunteer time of a large number of scientists as well as the work of a team of professionals. In this final report to the membership I must acknowledge the efforts of the original IUBMB Congress organizing committee. Planning and organization of this Congress began over 6 years ago with the preparation of a bid to IUBMB by Sean Brosnan and the late Peter Dolphin. I would like to highlight the efforts of Dr. Peter Lewis, who chaired the Local Organizing Committee for Toronto who did yeoman's service in organizing a multitude of events that were not to be, Yvonne Lefebvre who served as General Secretary, and Gene Tustanoff and David Andrews who represented CSBMCB.

I would like to thank Jack Priess, past

---

President of PABMB, who represented PABMB on the Organizing Committee and William Lennarz who served on the Executive in his capacity as Meeting Liaison for IUBMB. The executive of IUBMB, including past President Brian Clark and current president Mary Osborn, provided a great deal encouragement and financial support for the Young Scientist program, and I would also like to thank them for funding for several plenary lectures. I am especially thankful to Dr. Fred Palmer for re-organizing this event after cancellation of the Toronto YSP.

I really need to single out Michael Walsh and his Program Committee who worked day and night in May and June to resurrect a first class scientific program from the original Toronto program.

Finally, staging an international Congress is an expensive undertaking and fundraising is an important activity. I would like to thank Dr. Gerard Tertzakian who chaired the IUBMB fundraising committee and devoted untold hours working with potential donors. Through his efforts we were able to raise several hundred thousand dollars in direct and in-kind contributions, most of which was transferred to the Montreal Congress helping to make for a successful meeting.

The world changed significantly between 1996 and 2003. We could never have imagined the impact on travel and scientific exchange of the events of September 11, the Iraq war and SARS. I want to thank all the members of the CSBMCB who helped us weather these events.

---

# Personal Reflections on the joint HUPO/IUBMB meeting

David Andrews

When I was asked to write a summary of this years annual scientific meeting of CSBMCB I admit that my response was - Do I have to? Why go through it all again? Frankly a factual recounting of the events that led up to the meeting and the eventual success of the merged HUPO/IUBMB meeting is more than I can face. Instead I have elected to provide you with a more personal reflection on the meeting. I accept full responsibility for all of the factual errors, omissions and other sins. But if you are interested in a biased recounting of the tale then read on.

My involvement in the organizing the meeting began with a request to let my name stand as a candidate for president of CSBMCB. One argument used was - what better year could you do it? The annual meeting will be the IUBMB congress in Toronto. Organizing has been going on for 5-6 years...all you will have to do is show up to make a speech on stage and bask in the glory. Sounded good to me! Little did I know. My only real job on the organizing committee was to make sure that CSBMCB would be featured prominently at the meeting since organizing the meeting was already in very capable hands. The technical aspects were being handled by professional staff from National Research Council while the scientific part of the meeting, scheduling and fund-raising were the work of the local organizing committee headed by Joel Weiner. Mike Walsh was taking care of organizing the speakers and sessions. Fred Palmer was organizing the Young Scientist Program. Peter Lewis was the man-on-the-ground in Toronto. Bill Lenarz represented IUBMB. There were others that helped out significantly with fund-raising, advertising and sage advice. Unless you have been involved in organizing a meeting of this kind you can have no idea of the work and dedication that is required. Nothing is automatic... you have to negotiate everything from canapes to hotel room rates to the number of chairs in each room.

While Mike Walsh had one of the most

onerous tasks, contacting, keeping track of and organizing all of the speakers in the various sessions, that work is rewarding and visible. In the current fiscal climate a lot of personal credit/favours and cajoling was required to raise money for the event. Here most of us on the organizing committee called on every resource and contact that we had. Joel Weiner went above and beyond in ways that can never be measured however, anyone and everyone that had a contact went to bat. There is no glory in getting sponsorship dollars but it is an essential part of the process.

Early on the response from the United States was disappointing and left us scrambling. Without significant involvement from delegates from the US it was more difficult to convince companies to support the meeting or to rent booth space. Between travel fears after 9/11 and the growing rift between the USA and Canada over Iraq, it was clear that the meeting was not going to be the financial success we had hoped for. We were hoping for the kind of financial success we had with the last IUBMB meeting in 1979. Fortunately, people really went to work and we were able to raise a lot of the money needed to avoid a disaster. An important contribution came from CIHR for the IUBMB meeting. In the end this was money well spent by CIHR as it not only highlighted Canadian science and scientists to the world but by having Canadians share the podium with the best from around the world it allowed us to clearly demonstrate that at least in Biochemistry, Molecular and Cellular Biology, our science is internationally competitive. As always one of the greatest supporters of CSBMCB was Merck Frost. More companies should have their foresight and interactions with basic research communities.

As an aside, a major new problem that we will all have to deal with in future is the new policy at CIHR to not fund meetings that make a profit. Many societies (including our own) fund the vast majority of our advocacy work (lobbying) with the

profits from the meetings we organize. If CIHR continues this new policy we are rapidly going to find ourselves unable to maintain our lobbying activities. A major beneficiary of these activities is CIHR, which ironically is why they don't want to fund meetings that make a profit. Even more ironic is that they will fund meetings run by professional congress organizers that take their fees outside the country - but if we all volunteer our time so that there is a profit that can be used to support science within Canada we are ineligible!

Leaving this issue for the future, I will return to my chronology of the events leading up to the meeting in Montreal. With a fantastic program in place, a great location and facilities secured in Toronto we were all concentrating on fund-raising and attendance. Abstracts were coming in and NRC was processing them and preparing CD abstract e:books when SARS hit Toronto. It seemed like almost overnight that the American Association for Cancer Research (AACR) cancelled their meeting in Toronto. At our first of several emergency meetings we discussed the special difficulties faced by the AACR. At the time the extent of the SARS problem was unknown. Many of the AACR registrants dealt directly with immune compromised patients. Clearly they made the only decision that they could have at the time. But we were in a different situation and we decided to try and ride it out. We all started watching the news reports very closely. It was a real roller-coaster ride from January onwards. Fund-raising went from difficult to impossible. Registrants and exhibitors were nervous. To our great surprise and relief the roster of invited speakers held. We had remarkably few cancellations. In fact no more than we expected without SARS. This gave us the luxury of continuing to press on towards a successful meeting in Toronto. Indeed the news reports on SARS started to improve. But just in case - Joel Weiner and John Bergeron began to sketch out an idea for a back-up plan.

### **Disaster strikes decisively.**

There was a second out-break of SARS in Toronto. Hundreds of people were now in quarantine. There was a chance that SARS had escaped the hospitals! With only days to go before the bulk of

our speakers and registrants would be required to book non-refundable airline tickets we had an emergency meeting and decided to pull the plug. Joel Weiner kicked the emergency plan into gear. He got together with John Bergeron who had originally suggested we consider moving the IUBMB meeting to Montreal as a joint meeting with the second annual HUPO meeting. Due to some of the same issues we had previously faced in Toronto, the HUPO meeting was not attracting the numbers of registrants anticipated. As a result there was more than enough room already booked at the convention center in Montreal. By gentlemen's agreement between Joel, Mike, myself and with John Bergeron and Sean Taylor we formed a plan. But a lot of people had to come onside or get out of the way in order for it to happen.

In retrospect, it turned out the most important thing was for us to decide to make it happen. From there on in we just made it fly. NRC facing sky-rocketing losses pulled out. Peter Lewis having to endure the restrictions imposed by SARS on a daily basis had understandably also had enough. Joel took an amazingly short hiatus due to illness and then was back in the saddle. Isabel Stengler at Events International (the congress organizer that had been hired by the HUPO meeting organizing committee) did an amazing job on the logistics. On the financials we worked from a short letter of agreement, mutual trust and respect... not bad for an event requiring the commitment of millions of dollars. The fit between the two meetings was excellent. Because proteomics is emerging and technology driven they had less difficulty than we had selling booth space. The IUBMB organizing committee was able to draw on its stellar cast of invited speakers to make a major improvement in the roster of speakers. Most of the funds raised for the IUBMB meeting had been raised by the organizing committee rather than NRC and we were



---

able to make an arrangement to move these funds to the new meeting. This meant that NRC had to swallow a very bitter pill indeed, and we all owe a great debt to Hamid Jorjani at NRC for stepping up to the plate on behalf of science in Canada!

The scientific program was a success.

Attendance was good. The rest, as they say, is history. But I want to highlight some important firsts for CSBMCB! We had our first booth at a scientific meeting. Those of you that stopped by will have also noticed our flashy new T-shirt and newsletter. Any of you that missed out on the T-shirt will have another chance at the 2004 meeting, "Cellular Signalling: From the membrane to the nucleus", to be held in Mont Tremblant in May. At the booth in Montreal we had great help from an enthusiastic group of graduate students which augurs well for the future of our society. We managed to directly and indirectly support the largest number of student and post-doctoral travel awards in the history of the CSBMCB. We also held an awards reception that included wine, beer as well as fabulous Montreal smoked meat and that was followed by our AGM. Both of these events were organized by Gene Tustanoff and were a great success. The AGM was the most lively that I ever remember attending. John Orłowski has accepted the leadership of a revitalized society. Joel, Mike and I attended the IUBMB AGM, where some of us (i.e. both of them) even agreed to serve on committees for the IUBMB. We also entered into new negotiations with PABMB. Thus, I am happy to report that our relationship with our international community remains healthy.

The Young Scientist Program was in peril for the longest period of time. In July, in Toronto, we had access to inexpensive accommodation using university residence space. In October in downtown Montreal accommodation was a problem. We also lost some of the sponsorship money. Faced with increased expenses and decreased revenue Fred Palmer had a difficult job reorganizing this important program that brought young scientists from 35 different countries to the meeting. In the end it had to be scaled back but it went ahead! There were specific scientific sessions and social events for the young scientists attending the meeting. The IUBMB executive managed to come to

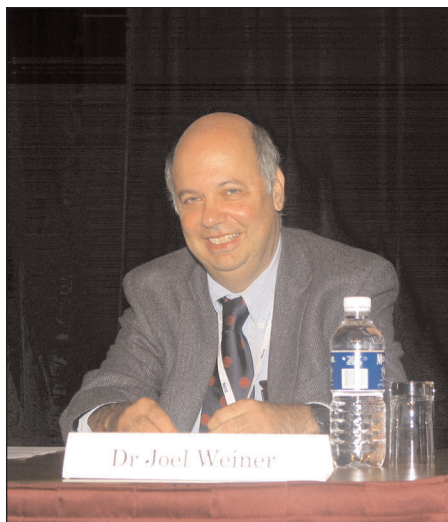
one of the events for the Young Scientists Program and their support was much appreciated by the Young Scientists and those of us not so young scientists that were helping out. By the end of the meeting Fred Palmer had no voice left at all - but a great success story under his belt.

Montreal was another eye-opener. For any of you that are like me and have not visited for some time, the next time you visit you are in for a pleasant surprise. There is construction everywhere and a new more positive attitude is pervasive. The future certainly looks bright for Montreal!

Another success of the joint meeting was the decision by HUPO to locate their world headquarters in Montreal. Hopefully, there will be sufficient support for this venture to get it through its fragile nascent period so that we can build a thriving new organization and demonstrate Canadian leadership in an important emerging area. CSBMCB will be lobbying hard in support of this organization in Canada.

As I write this we are in the final stages of the wrap-up. The auditors are examining the books and the taxes are being paid. All in all, the meeting will have cost CSBMCB about \$30,000. I don't look at this as a loss but as an investment in our future. For me working with Mike, Joel, Fred, John and Sean was also an experience that galvanized personal relationships from Calgary to Nova Scotia. I am more proud than ever to be a scientist in Canada. I am sure that all of the registrants found the meeting both scientifically rewarding and personally enriching.

# Scenes from the HUPO/IUBMB Montreal Congress



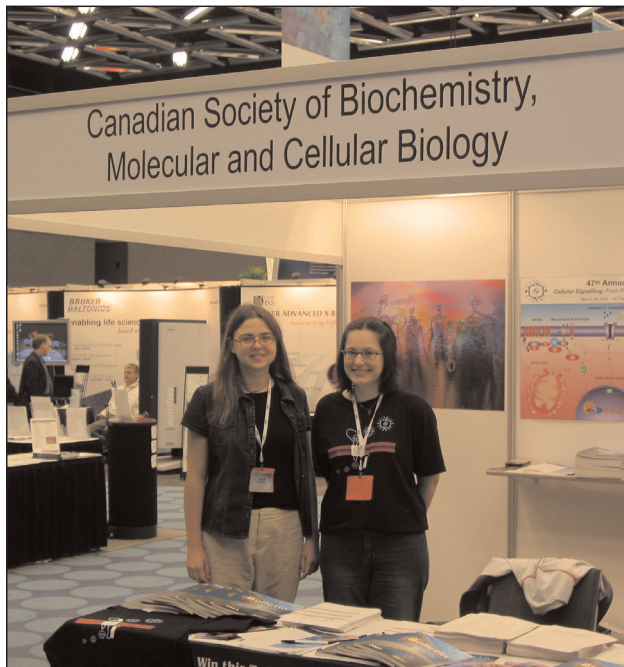
Joel Weiner, IUBMB Congress President, addresses the HUPO/IUBMB Congress at the opening ceremonies



John Bergeron, HUPO Conference President, at the podium



The outgoing CSBMCB President, David Andrews, addresses the Congress



The society ran a very successful booth at the Congress, which was organized by Felicia Vulcu, Magdalena Korczynska and Rani Cruz, all graduate students at McMaster University



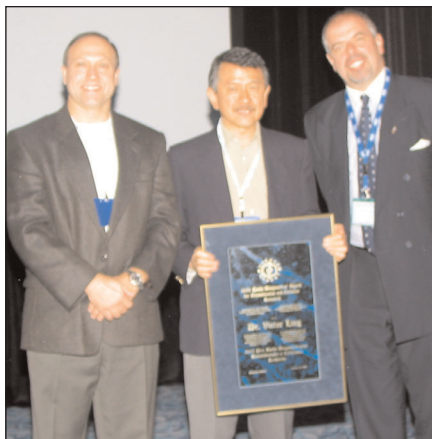
The 2003 winner of the CSBMCB Merck Frosst Prize, Charlie Boone of the University of Toronto, gives his award lecture entitled "Global mapping of the yeast gene interaction network: discovering gene and drug function"



Charlie Boone receives his award plaque from David Andrews, President of the CSBMCB



The 2003 winner of the Roche Diagnostics Award, Victor Ling of the BC Cancer Agency, gives his award lecture



Victor Ling receives his award plaque from John Orlowski, Vice-President and incoming President of the CSBMCB, together with a representative of Roche Diagnostics



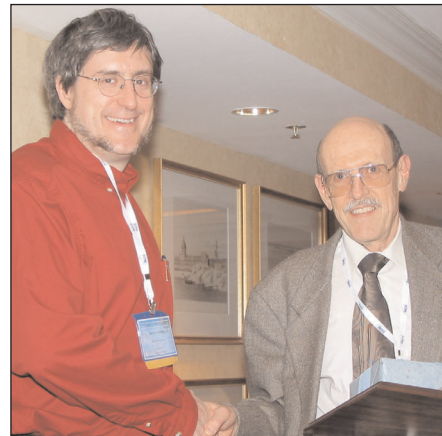
John Orlowski, Vice-President and incoming President of the CSBMCB, presents Fred Palmer, retiring Treasurer, with a gift in recognition of his dedication and outstanding contributions to the society over many years



David Andrews, CSBMCB President, presents Joel Weiner, IUBMB Congress President, with a gift in recognition of his outstanding contribution to the success of the Montreal Congress



David Andrews, CSBMCB President, presents Mike Walsh, Chair of the IUBMB Program Committee, with a gift in recognition of his outstanding contribution to the success of the Montreal Congress



David Andrews, CSBMCB President, presents Leon Browder, outgoing Past-President, with a gift in recognition of his dedicated work for the society for the past several years

David Andrews, CSBMCB President, presents Claude Lazure, outgoing Councillor, with a plaque in recognition of his contributions to the society over the past three years



David Andrews, CSBMCB President, presents David Litchfield, outgoing Councillor, with a plaque in recognition of his contributions to the society over the past three years



# Travel Award Recipients for the 2003 HUPO/IUBMB Montreal Congress

AWARDEE	UNIVERSITY	SUPERVISOR
<b>Amgen Inc. 10 x \$750 Stipends</b>		
Bukovac, Scott	University of Toronto	Dr. D. Mahuran
Colantonio, David	Queens University	Dr. J. Van Eyk
Domanski, Dominik	University of Victoria	Dr. C. Helbing
Dr. Li, Xiuju	University of Alberta	Dr. L. Fliegel
Minnema, Stephanie	University of Calgary	Dr. D. Rancourt
Oloo, Eliud	University of Calgary	Dr. P. Tieleman
Sarfo, Kwabena	University of Calgary	Dr. R. Turner
Slepkov, Emily	University of Alberta	Dr. L. Fliegel
Dr. Wilson, David	University of Calgary	Dr. M. Walsh
zur Nieden, Nicole	University of Calgary	Dr. D. Rancourt
<b>Roberts Research Institute 2 x \$750 Stipends</b>		
Del Bizzo, Paul	Univ. of Western Ont.	Dr. S. Dunn
Imabayashi, Fumie	Univ. of Saskatchewan	Dr. L. Delbaere
<b>Merck Frosst 15 x \$750 Stipends</b>		
Cheng, Victor	University of Alberta	Dr. J. Weiner
Choudhary, Kajal	University of Manitoba	Dr. H. Duckworth
Groenendyk, Judy	University of Alberta	Dr. M. Michalak
Hudson, David	Dalhousie University	Dr. K. Ewart
Kerr, Karen	Univ. of Western Ont.	Dr. I. Skerjanc
Libich, David	University of Guelph	Dr. G. Harauz
Morris, Katherin	University of Alberta	Dr. D. Brindley
Qiu, Zhijun	Dalhousie University	Dr. T. MacRae
Radeva, Galina	University of Guelph	Dr. F. Sharom
Russell, Paula	University of Guelph	Dr. F. Sharom
Savage, Josée	Univ. of Western Ont.	Dr. I. Skerjanc
Senta, Helena	Université de Sherbrooke	Dr. D. LeBel
Singh, Laila	Simon Fraser University	Dr. J. Thewalt
Sun, Yu	Dalhousie University	Dr. T. MacRae
Telmer, Patrick	Univ. of Western Ont.	Dr. B. Shilton
<b>Merck Frosst 9 x \$450 Stipends</b>		
Bélanger, François	University of Montreal	Dr. L. Brakier-Gingras
Bilodeau, Nicolas	Laval University	Dr. R. Fauré
Caron, Danielle	Laval University	Dr. R. Fauré
Gagnon, Jean-Nicolas	McGill University	Dr. J. Coulton
Gao, Huanhuan	McGill University	Dr. U. Stochaj
Gauthier, Daniel	IRCM	Dr. C. Lazure
Kodiha, Mohamed	McGill University	Dr. U. Stochaj
Léger, Mélissa	University of Montreal	Dr. L. Brakier-Gingras
Sanowar, Sarah	McGill University	Dr. H. Le Moual



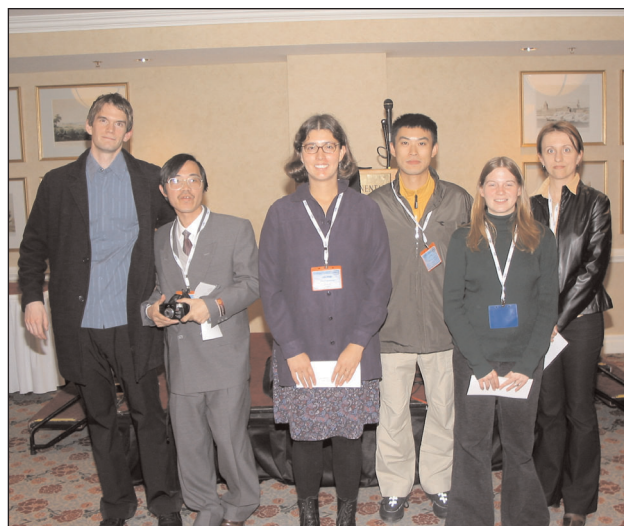
Winners of the Amgen Inc. Travel Awards



Winners of the Robarts Research Institute Travel Awards



Winners of the Roche Diagnostics Awards



Winners of the Merck Frosst \$750 Travel Awards



Winners of the Merck Frosst \$450 Travel Awards

---

# CSBMCB 47th Annual Meeting

## Preliminary Program

### Cellular Signalling: From the membrane to the nucleus

**THURSDAY MAY 27TH, 2004**

**OPENING SESSION**

Opening remarks:

John Orlowski and Terry Hébert

**CSBMCB AWARDS LECTURES**

19h30 – 21h30 pm

**Merck-Frosst Prize**

Richard Wozniak

Department of Cell Biology, University of Alberta

*Cell cycle specific regulation of nuclear transport*

**Jeanne Manery Fisher**

**Memorial Lectureship**

Morag Park

Molecular Oncology Group, McGill University

*The Met receptor tyrosine kinase: from tubes to tumorigenesis*

**OPENING RECEPTION**

Sponsored by Affymetrix

21h30-23h00

**FRIDAY MAY 28TH, 2004**

**MORNING SESSION I:**

Ion channels/transporters: roles in cellular signalling and gene regulation

Chairs: Lucie Parent and Céline Fiset

8h00 Morris Karmayzn

Department of Physiology and

Pharmacology,

University of Western Ontario

*The cardiac Na-H exchanger: a key downstream mediator for the cellular hypertrophic effects of paracrine, autocrine and hormonal factors*

8h35 Ligia Toro

Department of Anesthesiology,

David Geffen School of Medicine, UCLA

*Regulation of smooth muscle K<sup>+</sup> channels by sex hormones*

9h10 Jacques Barhanin

Institut de Pharmacologie du CNRS,

Valbonne Sophia-Antipolis, France

*Heteromeric KCNQ1 K<sup>+</sup> channels: heterogeneity and physiological roles*

9h45 Alvin Shrier

Department of Physiology, McGill University

*Localization of Kv4.2 and other membrane proteins*

10h20 Francisco Benzanilla

Department of Physiology,

David Geffen School of Medicine, UCLA

*Voltage sensors in voltage-gated ion channels: what have we learned from the crystal structure?*

10h55 Coffee Break

**MORNING SESSION II:**

Tyrosine kinase receptor signalling - interplay between kinases and phosphatases

Chair: Jana Stankova

11h15 Michel Tremblay

McGill Cancer Centre, McGill University

*Physiological consequences of insulin receptor and Janus family kinases modulation by protein tyrosine phosphatases*

11h50 Kenneth Hillan

Department of Pathology, Genentech

*Predicting response to targeted therapeutics*

---

**12h25 Amira Klip**  
Division of Cell Biology,  
Hospital for Sick Children  
*Insulin regulates the intracellular traffic,  
docking and fusion of the muscle cell glu-  
cose transporter GLUT4*

**13h00 Lunch**

**AFTERNOON SESSION:**

Large Scale Approaches and Model Systems  
for Cellular Signalling

Chairs: Bruce Allen and Angelino Calderone

**14h00 Albert Berghuis**  
Departments of Biochemistry, Microbiology  
and Immunology, McGill University  
*Cellular signalling and antibiotic resistance:  
What are you doing there?*

**14h35 Sergio Grinstein**  
Division of Cell Biology,  
Hospital for Sick Children)  
*Phosphoinositide signalling during bacterial  
invasion and phagocytosis*

**15h10 Coffee Break**

**15h30 Vanessa Auld**  
Cell Biology Group, Department of Zoology,  
UBC  
*Genetic approaches to understanding glia  
and blood-brain barrier development*

**16h05 Susan Parkhurst**  
Fred Hutchison Cancer Research Center,  
Seattle Washington  
*Rho GTPases in early Drosophila  
development*

**POSTER SESSION I: 17h00-19h00**

**19h00 Supper**

**21h00 Plenary Session on Signal Integration:**

**Gary Johnson**  
Department of Pharmacology,  
University of North Carolina  
*A connections map for MEKK1-4 regula-  
tion of MAPKs and control of cellular  
physiology*

**J. Sylvio Gutkind**  
NIH/NIDCR Bethesda, MD  
*A new RHOad linking G protein-coupled  
receptors to the nucleus*

**22h30 Posters/Social**

**SATURDAY MAY 29TH, 2004**

**MORNING SESSION I:**

G protein-coupled receptor signalling

Chairs: Jean-Luc Parent and Eric Thorin

**8h00 Audrey Claing**  
Département de pharmacologie,  
Université de Montréal  
*G protein-coupled receptor endocytosis:  
role of ARF proteins*

**8h35 William Miller**  
Department of Molecular Genetics,  
University of Cincinnati  
*Regulation of HCMV GPCR signal  
transduction by host cell proteins*

**9h10 David Siderovski**  
Department of Pharmacology,  
University of North Carolina  
*RGS proteins: more than just  
G-alpha GAPs*

**9h45 Coffee Break**

**MORNING SESSION II:**

Scaffolding proteins/adaptors and signalling  
networks

Chair: Terry Hébert

---

**10h15 Michel Bouvier**  
Département de biochimie,  
Université de Montréal  
*Oligomeric assemblies of 7TM receptors  
within modular signalling complexes*

**16h35 Eileen White**  
Department of Molecular Biology and  
Biochemistry, HHMI, Rutgers University  
*Role of apoptosis in suppression of  
tumorigenesis*

**11h05 Susan Steinberg**  
College of Physicians and Surgeons,  
Columbia University  
*Beta-adrenergic receptor signalling in car-  
diomyocyte caveolae*

**POSTER SESSION II 17h30-19h00**

**19h00 Banquet**

**22h00 Posters/Social**

**11h40 Angela Clerk**  
NHLI Division (Cardiac Medicine) Imperial  
College London, London, UK)  
*Signalling through the MAPKs in the  
cardiac myocyte*

**12h00 Lunch**

**AFTERNOON SESSION:**

Apoptosis- sponsored by BD Biosciences

Chair: David Andrews

**14h00 Doug Green**  
La Jolla Institute of Allergy and Immunology,  
La Jolla, CA  
*Mitochondria and apoptosis:  
A dance of death*

**14h35 Sally Kornbluth**  
Department of Pharmacology and Cancer  
Biology, Duke University  
*In vitro reconstitution of apoptotic  
processes*

**15h10 Richard Youle**  
NIH, NINDS  
*Role of Bcl-2 family members and  
mitochondrial morphology in apoptosis*

**15h45 Coffee Break**

**16h00 Don Nicholson**  
Merck-Frosst  
*Caspase modulation*

---

# Reflections, E. Reno Tustanoff, Secretary CSBMCB 1991-2003

*"Youth is a blunder; manhood a struggle; old age a regret."* Benjamin Disraeli

The time has come for me to relinquish my Office and take full advantage of my retirement years. As I reflect back over the twelve years that I served as Secretary of the Canadian Society of Biochemistry, Molecular and Cellular Biology, a number of significant changes have transpired within our Society to which I have in some small way contributed for better or worse. Our society expanded its mandate in 1995 to add cellular biology to that of biochemistry and molecular biology after the Canadian Society of Cellular Biology surrendered its charter and merged with our Society.

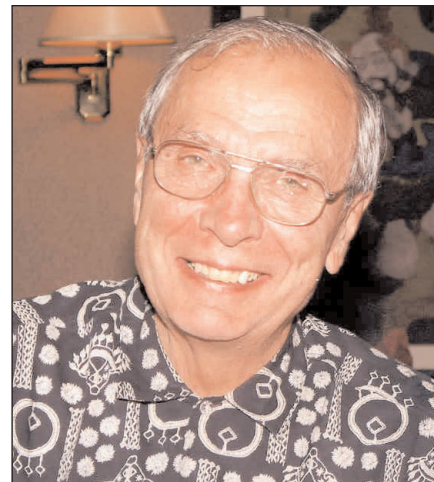
As a result of decreasing membership and apparent apathy in the scientific community in supporting the viability of our Society, another important milestone occurred in 2000. After heart-rending discussions and input from our Membership, the Society with some trepidation withdrew from the Canadian Federation of Biological Societies. It was thought this action would garner the Society more stature by focussing on organizing our own topic-directed annual scientific meetings and cater more to the specific needs of our membership, thus hopefully rekindling new interests in our Society. This decision has had a great impact on the structure and governance of our organization but as yet, not on the vitality of our Society, as reflected by the lack of success in attracting new members and retaining the present membership roll.

Another Society venture which I have been involved in with pride was the XIXth IUBMB Congress. The year 1998 turned out to be an exciting period for the Society. Working diligently with Dr. Sean Brosnan and Dr. Peter Dolphin, plans were put in place to organize and submit a bid to secure the 2003 IUBMB Congress for Canada, competing against Athens and Budapest. After Dr. Dolphin's diligent efforts in Gifu, Japan, in convincing the IUBMB Executive that Toronto was the only venue for the Congress, the newly

acquired torch was passed onto Dr. J. Weiner, Dr. M. Walsh, Dr. P. Lewis and Dr. Yvonne Lefebvre, who on behalf of the Society were to carry through with implementing the mechanics for Toronto meeting. Under the leadership of Dr. Weiner, numerous organizational meetings in which at times I participated, were held over the next five years. As 2003 approached, there was every indication that the Congress would be a success, however, despite the assiduous organizational efforts of Dr. Weiner's group, the spread of SARS marked the death knell for the Toronto meeting. However, all was not lost, since due to the dogged efforts of Dr. Weiner, Dr. Walsh and Dr. D. Andrews, a portion of the original Toronto scientific programme was salvaged and restructured as part of the combined HUPO/IUBMB Montreal Congress which was held this past November.

In 1999 the Society joined forces with the American Society of Biochemistry and Molecular Biology, and the Pan-American Association of Biochemistry and Molecular Biology to participate in the Western Hemisphere Congress of Biochemistry and Molecular Biology in San Francisco. Having organized a successful reception in concert with Dr. P. Lewis for our attending Canadian delegates, this afforded me an opportunity to meet and exchange ideas with a large number of Society members. Similarly the reception which I organized for the HUPO/IUBMB Congress was rewarding for the same reasons.

As Secretary of CSBMCB, it was my responsibility to support the Society's Executive to main-



---

tain the overall position and governance of the Society. This entailed organizing the two yearly Executive Meetings, the Annual General Meeting, as well as dealing with other Society functions and obligations, which culminated in the introduction of a number of new innovative programmes. I also acted as a co-editor of the Society annual publication BULLETIN during my twelve year tenure with the Society. During his term of office, I received a great deal of help from Dr. Fred Palmer, Treasurer of our Society. The Society is beholden to him for his dedication and outstanding contributions to the Society, which in my estimation were boundless in scope and effort.

Over the past decade the Society has struggled to keep its dwindling membership. The staunch support that the Society has received from our senior members over the past number of years is eroding due to retirements and death. There has been mediocre success in recruiting new members from the junior ranks of university departments and research institutes. From an active role of over a thousand in the nineties, there are now less than four hundred regular members. To engender and fire-up the attention and interests in our Society, great efforts have been made to organize "cutting-edge" scientific meetings, which have annually focussed on current subject-related topics. To this end, these meetings, which have been held annually in representative parts of Canada, have brought together an assemblage of international recognized expert speakers from Canada, the United States and Europe. There still appears to be a spreading malaise and apathy in supporting the Society and the disciplines it represents, by the scientific community in Canada. The Society is the only professional body in Canada that attempts to advance the scientific culture of biochemistry, molecular and cellular biology, and represent the interests of our membership at a national level to the Government and the people of Canada. If it were not for the resolve and hard work of a small cadre of dedicated individuals who have given their time and efforts to sustain the Society, the Society might well have collapsed. At times it seems that all innovative efforts introduced to try to instill new vigour into the Society have been fruitless. During my term in Office, the Society

has been indeed fortunate in recruiting a number of allegiant individuals who have stepped up to the plate and served as Board members of the Society. I would like to single out particularly those individuals with whom I closely worked with during their term as President of the Society: Dr. D. Vance (University of Alberta), Dr. H. Schacter (University of Toronto), Dr. M. Walsh (University of Calgary), Dr. J. Brosnan (Memorial University), Dr. P. Dolphin (Dalhousie University), Dr. J. Weiner (University of Alberta), Dr. P. Lewis (University of Toronto), Dr. P. Davies (Queens University), Dr. F. Sharom (University of Guelph), Dr. L. Browder (University of Calgary), Dr. D. Andrews (McMaster University) and Dr. J. Orlowski (McGill University). These dedicated people, each outstanding in their particular contributions to our Society, have sacrificed their time and efforts to the decrement of their own research, in order to promote the aims and future of our Society. It has been difficult at times to enlist individuals to serve on the Society's Executive, fortunately the right person at the right time has been recruited.

I have grave concerns about the future of the Society, if it were not for the efforts of a few dedicated individuals who are trying to sustain the organization, the horizon may not look too rosy unless there is a dramatic change in the attitude of our compatriot researchers. May I take this opportunity to welcome Dr. Albert Clark, Department of Biochemistry, Queen's University who has taken on the responsibility of the Society Secretariat and I wish him well.

---

# Dr. Kevin Keough appointed as President and CEO of AHFMR

Dr. Kevin Keough, Department of Biochemistry, Memorial University of Newfoundland, former President (1987-1990) and long standing member of our Society, has been appointed to serve as the third President and CEO of the Alberta Heritage Foundation for Medical Research, succeeding Dr. Matt Spence this July. Dr. Spence, who is also a member of our Society, has held this post since 1990, and made a significant imprint on Alberta's health research activities through his dedicated leadership and keen foresight.

As AHFMR President, Dr. Keough will guide the Foundation's planning, operations, and strategic directions in its third decade as a major provincial supporter of health research activity in Alberta. The President and CEO advises and reports to AHFMR's nine-member Board of Trustees and liaises with the provincial, national, and international research community to ensure the development and maintenance of top-ranked health research in the province, and its application for the benefit of all.

The Alberta Heritage Foundation for Medical Research is an internationally acclaimed health research funding organization. It was founded in 1980 with a \$300 million endowment from the provincial government. AHFMR has funded over 6000 health researchers and trainees over the past two decades, with more than \$750 million. Currently, more than 200 senior researchers and 600 trainees are supported by AHFMR in Alberta's three largest universities, in hospitals, and in health regions throughout the province. Heritage research is improving the lives of Albertans and people around the world.

Dr. Kevin M. W. Keough received his doctoral degree from the University of Toronto in 1971. He is currently a professor of biochemistry in the Biochemistry and Pediatrics Departments at Memorial University of Newfoundland, and first Chief Scientist with Health Canada in Ottawa. He most recently served as Memorial University's first Vice-President of Research and International

Relations. Dr. Keough has maintained a research laboratory for 30 years, with a focus on the structure and function of lipids. In particular, he investigates the chemistry of surfactant in lungs, and the biochemistry of liposomes, membranous structures that can act as carriers for drugs and vaccines. He founded a company, NovaLipids Incorporated, based on his liposome innovations.

Dr. Keough is the Deputy Chair of the Council of Science and Technology Advisors, an expert external advisory panel that provides guidance on federal science and technology issues to the Cabinet of the Government of Canada. He is also the Canadian Co-Chair of the Canada-European Union Science and Technology Agreement. As a former executive member of the Medical Research Council, he was instrumental in the creation of the Canadian Institutes of Health Research, and is now a member of its Governing Council. A founding member of the Board of Directors of Genome Canada, he was also a member of the boards of directors of the Genesis Group Inc., the Canadian Centre for Fisheries Innovation, the Canadian Centre for Marine Communications, the Centre for Cold Ocean Resources Engineering, Operation ONLINE Incorporated, and the Newfoundland and Labrador Science Centre. Dr. Keough also served as President of the Canadian Federation of Biological Societies, and the Canadian Association of University Research Administrators.



---

# Ross Hume Hall - Obituary

1926-2003

Karl B Freeman, Professor Emeritus of Biochemistry,  
McMaster University

Ross Hume Hall, the founding Chairman of the Department of Biochemistry at McMaster University in Hamilton, died on October 9, 2003 at his home in Danby, Vermont. During his 76



years, Ross's interests led him from studies of nucleic acids to nutrition and the environment. Born in Winnipeg in 1926, Ross was educated at UBC, U of T, and obtained a PhD in biochemistry under Lord Todd at Cambridge. After postdoctoral work with Gobin Khorana in Vancouver, he was at Lederle Laboratories in New York and Roswell Park Memorial Cancer

Research Institute in Buffalo before moving to McMaster in 1967 at the start of the new innovative Medical School and Health Sciences Faculty. There he built a strong department that has continued to expand and thrive. Ross's major contributions during these years were in the study of modified nucleosides in nucleic acids. His research was published in numerous scientific papers, and in 1971 he published his findings and summarized the field in his book "The Modified Nucleosides in

Nucleic Acids". By this time his interests had begun to shift to nutrition and the environment, and in 1974 he published the book "Food for Nought: The Decline of Nutrition", where he documented the problems of the factory processing of food. His concern about nutrition continued from then on and recently he published "The Unofficial Guide to Smart Nutrition". In addition, he published "Health and the Global Environment" in 1990, and numerous magazine and newspaper articles. Ross's expertise in these areas led him to take on a number of positions including: advisor to the Ministry of the Environment in Canada, co-chairman of the Human Health Committee of the International Joint Commission, and Chairman of the Board of Pollution Probe. Many of his interests in nutrition and the environment were pursued after his retirement from McMaster in 1987, at which time he moved to Vermont. Ross was an avid reader and writer with widespread interests. He was a well-liked teacher and was twice honored as "teacher of the year" at McMaster, where he pioneered an introductory course in chemistry and biochemistry for first year nurses. His book, "The Modified Nucleosides in Nucleic Acids", is still considered a basic book in the area. Ross is survived by his first wife Rachel, his second wife Anne, and his children, stepchildren and grandchildren.

---

# Abram Herman Neufeld - Obituary

## 1907-2004

Eugene Reno Tustanoff, Professor Emeritus of Biochemistry,  
University of Western Ontario

The Society has lost one of its most venerable members, Dr. Abe Neufeld, who passed away in London, Ontario on Thursday February 19th 2004. Dr. Abram Herman Neufeld, M.D., C.M., Ph.D., F.C.I.C., was born in the Ukraine region of Russia in 1907, and emigrated to Canada in 1923. He graduated from the University of Manitoba in Honours Medical Biochemistry in 1934. His work on the analysis of bromine and fluorine in biological tissue resulted in a M.Sc. degree in 1935, and in 1937 he was awarded the second Ph.D. granted by the University of Manitoba. In 1936 he commenced work at McGill University with Dr. J. B. Collip in the Department of Biochemistry. His appointments at McGill ranged from Lecturer and Research Assistant to Assistant Professor and Research Fellow. His first publication entitled "Experimental Diabetes in the Monkey" was published in 1937. This was followed by studies of pituitary and adrenal cortical hormones, the parathyroid glands, calcium and phosphorus metabolism, and metabolic studies in trauma and shock syndromes, which resulted in thirty-four publications. In 1941, along with Dr. R. I. Noble, he was appointed as Assistant Professor in the newly established Collip Research Institute at McGill University. During the Second War, 1943-1946, Dr. Neufeld served in the Royal Canadian Army Medical Corps as the Medical Liaison Officer in the Office of the Surgeon General in Washington, with the rank of Major. For his war service, US President Truman presented Dr. Neufeld with the Degree of Officer of the United States Legion of Merit medal, and the Canadian Defence Department awarded him the War Medal (1939-45), the Defence Medal, and the Canadian Volunteer Service Medal with Overseas Bar. In addition the American Association of Military Surgeons presented Dr. Neufeld with their Gold Medal in 1945.

Following Dr. Neufeld's discharge, he was appointed Medical Biochemist at Queen Mary Veteran's Hospital in Montreal on a part-time basis while he qualified for his M.D.C.M degree at McGill University, which he received in 1950. For the next ten years Dr. Neufeld was Chief of Biochemistry and Nuclear Medicine at Queen Mary Veterans Hospital and a Honorary Lecturer in Biochemistry and Endocrinology at McGill University. During this period he published a number of scientific papers dealing with various aspects of clinical biochemistry: flame spectrophotometry, methaemoglobinuria, infectious hepatitis, serum proteins in myelomathosis, coronary artery disease and atherosclerosis, red blood cell survival and the use of radioisotopes in diagnosis and research. During this period, serving as a Consultant in Laboratory Services to all the Canadian Veteran Hospitals, he visited all the DVA laboratories and most of the Canadian teaching hospitals, coming in contact with clinical chemists and biochemists across Canada. These contacts germinated the seeds for establishment of the Canadian Society of Clinical Chemistry in 1956, with Dr. Neufeld as one of the founding members. Dr. Neufeld was also one of the founders of the Canadian Biochemical Society, the forerunner of our present Society, when it was established in Toronto in 1957. In 1960, Dr. Neufeld became Head and Professor of Pathological Chemistry at the University of Western Ontario Medical School and Chief of Clinical Pathology at Victoria Hospital, London.



---

Here he built up new and extended modern laboratories in biochemistry, haematology and blood banking. Dr. Neufeld was named Emeritus Professor upon his retirement in 1972. In 1961, Dr. Neufeld was elected as the Honorary Secretary of the Canadian Federation of Biological Societies, where he served with distinction until 1967.

Dr. Neufeld has always had a deep interest in medical research, as evidenced by his numerous research grants, publications and continuous activity in many learned societies. He served as Editor of the Canadian Medical Association Journal and the Medical Services Journal of Canada. He was the First President of the Canadian Association of Medical Biochemists, and a member of the US National Research Council Committee on Hemoglobin Standardization. Dr. Neufeld was a Senior and Life Member of the Canadian Medical

Association, a Life Member of the London and District Academy of Medicine, an Emeritus Member of the Canadian Haematology Society, the Canadian Association of Pathologists, the American Society of Haematology, the Canadian Society for Clinical Investigation, and the Association of Military Surgeons of the United States, and a Fellow of the Chemical Institute of Canada. Dr. Neufeld enjoyed many years of retirement with his wife Lily through visiting family and friends, reading and travel. His writings did not cease with his professional years. In retirement, he translated and wrote a book "Herman and Katharina, their story" which documents the pre- and post- revolutionary years in rural Russia, taken from the diary of his father, who was an itinerant minister in the Mennonite Church: it is a horrifying tale of a country in transition.

---

# Dr. William O. Thompson - Obituary

## 1933-2004

Anders Bennick and Robert Murray, Department of Biochemistry,  
University of Toronto

William (Bill) Thompson died peacefully on April 12, 2004, in St Michael's Hospital, Toronto. Bill was somewhat of a medical miracle in having survived for over 25 years on hemodialysis. Despite the considerable limitations that this placed on his lifestyle, he always fiercely maintained his independence, and carried on both cheerfully and actively, be it while in the Department or in his retirement years. Faced with the imminent loss of independence due to his ever-increasing frailty, Bill took the personal decision to end dialysis and electrolyte-maintaining treatments.

Bill faced the end of life with a tranquillity and dignity that made a profound impression on all those who visited him during his last few days in the Palliative Care Unit of St. Michael's Hospital. In a moving ceremony, his ashes were scattered at the Mount Pleasant Cemetery in Toronto. The Department of Biochemistry will be holding a memorial event for Bill in the near future.

Bill was born in Glasgow, Scotland in 1933, and received his early education in that city. In 1955 he obtained his B.Sc. degree (Biochemistry major) from the University of Glasgow. After graduation, he moved to the Department of Biochemistry, University of Western Ontario, pursuing studies on lipid metabolism under the guidance of Professor Roger Rossiter, and leading to the PhD degree in 1960. From 1961-1963 Bill did post-doctoral work with Professor Rex Dawson at the Babraham Institute for Animal Studies, Cambridge, England. One of his important contributions during that time was the first demonstration that phospholipase C cleaved phosphatidylinositol-4,5-bisphosphate to form diacylglycerol and inositol-1,4,5-trisphosphate. Bill then returned to Canada to take up a position as Assistant Professor at the Banting and Best Department of Medical Research in Toronto, and subsequently transferred in 1965 to the Department of Biochemistry. For

the next thirty-odd years Bill and his graduate students pursued studies on the structure, function and metabolism of various phospholipids. His work was widely recognized and he was considered a leader in the field of phospholipid metabolism. His doctoral students over the years included Roy Baker, Kevin Keough and Joel Parkes. Eight other students obtained their M.Sc. degrees under his guidance. Bill was an excellent supervisor who expected and received high standards of performance from his students.

Bill was also a highly respected teacher of undergraduate students. While some students might gripe about having to take biochemistry, overall it was considered OK because "Dr Thompson was cool". He also took great pride in once being given an apple by a student!

Over the years Bill held a number of administrative positions. Within the University, he served as Associate Dean, Division IV, School of Graduate Studies. In the Department of Biochemistry, he served as Graduate as well as Undergraduate Coordinator and Associate Chair and Acting Chair. Bill performed his administrative tasks with a quiet efficiency and proved a sympathetic and highly able administrator.

Bill was a man of enormous intellect, and his dry wit and sense of humour were legendary. Those who regularly had lunch with him at what he called the "Biochemistry Academy" table of the cafeteria knew that they could count on Bill for in-depth knowledge and analysis of matters ranging from university politics, to world politics, to fine



---

arts, to the intricacies of some of the more bizarre dealings of the financial markets. It was always intellectually stimulating to have lunch at the "Academy" with Bill, and anyone who came to these lunches will cherish the memories forever.

Spurred on by events in the Faculty of Medicine, Bill started to write satirical poems on local academic and other matters. These poems are preserved in the Departmental Archives. As could be expected from Bill, the poems were witty and direct, and read by his colleagues with great appreciation.

Bill was a true friend to many; loyal, discreet and full of wise advice. He was a man for all seasons, a present-day Erasmus. He will be deeply missed by his numerous friends and by his former students and colleagues.

#### **A PERSONAL MEMOIR**

**Dr. W. C. McMurray,  
Department of Biochemistry,  
University of Western Ontario.**

For half a century my wife, Marnie, and I have considered Bill Thompson to be a very special friend. We still recall Bill arriving in this country, a young, angular Scot lugging a heavy briefcase, perhaps one-quarter of his weight. From the outset it was evident that he was the very model of a sceptical biochemist. A staunch foe of authoritarianism, with a devastating wit, Bill set a high standard for personal behaviour and scientific truth stripped free of pomposity.

As graduate students, Bill and I worked with Prof. Roger Rossiter on lipid chemistry and metabolism of the nervous system at the University of Western Ontario Medical School, in its janitor's basement living quarters, resurrected as the radioisotope laboratory. In the early sixties, Bill moved back to Britain for post-doctoral work with Rex Dawson in the Babraham Institute outside Cambridge. While visiting him there I was inspired to follow in his footsteps and subsequently spent three delightful sabbaticals at Babraham over the years. During our last leave a decade ago, Marnie and I were fortunate to have Bill back for a long visit with us in Cambridge and Norfolk.

We also shared a common penchant for poet-

ry, frequently of an ironic, doggerel nature re the vagaries of science and academe. Most of this output is, I suspect deservedly, under wraps of privacy. In my inner ear I can hear Bill's wry comment about my concluding lines - but they come unbidden, and from the heart.

#### **LYRIC TO AN ICON OF HUMANITY**

*Some took a baser path - you always rode the high road  
Bestride adversity, in company with pain.  
You bore a burden on that highest road  
With cheerful suffering that was not in vain.  
For now our sorrow on your last long road,  
Our petty woes, our minor pains and strain,  
Draw strength and comfort from the courage you  
showed,  
And gentle laughter echoes once again.*

---

# Global Mapping of the Yeast Genetic Interaction Network: Discovering Gene and Drug Function

**Amy Tong<sup>1,2</sup>, Guillaume Lesage<sup>3</sup>, Ainslie Parsons<sup>1,2</sup>,  
Brenda Andrews<sup>2</sup>, Howard Bussey<sup>3</sup> and  
Charles Boone<sup>1,2</sup>**

1. Banting and Best Department of Medical Research, University of Toronto, Toronto ON, Canada M5G 1L6.
2. Department of Medical Genetics and Microbiology, University of Toronto, Toronto ON, Canada M5S 1A8.
3. Biology Department, McGill University, 1205 Dr. Penfield Avenue, Montreal, QC, Canada H3A 1B1.

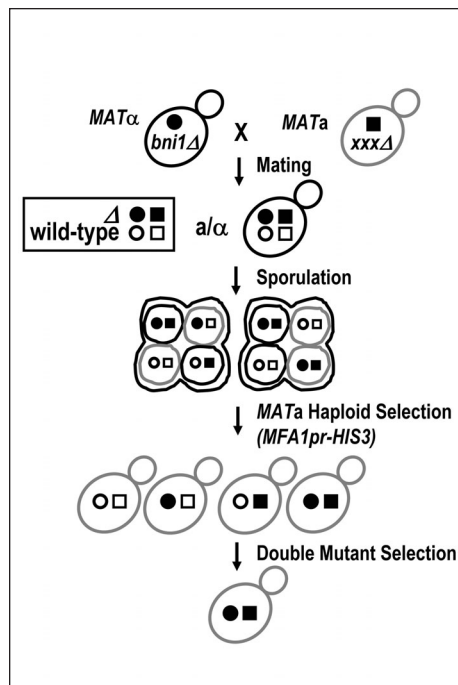
## Abstract

In the budding yeast *Saccharomyces cerevisiae*, ~80% of the ~6000 genes are nonessential, indicating that many biological processes are buffered from the phenotypic consequences of genetic perturbation. To examine these functional relationships we developed a method called Synthetic Genetic Array (SGA) analysis, which automates yeast genetics and enables a systematic and high-throughput construction of double mutants from an ordered array of ~4700 viable gene deletion mutants. In particular, double mutants showing reduced fitness (a synthetic sick phenotype) or lethality (a synthetic lethal phenotype) define functional relationships between genes and their corresponding pathways. We have undertaken a project to generate a synthetic genetic interaction network for the yeast cell with the expectation that it will represent a global map of functional relationships amongst most genes. We found that synthetic genetic interactions are more common than anticipated previously, with an average query gene displaying ~30 different interactions. Cluster analysis of a compendium of ~132 SGA screens revealed that genes displaying similar patterns of genetic interactions often encode proteins within the same pathway or complex; therefore, the yeast genetic interaction network predicts precise molec-

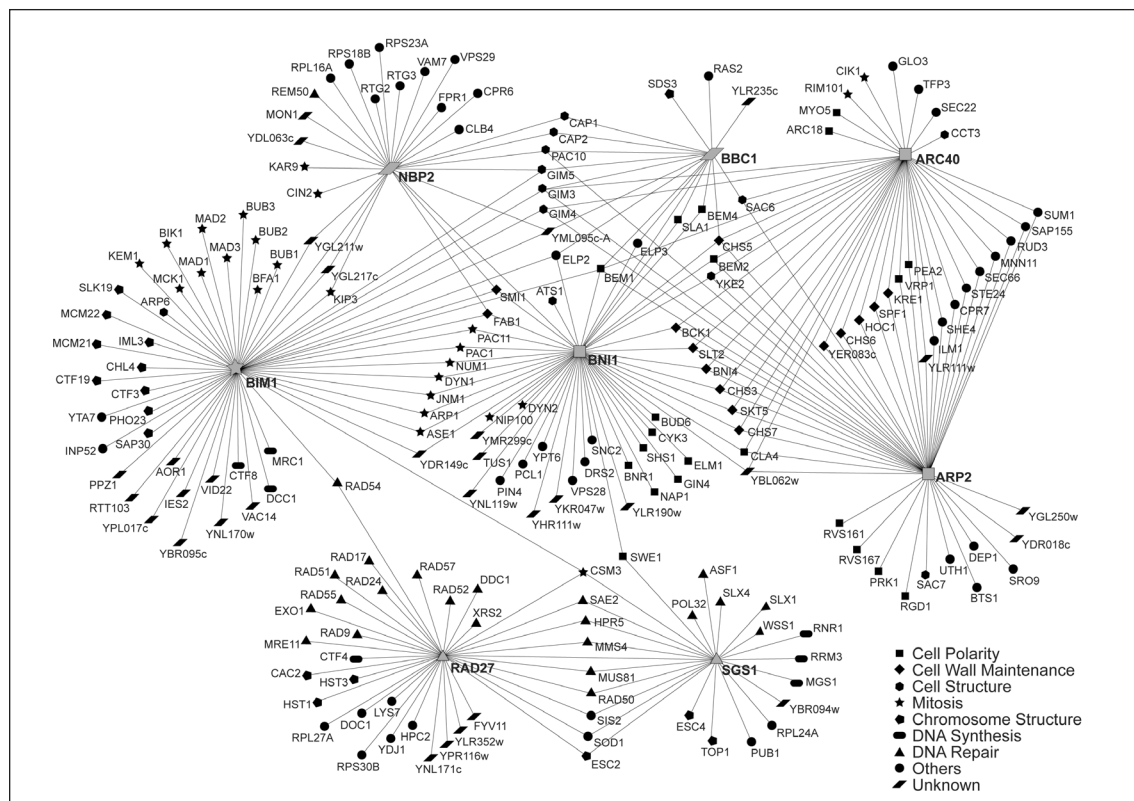
ular roles of previously uncharacterized genes. Moreover, because a gene deletion mutation provides a model for the effect of a compound that inhibits its corresponding gene product, our compendium of synthetic genetic profiles provides a key for determining the cellular targets of small molecules and drugs. Finally, the surprisingly large number of synthetic genetic interactions observed for defined mutations of inbred laboratory yeast strains suggests that digenic interactions of this type may also occur frequently amongst different alleles of genes found within the individuals of an outbred population and thus similar genetic interactions may underlie many of the inherited phenotypes in other organisms.

## Introduction

Gene deletion mutations have been constructed for each of the ~6000 known or predicted genes in the budding yeast *Saccharomyces cerevisiae*, revealing that ~80% of the genes are not required for viability. Synthetic genetic array (SGA) analysis, an approach that automates the isolation of yeast double mutants, enables large-scale mapping of genetic interactions. In a typical SGA screen, a mutation in a query gene of interest is crossed into an array of viable gene deletion mutants to generate an output array of double mutants (Fig. 1), which can then be scored for spe-



**Figure 1.** Synthetic genetic array methodology (3). (i) A MAT $\alpha$  strain carrying a query mutation (*bni1* $\Delta$ ) linked to a dominant selectable marker, such as the nourseothricin-resistance marker *natMX*, and an MFA1pr-HIS3 reporter is crossed to an ordered array of MAT $\alpha$  viable yeast deletion mutants, each carrying a gene deletion mutation linked to a kanamycin-resistance marker (*kanMX*). Growth of resultant heterozygous diploids is selected on medium containing nourseothricin and kanamycin. (ii) The heterozygous diploids are transferred to medium with reduced levels of carbon and nitrogen to induce sporulation and the formation of haploid meiotic spore progeny. (iii) Spores are transferred to synthetic medium lacking histidine, which allows for selective germination of MAT $\alpha$  meiotic progeny because these cells express the MFA1pr-HIS3 reporter specifically. (iv) The MAT $\alpha$  meiotic progeny are transferred to medium that contains both nourseothricin and kanamycin which then selects for growth of the double mutant meiotic progeny. A colony arraying robot is used to transfer the cells to facilitate, mating, sporulation, MAT $\alpha$  haploid selection, and double mutant selection. In total, 384 different deletion mutants can be examined, in duplicate, on a single plate. Double mutants associated with reduced fitness or lethality are identified as small colonies on the final double mutant selection plate.



**Figure 2.** Genetic interaction network representing the synthetic genetic interactions determined by SGA analysis (3). The query genes BNI1, ARC40, ARP2, BBC1, NBP2, BIM1, RAD27, SGS1, which were screened for interactions against ~4,700 viable deletion mutants, are displayed as grey shapes, which correspond to various cellular roles. The array genes also shown as distinct shapes, which correspond to the cellular roles in the legend, and interactions are represented as edges that connect the query genes to the array genes; 291 interactions and 204 genes are shown.

cific phenotypes. Synthetic lethal or sick interactions, in which the combination of mutations in two genes causes cell death or reduced fitness, respectively, are of particular interest because they can identify genes whose products buffer one another and impinge on the same essential biological process. To determine the basic principles of genetic interaction networks, we conducted a large-scale analysis of synthetic genetic interactions in yeast. Because many of the genes that control the essential processes of eukaryotic cells are highly conserved, we expect that specific elements of the yeast genetic network and its general properties also to be conserved.

## Proof-of-principle Genetic Interaction Network

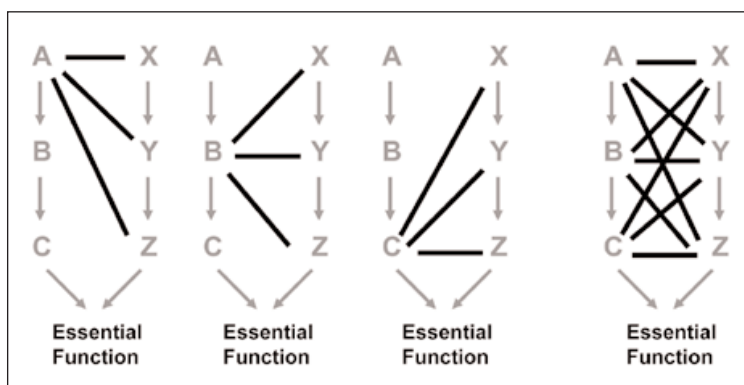
In a proof-of-principle study, we conducted 8 SGA screens of genes with roles in cytoskeletal organization (BNI1, ARP2, ARC40, BIM1), DNA synthesis and repair (SGS1, RAD27), or uncharacterized functions (BBC1, NBP2). This relatively small set of SGA screens created a network of 291 interactions among 204 genes (Fig. 2) and showed that genetic interactions tend to occur amongst functionally related genes. For example, BNI1, which encodes a member of the highly conserved formin family and controls the nucleation and assembly of actin cables to coordinate polarized cell growth and spindle orientation, displayed 51 different genetic interactions, enriched for genes with general roles in cell polarity (20%), cell wall maintenance (18%), and mitosis (16%). Similarly, SGS1, which encodes the yeast homolog of the human Werner's syndrome protein, WRN, a member of the RecQ family of DNA helicases showed 24 interactions, most of which involve genes with cellular roles in DNA synthesis and repair. Thus, query genes appear to show interactions with functionally related genes.

## Pathways and Complexes Revealed by Genetic Interaction Maps

If the activity of a nonessential pathway is required for cellular fitness when the product of a particular query gene is functionally compromised, then all of the components of the pathway should be identi-

fied in a comprehensive genetic interaction screen. For example, BIM1 encodes a protein that associates with the plus end of microtubules and participates in nuclear positioning and spindle orientation. As shown in Figure 2, the SGA screen with a BIM1 query mutation identifies genetic interactions with kinetochore components (MCM22, MCM21, CTF3, CTF19, IML3, CHL4), spindle checkpoint pathway components (MAD1, MAD2, MAD3, BUB1, BUB2, BUB3, BFA1), and with components of the dynein-dynactin spindle orientation pathway (DYN1, PAC11, PAC1, JNM1, ARP1, NUM1). Thus, SGA analysis appears to often identify pathways and complexes.

As the genetic network expands, specific pathways and complexes are expected to show a unique pattern of genetic interactions. Hypothetically, consider a nonessential pathway A-B-C and another nonessential pathway X-Y-Z, whose activity is required for cellular fitness in the absence of A-B-C activity (Fig. 3). Because removal of A, B, or C from the cell will block the activity of pathway A-B-C, deletion mutations in the genes encoding these components will be synthetically lethal with gene deletion mutations in either X, Y,



**Figure 3.** Similar patterns of genetic interactions identify pathways and complexes. If the activity of a hypothetical nonessential pathway A-B-C impinges in the same essential function as the nonessential pathway X-Y-Z and the two pathways buffer one another; then a deletion mutation in the gene encoding A (which blocks pathway A-B-C) will be synthetically lethal with a deletion mutation in the gene encoding X, Y, or Z (each of which blocks pathway X-Y-Z). Genetic interactions are represented as thick black lines connecting pathway components. Similarly, deletion mutations in B or C will be synthetically lethal with a deletion mutation in X, Y, or Z. Thus, genes coding for A, B, and C have the same genetic interaction profile and the genes coding for X, Y, and Z have the same genetic interaction profile. Because the pathways are nonessential, the genes encoding A, B, or C do not interact genetically with one another and the genes encoding X, Y, and Z do not interact genetically.



---

or Z, each of which block the activity of pathway X-Y-Z. Thus, the genes encoding A, B, and C would have identical genetic interaction profiles, as each gene would be synthetically lethal with the genes encoding X, Y, and Z. Similarly, X, Y, and Z would have identical synthetic genetic interaction profiles, as each would be synthetically lethal with A, B, and C. Thus, overlapping genetic interaction profiles should group genes into subsets that correspond to pathways.

## Large-scale Genetic Network Analysis

As the first phase of our large-scale genetic interaction mapping project, we performed 132 SGA screens, focused on query genes involved in actin-based cell polarity, cell wall biosynthesis, microtubule-based chromosome segregation, and DNA synthesis and repair. The query mutations were either deletion alleles of nonessential genes or conditional (partially functional) alleles of essential genes. The resulting data set contains ~4000 interactions amongst ~1000 genes and should contain only few false positives (incorrect interactions) because each interaction was examined by a secondary assay (either tetrad or random spore analysis). The number of confirmed interactions per query gene varied from 1 to 146, with an average of 34 interactions per screen. By comparison, the recent TAP and HMS-PCI large-scale protein interaction data sets show about 8 physical interactions per query protein, suggesting that the yeast genetic interaction network is at least 4 times denser than that the yeast protein interaction network. The greater density reflects that genetic interactions map functional relationships, which transcend physical interactions. Assuming that gene pairs not yet tested by SGA behave similarly to those analyzed here, the complete yeast synthetic genetic network contains on the order of ~100,000 interactions.

## Two-dimensional Hierarchical Clustering of Genetic Interaction Profiles

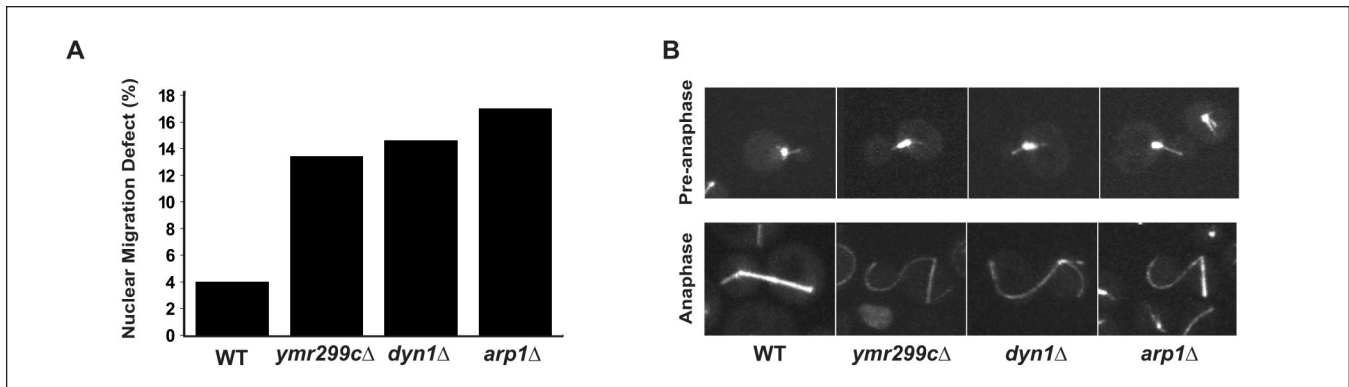
The ~4000 genetic interactions we mapped formed a single highly connected network. In order to visualize the network and to organize the genes by

their genetic interaction patterns, we performed two-dimensional hierarchical clustering analysis (Fig. 4), which is often used to examine similar gene expression patterns. This method clusters the query genes (vertical axis) displaying similar patterns of genetic interactions with array genes and clusters array genes (horizontal axis) displaying similar patterns of interactions with different query genes. As described above, sets of genes that function within the same pathway or complex are expected to show overlapping sets of genetic interactions and therefore cluster together. Indeed, we found that both query genes and array genes clustered into known pathways or complexes.

Examples of clustered query genes (Fig. 4B) include those involved in actin patch assembly (ARC40, ARP2), the chitin synthase III pathway (BNI4, CHS6, CHS3, SKT5, CHS7, CHS5), the prefoldin complex (GIM3, GIM4, GIM5, PAC10, YKE2), and sister chromatid cohesion (CTF18, DCC1, CTF8, CTF4). Examples of clustered array genes (Fig. 4B) include components of the PKC MAP kinase signal transduction pathway (BCK1, SLT2), the dynein-dynactin spindle orientation pathway (ARP1, NUM1, DYN1, PAC11, PAC1, DYN2, JNM1, YMR299c, NIP100, BIK1), and the spindle checkpoint pathway (BFA1, BUB2, BUB1, MAD1, MAD2, MAD3, BUB3).

## Predicting Gene Function From Genetic Interaction Patterns

Clustering uncharacterized genes with the components of defined pathways should enable us to predict precise biological functions. For example, the uncharacterized gene YMR299c clusters with the genes encoding the dynein-dynactin spindle orientation pathway, suggesting it may be a new component of this pathway (Fig. 4B). Close inspection of the predicted YMR299c protein sequence revealed weak similarity to mammalian cytoplasmic dynein light intermediate chain and analysis of the YMR299c deletion mutant revealed that it showed a number of phenotypes known to be associated with cells defective for dynein-dynactin function, including exaggerated cytoplasmic microtubules and a more severe nuclear migration defect (Fig. 5). Thus, Ymr299c may function as the yeast dynein light intermediate chain. Figure 4 contains



**Figure 5.** Ymr299c functions as a component of the dynein-dynactin spindle orientation pathway (7). A. *ymr299cΔ* exhibits nuclear migration defect similar to *dyn1Δ* and *arp1Δ*. B. *ymr299cΔ* also exhibits defects in mitotic spindle positioning, and abnormal cytoplasmic microtubules similar to *dyn1Δ* and *arp1Δ*. Cells were stained with anti-tubulin and DAPI, the percentage of cells with microtubule orientation defects was scored in large-budded cells.

over 174 uncharacterized genes, a number of which display genetic interaction patterns that are predictive of precise function; therefore, a comprehensive genetic interaction map of the yeast cell will assign function(s) to hundreds of previously uncharacterized genes.

## The Small World of Genetic Interactions

The yeast synthetic genetic network exhibits two network properties shared by networks as diverse as the World Wide Web to protein-protein interactions. First, the connectivity distribution of array genes follows a power-law distribution (Fig. 6), containing many genes with few interactions and a few highly-connected “hub genes”. Network hubs are important because their removal tends to collapse the connectivity of the network, indicating that they are key components of biological buffering. For example, in protein interaction networks hubs are more likely to be essential genes. Because all of the genes on our array are nonessential, the genetic network hubs, by definition, are not required for viability but probably are more important for cellular fitness than the less connected genes. Indeed, genetic network hubs associated with conserved genes may be potential targets for anticancer drugs because cancer cells often carry a large mutation load and thus may be killed preferentially by drugs that inhibit the protein product of a nonessential hub gene. The top 5 array gene hubs include 4 components of the prefoldin com-

plex, GIM3, GIM5, PAC10, and GIM4, which functions as a chaperone for actin and tubulin and thereby buffers many cellular processes.

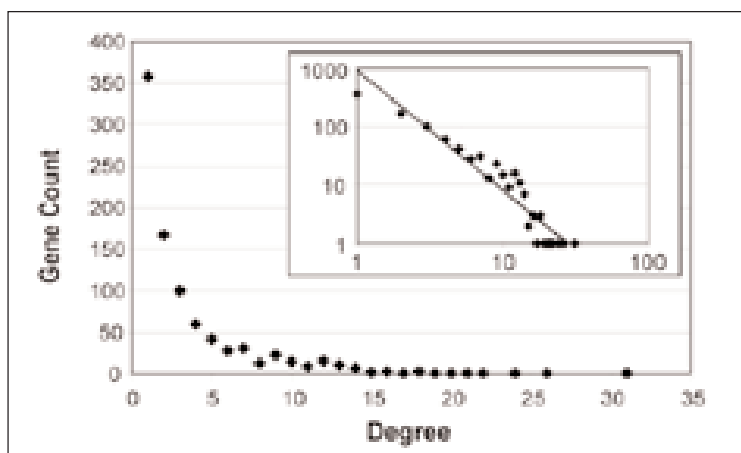
Second, the genetic network appears to be an example of a small world network, in which the length of the shortest path between a pair of vertices tends to be small (i.e., the network has a short characteristic path length) and local neighborhoods tend to be densely connected. Indeed, the observed genetic network has a short characteristic path length of 3.3. Moreover, the topology of the genetic network also exhibits dense local neighborhoods because the immediate neighbors of a gene, its genetic interaction partners, tend to interact with one another. For instance, when we examined the genes that interact with SGS1 for interactions amongst each other, ~24% of the interactions tested positive, which is highly enriched compared to the ~1% expected for all SGA-tested gene pairs. The dense neighborhood characteristic of small world networks is of particular interest because it can be exploited to predict interactions, as has been shown previously for protein-protein interactions. Thus, given a partially-mapped genetic network, candidate interactions would be predicted for genes that occupy the same neighborhood. Thus, for organisms that are less genetically tractable than yeast, there is the potential to map genetic networks by combining experimental and theoretical approaches.

## Integration of Chemical-genetic and Genetic Interaction Data Links Bioactive Compounds to Cellular Target Pathways

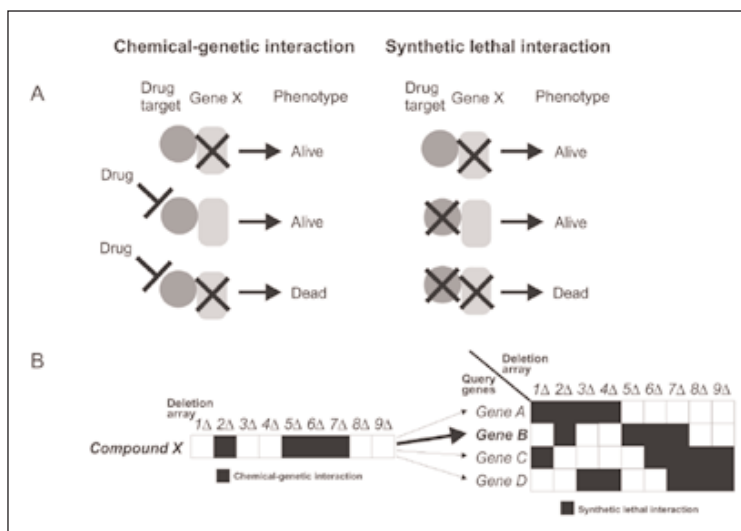
Bioactive compounds can act as mimetics of genetic mutations. Therefore, testing the set of viable gene deletion mutants for hypersensitivity to a target-specific compound identifies a chemical-genetic interaction profile, which, for highly specific compounds, consists of a set of genes that buffer the cell from defects in target activity and should resemble the genetic interaction profile associated with the drug target gene (Fig. 7). To establish this proof of concept we conducted chemical-genetic screens for several drugs (e.g. fluconazole, FK506, cyclosporin A, benomyl, hydroxyurea, camptothecin) with well known targets and compared the results of these screens to a compendium of genetic interaction profiles containing those for the compound target genes. Indeed, cluster analysis linked the chemical-genetic profiles to their target pathways or proteins, demonstrating that the compendium of genetic interaction profiles provides a key for interpreting chemical-genetic interaction data sets. Because each of the deletion mutations is linked to a unique oligonucleotide barcode tag, a parallel fitness tests with pooled deletion mutants and a microarray readout could be used to generate chemical genetic profiles for compounds that are limited in supply. Our chemical-genetic profiling method complements other yeast genomic methodologies, such as cluster analysis of gene expression profiles and parallel analysis of chemically-induced haploinsufficiency profiling.

## Population Genetics of Yeast Synthetic Genetic Interactions

Because inbred laboratory yeast strains carrying defined mutations display an extensive number of synthetic genetic interactions, we anticipate that similar interactions may also occur in outbred strains, which carry different alleles of genes due to the accumulation of mutations within a population. The theoretical framework for synthetic genetic interactions has been established by Phillips and Johnson and their calculations suggest



**Figure 6.** The degree distribution of SGA array genes not also used as query genes (7). The number of genes with each degree (number of interaction partners) is shown on linear and log-log (inset) scales. The fit to a straight line in the log-log plot indicates a power-law degree distribution, a characteristic of a "scale-free," network.



**Figure 7.** Chemical-genetic interactions can be modeled by synthetic genetic interactions (22). A. In a chemical genetic interaction (left), a deletion mutant, lacking the product of the deleted gene (represented by a black X), is hypersensitive to a normally sublethal concentration of a growth-inhibitory compound. In a synthetic lethal interaction (right), two single deletions lead to viable mutants but are inviable in a double-mutant combination. Gene deletion alleles that show chemical-genetic interactions with a particular compound should also be synthetically lethal or sick with a mutation in the compound target gene. B. Comparison of a chemical-genetic profile to a compendium of genetic interaction (synthetic lethal) profiles should identify the pathways and targets inhibited by the drug treatment. In this hypothetical figure, chemical-genetic and genetic interactions are both designated as grey squares. For example, deletion mutants 3Δ, 5Δ, 6Δ, and 7Δ, are hypersensitive to compound X and a mutation in a query gene A leads to a fitness defect when combined with deletion alleles 1Δ, 2Δ, 3Δ, and 4Δ. Here, the chemical-genetic profile of compound X resembles the genetic profile of gene B, thereby identifying the product of gene B as a putative target of compound X.

that a conservative equilibrium frequency estimate for synthetic genetic combinations in diploids can be of the order of one in a thousand carrier gametes. Therefore, the frequency of double mutant zygotes that would be homozygous for a synthetic genetic gene pair is the product of the gamete frequencies, one in a million for a given synthetic mutant pair. Nevertheless, the genomic load of synthetic genetic effects has remained a mystery because the number of mutated genes that can accumulate within a population and the number of synthetic genetic interactions per gene have remained unknown for any organism.

Importantly, synthetic genetic interactions amongst alleles of nonessential genes may play a major role in determining the genetic basis of phenotypic variation, because polymorphisms are protected from selection if they only display a deleterious phenotype when in combination with a mutant allele at a second locus. For yeast, we now know that ~80% of all genes are nonessential and that the growth rate of close to 50% (~2,500) of viable homozygous diploid gene deletion mutants is normal under 6 different environmental conditions. This surprisingly large fraction of apparently benign mutations indicates that thousands of mutated genes may have the potential to accumulate within the diploid cells of a natural yeast population as single homozygous mutations in diploids. Given that ~2500 loci are buffered individually from selection when null, and that a substantial fraction of these, perhaps 10 to 50% as a conservative estimate, may participate in synthetic genetic interactions with ~30 other loci, then on the order of 0.8 to 4% of the zygotes formed in yeast populations would have a synthetic double mutant phenotype. Because the potential for creating synthetic double mutant combinations should increase with gene number, the genomic load of synthetic effects may be even higher in humans.

### **Synthetic Genetic Interactions and Complex Human Disease**

Because most of the genes of eukaryotic organisms are nonessential and because asymptomatic mutations can accumulate in the population and probably have the potential to interact with numerous genes, digenic effects like those observed for the

yeast genetic interaction network may underlie many common diseases that are familial but not Mendelian in their inheritance. For complex heterogeneous human disease syndromes such as glaucoma, type II diabetes, lupus erythematosus, schizophrenia, Alzheimer's disease and retinitis pigmentosa, a component of the genetic basis of the disease may be similar to the synthetic effects we see within a dense local neighborhood of the yeast genetic interaction map, where multiple pairs of gene alleles have the potential to combine and compromise cellular fitness through a related mechanism. Mapping the expected dense network of digenic interactions in humans will be extremely challenging. However, SGA-like approaches can be undertaken with *C. elegans*, *Drosophila*, zebrafish, mice, and mammalian cell lines, using large-scale RNA-mediated interference, transposon based mutagenesis or morpholino-modified antisense oligo nucleotide approaches, and thereby build a model for the evolution of genetic networks. Moreover, because elements of the genetic networks derived from model organisms are likely to be conserved and most interactions occur amongst functionally related genes, there is potential for predicting candidate genetic interactions from large-scale functional genomics information.

### **References**

1. K. Dolinski, Balakrishnan, R., Christie, K. R., Costanzo, M. C., Dwight, S. S., Engel, S. R., Fisk, D. G., Hirschman, J. E., Hong, E. L., Sethuraman, A., Theesfeld, C. L., Botstein, D., and Cherry, J. M., "Saccharomyces Genome Database", <http://www.yeastgenome.org/>, August 19, 2003.
2. G. Giaever et al., *Nature* 418, 387 (2002).
3. A. H. Tong et al., *Science* 294, 2364 (2001).
4. J. L. Hartman, B. Garvik, L. Hartwell, *Science* 291, 1001 (2001).
5. M. Evangelista, D. Pruyne, D. C. Amberg, C. Boone, A. Bretscher, *Nat Cell Biol* 4, 260 (2002).
6. D. Pruyne et al., *Science* 297, 612 (2002).
7. A. H. Tong et al., *Science* 303, 808 (2004).
8. A. C. Gavin et al., *Nature* 415, 141 (2002).
9. Y. Ho et al., *Nature* 415, 180 (2002).

- 
10. M. B. Eisen, P. T. Spellman, P. O. Brown, D. Botstein, *Proc Natl Acad Sci U S A* 95, 14863 (1998).
  11. References for all the genes mentioned in this study can be found at the *Saccharomyces* Genome Database (SGD) (<http://www.yeastgenome.org/>), the Yeast Proteome Database (YPD) (<https://www.incyte.com/tools/proteome/YPDsearch-quick.html>), and the Munich Information Center for Protein Sequences (MIPS) (<http://mips.gsf.de/>).
  12. W. L. Lee, J. R. Oberle, J. A. Cooper, *J Cell Biol* 160, 355 (2003).
  13. A. L. Barabasi, R. Albert, *Science* 286, 509 (1999).
  14. A. L. Barabasi, E. Bonabeau, *Sci Am* 288, 60 (2003).
  15. H. Jeong, S. P. Mason, A. L. Barabasi, Z. N. Oltvai, *Nature* 411, 41 (2001).
  16. A. Kamb, *J Theor Biol* 223, 205 (2003).
  17. D. J. Watts, S. H. Strogatz, *Nature* 393, 440 (1998).
  18. D. S. Goldberg, F. P. Roth, *Proc Natl Acad Sci U S A* 100, 4372 (2003).
  19. M. J. Marton et al., *Nat Med* 4, 1293 (1998).
  20. G. Giaever et al., *Nat Genet* 21, 278 (1999).
  21. L. H. Hartwell, P. Szankasi, C. J. Roberts, A. W. Murray, S. H. Friend, *Science* 278, 1064 (1997).
  22. A. B. Parsons et al., *Nat Biotechnol* 22, 62 (2004).
  23. T. R. Hughes et al., *Cell* 102, 109 (2000).
  24. P. Y. Lum et al., *Cell* 116, 121 (2004).
  25. G. Giaever et al., *Proc Natl Acad Sci U S A* 101, 793 (2004).
  26. T. Hughes, B. Andrews, C. Boone, *Cell* 116, 5 (2004).
  27. P. C. Phillips, N. A. Johnson, *Genetics* 150, 449 (1998).
  28. Y. Shi, *Trends Genet* 19, 9 (2003).
  29. R. Barstead, *Curr Opin Chem Biol* 5, 63 (2001).
  30. D. S. Conklin, *Chembiochem* 4, 1033 (2003).

---

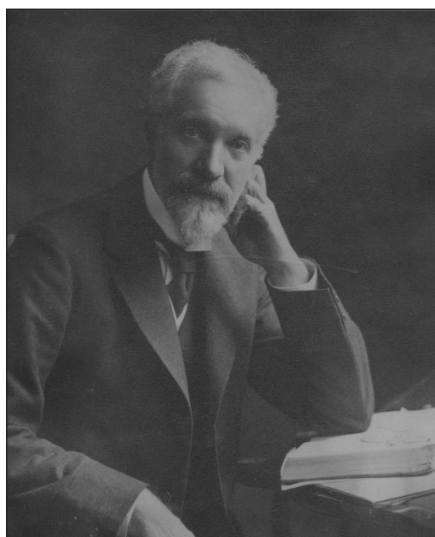
# A History of the Department of Biochemistry at McGill University

Dr. Rose M. Johnstone,  
Department of Biochemistry, McGill University

Biochemistry at McGill University has its origins in teaching chemistry to medical students. Shortly after the Medical School at McGill (the first recognized unit of higher education at McGill) began to train physicians, the members of the Medical Faculty taught chemistry as well as the clinical subjects to students enrolled in the fledgling medical school. From the middle of the 19th century onward, as the University grew to include disciplines other than Medicine, the same core of people taught all students interested in Chemistry. At the turn of the 20th century, a Department of Chemistry was established at McGill, under the leadership of Robert Ruttan. Ruttan was a physician, a graduate of McGill's Medical School, who had been hired to teach practical chemistry to medical students. Although he had no formal degrees in chemistry, he had spent several years training in chemistry in Germany, and had a deep interest in chemistry since his undergraduate years. He was clearly a person of enormous energy, with

no wife or family to compete for his time. In the course of his career at McGill, Ruttan became head of Amalgamated Services, in addition to being the first Chairman of the Department of Chemistry. In 1907, he was the first person at McGill to be named Professor of Biochemistry, well before a separate Department of Biochemistry was launched. Since the term "Biochemistry" had been coined only a few years earlier by Neuberg, conferring this title on Ruttan, in addition to his other titles and duties many years before a Department of Biochemistry was formed, probably reflected the desire of the University to show it was "au courant" with the new discipline.

The Department of Biochemistry at McGill University came into official existence in 1920, over a dozen years after introducing the name "biochemist". In reality the true beginnings of "biochemical training" at McGill preceded that date by more than twenty years since, as alluded to above, aspects of pathological chemistry had



**Figure 1.** Archibald Macallum.



**Figure 2.** The Biology Building, which housed the first Department of Biochemistry at McGill University, was built in 1920.

already been taught for some years to students in the Faculty of Medicine by both chemists and physicians without calling the subject matter Biochemistry.

Although McGill's Department of Biochemistry is a late arrival compared to the sister Departments of Bacteriology, Botany, Physiology and Pharmacology, its late arrival is not obvious today. It has a prominent position vis a vis other Departments with respect to its research, and its ability to attract undergraduate and graduate students from Canada and abroad. The achievements of its graduates and the international recognition of its scientific staff have cast the Department in a bright light compared to other schools inside and outside Canada. No fewer than sixteen of its Ph.D. graduates have served as Chairs of Biochemistry, ten of them in Canada. In addition, no less than eight have been - or are - directors of Research Institutes. One of its graduates became a DAME of the British Empire [Brigitta Askonas], another [Ronald Cape] founded Cetus Corporation (where the polymerase chain reaction was introduced). A third [A. Schally] was awarded the Nobel Prize for work initiated at McGill. Since the first Ph.D. degree in 1925, over 700 M.Sc. and Ph.D. degrees have been awarded.

The current Chair of the Department, David Thomas, is the eighth individual to hold this position, being preceded by Philip Branton [1990-2000], Rose M. Johnstone [1980-1990], Angus F. Graham [1970-1980], Kenneth A.C. Elliott [1958-1968], David L. Thomson [1941-1958], James B. Collip [1928-1941], and the first Chairman, Archibald Macallum [1920-1928].

Archibald Macallum, M.D., Ph.D., was a distinguished scientist with an international reputation for his basic research. He was a Fellow of the Royal Societies of London, Glasgow and Canada. He had extensive training in research. He revitalized the Medical Faculty and the Department of Biochemistry at the University of Toronto. He was also the founder of the National Research Council of Canada (NRC) and became its first President after he stepped down from the Chair of Biochemistry at the University of Toronto. In 1920, after about two years at the NRC, Macallum (Figure 1) became the first



**Figure 3.** The first Biochemistry teaching laboratory (circa 1921).

Chairman of the new Department of Biochemistry at McGill. A new building was opened at that time which housed the new Department as well as the first teaching laboratory in biochemistry (see Figures 2, 3). Macallum's best-known scientific achievement is the demonstration that the intracellular ionic composition of vertebrates and invertebrates resembles seawater, an observation which led him to speculate on the origin of life in the sea. Most of his major research contributions were made before he came to McGill. After eight years as the Chair, he retired to his home in Ontario. His son carried on the biochemical tradition and became Chairman of Biochemistry at the University of Western Ontario.

James B. Collip, M.D. Ph.D., the second Chairman (Figure 4), had been Macallum's first graduate student in Biochemistry at the University of Toronto. Macallum was no doubt instrumental in attracting Collip to McGill. Collip started his research career by following Macallum's interest in inorganic ions when he took up his first position at the University of Alberta. However, Collip's name is forever associated with the isolation of insulin. While not named in the Nobel Prize for its isolation, his skills and insight into protein chemistry were instrumental in making insulin preparations safe for human use. During a Sabbatical leave from Alberta, he worked with Banting and McLeod at the University of Toronto in 1921 for a few months. His proposal to remove unwanted products by judicious use of higher alcohol concentrations, which retained insulin in solution but



**Figure 4.** James B. Collip.

removed many other proteins, overcame the unacceptable side effects of the crude, but active, insulin preparation. Collip became convinced of the importance of endocrine research and left his previous studies behind. He continued his endocrine research when he returned to Alberta and later when he became Chairman at McGill. Indeed, he was the major figure launching Endocrinology as an important area of research throughout the University.

Under Collip, the Department acquired a wide international reputation for hormone isolation, purification and quantification. Several of Collip's students and associates became prominent scientists with international reputations, including Hans Selye, J.S.L. Browne, Orville Denstedt, and A. Neufeld. During this period, ACTH was isolated for the first time by members of Collip's team. In addition, an estrogen conjugate was isolated and successfully used and marketed. Furthermore, while a member of the Department, Selye introduced his theory of the stress response and its relation to corticosteroid secretion.

The Department's success did not lessen Collip's desire to head and manage an independent endocrine research Institute, rather than run a major teaching department. The University

agreed to his request, and in 1941 he left the Department to launch the first Endocrine Research Institute at McGill. The Institute did not last long. The war years had distracted him from his main direction of work, and shortly after the war Collip left McGill to become Dean of Medicine at the University of Western Ontario. However, McGill has remained an important centre for the study of Endocrinology to this day.

Running the Department fell to David Landsborough Thomson in 1941. Thomson had been one of Collip's first appointees, and had taken charge of the main teaching activities for some years before Collip left. He had arrived at McGill in 1928 with a new Ph.D. from the Biochemistry Laboratory at Cambridge, UK. In the early years, the record shows he participated actively in the research activities of the Department. His name appears as a coauthor on many of the ~200 papers published by the members of the Department during Collip's era. There is no evidence that Thomson ever ran an independent research laboratory before or after Collip's departure.

Thomson was by all accounts the most erudite member of the teaching staff in Biochemistry and was widely renowned and respected University wide, including at the most senior levels of the University. He held the Chair until 1958, longer than any other incumbent. Concomitantly, he was Dean of Graduate Studies and in later years was also named Vice Principal. He was adored by generations of students for his charismatic and exciting exposition of the events evolving in Biochemistry internationally. Many of his students were inspired to follow careers in Biochemistry.

After Collip's departure from the Department, Thomson himself participated relatively little in research and devoted his time to major administrative and teaching responsibilities. The research activity slowed down. The remaining member of Collip's group, O. Denstedt, continued in the Department along with R.D.H. Heard, whom Thomson appointed shortly after assuming the Chair. During Thomson's tenure, the Department developed close ties with two research institutes in particular, one headed by J.H. Quastel and the other by K.A.C. Elliott. The latter two additions

to the teaching staff of the University and the Department between 1945 and 1948 signify the beginnings of the study of Neurochemistry at McGill.

Three major foci of research evolved in the Department, and in the research institutes which established affiliations with the Department, under Thomson. These were Metabolism, Endocrinology and Neurochemistry. Of the three prominent scientific figures who joined the Department during Thomson's era (Heard, Quastel and Elliott), only Heard was an "inside" member of the Department, the others being primarily involved with the "external" research units which they headed. Nonetheless, large numbers of students trained for graduate degrees under the umbrella of the Department, but spent their days doing experimental work at the Montreal Neurological Institute (Elliott), the McGill-Montreal General Hospital Research Institute (Quastel), and a number of other research laboratories in the clinical units of the University.

The intervening world war and Thomson's other heavy University and national commitments led to an erosion of academic life in the Department. Hiring of new staff and refurbishing of departmental resources were sadly neglected for many years. Many of the existing resources from Collip's era had been transferred to the new Endocrine Institute where they remained. By the

time Thomson retired from the Chair, the Department's international stature had become a mere shadow what it had been in its heyday in Collip's era.

At Thomson's retirement in 1957, the Dean of Medicine, Lloyd Stevenson, implored the University to make new important resources available to one of the Medical Faculty's key basic science departments. However, no prominent international scientist outside the University was persuaded to take the position of rebuilding the Department. The lot fell to one of the Faculty's insiders, K.A.C. Elliott, who was a respected figure in Neurochemistry, and in whose laboratory the first neuroinhibitory transmitter had been identified (GABA, gamma amino butyric acid). Thus Elliott became the third Chairman of Biochemistry at McGill and filled the position for a decade until his retirement at age sixty-five.

At the start of Elliott's tenure, nearly half of the teaching staff of the Department were members of Quastel's research group, whose major responsibilities were outside the Department (see Figure 5). Thomson continued as Dean of Graduate Studies and Vice-Principal for a few years after stepping down from the Chair. An unfortunate accident on Montreal's ice-covered streets caused him irreversible damage and he died in 1964.

During the decade under Elliott there were



**Figure 5.** Elliott's Department (circa 1959). Back row L to R: Orville Denstedt, D.L. Thomson, Rose Johnstone\*, K.A.C. Elliott, Murray Saffran, William Creaser\*, H. Quastel,\* Front row L to R: David Rubinstein, Esau Hosein, Peter Scholefield\* Names with asterisks identify the members of Quastel's research group.



**Figure 6.** The circular McIntyre Building (built 1964) seen in the snow. The present home of the Department of Biochemistry.

new faculty appointments, and by 1964 a much needed new building (see Figure 6) to house three basic science departments (Biochemistry, Physiology, Pharmacology), a new Cancer Research Centre, as well as the Medical Faculty and the Medical Library. The new, round medical building changed the skyline of Montreal as well as the spirits and the working environment of the members of the Department of Biochemistry. With the help of newly acquired Faculty members such as David Rubinstein and Murray Saffran, the Department took on new life, new courses and additional growth and vitality. Both official and unofficial cross appointments of leading scientists from the local academic community, such as Samuel Solomon, Theodore L. Sourkes, Rhoda Blostein, and Leon Wolfe, expanded the breadth of expertise available in the Department for student training and provided additional intellectual vigour. During the fifties and sixties, there was major growth in knowledge and technology in Biochemistry as a discipline in the Western world. Unfortunately, the years of neglect and lack of funds, coupled to a short-range vision of the necessary future development, left the Department unable to join the leading groups in Biochemistry on the international stage.



**Figure 7.** The Department in 1979-1980 at the end of Graham's tenure.

Back row L to R : Samuel Solomon\*, Lawrence Goodfriend\*\*, Joseph Shuster\*, Aaron Wasserman, Edward Meighen, Steward Millward, Walter Mushynski, Angus Graham, Rose Johnstone, Robert Mackenzie, K.A.C. Elliott, Peter Braun, Bruce Livett\*, Hannah Pappius\*, Esau Hosein. Front row L to R: Nahum Sonenberg, David Denhardt, Murray Fraser, Kimon Angelides.

\* Cross appointees. \*\* Associate members.

Rhoda Blostein and Theodore L. Sourkes, cross-appointed members, are missing from the photograph.

A major modernization of the Department reflecting the changes in approach to the study of Biochemistry throughout the world, was introduced when Angus F. Graham was appointed to the Chair in 1970. Graham was the first Chairman of Biochemistry at McGill whose principal expertise was in nucleic acids and the "life" of viruses. He joined the Department at a time when knowledge and understanding in this area were expanding rapidly. Since Graham's tenure, the central aspects of Molecular Biology have been at the core of the research undertaken in the department and in the curriculum at both the graduate and undergraduate levels. Under Graham, several professorial positions were added to the ranks, a number of whom became leading figures in Canada's research establishment. These include E.A. Meighen, R.M. Mackenzie, D. Denhardt, P. Braun, and N. Sonenberg. Unfortunately, a number of the well-established "old guard", D. Rubinstein, M. Saffran and J.H. Spencer, left the Department to head Departments of Biochemistry at Dalhousie, Toledo, Ohio and Queens University, respectively. By the end of Graham's tenure, there had been a substantial growth in the academic staff (see Figure 7). When Graham retired from the position of Chairman in 1980, the Department had undergone a major transformation on several fronts - new staff, new research interests, major new technical facilities, revision of undergraduate and graduate training and major new research resources. The Department had regained a dominant position amongst Biochemistry and Molecular Biology Departments in Canada. Its faculty contributed widely to international as well as national scientific meetings and symposia.

Graham's successor, R.M. Johnstone, the author of this review, was the first "insider" (i.e. a McGill trained biochemist) to be appointed to the Chair, although there had been two periods of "insider" interim Chairs. Except for Elliott, all other incumbents had been native sons of Ontario. Johnstone's appointment marked the first time that the Faculty of Medicine named a woman to the Chair of a Basic Science Department.

The decade under this Chair was also one of major financial stress. While financial shortfalls are nothing new at McGill, indeed they are the

---

rule rather than the exception, this decade fell during a period of extraordinary deficits, causing major cutbacks and restrictions in new appointments. Nonetheless, the Department's academic life continued to grow, research funds continued to increase, testifying to the overall quality of the academic staff. The teaching programs continued to attract both graduate and undergraduate students as well as an increasing number of post-doctoral Fellows. The increased demand for undergraduate training in the practical aspects of biochemistry, coupled to the shortage of funds, forced us for the first time to restrict the undergraduate laboratory to students registered in a Biochemistry program. Furthermore, a laboratory for medical students had outlived its purpose and was abolished.

Three new faculty members who joined the Department in this decade, and who have remained to become leading experts in their chosen fields, include John R. Silvius (Lipids and Membranes), Philippe Gros (Multidrug Resistance & Natural Immunity to Infection), and Gordon Shore (Translocation of Proteins Across Membranes and Apoptosis). During this era, the ties between the McGill Cancer Centre and the Department became more intertwined, particularly when C. Stanners joined the Department and became the Director of the Centre.

In addition to the usual financial constraints, the Department also went through the turmoil of having to deal with a potential case of scientific fraud resulting in the resignation of a young Faculty member two years after his appointment. In retrospect these woes seem trivial compared with the future events involving the same individual played out at Baylor in Texas.

After the almost traditional ten year cycle in operation since Thomson's era, Philip Branton, from McMaster University, was offered the Chair in 1990. Branton joined the Department bringing with him his expertise in human adenoviruses and the role of phosphotyrosine phosphatases in tumour induction. Prior to the end of Johnstone's tenure, it had already become clear that a major new direction into Structural Biology had to be introduced into the Department's research and teaching program. Although the Dean of

Medicine had acknowledged that such a direction was essential to maintain and elevate the profile of the Department, and to provide our students with the skills required for the future, little had been achieved prior to the new leadership under Branton. This Department was not the only one to have recognized that traditional Biochemistry and Molecular Biology were moving rapidly along a new path capable of yielding deeper insights into understanding biological systems. Personnel with expertise were not plentiful and the funds for the major new technological support hardly adequate. Two talented individuals, Alice Vreilink and Kalle Gehring, eventually joined the staff, the first a crystallographer, the second an expert in structural analysis of macromolecules by NMR. M. Tremblay also joined the Department and introduced the use of transgenic mouse technology. Of the three, only Gehring remains primarily associated with the Department. Tremblay has now become the Director of the Cancer Center although he maintains his position in the Department. Alice Vreilink has joined the staff of the University of California at Irvine.

The success of the Department in attracting research funds, students and research fellows, has led to the inevitable space crunch. Only the fact that the space for the teaching labs was reduced, with student training taking place in the research labs, enabled the Department to avoid using ceiling suspensions for instruments to make floor space available. A new attitude to research and the possibility of putting products on the market has resulted in extramural activity by a significant fraction of the academic staff. Now it is not uncommon for full time faculty to operate a "laboratory start-up" with funds raised by private capital. The Biochemists of today have become like the engineers of yesterday.

When Branton stepped down from the Chair in 2000, the new century ushered in a new head, David Thomas. An established and highly respected yeast geneticist, accustomed to running a large research laboratory, he had been with the National Research Council for many years, and recently with the Biotechnology Research Institute in Montreal. Thomas has continued the drive to develop Structural Biology. A man of enormous

---

energy, he has become involved in developing Proteomics and Genomics Centres at McGill in association with other members of the Science and Medical Faculties. The Department keeps on expanding without acquiring new actual floor space by trying to move walls and readjust halls. The new buildings now being erected promise to allow a burst of development, given the zest with which the current Chair sees the scientific and technological developments on the horizon.

The last report made public by the University showed that the Department of Biochemistry had the largest research budget from competitive external sources in the University, exceeding by nearly \$1,000,000 its closest contender, despite the fact that this department is not the largest in either of the Faculties of Science or Medicine with respect to student body or teaching staff.

Historically, the Department can lay claim to several major firsts. Only a few of these original findings are cited. These include the isolation of estriol and ACTH, the synthesis of the first radioisotope labelled estrogen, the discovery of corticotrophin releasing factor (CRF), the identification of a new organelle from red cells (the exosome), the isolation of a gene for multi-drug resistance, the role of the cap structure in the initiation of protein synthesis, the identification of the natural inducer for bacterial luminescence, and the discovery of a mammalian NAD-linked folate dehydrogenase. A list of current research interests and achievements can be found on the website for the Department of Biochemistry at McGill University.

At present, the Department has a faculty of over 20, as well as several associate members. Over 140 students are registered for graduate degrees. The Department is now entering another era in collaboration with other departments at the University, expanding into the areas of Proteomics and Genomics. The latter will become part of the fundamental mandate in training and education, enhancing the vistas and the opportunities of students and Faculty of the Department.

---

# How I became a Biochemist\*

**Bibudhendra Sarkar**

Department of Structural Biology and Biochemistry, Hospital for Sick Children,  
Toronto, ON, Department of Biochemistry, University of Toronto

I was born in India, during one of the most turbulent times in the subcontinent's history. My childhood memories include vivid images of the Second World War (1939-45). Mahatma Gandhi's non-violent movement to free India from British rule and the horrific aftermath of the partition of Pakistan from India in 1947. The entire region was engulfed in communal violence: almost a million dead and some 10 million in flight, one of the largest mass migrations in human history. Born into a family of well-known lawyers and writers, I was privileged to attend a private Catholic school for my kindergarten and primary school years, where major emphasis was on strict discipline and the 3Rs. When the place where I was born became East Pakistan (today's Bangladesh), my family migrated to India as refugees, leaving behind everything that we possessed.

My family was determined to rebuild all that we had lost, but it was a struggle in the beginning. I received special attention from the family because I was so little and my mother had died when I was only one year old. Mathematics, English and Music became my favorite subjects as I grew up. As a child, I enjoyed doing complicated arithmetic 'in my head'. My love for English literature stems from my father's influence. He helped me read several Shakespearean tragedies and selected poems of Wordsworth and Coleridge before the age of 12. I was fond of songs and poems written by the Nobel Prize winning Indian poet, Rabindranath Tagore. I did not think much about science in those days!

Despite lacking resources after migrating to India, my father and two brothers always thought that I should be given the best possible education. With the money they could provide, plus an Indian Government Scholarship, I was admitted to one of the most exclusive residential universities in India at that time, Banaras University, in the ancient holy city of Varanasi. After much debate, I

chose an undergraduate programme in pharmaceutical chemistry, with the idea that would get a job in an applied field. My love for mathematics was still strong but there were no job prospects.

The closest I came to biochemistry in those days was when I took a summer studentship in the Central Drug Research Institute in Lucknow. There I met a brilliant young scientist, Babul Dhar, a graduate of Cambridge University, who would have a lasting influence on my career. He spent hours discussing medicinal chemistry and drug design with me. Together we read critically the important papers of the time, such as Bob Woodward's cortisone synthesis involving a microbiological step and Dorothy Hodgkin's vitamin B12 structure. Babul's many interests matched mine. He was a pianist and talked to me about the Goldberg variations with the same ease as he would discuss a complex organic reaction. I had dinner at his house almost every other weekend. His wife Bertie, a delightful lady from Yorkshire, was equally nice to me. As time passed, Babul became a real role model for me. He was the one who kept encouraging me to go abroad to do my graduate studies.

I wanted to go to Cambridge University, but I did not have the money nor did I find any scholarship. (In later years I did go to Cambridge as a Nuffield Foundation Fellow to work in Hal Dixon's lab and was thrilled to use the same electrophoresis tanks that Fred Sanger had used in his pioneering work on the insulin sequence.) I started writing to universities in the United States and received financial assistance from the University of Southern California, Los Angeles in 1959 to do my graduate studies in chemistry. To minimize the costs, I travelled by an American President Lines ship across the Pacific. Although my strong points were physical chemistry and mathematics, I did not find anyone in the Chemistry Department with a biochemical interest. By Christmas of

---

1959, I met Paul Saltman, a young, charismatic and most outgoing Assistant Professor of Biochemistry, and I decided to do my PhD studies in his lab in the Biochemistry Department. Paul had received a new grant from the Atomic Energy Commission to work on iron transport and he thought that I had the perfect background. It was in Paul's lab that I started to become a biochemist - with a new twist: 'inorganic biochemist', a term which was yet to be invented. In those days, metals were left either to inorganic chemists or to nutritionists and there was not much communication between them. Many thought that metals in metalloenzymes were mere contaminants. Iron chemistry itself is complex, but my work on the interaction of iron with biological ligands turned out to be even more challenging. Paul was a great supporter, which kept my spirits up. It was during this time that I had the good fortune to meet Bo Malmstrom, a visiting professor at USC who would make a great impact on my future career as a biochemist. I took a course from him on metal-activated enzyme kinetics. Later he served on my PhD thesis supervisory committee. During those years Bo really guided me in the studies of metal-protein interactions, at that time an area hardly explored. Unfortunately, he left for Goteborg, to take up the position of a Chair of Biochemistry in the Chalmers Institute of Technology before I finished my PhD. Prior to leaving, he offered me a postdoctoral fellowship if I wanted to come to his lab in Goteborg. Bo was a musician who played the recorder, and specialized in Baroque music. I would often accompany him and his wife to Los Angeles Philharmonic for concerts. We communicated regularly even after he became so busy with his chairmanship of the Chemistry Committee for the Nobel Prize.

I graduated with a PhD in Biochemistry in 1964. Paul sent me to Chicago to present my thesis work at the FASEB meeting, just before my defence. There I met a delightful man, Andrew Sass-Kortsak, a clinician-scientist at the Hospital for Sick Children in Toronto, Canada. Andrew was at the meeting to recruit young scientists for the Hospital's Research Institute. He invited me for dinner and told me over dinner how much he liked my talk and invited me to come to Toronto

to give a seminar. I came to Toronto to give my seminar and on the same day I was offered a position of Staff Scientist to work in the Genetic Metabolic Research Programme. It was a real dilemma for me, since I had several postdoctoral fellowship offers lined up, including one from Bo in Sweden. I was also very hesitant since I was a fresh PhD and had no postdoctoral experience. But the offer from Toronto was too tempting, with start-up funds and my own lab. Despite opposition from many colleagues, I finally decided to join the Research Institute of the Hospital for Sick Children at the age of 28. Soon thereafter, I was cross-appointed to the Department of Biochemistry at the University of Toronto as Assistant Professor.

Although I never had a formal postdoctoral training, several factors made up for it. Andrew's vast experience in clinical medicine opened new horizons for me. I found a perfect niche where I could apply my basic biochemistry knowledge to solve medical problems. I started going to the Grand Rounds with Andrew and would also go to the wards to visit Wilson disease patients. During one of my discussions with Andrew, I said that copper cannot circulate in blood in ionic form, it must be bound to some ligands. He threw a challenge and asked me to find the copper-transporting ligands in human blood. This led to my discovery of copper-histidine in human blood. Little did I know at that time that this finding would lead to a treatment for a fatal genetic disease known as Menkes disease, which causes copper deficiency, resulting in neurodegeneration and death before the age of three. Also around that time, I was joined by a brilliant geneticist, Diane Cox, a recent graduate from McGill University. The strong bond formed between Andrew, Diane and myself in those early years became an asset to my future research. Later, Diane would clone the Wilson disease gene and my lab would express and characterize the copper-binding domain of the Wilson disease protein.

Andrew and Diane were not the only ones. I also had close interactions with John Edsall, Ted Peters, Jr., Frank Gurd and Esther Breslow during those years when I was working with human albumin. It was then that I developed the idea of designing a simple Gly-Gly-L-His peptide molecule

---

to mimic the native copper transport site of human albumin. I never imagined that this would form the basis for such diverse endeavours: for Linus Pauling to kill Ehrlich ascites tumour cells with it by generating free radicals in the presence of copper and ascorbic acid, Peter Dervan to cleave DNA specifically by attaching this peptide to a DNA-binding protein, and Julie Forman-Kay and Lewis Kay to use this motif for structure characterization of proteins by NMR.

When I look back, I feel satisfied that I made a good decision 40 years ago to come to Toronto's Hospital for Sick Children and the University of Toronto where I grew up as a biochemist. At the same time the whole field of inorganic biochemistry came of age. My career was enriched by so many lives — every one of them has a place in my science.

*\* This article is reprinted from IUBMB LIFE, vol.55, 287-289, 2003 with permission of the publishers Taylor & Francis Ltd.,*

---

# **The Canadian Society of Biochemistry, Molecular & Cellular Biology\***

**Eugene Reno Tustanoff**

Department of Biochemistry, University of Western Ontario

The Canadian Biochemical Society (CBS) was organized at a meeting of biochemists attending the Canadian Physiological Society Meeting at the University of Ottawa on October 9, 1957, for the purpose of fostering the science of biochemistry. The first President of the organization was Professor A.M. Wynne, Head of the Department of Biochemistry, University of Toronto. The first meeting of the Society was held at Queen's University the following summer. This meeting was organized under the auspices of the Canadian Federation of Biological Societies (CFBS), which was formed in 1958 with CBS as one of the founding member societies. Since that first meeting, the Federation, now constituted with a number of other biological oriented societies, has annually organized scientific meetings at various Canadian sites with our Society's high profile participation. In 1992 the Society changed its name to reflect the scientific interests of its membership to the Canadian Society of Biochemistry and Molecular Biology. In 1995 the Canadian Society of Cellular and Molecular Biology (CSCMB) elected to surrender its charter and merged with the Canadian Society of Biochemistry and Molecular Biology to form the Canadian Society of Biochemistry and Molecular & Cellular Biology (CSBMCB). In order to strengthen its visibility and mandate CSCMB in 2000 withdrew its membership in CFBS but continued to participate in their advocacy programme. Since then, our Society has organized a series of successful independent meetings, and more recently has become more proactive in advocacy issues relevant to our membership. Management of the CSBMCB is vested in an Executive Board which consists of a President, Vice-President, Past-President, Treasurer, Secretary and six Council members. Since its inception, 47 eminent Canadian biochemists have held the Presidency of the Society. Membership to the

Board is by an annual ballot by the Society's constituents and members serve a 3-year term; the holder of the office of Vice-President passes annually in turn to that of President and then Past-President. The Society is governed by a constitution and a set of bylaws and is bilingual by mandate.

At present there are more than 800 members, made up of Regular, Emeritus and Trainee members (graduate and postgraduate students). Trainee members have their Society membership dues waived during the duration of their training period, whilst Emeritus members are granted lifetime membership.

In 1977, the Society was incorporated to position itself to host the XIth IUB Congress. This meeting which was organized in Toronto in 1979 under the Chairmanship of Dr. George Connell, was one of the most successful congresses held to date both scientifically and socially with over 7000 participants. A sizable infusion of funds resulted from the financial success of the Congress which has been shrewdly invested over the past number of years by a succession of Society Treasurers and now affords the Society a modicum of financial stability.

In 1997 the Executive of the Society in concert with the National Research Council of Canada successfully placed a bid to host the XIXth IUBMB Congress in 2003 in Canada. A great deal of planning and effort over the past six years has been expended in organizing this meeting by Dr. Joel Weiner, President of the Congress, Dr. Michael Walsh, Chair of the Programme Committee and Dr. Peter Lewis, Chair of the Local Organizing Committee and their associates. It is hoped that the Toronto venue in 2003 will again attract the international scientific community to partake of our Canadian hospitality and the superb scientific tableau which has been laid out for this

---

meeting. Professional activities of the Society include the organization of its annual scientific meeting, sponsorship of symposia, participation in science advocacy and the administration of a number of awards. The Society at one time sponsored an annual National Lectureship which was then replaced by, annual topic-specific Winter symposia. The latter meeting, which alternated between Quebec and Alberta, has been in a hiatus for the past 10 years. Following the merger with CSCMB, our Society has taken over the responsibility of maintaining the former organization's annual Winter National Meeting. This meeting had alternated between Western and Eastern Canada and has been topic oriented in nature. Since 2001 the Society's General Meeting has been structured on the foundation of this latter meeting.

In 1966, the Society initiated the first of its distinguished award programmes, the Ayerst Award, which was presented annually to single out the accomplishments of an outstanding young Canadian biochemist. In 1991 the sponsorship of this award changed and was designated as the CBS - Pharmacia Award, and since 1993, it has been sponsored by Merck Frosst Canada and is now titled the CSBMCB's Merck Frosst Award. The second Society award, the Roche Diagnostics Prize for Biomolecular and Cellular Research (formerly known as the Boehringer-Mannheim Award), was instituted in 1981 and is awarded in alternate years in recognition of a record of outstanding achievement in research in the field of biochemistry and/or molecular biology. The third prestigious award, sponsored by the Society, which alternates annually with the Roche Diagnostics Award, is the Jeanne Manery Fisher Memorial Lectureship. This award is given to a Canadian woman scientist who has distinguished herself in the field of biochemistry, molecular biology or cellular biology in one or more of the areas of, research, teaching or community service.

In addition to these prizes, the Society has instituted a number of awards to benefit its student and post-doctoral members. To encourage attendance at Society scientific meetings and defray expenses, a number of travel stipends have been

endowed for both graduate and post-doctoral members: The Merck Frosst-Canadian Society of Biochemistry, Molecular and Cellular Biology Student Travel Award and CSBMCB's Post-doctoral Travel Award respectively. In recent years, additional travel awards have been provided on an ad hoc basis by a number of other commercial sponsors, AMGEN, Perkin Elmer, BD Biosciences, PENCE Alberta. A Graduate Student Poster Competition sponsored by Roche Diagnostics Canada also is held at the annual Society meeting and is complemented by similar awards to post-doctoral fellows which are provided by the Society. The Society also sponsors various graduate student activities held within their own institutions, such as poster days, scientific lectures and colloquia.

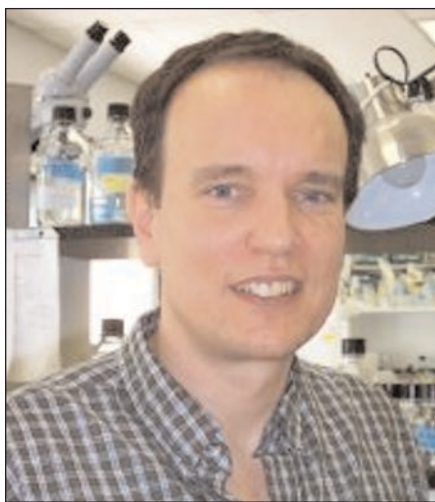
*\*This article is reprinted from IUBMB LIFE, vol.55, 181-182, 2003, with permission of the publisher, Taylor & Francis Ltd.*

---

## 2004 Society Award Designates

**Dr. Richard Wozniak** from the Department of Cell Biology, University of Alberta, has been chosen to receive this year's **Merck Frosst Prize** for meritorious research by a young Canadian scientist with ten years or less of independent research in the areas of biochemistry, molecular or cellular biology. **Dr. Morag Park**, a member of the Molecular Oncology Group at the Royal Victoria Hospital, McGill University, has been selected to receive the **Jeanne Manery Fisher Memorial** Lectureship award for outstanding contributions by a Canadian woman scientist to research, teaching or society in the fields of biochemistry, molecular or cellular biology. Both awardees will be presenting Plenary Lectures at the 47th Annual General Meeting of the Canadian Society of Biochemistry, Molecular and Cellular Biology to be held May 27-30, 2004 at the Fairmont-Chateau Mont Tremblant (Mont Tremblant, Québec).

### The 2004 CSBMCB Merck Frosst Prize Dr. Richard Wozniak



Dr. Wozniak received his Ph.D. from The Rockefeller University in the laboratory of Nobel Laureate Dr. Günter Blobel. Following postdoctoral training at The Rockefeller University, Dr. Wozniak joined the Department of Cell Biology at the University of Alberta as an Assistant Professor in 1994 and was recently promoted to the rank of Professor.

Dr. Wozniak's research is focused on understanding the structure and function of the nuclear pore complex (NPC), which is the major site for transporting macromolecules into and out of the nucleus. Using the yeast *Saccharomyces cerevisiae* as a model organism, Dr. Wozniak and his colleagues identified the first yeast NPC membrane protein called Pom152p,

which is one of the most abundant proteins of the NPC. When ectopically expressed in mammalian cells, Pom152p is similarly targeted to the NPC, which suggests that the molecular mechanisms governing protein sorting and assembly of the NPC are highly conserved. Using a lethal genetic screening procedure, Dr. Wozniak and his coworkers subsequently identified two structurally-related NPC proteins, Nup157p and Nup170p, that together with Pom152p and three other NPC proteins, Nic96p, Nup188p, Nup192p, constitute ~25% of the NPC mass and probably form the repetitive core structures of the NPC. Further analyses led to the identification of two novel Nup170p-interacting proteins, termed Nup53p and Nup59p, which form a subcomplex of the NPC, and act as a docking site for the  $\beta$ -karyopherin/importin- $\beta$  nuclear transport factor, Kap121p, which mediates translocation of macromolecules through the NPC.

More recent exciting studies have revealed a physical and functional link between the NPC and proteins of the spindle checkpoint machinery which is responsible for the faithful separation of sister chromatids during mitosis. Dr. Wozniak and graduate students Tatiana Louk and Oliver Kerscher demonstrated that Mad1p and Mad2p, two proteins required for the execution of the spindle checkpoint, are localized to a great extent at the NPC throughout the cell cycle until the checkpoint is activated. Mad2p is then released from the NPC and accumulates at kinetochores. This was the first report that Mad1p and Mad2p require specific nucleoporins as a scaffold for their action.

In a separate investigation, Dr. Taras Makhnevych, a postdoctoral fellow in Dr. Wozniak's laboratory, uncovered a novel role for nucleoporin Nup53p in inhibiting nucleocytoplasmic transport across the NPC during mitosis. This work represents the first description of a transport inhibitory function for a nucleoporin and establishes a more elaborate role for the NPC in mediating nucleocytoplasmic transport than previously appreciated. This landmark study was recently pub-

---

lished in the December 2003 issue of *Cell*. These findings, as well as other seminal research papers, have paved the way for a greater understanding of the structural organization of the NPC, and how proteins and other macromolecules are transported between the cytoplasm and nucleus of eukaryotic cells.

Dr. Wozniak has established an international reputation for original thinking and definitive experimentation to address questions of major scientific importance. His work is consistently of the highest quality and published in top-ranked journals in the field. He has received Scholarships from the Alberta Heritage Foundation for Medical Research (AHFMR) and the prestigious Investigator (formerly Scientist) award from the Canadian Institutes of Health Research (CIHR) in recognition of his research accomplishments. His scientific ability and evaluation skills have been sought after by provincial, national, and international biomedical funding agencies and prominent scientific journals. Dr. Wozniak has clearly distinguished himself as an outstanding scientist in Canada and internationally, and is a worthy recipient of the Merck Frosst Prize.

### **The 2004 Jeanne Manery Fisher Memorial Lectureship Dr. Morag Park**

Dr. Park earned her Ph.D. degree from the University of Glasgow under the supervision of Dr. Joan McNab, working on the role of herpes simplex viruses in oncogenic transformation. She then carried out postdoctoral training as a Fogarty Fellow, first with Dr. Donald Blair at the National Cancer Institute in Washington, D.C., and thereafter with Dr. George Vande Woude at the National Cancer Institute in Frederick, Maryland. During this time Dr. Park studied oncogenic signalling pathways, which led to the initial molecular cloning of the Met oncogene, a receptor tyrosine kinase that she has investigated ever since. Following completion of her postdoctoral training in 1988, Dr. Park was recruited as Director of the Molecular Oncology Laboratory of the Ludwig Institute for Cancer Research in Montreal, which at that time was affiliated with McGill University.

In 1992, she joined the Departments of Medicine, Oncology and Biochemistry at McGill as an Assistant Professor, and rapidly rose through the ranks to the level of Professor. She was recently appointed Associate Director of Fundamental Research for the McGill University Health Centre.

Since becoming an independent investigator, Dr. Park has continued to make many seminal contributions to our understanding of cell growth and motility factor signalling through receptor tyrosine kinases, such as the Met/hepatocyte growth factor(HGF)/scatter factor receptor, and has investigated the role that these proteins play in epithelial neoplasias, particularly human breast cancer.

Her research has led to a more comprehensive understanding at the molecular level of the distinct signalling proteins that are required for epithelial morphogenesis, as well as those that promote the disruption of organized epithelial structures, anchorage independent growth, tumorigenesis and invasion. Of notable significance are recent observations that continuous activation of signalling pathways through the Met/HGF receptor in transformed and tumor cells is distinct from those activated following short-term stimulation of the receptor by its ligand. The challenge now is to elucidate how these signals become distorted in tumor cells compared to normal cells, and to identify the critical molecular signals that may be suitable targets for therapeutic intervention. One of Dr. Park's current ambitions is to establish murine models of breast cancer that integrate the complexity of genetic alterations found in human breast cancer, and then rapidly transfer discoveries made at the "bench" to the "bedside". To materialize this vision, Dr. Park, in partnership with clinician scientist Dr. Meterissian, has formed the Montreal Breast Cancer Functional Genomics Group which is a multidisciplinary team of scientists, surgeons, oncologists and pathologists from basic science departments at McGill



---

University and units within the McGill University Hospital Centre. The strategy is to exploit recent advances in genomic and proteomic methodologies to identify molecular determinants of tumor prognosis, diagnosis, and response to therapeutic modalities. This translational research project will also interface more broadly with a multidisciplinary team of investigators from across Canada who are funded by the “Streams of Excellence Program” of the Canadian Breast Cancer Research Initiative, in a joint effort to apply basic cancer research findings to improved patient care.

Dr. Park has earned numerous competitive awards during her entire career. As an independent scientist, she obtained Scholarship support from the National Cancer Institute of Canada and former Medical Research Council of Canada, and most recently obtained a Senior Investigator award from the Canadian Institutes of Health Research. She has published extensively during all phases of her career in the very best scientific journals, attesting to the excellent quality of her work. Her prominence in the field is also evidenced by numerous invitations to present her work at important national and international scientific conferences, and to write reviews for high-profile journals on a regular basis. In addition, Dr. Park has participated in many other scientific activities that further attest to her scientific standing and contributions to Canadian science. These include acting as a grants panel member for several agencies in both Canada and the United States. She has chaired the Canadian Institutes of Health Research Cancer A and B panels, as well as the Idea Grants Panel of the Canadian Breast Cancer Research Initiative. Dr. Park has also taken on many leadership roles at McGill University; for example, she is currently the Associate Director of Fundamental Research in the McGill University Health Centre. As well, she has helped organize a number of scientific meetings. Dr. Park is clearly recognized as one of the very best scientists world-wide in the signalling field, and is a most deserved recipient of the Jeanne Manery Fisher Memorial Lectureship award.

---

# News From Member Departments

## Memorial University of Newfoundland

### Department of Biochemistry

*Correspondent: Phil Davis*

During 2003, we continued our faculty renewal in preparation for the retirements expected to start in just a few years. We were fortunate to attract **Dr. Ross McGowan** from the University of Manitoba who joined the department in August. Ross is interested in developmental molecular biology and uses the Zebra Fish as his favorite model. His arrival lends strength to the Molecular Biology section of the department. Ross has already established an active research program with new graduate students and staff.

We have also begun a search for a Tier II Canada Research Chair in Proteomics and have received a number of impressive applicants. Meanwhile **Dr. Bill Driedzic** has taken up his Tier I Canada Research Chair in Marine Biochemistry, held jointly with the Ocean Sciences Centre. These CRCs will be an important component of the department's future. The department is also seeking a new Chair to replace **Dr. Phil Davis** who completes his three year term in April, 2004.

This year **Dr. Sukhinder Kaur** was the recipient of the Young Investigator Award from the International Academy of Cardiovascular Sciences. **Dr. Kaushik Nag** has also received a major CFI grant to acquire an Atomic Force Microscope and a Raman Spectrometer. These will enhance our facilities for Biophysics.

We have also just learned that **Dr. Kevin Keough** will make his final break with our department, his academic home for over 30 years. Kevin will soon take up his new post as President and CEO of the Alberta Heritage Foundation for Medical Research.

## Queen's University

### Department of Biochemistry

*Correspondent: Glenville Jones*

There have been a number of changes in the Department over the past two years. **Dr. Albert Clark** completed his term as Head of the Department June 30, 2002 and was succeeded by **Dr. Glenville Jones** on July 1. Dr. Jones has been a member of the Department since 1984. He runs an active research program on vitamin D metabolism and its actions. He is a member of the Advisory Board of the Canadian Institute of Nutrition, Metabolism and Diabetes.

Several long time members of the Department retired during 2002 and 2003. **Dr. Geoffrey Flynn**, former Head of the Department, retired in June 2002. He continues to direct a venture capital supported biotechnology company, Cardiomics, which is developing new assays for the detection of heart disease. **Dr. Eileen Walters**, an Adjunct Faculty member, who directed the undergraduate student laboratories and the Co-op Program and taught the biochemistry course for nursing students also retired in June 2002. Her husband **Dr. John Elce**, a professor in the Department, retired in August 2003 and they moved to England where they had come from in the late 60's. **Dr. Albert Clark** retired in August 2003 and continues to be involved in some teaching and administrative duties with the Department and the University. Drs. Flynn, Elce and Clark are all Professors Emeriti.

**Dr. Andrew Craig** was appointed as Assistant Professor in July 2002. Dr. Craig received his PhD from McGill University in 1998 following which he was a post-doctoral fellow with Dr. Peter Greer in the Cancer Research laboratories at Queen's University. Dr. Craig's research is in the field of inflammation and signaling pathways. He is the recipient of a New Investigator Award from CIHR.

Several new adjunct appointments were made dur-

---

ing 2002 and 2003. These include **Dr. Sonoko Masuda**, who is associated with **Dr. Glenville Jones'** research program, **Dr. Michael Boffa** who is associated with **Dr. Marlys Koschinsky's** research program, **Dr. David Hyndman** who directs the Protein Function Discovery Group's laboratories, **Dr. Laurie Graham** who is associated with **Dr. Peter Davies'** research program, **Dr. John Samis** from the Department of Pathology who is associated with **Dr. Michael Nesheim's** research program and **Dr. Ali Tahayato** who is associated with **Dr. Martin Petkovich's** research program. These new Adjunct faculty members are contributing to the Department's teaching programs in various ways.

Recent major awards received by members of the Department include a Tier 1 Canada Research Chair to **Dr. Peter Davies** and an NSERC Steacie Fellowship to **Dr. Zongchao Jia**. **Dr. Davies** continues his structure-function research on antifreeze proteins and calpain. **Dr. Jia** continues to work on the structure-function relationships of several proteins including calpain and phosphatases.

The Department of Biochemistry is very involved with several of the research themes/groups whose development has been fostered and facilitated by the Faculty of Health Sciences and the University.

The Cancer Research Institute at Queen's University moved into a new building (which adjoins and is connected to Botterell Hall where the Department of Biochemistry is located) in April 2003. This multidisciplinary group of investigators, which engages in cancer research from "the bench to the bedside", includes groups investigating basic cancer biology and genetics, clinical trials and outcomes research. The new building has allowed the former Cancer Research Laboratories, the Radiation Oncology Research Unit and the National Cancer Institute of Canada Clinical Trials Group to be in contiguous space. **Dr. Roger Deeley**, a cross-appointee in the Department of Biochemistry who has directed the Cancer Research Laboratories for a number of years has recently been appointed Director of the Institute. Other Department members in the institute are **Drs. Martin Petkovich** and **Christopher Mueller** and cross-appointees **Dr. Peter Greer** and

**Scott Davey**. The Institute has been successful in obtaining a CIHR Training Grant which is directed by **Dr. Lois Mulligan** from the Department of Pathology and supported by **Dr. Peter Greer**, Coordinator of Graduate Studies in the Department of Pathology.

The Protein Function Discovery Group has developed in association with major equipment acquisitions achieved through significant awards from the Canadian Foundation of Innovation and Ontario Innovation Technology Fund to a group of investigators from several departments. Equipment attained through these awards includes an NMR spectrometer, mass spectrometers, SGI graphics supercomputer, confocal microscope and fluorescence activated cell sorter.

Much of the equipment is within Department of Biochemistry space. **Dr. Alan Mak**, a professor in the Department has been appointed Director of the Group and **Dr. David Hyndman**, Adjunct Assistant Professor is Manager of the facility. The laboratory is supported in part by a CIHR Multi-User Maintenance Award. The Group has been successful in attaining a CIHR Training Grant which is being coordinated by **Dr. Graham Coté**, a Professor in the Department of Biochemistry and **Dr. Nancy Martin** of the Department of Microbiology and Immunology and is being managed by **Chris Kazala** who came from the University of Lethbridge.

The multidisciplinary Cardiac, Circulatory, Respiratory Research Program in the Faculty is being directed by **Dr. Marlys Koschinsky**, a Professor in the Department. Other department members in the group include **Drs. Michael Nesheim**, **Alan Mak** and **Graham Coté**. Researchers from the program investigating vascular function have received a five year Program Grant from the Heart & Stroke Foundation. This grant provides funds for group infrastructure, equipment and post-doctoral fellow stipends.

---

# Université de Sherbrooke

## Département de Biologie

Correspondent: Denis LeBel

In Sherbrooke the undergraduate program of Biochemistry is a program of the Faculty of Science shared with the Faculty of Medicine, thus explaining the strong involvement in research of the Department of Biology in Biochemistry and Molecular Biology. The Department also harbours the undergraduate programs in Microbiology and in Biotechnology. Starting September 2004, the Biotechnology program will have two concentrations, Molecular Biology and Bioinformatics.

In the last 5 years, the Département de Biologie has undergone a tremendous expansion. There are now 14 researchers, covering the fields of biochemistry, molecular and cellular biology. Nine of them have been recruited since 1998. This increase in new faculty members involved in research has led to the completion of construction in spring 2004 of a new Life Science building (see sketch) dedicated to research, having 6,500 square meters of laboratories and offices. This facility will allow for the recruitment of more researchers in the fields of biochemistry, molecular and cellular biology in the coming years. Indeed, the Département de Biologie aspires to become a Canadian leader in the next few years. The research interest of all faculty members in these fields is described below.

### Nathalie Beaudoin

B.Sc. (1990) Université Laval, Ph.D. (1996) University of Guelph, PDF Institut des Sciences Végétales, CNRS, France and Centre de Foresterie des Laurentides, Québec.

Dr. Beaudoin's research in plant molecular biology involves the characterisation of the genetic program of cell death in plant cells. Programmed cell death is a phenomenon that occurs during plant development and in response to biotic and abiotic stress. Using the plant *Arabidopsis thaliana*, she studies the genes expressed when the program of cell death is activated. She is also looking for mutants where the signalling cascade leading to cell death is deficient.



### Carole Beaulieu

B.Sc. (1981) Université du Québec à Rimouski; M.Sc. (1983), Ph.D. (1987) Université Laval, PDF Université Libre de Bruxelles and University of Florida.

Dr. Carole Beaulieu is specialised in plant pathology. The research focuses on physiological and molecular aspects of plant-actinomycete interactions and on biological control of plant diseases. The group is especially interested in elucidating the pathogenicity mechanisms of *Streptomyces* scabies and other causal agents of the potato common scab. The group also tries to develop strategies to control this plant disease.



Nathalie Beaudoin



Carole Beaulieu

### Richard Blouin

B.Sc. (1985) Université du Québec à Trois-Rivières, Ph.D. (1990) Université Laval, PDF Mount Sinai Hospital, Toronto.

Dr. Blouin is investigating the role of protein kinases in the control of cell death and differentiation. It is of particular interest to study protein kinases since alterations in their functions can lead to a spectrum of defects ranging from



Richard Blouin



Kamal Bouarab

developmental abnormalities to numerous diseases, including cancer. A comprehensive knowledge of protein kinases should help finding new ways to control these disorders.

#### **Kamal Bouarab**

Maîtrise (1994), Ph.D. (2000) Université Pierre et Marie Curie (Paris VI), PDF Roscoff, CNRS, France and John Innes Centre, Sainsbury Laboratory, UK.



Ryszard Brzezinski

Plant disease resistance can be conferred by constitutive features such as structural barriers or preformed antimicrobial secondary metabolites while others defence responses are induced after perception of the elicitors produced by pathogenic microorganisms. These recognition events trigger an array of plant signals and a cascade of signalling pathways that activate a battery of metabolic alterations responsible for the observed induced resistance. The aim of the research is to characterise the molecular responses induced by the elicitor recognition by using Virus Induced Gene Silencing (VIGS) and the suppressors of plant disease resistance.

#### **Ryszard Brzezinski**

B.Sc. (1970), M.Sc. (1972), Ph.D. (1980) Université de Varsovie, Pologne, PDF Université de Sherbrooke.

Dr. Brzezinski is involved in research on enzymes produced by actinomycetes, filamentous bacteria living in soil and water and known as producers of many antibiotics. Main goals

include the study of enzymes involved in the biodegradation of biomass components such as chitinases, chitosanases, glucanases and xylanases. Suitable strains secreting such activities are selected from natural populations, the genes are cloned and the efficiency of enzyme production is improved by genetic engineering using appropriate expression vectors. Fundamental studies on sequence-structure relationships on some of these enzymes extended the knowledge about their catalytic mechanisms and enzyme-substrate interaction. Current studies on DNA-protein interactions involved in the regulation of gene expression should lead, in the near future, to a further improvement.

#### **Marco Di Fruscio**

B.Sc. (1991) Concordia University, Ph.D. (1997) University of Ottawa, PDF McGill University.

Dr. Di Fruscio's interest lies with a family of RNA binding proteins possessing a KH domain. KH domain proteins have been implicated in a number of biological processes including apoptosis, cell cycle control, alternative splicing and muscle development. He is examining the mechanism of action of these proteins in the normal development of *Drosophila melanogaster*. He is currently focusing on the process of apoptosis during both oogenesis and the formation of the nervous system.

#### **Nancy Dumais**

B.Sc. (1990), M.Sc. (1996), Ph.D. (2001) Université Laval, PDF McMaster University.

The multidrug transporter P-glycoprotein (P-gp) is functionally expressed in lymphocytes and macrophages, which are cellular reservoirs for HIV-1. HIV-1 protease inhibitors (PI) interact with P-gp; consequently the transporters could reduce the local concentration of PI and, thus potentially influence the selection of viral mutants. Dr. Dumais is interested in understanding the role played by prostaglandin E2, an immunomodulatory molecule, in the overexpression of multidrug transporters and in particular, to better defined the transcriptional regulation of MDR1.

#### **Luc Gaudreau**

Canada Research Chair in Gene Transcription Mechanisms



Marco Di Fruscio



Nancy Dumais

B.Sc. (1989) Université de Moncton, Ph.D. (1993) Université de Sherbrooke, PDF Harvard University and Sloan-Kettering Cancer Institute, NY.

Gene transcription is the cellular process that allows genetic information to be transmitted from DNA to RNA. It is a critical stage in the control of gene expression in living organisms. Any disruption of the molecules that regulate gene transcription can have an impact on the viability of an organism or lead to disease, including many types of cancer. Research in this laboratory focuses on the explanation of mechanisms of gene transcription in three different contexts: the role of a histone variant found in yeast (which is also essential for the survival of mice and fruit flies); the active mechanism of tumour suppressor genes in the mammary glands; the identification of genes that cause virulence (infectious action) in the tuberculosis bacillus. By increasing our understanding of gene transcription mechanisms, this research may lead to the development of new therapeutic targets for the treatment of many diseases.

#### **Daniel Lafontaine**

B.Sc. (1994), Ph.D. (1990) Université de Sherbrooke, PDF University of Dundee, UK.

The research of Dr. Lafontaine has a general interest in the structure of helical branchpoints in nucleic acids, and their roles in their cellular environment. A major part of his work is being directed towards RNA, especially ribozymes and riboswitches. In most RNA species their functional structure is determined by their folding, and branchpoints act as scaffold elements in the assembly of these structures. He employs the FRET technique in order to derive models of studied RNA molecules.

#### **Denis LeBel**

B.Sc. (1972) Université de Sherbrooke, M.Sc. (1976) Université de Montréal, Ph.D. (1979) Université de Sherbrooke, PDF BBDMR, University of Toronto.

Dr. LeBel has been studying the mechanisms of cellular secretion for more than 20 years. His work is involved in defining the secretory pathways of the cell, the manner in which secretory granules

are synthesised, and which structural component(s) of accumulated proteins targets them to the secretory granules and allows them to be retained in the cell. In order to elucidate the underlying mechanisms, pancreatic and barley  $\alpha$ -amylases, an exocrine and a plant protein, respectively, are heterologously expressed in an endocrine cell and their accumulation in the secretory granules is examined. In addition to examining their secretion from cells, the structure of these amylases is being studied, particularly with regard to the role of the C-domain. This domain is one of the three that comprise all  $\alpha$ -amylases and to which no function has yet been assigned, other than that its presence is obligatory for the correct folding and enzymatic activity of the protein.

#### **Benoit Leblanc**

B.Sc. (1986) Université du Québec à Rimouski, Ph.D. (1993) Université Laval, PDF, EMBL Heidelberg, Université Laval and NIDDK, NIH, Bethesda. Dr. Leblanc is interested in the regulation of genes that lead to cellular development and to the adoption of specific phenotypes. More specifically, he wants to describe the molecular mechanisms that will cause a relatively undifferentiated cell to engage in a neuronal developmental pathway. This will be done by performing and competing gene expression profiles during retinoic acid-induced or DMSO-induced differentiation



Luc Gaudreau



Daniel Lafontaine



Denis LeBel



Benoit Leblanc



François Malouin

of embryonal carcinoma cells (leading to neuronal or muscular identities, respectively).

#### **François Malouin**

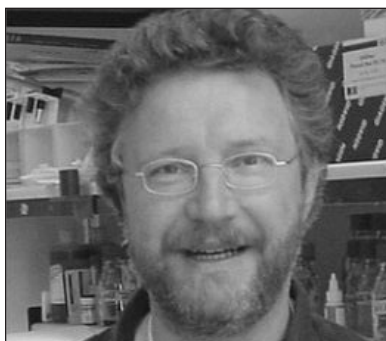
B.Sc. (1982) Université de Sherbrooke, M.Sc. (1985) Université de Montréal, Ph.D. (1988) University of Calgary, PDF Lilly Research Laboratories, Eli Lilly and Co.

The objectives of the research performed by Dr. Malouin are to understand the molecular mechanisms of bacterial resistance to drugs, to define the bacterial processes leading to infections, to identify new therapeutic targets for drug development, and to perform pre-clinical studies on experimental drugs. More specifically, several projects use a DNA chip approach for studying the transcriptome of *Staphylococcus aureus* and the identification of virulence factors or accessory genes involved in antibiotic resistance.

#### **Viktor Steimle**

Staatsexamen" (1986), Ph.D. (1990) Universität Freiburg, Germany, PDF Université de Genève, Switzerland.

Dr. Steimle studies the genomic regulation and differentiation of the immune system in mammals. The two main research projects involve the regulation of gene expression of Class II Major Histocompatibility Complex, and particularly the role of factor CIITA, a class II transactivator which is a major regulator of CMHII genes. Also under study are the molecular mechanisms involved in the generation and differentiation of auxiliary and cytotoxic T lymphocytes from their common precursors.



Viktor Steimle



Brian Talbot

#### **Brian Talbot**

B.Sc. (1969) Bath University of Technology, UK (1969), Ph.D. (1974) University of Calgary, PDF University of Guelph and Université de Sherbrooke.

The group of Dr. Talbot is studying the development of genetic vaccines, molecular adjuvants and immunodiagnostic tools. They have succeeded in developing a prototype vaccine for bovine viral diarrhoea virus, and are in the process of developing a combined vaccine strategy for the *Staphylococcus aureus*. This is being carried out in the context of the Canadian Network for Mastitis Research.

## **L'Université Laval**

*Correspondent : Guy Poirier*

A l'Université Laval, il y a beaucoup de développements en biologie cellulaire et moléculaire ainsi qu'en biochimie. Sur le campus, l'agrandissement prévu de la Faculté de Médecine permettra d'augmenter les espaces d'enseignement en sciences de la santé. De plus, Héma-Québec construit son pavillon de recherche et développement près du campus. Grâce à des investissements FCI, le Centre de recherche de l'Hôtel-Dieu (CHUQ) s'agrandit afin de développer la recherche clinique en oncologie. Enfin le Centre de recherche du CHUL (CHUQ) ajoute de nouveaux espaces afin de satisfaire l'expansion du Centre génomique de Québec, du Centre Protéomique de l'Est du Québec et du Centre de recherche en Infectiologie. Le département de biochimie et le CREFSIP ont ouvert un nouveau Centre de protéomique structurale dirigé par Stéphane Gagné où on étudiera la structure des protéines par RMN à haute résolution.

At Laval University, there have been a lot of developments in cell biology and molecular biology, and also in biochemistry, in the last year. On campus, there is a construction project to increase the teaching space in health sciences. Moreover, Héma-Québec, the blood agency of Quebec, is constructing a building where all aspects of blood

---

immunology, biology and biochemistry will be studied, along with service capacity.

At Hôtel-Dieu de Québec (CHUQ), which is one of the two oldest hospitals in North America, a new research center in oncology will be built. The CHUL Research Center (CHUQ) will expand to house major platforms in genomics and proteomics and for the Research Center in infectiology. Finally, the Department of Biochimie in the Faculty of Science and the CREFSIP have opened a new structural Proteomics Center directed by Dr. Stephane Gagné, where the structure of proteins will be studied by high resolution NMR.

## University of British Columbia

### Department of Biochemistry and Molecular Biology

*Correspondents: Vince Duronio and Roger Brownsey*

The past year or so has brought a number of significant changes to the Department of Biochemistry and Molecular Biology at UBC. Two long-serving and valued colleagues, Caroline Astell and Peter Candido, have chosen to take early retirement. Caroline has taken up a position as a project leader at the Genome Sciences Centre of B.C. and has had considerable excitement in her first year there, with the flurry of work leading to the sequencing of the SARS genome, among other things. Peter also continues in science, although after a lifetime of studies at the molecular level and with *C. elegans*, Peter has now become a "Systems Biologist", with a strong emphasis on feathered systems. Peter's love of ornithology will now take precedence over his love of biochemistry and molecular biology.

Another significant change in prospect will occur "at the top". After two outstanding terms as the head of Biochemistry and Molecular Biology at UBC, George Mackie will be stepping down in 2004. George will be taking a much-deserved, and

probably much-needed, administrative leave and the search is now on for a new leader in the department. George has steered the department through some turbulent waters over the past ten years and through his remarkably hard work has achieved many successes on behalf of the department. High on the list of successes is the foundation laid for the future, with the recruitment of a number of outstanding new young faculty members, the most recent recruits being Masayuki Numata and LeAnn Howe. "Masa" obtained his MD and PhD degrees in Japan (Nigata and Tohoku, respectively) and subsequently trained in Kanazawa, the Fred Hutchinson Cancer Research Centre in Seattle and at McGill University. Masa brings an interest in the structure, function and regulation of ion transporters, notably that of the sodium-proton family of transporters, and is off to an excellent start with the award of a Michael Smith Scholarship and significant initial grant funding. LeAnne obtained her bachelor and doctoral degrees at the University of Victoria and then trained as a post-doctoral fellow at Penn State. LeAnne is primarily interested in the structure and function of chromatin and has also been successful already in generating grant support.

The department was also saddened by the loss of Ian Clark-Lewis, one of the founding members of the Biomedical Research Centre and an active member of our department. Ian's sudden death in December 2002, at the young age of 47, was a great shock. Canada has surely lost one of its best protein chemists. Ian had received his Ph.D. in Australia, and trained with Lee Hood and Steve Kent, doing pioneering work in the field of automated peptide synthesis. Ian's work on peptides was multi-faceted. Among other things, Ian's efforts led to the generation of some of the largest functionally active protein molecules ever made completely by chemical synthesis. Ian was also at the forefront of a number of practical applications of synthetic peptides and was a valued collaborator of many groups around the world. Ian will be remembered as a unique individual who had dedicated his life to the pursuit of scientific excellence, both in his own work, and in his critical assess-

---

ments of many different areas.

A particularly exciting development on the UBC campus, affecting many departments, is the new Life Sciences Centre. This new building, over 450,000 square feet in all, has risen impressively during the past several months. Outwardly, the building structure is now close to completion, although much remains to be done prior to the opening of the teaching facilities in August 2004. The five floors of research space will come "on stream" in a number of phases thereafter. The "LSC" will become home to more than 90 principal investigators, drawn from a number of academic departments across the Faculties of Medicine and of Science. The researchers will become members of the "Life Sciences Institute", the governance of which is evolving rapidly at the time of writing. The main aim is to allow researchers to establish their laboratories in closest proximity to those with whom they intend to collaborate. The new physical organization will lead to a number of new research themes, also still emerging, that will cross the more conventional boundaries of departments and disciplines. One pioneering new group, headed by Ross MacGillivray, will focus on blood research and has already generated major support from CFI and other sources. It is hoped that this venture will provide a model for successes in other strategic areas that may be promoted by collaborative research within the LSC/LSI. The next several years promises to be challenging and exciting in the Life Sciences, with the members of the department of Biochemistry and Molecular Biology likely to play a major role.

On a more individual level, members of the department have won a number of prestigious awards during the past year. For example, Natalie Strynadka has continued her stellar progress, becoming a CIHR Scholar, while Brett Finlay and Lawrence MacIntosh are now both CIHR Scientists. Brett has also been awarded the top UBC academic honour, that of the Peter Wall Professor. In addition, Shoukat Dedhar has been awarded a Michael Smith Foundation for Health Research Distinguished Scholarship, while Grant Mauk and Bob Molday have been awarded Canada

Research Chairs.

One of your correspondents is a biochemist outside of the department – Vincent Duronio is the new treasurer of the CSBMCB and he is located at the newly named Vancouver Coastal Health Research Institute (most people still know it as VGH). Vince's primary appointment is in the department of Medicine. He recently held a BCLA/CIHR Scientist award and is also the recipient of a Michael Smith Foundation Senior Scholar award. Vince hopes to increase the profile of the CSBMCB at UBC. One area of expansion should be into the cell biologists' domain. The department of Anatomy and Cell Biology recently recruited Christian Naus from UWO as its new chair, and he holds a Canada Research Chair in Gap Junctions and Disease. One new initiative taken on by Christian, together with the Cell Biologists in the Zoology Dept., led by Linda Matsuuchi, is a high profile Cell Biology Lecture series. In this series, a number of outstanding speakers have been invited to give a talk of general interest, at Green College, as well as a traditional research seminar. We are all looking forward to the opportunities that will be provided in the LSC/LSI for interactions between the growing group of cell biologists and researchers in the established basic health sciences.

## **University of Calgary**

### **Biochemistry, Department of Biological Sciences**

### **Faculty of Science**

*Correspondent: Raymond J. Turner*

The last year has been a year of stabilization for our group with several new faculty members now establishing their labs. The biochemists at our university are split into two groups, one within the faculty of medicine and our group in the faculty of science. Although we all have productive research programs what separates us from the other group is that we are responsible for teaching the undergraduate program in Biochemistry. Over the past year

---

our group has dedicated a significant amount of effort rethinking our program. Our biochemistry program is considered one of the tougher programs on campus and our graduates are very successful in the next stage of their careers. However, we have recognized that our program is somewhat rigid in its structure, limiting our students to acquire unique minors or double majors. Therefore, efforts led by Rob Edwards, Elke Lohmeier-Vogel and Hans Vogel (as the division chair) have generated a restructuring of our undergraduate program that is being implemented over the next few years. The new program should also more easily facilitate student transfers from other Canadian universities.

The challenge facing our group is to provide an excellent undergraduate experience with the limited resources available. As our group has a number of AHFMR scholars, which have their time protected for research, we have to be creative to provide enough faculty members to run our program. However, we have been quite successful in obtaining contributions by individuals from the faculty of medicine.

Below follows a brief description of our present faculties research and teaching activities. For more information about our biochemistry group visit [www.bio.ucalgary.ca/divisions/biochem/index.html](http://www.bio.ucalgary.ca/divisions/biochem/index.html).

**Robert A. Edwards, Senior Instructor.**

Rob's contributions to undergraduate teaching are significant with recent efforts put forward toward blended learning initiatives with computer based teaching drills, labs and assignments. Additionally, he participates in active research. Research in the area of integral membrane proteins focuses on the development and testing of computer algorithms that use a bioinformatics approach to get 3-dimensional structural information about integral membrane proteins from homologous sequences. Additionally, research is carried out in collaboration with Dr. Turner on chemical modification of the indole ring in the side chain of tryptophan. Indole undergoes a light driven reaction with various halocompounds to yield products that emit visible light. This reaction has recently been used to make proteins glow on gels and hence detect the protein bands that result from electrophoresis.

Research in this area focuses on: What are the products of this reaction? In what ways can the derivatization of tryptophan with halocompounds be used to study the structure and organization of integral membrane proteins?

Rob's contributes his teaching time to the introductory biochemistry courses as well as the biophysical chemistry course.

**Marie Frasier, Associate Professor, AHFMR scholar.**

Marie has been at the University of Calgary for a year now and has her lab up and running. This group uses the tools of X-ray crystallography and molecular biology to investigate the catalytic mechanisms of enzymes, in particular succinyl-CoA synthetase and CoA transferase. Marie's work is funded by AHFMR, CIHR and NSERC. Marie contributes lectures to the proteins course.

**R. E. (Gene) Huber, Professor.**

The main focus of Gene's work is the study of enzymes that hydrolyze disaccharides. Most of the studies carried out concern the action of b-galactosidase from *E. coli*. b-Galactosidase hydrolyzes disaccharides having linkages to D-galactose. The enzyme is being studied as a model of enzymes that hydrolyze disaccharides in general. The main approach taken is an analysis of the residues of the enzyme that are important for substrate binding and catalysis by site-specific mutagenesis. Residues on the enzyme of potential significance are being systematically substituted by other residues and the effect is being studied kinetically and physically. Gene's work is funded by NSERC.

Gene gives an enzymology course as well as contributes lectures to the introductory biochemistry courses.

**Elke M. Lohmeier-Vogel, Senior Instructor**

Although her major contribution is to our undergraduate program, Elke has active research focused on two topics: 1) yeast strains involved in producing renewable energy sources and 2) bacteria used in soil bioremediation. In both cases the metabolic pathways that lead to the desired outcome are studied. With yeast she studies the fermentation of pentose sugars to the biofuel ethanol, while bacter-

---

ial degradation of the toxic pollutant pentachlorophenol (PCP) and toxic metal oxyanions is also studied. Methods such as fluorescence spectroscopy, HPLC, as well as phosphorus-31 NMR spectroscopy are used to investigate these problems. Elke also contributes significantly to the development of new undergraduate teaching laboratory exercises. She participates in introductory biochemistry courses including a course for non-majors as well as lectures in our techniques and applied biochemistry courses.

**Greg B. G. Moorhead**, Associate Professor

Greg's research focuses around the role of protein phosphorylation in both animal and plant systems. The major research interests in his laboratory are understanding the role of protein phosphorylation in the regulation of carbon-nitrogen interactions in the model higher plant, *Arabidopsis thaliana* and the dephosphorylation of hormone sensitive lipase in mammalian adipocytes in response to insulin. The rate-limiting step in the mobilization of fats to free fatty acids and glycerol is catalyzed by the regulatory enzyme hormone sensitive lipase (HSL). HSL is activated to breakdown triacylglycerols in response to lipolytic hormones, such as adrenaline. Fundamental to the activation of HSL is phosphorylation of the enzyme by protein kinase A (PKA). The dephosphorylation and therefore inhibition of HSL activity by an endogenous protein phosphatase is a poorly understood event. Data suggest that this protein phosphatase is regulated in response to the major anti-lipolytic hormone, insulin. The key regulator of nitrogen metabolism in bacteria is a protein known as PII. Recently a homologue has been identified in *Arabidopsis thaliana*. Greg's group is currently cloning this protein for over-expression and biochemical analysis with future goals of understanding what other molecules interact with PII and how this regulates nitrogen metabolism in higher plants. Greg's research is funded by NSERC.

Greg provides lectures in our introductory courses as well as running a signal transduction course and applied biochemistry course

**Kenneth K.-S. Ng**, Assistant Professor,  
AHFMR Scholar

Ken has now been with us for a year and has his lab up and running well. Ken's research investigates the structure and function of RNA-dependent RNA polymerases from positive-stranded RNA viruses. X-ray crystallographic, enzymological and drug design studies aimed at understanding the structural basis for the function of the key enzyme responsible for replication in a wide range of medically and economically important viruses. Additionally, carbohydrate-binding proteins and carbohydrate-processing enzymes are investigated in order to understand the structural basis of carbohydrate recognition in toxins. Ken's work is funded by CIHR and through collaboration with other members of the Alberta Ingenuity Centre for Glycosciences. Visit Ken's personal web page [www.ucalgary.ca/~ngk](http://www.ucalgary.ca/~ngk) for more information.

Ken provides lectures in the proteins course and enzymology courses.

**Elmar Prenner**, Assistant Professor,  
AHFMR scholar

Elmar has just recently got his lab set up and is presently recruiting people to join him. Elmar studies lipid rafts and in particular the investigation of the role of various lipid components and their interactions with proteins. Which lipids will form domains at what ratios? Which proteins will induce or dissolve such structures? Which proteins do or do not interact preferentially with such lipid domains? Additionally, Elmar is interested in the establishment of fluorescent-based bioassays using novel LED based handheld devices. In particular, development of assays for DNA detection in bodily fluids, mutant detection by DNA melting and the use of labeled antibodies for protein detection in complex mixtures. Elmar gives his lecturing time in the Biomembranes course and Biophysical course.

**D. Peter Tieleman**, Associate Professor,  
AHFMR Scholar

Peter's group uses computational methods to investigate the atomic detail of essential biological processes such as enzyme function, protein folding, ion transport, and the interactions between mem-

---

branes and drugs. Computer simulations are used to provide a link between structure and function of peptides and proteins and the interactions between small molecules (such as drugs or peptides) and membranes, as well as to calculate thermodynamic properties. Ultimately, his research goals are to i) understand how membrane proteins work ii) be able to model membrane proteins for which there are no high resolution structures, and iii) design new membrane proteins. Visit Peter's biocomputing web page <http://moose.bio.ucalgary.ca>. Peter's research is funded by NSERC, CIHR and PENCE. Peter provides lectures to the biomembranes course as well as new lectures in biocomputing that will be a new course in our program.

**Raymond J. Turner**, Associate Professor

The overall focus of Ray's laboratory is the study of the targeting, folding, structure, and assembly of membrane proteins. Ray has a wide range of research topics under investigation. i) The investigating the phenotypes, folding and structure of members of the Small Multidrug Resistance (SMR) protein family. Recombinant DNA methods in combination with biophysical techniques of fluorescence, calorimetry, and size-exclusion HPLC are used to examine the SMR proteins structure and ligand binding properties in various biomembrane mimetic environments. ii) Sec-Independent translocation by the twin-arginine leader dependent translocase (Tat) is under investigation. Biochemical and proteomic approaches are being used to characterization of specific Redox enzyme Maturation Proteins involved in this translocation pathway. iii) Research into the photochemistry of the amino acid tryptophan in collaboration with Rob Edwards in order to develop unique spectroscopic probes useful to the study of protein structure and function. iv) Research is also ongoing towards understanding the mechanisms of bacterial resistance towards the metalloid oxyanion tellurite and other metals. Visit Ray's personal web page for more information ([www.ucalgary.ca/~turnerr](http://www.ucalgary.ca/~turnerr)). Ray's research is funded by NSERC and CIHR.

Ray looks after the senior independent projects as well as Biomembranes and biochemical techniques courses and some undergraduate lab development. Ray also contributes lectures to microbiology courses.

**Hans J. Vogel**, Professor, AHFMR Scientist

Han's research areas are diverse but for the most part rely to a large extent on the use of protein chemistry and molecular biology methods, in combination with multi-nuclear NMR spectroscopy. This experimental approach provides unique capabilities to study protein and peptide structures and their functional properties (metal ion and ligand binding properties, flexibility, membrane binding, etc.). In addition we make use of molecular dynamics calculations and other biophysical approaches in our research (fluorescence and circular dichroism spectroscopy, microcalorimetry and mass spectrometry). Our attention is presently focused on a number of projects: i) The regulatory calcium binding protein calmodulin and related calcium-binding proteins, such as calcium dependent protein kinases and calcium integrin binding protein.

ii) Proteins involved in Fe (III) uptake and transport. In the early 90s we developed novel NMR techniques to directly study the binding of metal ions to mammalian Fe (III) transport proteins, the transferrins. Currently our interest is primarily focused on bacterial periplasmic proteins that mediate bacterial iron uptake. For example, ferric siderophore binding proteins are characterized by structural methods. Furthermore we study proteins, such as TonB, that are involved in energy transduction involved in the uptake of iron in bacteria. iii) Antimicrobial peptides particularly several tryptophan-rich peptides found in digests of food proteins, or in neutrophils. Our work is aimed at elucidating their mechanism of action, and relies on NMR structure determination of membrane-bound peptides, in combination with calorimetry and membrane leakage studies. Recently we have also become involved in studies of human peptides, such as beta-defensins and hepcidin, which have additional activities as chemokines or peptide hormones. Visit Han's web sites <http://groningen.bio.ucalgary.ca/> and <http://groningen.bio.ucalgary.ca/user/?Hans>. Han's research is funded by NSERC and CIHR. Hans contributes lectures to the structural biology course and proteins course.

---

## University of Calgary

### Department of Biochemistry

### Faculty of Medicine

*Correspondent: Leon Browder*

The Department of Biochemistry in the Faculty of Medicine at the University of Calgary, is a diverse department with a highly productive research program. We also administer the genomics, proteomics and bioinformatics infrastructure that facilitates the research activities of biochemists and molecular biologists in Calgary and beyond. The department consists of 49 faculty members plus 16 adjunct appointees. Members of the department supervise 170 graduate students.



Dr. Mike Walsh

Currently, members of the department receive approximately \$19,370,423 in competitive research support with additional support for core facilities totaling \$22,448,633. We encourage you to visit our Web site at [www.ucalgary.ca/bmb](http://www.ucalgary.ca/bmb) for additional information about the department.



Dr. Susan Lees-Miller

We are pleased to acknowledge these recent accomplishments of members of our department.

**Dr. Mike Walsh** served as Chair of the Scientific Program

Committee for the International Congress of the International Union of Biochemistry & Molecular Biology (IUBMB). This was an onerous task that spanned several years of planning, soliciting, cajoling, etc. Mike put together a remarkable slate of speakers for the meeting that was scheduled to be held in Toronto in July 2003. However, as we all know, Murphy's Law kicked in and the SARS outbreak hit Toronto. This caused some of the speakers to withdraw. This required Mike to find substitutes. SARS appeared to subside, so the Congress was a "go". Then, SARS resurfaced and it became apparent that the meeting had to be cancelled. Fortunately, the second World Congress of the International Proteome Organization had been scheduled for October in Montreal. Hence, negotiations were undertaken to merge the two meetings. This was a heroic effort, but Mike and his committee put together an outstanding meeting that was well attended, scientifically superb and very topical. We all owe Mike a debt of gratitude for his service to the community; we are proud to claim him as a member of our department.

**Dr. Susan Lees-Miller** was appointed the Engineered Air Chair in Cancer Research on April 7, 2003. Susan, who is also a CIHR Investigator and AHFMR Medical Scientist, has a highly productive research program on DNA repair that has been highlighted in editorials in both *Science* and *Nature*. She has presented a large number of invited lectures in recent years, including frequent presentations at the prestigious Gordon Conferences and at a variety of international venues. In addition to her strong research program, Susan gives generously of her time to her colleagues and stu-



Dr. Shirin Bonni



Dr. Justin MacDonald



Dr. Jeb Gaudet

---

dents. The Chair in Cancer Research is a well-deserved honor for a valuable colleague.

We are pleased to welcome the following new members of our department.

### **Assistant Professors:**

**Dr. Shirin Bonni** joined the department in January 2003. She is an AHFMR Scholar and has received research support from CIHR, CFI and the Alberta Cancer Board. Shirin received her Ph.D. in the Department of Pharmacology and Toxicology at Queen's University in 1995. She then pursued postdoctoral training with Dr. Jeff Wrana at Sick Kids Hospital and the Samuel Lunenfeld Research Institute of Mount Sinai Hospital in Toronto before coming to Calgary. Shirin, who is an expert in regulatory mechanisms downstream of the TGF $\beta$  receptor, had a very productive postdoc in the Wrana laboratory. She has a promising future as an independent investigator.

**Dr. Justin MacDonald** joined the department in January 2003. Justin obtained his Ph.D. at Carlton University and pursued postdoctoral training in proteomics in the Haystead laboratory at Duke University. Justin has received support from the Alberta Heritage Foundation for Medical Research, CIHR, CFI and the Crohn's and Colitis Foundation of Canada. Notably, he is the recipient of the first Chair in Protein Sciences Research awarded by the Protein Engineering Network of Centres of Excellence (PENCE). The PENCE Chair program was established to attract promising proteomics investigators to Canada and to provide them with sufficient funds to enable them to initiate internationally competitive research in proteomics. Justin's research program fills a unique, but complementary, niche in our smooth muscle research community. In particular, he is using a proteomics approach to study the molecular mechanisms underlying calcium sensitivity in smooth muscle.

**Dr. Jeb Gaudet** joined the department in January 2004. Jeb has an impressive scientific pedigree, having received his Ph.D. under the tutelage of Andrew Spence at the University of Toronto and serving as a Postdoctoral Fellow in the laboratory

of Susan Mango at the University of Utah. Jeb's research focuses on the molecular mechanisms that control formation of the *C. elegans* pharynx. His continuing research aims at unraveling the complete regulatory circuit that underlies pharyngeal development.

### **New Adjunct members:**

Mayi Arcellana-Panlilio (Adjunct Assistant Professor) Alexandre Bureau (Adjunct Assistant Professor) Henrik Hansen (Adjunct Assistant Professor) Andreas Wissman (Adjunct Assistant Professor) Michael Brain (Research Professor)

## **University of Guelph Department of Chemistry and Biochemistry**

*Correspondent: Frances Sharom*

The past year has been a busy one for the Biochemistry Group, as we prepare to leave the chemists and join a large new department of Molecular and Cellular Biology which will come into being in the next year, in the College of Biological Science. On May 1 2004, we will join the Microbiology department for a one-year interim period before the new department is formed in 2005.

We are also in the throes of moving to Phase 1B of the new Life Sciences Complex at the University of Guelph. This new building is scheduled to open July 1 2004, and the biochemists will be the first group to move, followed a few weeks later by the microbiologists. Phase 1A of the complex will house brand-new teaching labs for chemistry, biochemistry, microbiology, and molecular biology, and is also slated to open in the summer of 2004. After demolition in Fall 2004 of the old Chemistry and Microbiology building, which dates back to just after WWII, construction will start on Phase II of the complex, which will eventually house the molecular biologists, plant and animal biologists. It is slated for completion in 2006. Right now we are

---

all mired in moving plans, and are having large “fire-sales” of lab equipment, on the premise that “we’d rather chuck it than move it”!

**Marc Coppolino’s** new Leica spectral confocal microscope (TCS SP2) is up and running, facilitating detailed imaging of intracellular compartments/structures involved in cell motility. Marc’s M.Sc. student Michael Tayeb presented his work at the annual meeting of the American Society for Cell Biology in San Francisco in December 2003. His poster was titled “Cell Migration is Dependent upon SNARE-mediated Membrane Traffic”, and he reported that the weather and the wine were both excellent.

**John Dawson** has been busy ordering and setting up equipment in his new laboratory, where he focuses on actin biochemistry and cell biology. An NSERC-funded spectrophotometer equipped with a Peltier temperature control unit and a sipper is used for protein folding studies. CFI New Opportunities funded the acquisition of a FPLC system complete with cold cabinet and columns (this brings the group’s complement to three FPLCs), as well as an environmental shaker used for the growth of yeast cultures, and a micro-ultra-centrifuge that will see heavy use for actin characterization studies. At the beginning of 2003, John hired two research assistants to begin research work in the lab. One of these, Joanna Summerscales, left the group in August to pursue her law degree at Cornell University after completing her M.Sc. in Biochemistry with David Josephy. The lab now has three graduate students. Braden Sweeting, a M.Sc. student, attended the HUPO/IUBMB meeting in Montreal in October and presented his most recent work on the study of actin folding using an absorbance-based assay. John attended the second CIHR New Investigator’s Conference in November and then travelled to San Francisco for the ACSB Meeting, where his work on the actin thermal denaturation assay was presented. He also had a chance to meet with collaborators at UCSF and Stanford and visit old friends in the Bay area. John successfully negotiated a subcontract on an NIH grant with Dr. Robert Fletterick at UCSF to collaborate on

research into conformational changes in actin, and was recently awarded a CIHR grant on his first attempt.

**Frances Sharom** was appointed to a Canada Research Chair in Membrane Protein Biology on October 1st 2003, and has been busy ordering new CFI equipment to rejuvenate the lab. Two long-term international visitors have added spice and linguistic challenges to the lab. Olivier Dalmas, a Ph.D. exchange student from the University of Lyon, France, visited for two periods in 2002-2003 on a Eurodoc fellowship, and learned how to do all kinds of fluorescence experiments on his bacterial ABC transporter. Miguel Lugo, a visiting scientist from the Universidad Central de Venezuela in Caracas, arrived in the lab in early February 2002, and plans to stay until the end of 2004. Miguel has been very busy developing new fluorescence approaches to study the P-glycoprotein multidrug transporter.

**Dev Mangroo** had a sabbatical leave during 2003. He established an initiative with Dr. Manal Swairjo at the Scripps Institute to determine the crystal structure of a collection of novel proteins involved in nuclear tRNA export in *Saccharomyces cerevisiae*. His group is now in the process of crystallizing Utp8p, a nucleolar protein that his laboratory identified and showed to be a key component of the nuclear tRNA export machinery. These studies should allow increased understanding of the molecular mechanism of these proteins in facilitating nuclear tRNA export. Dev and wife Carol Creuzenet (who is a faculty member in Microbiology and Immunology at the University of Western Ontario) also welcomed their first child into the world; Sebastien Jean-Luc Creuzenet-Mangroo was born in July 2003, and is keeping both his parents very busy.

**Rod Merrill** received a CIHR equipment grant for an AKTA FPLC system, as well as an NSERC equipment grant for an upgrade to the stopped-flow spectrometer. Rod also had a sabbatical leave during 2003, which he spent learning protein crystallography. During the period from September 1st to December 15th 2003, Rod worked in the Department of Macromolecular Crystallography at

Aarhus University in Aarhus, Denmark. The sabbatical was part of a collaboration between Rod and Professor Gregers Rom Andersen. Professor Andersen's group recently solved the first structure of the eukaryotic elongation factor 2, known as the ribosome translocase, (from yeast at 2.9 ( resolution) and the collaboration was to determine the structure of elongation factor 2 in complex with *P. aeruginosa* exotoxin A, a virulence factor produced by the bacterium that blocks eukaryotic protein synthesis by ribosylating domain IV of elongation factor 2. In addition, Rod is working on various structures of the *Pseudomonas* toxin in complex with water-soluble inhibitors of its ADP-ribosylation enzyme activity. His research sabbatical was funded by a Danish Research Council Visiting Scientist Fellowship.

## University of Lethbridge

### Departments of Biological Sciences and of Chemistry and Biochemistry

*Correspondent: Marc R. Roussel*

Not surprisingly given our location, there is a great deal of agricultural research at the University of Lethbridge, some of which attracts substantial funding. **Olga Kovalchuk** of the Department of Biological Sciences has recently received a grant of \$80 000 per year for four years from the Alberta Agricultural Research Institute (AARI) and the Alberta Value Added Corporation (AVAC), a nonprofit company which invests in agricultural research. This is joint work with **Kevin Smith**, on whom more below. Olga and Kevin are on the hunt for novel anti-cancer and anti-inflammatory compounds of plant origin.

**Igor Kovalchuk**, also from the Department of Biological Sciences, has recently received an AARI grant of \$88 000 per year for four years. This grant will fund work on pollen transgenesis in monocots. The project involves the development of a new microinjection-based technique first used for animal transgenesis. This new technique will

substantially accelerate the implantation of transgenes in monocots.

Igor's work has attracted **Professor Alicja Ziemienowicz** from the Jagiellonian University in Krakow, Poland, who will be visiting Igor's lab from October 2003 to March 2004. Igor and Alicja will be collaborating on the preparation of a special T DNA-protein complex which mimics the natural *Agrobacterium*-based DNA delivery system.

Igor's lab also has a new postdoctoral researcher, **Dr. Youli Yao**. Youli studied in Japan and was recently a postdoc in Israel. He will be here for a few years working on various projects whose goal is to understand how the plant pathogen resistance machinery works.

The University is a participant in the Canadian Water Network (CWN) and the home of WISE, the Water Institute for Semi-arid Ecosystems. Among other things, our water research group has an interest in water-borne pathogens, and so is involved in a certain number of applied molecular biology projects. For instance, **Dr. Yong Xiang Zhang**, a Research Associate affiliated with CWN and WISE, has recently received funding from Health Canada to develop microarrays for the identification and characterization of variant environmental and human isolates of enterohemorrhagic *E. coli* O157:H7. Yong first came to the University as a postdoctoral researcher in the laboratory of Randall Weselake in the Department of Chemistry and Biochemistry. He has been involved in water research for about one year now.

In addition to the applied work,



Olga Kovalchuk



Andrew Hakin

---

there is quite a bit of fundamental biochemical research going on in the two departments. Last summer, **Andrew Hakin** of the Department of Chemistry and Biochemistry was awarded the Stig Sunner prize, which is given annually for outstanding contributions to the field of thermochemistry by a scientist under the age of 40. The main focus of Andrew's work is the measurement of thermodynamic properties at high temperatures and pressures. He has for some years been interested in the properties of amino acids and peptides under extreme conditions. The readers of this Bulletin will of course be aware of the interest in extremophiles and in their unusually stable proteins. Andrew's research is providing us with the building blocks for an understanding of biological function in hostile environments.

**Dr. Rui Zhu** has recently joined my laboratory in the Department of Chemistry and Biochemistry to work on reduction methods for large mathematical models of cell metabolism and genetic control. Rui is a recipient of a prestigious Alberta Ingenuity Fellowship, and I feel very fortunate that he has chosen to pursue his training here. Rui has a Ph.D. from the Beijing Institute of Technology where he worked mainly on the effects of noise in chemical systems.

**Kevin Smith** has left the Department of Chemistry and Biochemistry to accept a position in the Weill Cornell Medical College in Qatar. Kevin is a bio-organic chemist whose work focuses on extracting biologically active compounds from plants. While we will miss Kevin, he assures us that his AARI/AVAC-funded research with Olga Kovalchuk will bring him back to our campus often.

## University of Toronto

### Department of Biochemistry

*Correspondent: David Williams*

#### Coping with SARS

2003 was particularly memorable as the year we had to cope with severe acute respiratory syndrome (SARS) in Toronto. From late March to late May there were many disruptions in our academic life. Access to labs in the Ontario Cancer Institute and Mount Sinai Hospital was restricted for nearly two weeks. Even when restrictions were lifted, entry to all hospitals was delayed by as much as 30 min due to SARS screening. Both faculty members and graduate students at the Hospital for Sick Children pitched in and helped with the screening process, donning masks and gowns to take temperatures and interview employees and visitors. In the early weeks, many seminars and student committee meetings were cancelled. Subsequently, meetings involving both hospital and campus-based personnel required hand washing upon entry and completion of a form known as the "SARS Screening Tool". You can imagine the back-ups that occurred in our weekly student seminars attended by over a hundred students and faculty! A collective sigh of relief accompanied the ending of SARS screening in late May. We're hoping that 2004 will be free of SARS re-emergence or the arrival of the avian flu!

#### Faculty News

Many of our faculty members were honoured for their research or administrative accomplishments during the past year. **Bibudhendra (Amu) Sarkar**, Emeritus Professor of Biochemistry received the "Citizen of the Year 2003" Award from the Research Institute of the Hospital for Sick Children. This award is given to a scientist chosen by his/her peers in the Research Institute who has constantly demonstrated an extra effort over and above the call of duty. He was particularly cited for his selfless and tireless efforts to enhance the quality of the work environment and for his outstanding mentorship: constantly striving to facilitate the success of junior scientists and students by encouraging them to reach the next level and taking pride in their achievements.

**Liliana Attisano** achieved a career milestone by making the list of the 100 most-cited researchers in the field of Molecular Biology and Genetics over the last decade. To have a look at the top 100, visit: [www.in-cites.com/nobel/nov2002-phy-med-molgen-top100.html](http://www.in-cites.com/nobel/nov2002-phy-med-molgen-top100.html). Fred Keeley was awarded the Heart and Stroke Foundation of Ontario Robert M. Freedom Chair in Cardiovascular Sciences at the Hospital for Sick Children. Anders Bennick was presented with the "Distinguished Scientist Award" by the International Association for Dental Research at their annual meeting in Gothenburg, Sweden on June 25, 2003. Anders was honoured for his lifetime research on salivary glands and saliva.

**Grant Brown** was awarded the 2003 Elsie Winifred Crann Memorial Trust Award in Medical Research. This Award was created to encourage young investigators to pursue research related to cancer. The Award is a \$35,000 grant that will be used to support Grant's research on "DNA Replication and Damage"

**Roy Baker** was awarded the Harry Whittaker Outstanding Teacher Award by the Faculty of Medicine for his teaching of first year medical students. The Harry Whittaker Award is decided upon annually by the first year medical class and is awarded to a lecturer who gave encouragement and displayed genuine concern for student well-being and, through personal commitment to quality teaching, provided practical and clear insights in the basic sciences during the first year of the undergraduate medical program.

**Christopher Hogue**, who heads the Blueprint Research Program, secured \$29 million in government and public funding to enter 80,000 molecular interaction records into the Biomolecular Interaction Network Database ([bind.ca](http://bind.ca)). This award represents Genome Canada's largest investment in Ontario to date.

Both **Annelise Jorgensen** and **David Pulleyblank** were presented with Twenty-Five Year Service Awards in recognition of significant service to the University of Toronto.

A number of faculty have been busy organizing conferences and speaking on the international circuit. **Morris Manolson** is the Chair of this year's 10th annual Canadian Connective Tissue Conference, to be held in Toronto from May 28th-30th. **Régis Pomès** co-organized the 5th Canadian Computational Chemistry Conference, which took place on the U. of T. campus in July 2003. Régis was also an invited speaker at the Gordon Research Conference on Proton and Membrane Reactions in Ventura, California; at a symposium on Ion Channels at the ASTAT-PHYS Statistical Physics Meeting in Puerto Vallarta, Mexico; at the 48th Annual Meeting of the Biophysical Society in Baltimore and at the 11th International Conference on Retinal Proteins, in Chiemsee, Germany. **Russell Bishop** delivered the opening lecture at the Benzon Symposium on the Lipocalcin Protein Superfamily in Copenhagen, Denmark and was an invited speaker at the International Endotoxin Society symposium in San Diego, California.

### Events

The Biochemistry Department has a new look on the Web! Our Website has been completely overhauled and our News and Events page is a particularly good spot to keep up to date with your colleagues in Toronto.



Bibudhendra (Amu) Sarkar



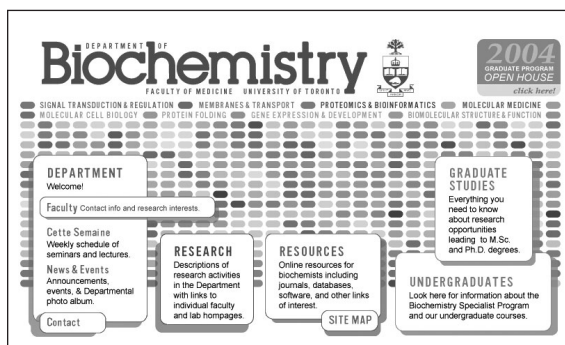
Anders Bennick



Grant Brown



Roy Baker



We invite you to visit us at:  
[www.biochemistry.utoronto.ca](http://www.biochemistry.utoronto.ca)

The Department hosted birthday celebrations for two of our Emeritus Professors, **Theo Hofmann** who turned 79 and **Marian Packham** who marked her 75th. Both professors remain very active in the Department. Photos of the happy events can be seen at:  
[www.biochemistry.utoronto.ca/news/news\\_archive/news\\_2003/news\\_2003.html](http://www.biochemistry.utoronto.ca/news/news_archive/news_2003/news_2003.html)

The Department has instituted an annual Open House for prospective graduate students. It involves short talks by the Chair and Grad. Coordinator, a very entertaining movie on our research themes, viewing graduate student posters over a pizza lunch, student-led tours of the campus-based research facilities and the Research Institute at the Hospital for Sick Children, and a final get-together with a Chinese food buffet. This has turned out to be very successful, attracting between 60-80 potential students from around southern Ontario and Western Quebec. Some scenes from this January's Open House can be found at: w

Budding Biochemists! The past year has witnessed a boom in the number of children born to members of our Faculty. **Jim Rini** and wife Lynn welcomed their daughter, Madison Michelle Rini, who was born on May 16th, 2003. **Alan Davidson's** wife, Karen Maxwell who is a post-doc in the Pai lab, gave birth to son Matthew Vernon Lou who arrived Aug. 13, 2003. Daughter Claire was born on Sept. 17, 2003 to **Gil Privé** and his wife Susan. Finally, **Julie Forman-Kay** and **Lewis Kay** brought daughter Shira into the world on Sept. 20, 2003, a sister for 5-year-old Raphael. When asked for a

comment, Lewis remarked that "it's *almost* as good as publishing a paper".

## Appointments

Our Faculty complement continues to grow at a healthy rate. We are pleased to welcome **John Parkinson**, a Scientist at the Hospital for Sick Children, who was appointed to the Department of Biochemistry as an Assistant Professor. John's research uses comparative genomics, sequence analysis, and simulation methods to understand the mechanisms by which sequence information is translated into the molecular and physical mechanisms underlying cell based processes.

In past issues of the Bulletin, I neglected to mention another important appointment to our Department. **Russell Bishop**, an Assistant Professor in Lab Medicine and Pathobiology, was cross-appointed to Biochemistry in 2001. Since that time, Russ has been a very active member of the Department and is engaged in the study of pathogen-associated molecular patterns in the Gram-negative bacterial cell envelope.

We are also actively recruiting new Faculty with two Assistant Professor positions being advertised at this time.

Our congratulations to **Hue Sun Chan** and to **Daniela Rotin** who were promoted to the rank of Full Professor.

We also extend our best wishes to Department members **Janet Forstner** and **Vitauts (Vic) Kalnins** who retired during the past year.

**Stephen Pasternak**, who has been a PDF with John Callahan and Don Mahuran (Medicine and Lab Med and Pathobiology), has taken up a faculty position in Neurology at the University of Western Ontario, where he will continue his research in neurodegenerative diseases, in particular the roles of lysosomes in the pathogenesis of Alzheimer disease.

## Graduate Studies

We were very successful in the first round of funding for two CIHR Strategic Training Programs. These programs were developed by CIHR "for the

purpose of building capacity within Canada's health research community through the training and development of researchers, and fostering the development and ongoing support of the research careers of women and men in health research". **Charles Deber** and **Reinhart Reithmeier** spearheaded the creation of the CIHR Training Program in the Structural Biology of Membrane Proteins Linked to Disease ([www.biochemistry.utoronto.ca/CIHR\\_membrane](http://www.biochemistry.utoronto.ca/CIHR_membrane)). **Julie-Forman-Kay** and **Walid Houry** led the application for the CIHR Training Program in Protein Folding: Principles and Diseases ([www.biochemistry.utoronto.ca/CIHR\\_folding/](http://www.biochemistry.utoronto.ca/CIHR_folding/)). Each program provides \$1.8 million over 6 years to support the training of graduate students and post-doctoral fellows. The two programs will be holding a joint conference this coming June to showcase the work of their trainees.

The Department held its annual graduate student poster day on May 27, 2003. The poster day took place in conjunction with the annual Theo Hofmann Lecture which was presented this year by **Dr. John Bergeron** of the Department of Anatomy and Cell Biology, McGill University. **Dr. Bergeron's** lecture was entitled: "From Calnexin to ER Proteomics".

Poster judging was challenging but with Dr. Bergeron's help, the following winners (who receive cash awards) were chosen:



Winners in the Ph.D. category were:

FIRST, **Jeff Lee** (Howell lab):

"Structural studies of MTA/AdoHcy nucleosidase and MTA phosphorylase provide a blueprint for design";

SECOND, **Bomina Yu**

(Howell lab): "Intragenic complementation in argininosuccinate lyase/delta crystallin";

THIRD, **Jianfai Qi** (Siu lab):

"Involvement of beta-catenin signaling in transendothelial migration of melanoma cells".

Winners in the M.Sc. category were:

FIRST, **Jennifer Marles**

(Davidson lab): "Significance of the ligand binding affinity of an SH3 domain for biological function";

SECOND, **Eileen Lo** (Bishop lab):

"Structure and function of an outer membrane acyltransferase";

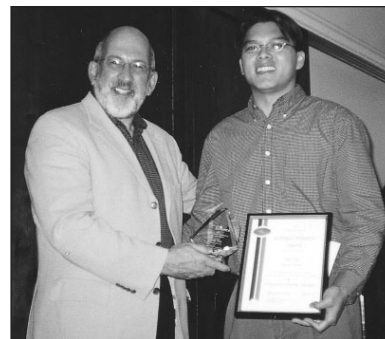
THIRD, **Guillaume Thibault** (Houry

lab): "Substrate recognition and degradation by the ClpXP chaperone of *E. coli*".

### Additional graduate awards:

Paul Yip, a Ph.D. student in the Biochemistry Department, was chosen from among nearly 500 volunteers as the recipient of the 2003 National Volunteer Award for his outstanding achievements in the

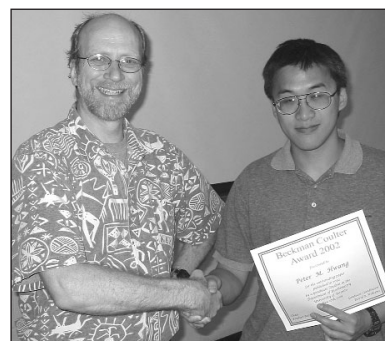
promotion of science in his community. Through the "Lets Talk Science Partnership Program", Paul formed linkages with 5 different teachers at two schools, making visits to classrooms, designing activities that bring biotechnology to life and engaging students in their own DNA investigations. He also developed workshops in biotechnology education for both Ontario Institute for



Paul Yip (left) receives National Volunteer Award from Mark Poznansky



Roberto Botelho receives the Scott Prize from Grad. Coordinator David Williams



Beckman Paper of the Year winner Peter Hwang with Grad. Coordinator David Williams

---

Studies in Education students and high school science teachers.

The winner of the Beckman Paper of the Year Award for 2002 was Peter Hwang (Kay lab) for his paper entitled "Solution structure and dynamics of the outer membrane enzyme PagP by NMR." published in *Proc. Natl. Acad. Sci.* (2002) 99:13,560.

The annual David Scott prize for outstanding all-around graduate student was awarded to Roberto Botelho (Grinstein lab).

## University of Victoria Department of Biochemistry and Microbiology

*Correspondent: Claire Cupples*

### Caren Helbing wins Michael Smith Award

**Dr. Caren Helbing** has recently been awarded a scholar award from the Dr. Michael Smith Health Research Foundation. The salary award lasts for up to five years, and will enable her to devote more time to her innovative study of thyroid hormone-dependent cell signaling and the tumour suppressor Inhibitor of Growth (ING). Cell signaling is a fundamental area of biomedical research. Researchers are clambering to understand how a solitary signal can evoke a myriad of cellular responses. As Caren notes, "to understand how a cell decides what path

to take is the holy grail". Her research has focused on thyroid hormone's pivotal role in cell activity. In humans such hormones are essential to health, growth, and development. Thyroid hormone abnormalities have been implicated in brain defects and cancer. The distressing increase in thyroid disorders in North America has made this research all the more crucial. This is where her unusual frog model system comes in. Tadpole metamorphosis into a frog is precipitated by an increase in the level of thyroid hormone. This permits Caren to study how a single external stimulus can produce a variety of cellular effects. However, this is not where the usefulness of these prodigious little creatures ends. In fact, Caren also uses the tadpole as indicators of environmental contaminants.

Thyroid hormones play an important role in other aspects of human health. Controversially, the hormone has been implicated as important in the development of the susceptibility to cancer. At the moment, Caren's laboratory is studying the function of the thyroid hormone responsive Inhibitor of Growth (ING). ING is a tumour suppressor, which is active in phosphorylation pathways and interacts with the pivotal tumour suppressor p53. ING alters gene expression through the modulation of chromatin structure and activity. Caren is currently trying to ascertain how ING functions in a normal cell. With the aid of her award, she will have the opportunity to learn about this pivotal hormone and the important role it plays in human health.



Dr. Stephen Evans

**Dr. Stephen Evans**, a new addition to the faculty, recently left his University of Ottawa laboratory of 13 years to return to the west coast. With him he has brought some highly impressive X-ray crystallography equipment to continue his research on the molecular structure of proteins. X-ray crystallography is an experimental technique that allows for the determination of molecular structure. A protein is crystallized and irradiated by x-rays. Analysis of the pattern produced by the diffraction of the x-rays by the crystals allows for the determination of the molecular structure. Evans' lab has been exploiting this technique in order to gain insight into the structure and function of various

proteins and antibodies. As the UBC trained chemist points out, "if you can understand the structure, then you can understand the function." This desire to understand the function of proteins has led to some significant research. In association with his colleagues, Evans elucidated the structure for the enzymes integral to human blood group antigen biosynthesis. The human blood groups A and B antigens are highly similar. The human blood groups A and B differ in the addition of different sugars to the O blood group antigen. These monosaccharides are transferred to the O antigen by differing glycosyltransferases. Through x-ray crystallography, Dr. Evans and his colleagues managed to determine the molecular structure of the two GTs, N-acetylgalactosaminyl transferase (GTA) and galactosyltransferase (GTB), which synthesize the blood group A and B antigens respectively. Significantly, it was specificity of GTA and GTB was determined by only one amino acid. Such a discovery may have a wide reaching impact on diagnostics and therapy. A blood type mismatch during a blood transfusion can lead to a severe immune response, and death. Understanding the mechanism and specificity of GTA and GTB will enable researchers to manipulate the enzymes, using them as chemosynthetic machines, creating altered molecules. Further knowledge of the structure allows for the production of specific antibodies, for diagnostic and therapeutic use. Indeed, this research has the potential to allow for the creation of exciting new treatment options.

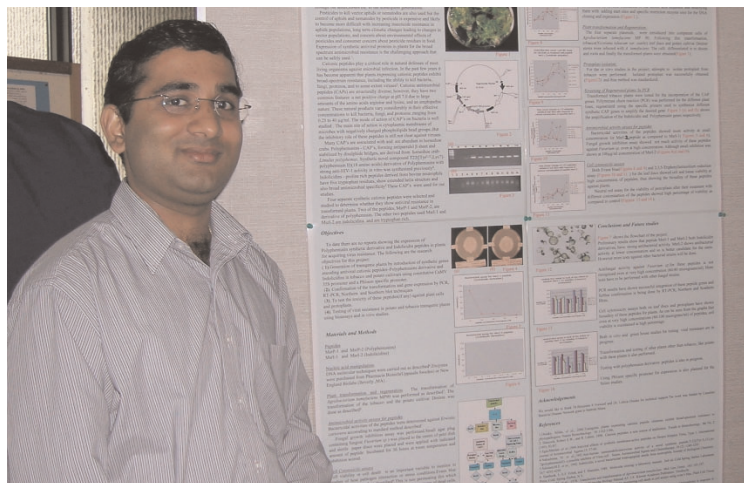
### Biochem and Micro Alumni News

On a recent working sojourn in Bath, England and Ames, Iowa, **Dr. Francis Nano** encountered a number of Uvic students and graduates who are making great headway in their careers. Present at the International Tularemia Conference in Bath, was Monique Von Hoek. After finishing her BSc at Uvic she received her PhD from the University of Virginia. Right now she is working for Ken Alibek, author of "Biohazard", who defected from the former Soviet Union after a career producing biological weapons. Also at the conference was Siobhan Cowley (BSc, PhD), now a post-doctoral fellow at UBC. She gave a presentation on her

current research on Mycobacterium species. At the International Conference on undergraduate Tara Gray presented a poster. She is currently working for health Canada in Winnipeg, studying Ebola virus proteins for her coop work term. Gerry Baron (BSc, PhD), a promising prion researcher, was interviewed by CBC radio about the need to recruit new scientists into prion research, and bring expatriot prion researchers back into the country. Bob Belland, who received both his BSc and PhD from UVic, has just taken a faculty position at the University of Tennessee in Memphis. To celebrate this momentous occasion, he invited our own Francis Nano to give a talk. Robin Harkness (PhD), has been appointed as Vice-President, research at Aventis Pasteur Limited, the vaccine division of Aventis, in Canada. Robin, who has been employed at Aventis since 1990, will be responsible for the direction, administration, and management of all activities for the research department. Prior to his work at Aventis, he held a position at the University of Tuebingen in Germany. Nano has kept himself very busy over the past few weeks. At the fourth International Conference on Tularemia Nano presented his research on the pathogenicity of Francisella tularensis, which was quoted in the October 10 edition of Science.

### Award Winning Poster

Crop loss and damage caused by viruses and bacteria is a grave problem facing all parts of the world



Apruv Bhargava

---

today. Alleviating this destruction of important crops is the focus of many leading researchers. Graduate student **Apruv Bhargava**, of **Dr. Santosh Misra's** laboratory, is currently studying an innovative way to protect crops from destructive viruses. His research focuses on the use of cationic antimicrobial peptides (CAPs) as a means of defense against pathogens. CAPs are a class of natural antibiotics found in many different phyla, which were only discovered in the mid 1980s. These small positively charged peptides, of a mere couple of dozen amino acids, exhibit a potent antimicrobial activity. CAPs work by altering gene expression in the host vector and increasing the permeability of the bacterial outer membrane. However, bacteria are not the only pathogens that are killed by CAPs. Their ability to kill protozoa and fungi is well documented. Apruv is concentrating on the potential of CAPs to kill plant specific viruses. He is trying to create transgenic plants that express the synthetic genes encoding antiviral CAP. In this case the plants containing the CAP genes will express the protein and will be able to fend off damaging viruses. It is hoped this technique will provide an alternative to the pervasive use of pesticide, which has been plagued by many problems, including, pathogen resistance, environmental effects, and human health problems. The efficacy of this new approach to crop management could have a profound effect on the agricultural world. Indeed, this technology may provide an exciting new alternative in crop management

### **Graduate Student Symposium**

Usually when walking down the hallways of Petch, the whirring of stir bars is the only sound to be heard. However, that was to change on October 4, the day of the graduate student poster symposium. That morning the halls were alive with the sound of discussion, intellectual discourse, and the snatching of free coffee and doughnuts. This year's symposium began with talks from two of the department's faculty members. **Dr. Alisdair Boraston's** talk focused on his research on carbohydrate recognition in polysaccharide depolymerization. **Dr. Rachel Roper** followed discussing SARS and the impact of bioinformatics. Following the much lauded free coffee and doughnuts, was

the graduate students poster presentation. This year 21 posters were presented, including one from undergraduates Avril Brett and Vanessa Lloyd (pictured above), who spent the summer working in the laboratory of former Chair, **Dr. Edward Ishiguro**. The event brought the research of the graduate students to attention of the Department and the wider community.

### **A Career in Microbiology**

Next year the Department will bid farewell to **Katie McKechnie**, a long term employee of the Biochemistry and Microbiology department, who will be retiring. For the past 13 years Katie has been working as the undergraduate laboratory faerie. You know, she is the one who prepares the media and equipment that magically appear on the lab bench every week. Katie started working in microbiology after she left high school in her native Aberdeen. She enrolled in a local technical college to train as a laboratory technician. This led to her position at the College of Agriculture in Aberdeen, where she stayed for 10 years. Following her emigration to Canada, with her husband, Katie worked for federal government performing routine microbiological inspections in fish processing facilities on Vancouver Island. After spending half of her life in microbiology, she decided that a change of career was in order and she decided to return to school. In 1982 she completed her BA in economics from UVic. Unfortunately, this year marked the beginning of a downturn in the Canadian economy, and the job supply for economics graduates was low. After briefly working as a real estate agent, Katie once again returned to school, at this time to complete a course in office Administration at Camosun College. This led to various positions in the civil service, but the rigidity of the schedule and endless paper work did not suit her temperament. Katie then decided to return to microbiology and started her work in this department, where she has remained since. This June, Katie will be leaving to join her husband in retirement. Although she will miss her work and the university retirement she is looking forward to having free time for travelling, reading, and pursuing new hobbies. We will miss you Katie and we wish you all the best!

---

# University of Western Ontario

## Department of Biochemistry

*Correspondent: Eric Ball*

The Department was delighted to welcome several new members in 2003. **Dr. Richard Rozmahel** and Dr. Nathalie Berube have joined as part of the Human Molecular Genetics Program co-sponsored by the London Child Health Research Institute, London Regional Cancer Clinic, and the London Health Sciences Centre. Dr. Rozmahel comes most recently from the Department of Genetics at University of Alabama and will continue his work on genetic modifiers of disease, primarily those of Alzheimers and cystic fibrosis. Dr. Berube was formerly at the Ottawa Health Research Institute as a CIHR fellow, studying the role of chromatin remodelling proteins in brain development.

Additional arrivals include **Drs. Megan Davey, David Edgell** and **Hong Ling**. Dr. Davey comes to us from a position as Research Associate in Dr. O'Donnell's lab at Rockefeller University. Her research concentrates on the assembly of replication forks at eukaryotic origins of replication. Dr. Edgell is interested in evolution of protein structure and function and mobile genetic elements. He was at the Wadsworth Center in Albany, NY before his arrival here. Dr. Ling has been working on the crystal structure of the first intact error prone Y-family DNA polymerase at the NIH. She contributes additional expertise to the Department in the X-ray crystallography field.

**Dr. Ilona Skerjanc** received a CIHR Investigator's Award in the area of Aging as well as a Heart and Stroke Scientist Award (declined).

Renovation of the Department's space in the Medical Sciences Building continues apace, although at a slow pace. Scheduled to last four or five years overall, the first phase is now nearing completion after a year as labs are shuffled around to accommodate construction. We all look forward to the end of jackhammers and paint, and the new space that will be available.