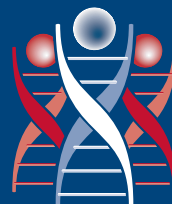


NICKERSON LABORATORY

ANNUAL REPORT 2005



Pathology and  
Molecular Medicine

QUEEN'S UNIVERSITY

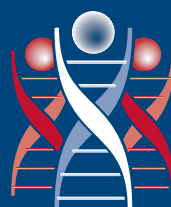
EXCELLENCE IN EDUCATION, RESEARCH AND CLINICAL CARE





Queen's  
UNIVERSITY

# Annual Report 2005



Pathology and  
Molecular Medicine  
QUEEN'S UNIVERSITY

EXCELLENCE IN EDUCATION, RESEARCH AND CLINICAL CARE

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### MISSION

Together, we proudly serve our regional community through the provision of expert laboratory and clinical services, education and research.

### VISION

We strive to be national leaders in advanced diagnostic services, employee success, student achievement and knowledge discovery.

### VALUES

In our pursuit of excellence, we value people by practicing mutual respect, professionalism, teamwork, integrity, trust and accountability.

# Message from the Head

Photo of Ian

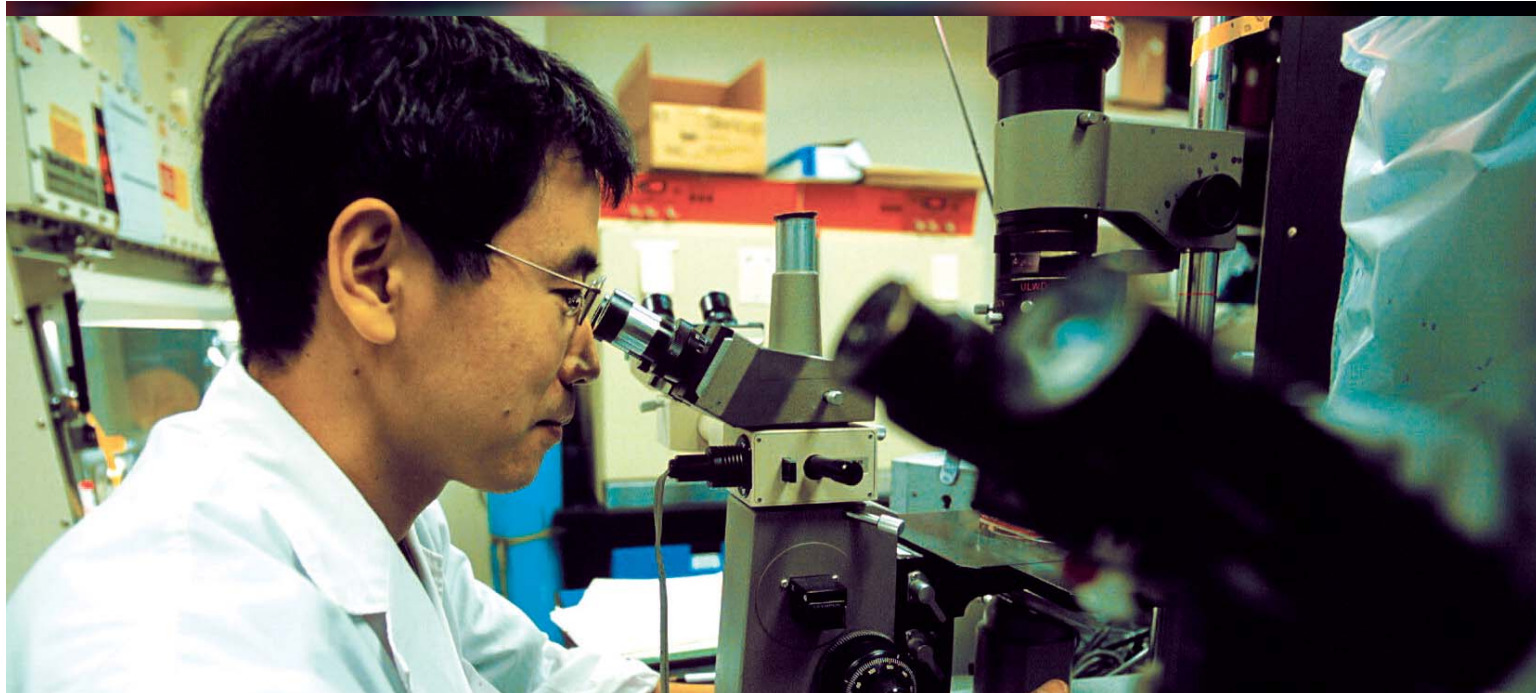
In 2005, growth was the theme that dominated our departmental activities. We expanded our teaching, research and clinical initiatives and, while doing so, we maintained the quality of our programs at a very high level.

In education, our graduate program continued to expand. Five-year growth in student enrollment exceeds 30% and we project further short-term growth of at least 10-20%. The ongoing growth will be spurred by an increase in the number of our graduate faculty, the investments the province of Ontario has committed to graduate education and Queen's strategic initiative to develop graduate programs. We have revised our graduate curriculum and increased its flexibility in order to better meet student needs and to optimize the duration of their programs.

The resurgence of our postgraduate program continued. In 2005, resident enrollment increased 30% over the previous year and there has been a six and a half-fold increase in the number of residents in the last three years. Total resident enrollment currently exceeds 85% of program capacity. The postgraduate research program has also been successfully reinstated.

In 2005, we recruited two research faculty to new positions and, in parallel with the growth of our graduate program, the number of postdoctoral fellows in the department reached a historic high. Total departmental research funding exceeded \$6M for the first time in the 2004-2005 fiscal year and the quality of our scholarship continues to be excellent. This is manifested not only by the high productivity of our faculty but also by the esteem in which they are held in the academic community. Most notably, Susan Cole and Roger Deeley were honoured by the National Cancer Institute of Canada/Canadian Cancer Society as co-recipients of the 2005 Noble prize for outstanding achievement in cancer research.





*“Most notably, Susan Cole and Roger Deeley were honoured by the National Cancer Institute of Canada/ Canadian Cancer Society as co-recipients of the 2005 Noble prize for outstanding achievement in cancer research.”*

In the clinical domain, we continued to provide strong leadership in the regional delivery of medical laboratory services. Our faculty played an integral role in the establishment of a regional infection control program in southeastern Ontario and provide ongoing medical leadership for that initiative. We were instrumental in the successful implementation of a regional medical laboratory equipment plan which led to a major capital investment in both our Academic Health Sciences Centre and our regional partner health care sites.

At the provincial level in laboratory medicine, 2005 marked the implementation of the initial Laboratory Medicine Funding Framework Agreement (LMFFA) between the Laboratory Medicine Section of the Ontario Medical Association and the Ministry of Health-Long Term Care. Through this agreement, the MOH-LTC made a significant investment in the profession of laboratory medicine and, in so doing, harmonized the Ontario laboratory physician funding schedule with those of western Canada. This has restored the competitive position of both the academic and community sections of laboratory medicine in Ontario and positioned us very well to compete for and retain the best professional talent. The LMFFA also addressed the issue of laboratory physician accountability, specifically with respect to physician workload, and required that a mechanism for workload measurement be established. Although the current LMFFA does not stipulate productivity targets, this is a direction in which the province may well be heading. If so, academic laboratory medicine will face the challenge of protecting and maintaining its mission of scholarship in a funding environment which is driven largely by the clinical service domain.

Iain D. Young,  
*Professor and Head,  
Pathology and Molecular Medicine*

# People

## FACULTY

### PRIMARY APPOINTED EMERITUS PROFESSORS

Sergio Bencosme  
William Corbett  
Alan Giles  
Nathan Kaufman  
George Kipkie  
Robert Kisilevsky  
Howard Steele  
David Robertson

### PROFESSOR AND HEAD

Iain D. Young

### PROFESSORS

Susan Cole  
Roger Deeley  
Bruce Elliott  
David Lillicrap  
Samuel Ludwin  
Paul Manley  
Lois Mulligan  
Sandip SenGupta  
Dick Zoutman

### ASSOCIATE PROFESSORS

Sandy Boag  
Christine Collier  
Scott Davey  
David Dexter  
Peter Greer  
David Hurlbut  
Mohamed Khalifa  
David LeBrun  
John Rossiter  
Lorne Seargeant  
Lois Shepherd  
Sherryl Taylor

### ASSISTANT PROFESSORS

Timothy Childs  
Harriet Feilotter  
Karen Harrison  
Tadaaki Hiruki  
Phillip Isotalo  
Robert Liao  
Christopher Nicol  
Dilys Rapson  
Michael Raymond  
Caroline Rowlands  
Xiaolong Yang

### CROSS-APPOINTED PROFESSORS

John Matthews, *Medicine*  
Martin Petkovich,  
*Biochemistry*  
Paul Young, *Biology*

### ASSOCIATE PROFESSORS

Gerald Evans, *Medicine*  
David Lee, *Medicine*  
Donald Maurice,  
*Pharmacology and  
Toxicology*  
Christopher Mueller,  
*Biochemistry*  
Leda Raptis, *Microbiology  
and Immunology*  
Lewis Tomalt, *Microbiology  
and Immunology*

### ASSISTANT PROFESSORS

Cynthia Forster-Gibson,  
*Family Medicine*  
Paula James, *Medicine*  
Jennifer MacKenzie,  
*Pediatrics*

### ADJUNCT FACULTY

John Ancsin  
Melanie Borden  
Daniel Connor  
Daria Haust  
Christine Hough  
Lloyd Kennedy  
Norma Layno  
David Piper  
Michael Raymond  
Waheed Sangrar  
Ines Sumargo  
Shui Pang Tam  
Greg Twemlow  
Virginia Walley  
Jeannette Wilkins

### PROMOTIONS

(Effective July 1, 2005)

### PROFESSOR

Peter Greer  
Sandip SenGupta

### ASSOCIATE PROFESSOR

David Hurlbut

### NEW APPOINTMENTS

Scott Davey  
Norma Layno  
Christopher Nicol

### ADMINISTRATION AND SUPPORT SERVICES

Marg Croft, *Postgraduate Program Assistant*  
John DaCosta, *Electron Microscopy Service*  
Barb Dafoe, *Administrative Assistant to Managers  
of Clinical Laboratories*  
Maria Dickson, *Financial Administrative Assistant*  
Laura Emery, *Administrative Secretary*  
Kevin Kell, *Network Coordinator*  
Barb Latimer, *Administrative Assistant*  
Norma Layno, *Administrative Director*  
Barb Saunders, *Graduate Program Assistant*  
Shakeel Virk, *Pathology Coordinator, NCIC-Clinical Trials  
Group National Tissue Bank*

### CLINICAL LABORATORY SERVICES MANAGEMENT

Norma Layno, *Administrative Director*  
Dave More, *Manager, Pathology Services*  
Joyce deVette-McPhail, *Manager, Core Laboratory Services*  
Susan Pugh, *Manager, Microbiology and Genetics Services*  
Cathie Trayner, *Laboratory Information System Specialist  
and Manager, Point of Care Testing and Quality*

### DEPARTMENTAL HISTORIAN AND ARCHIVIST

M. Daria Haust

# Committees and Appointments

## DEPARTMENTAL COMMITTEES

### PROMOTION, REAPPOINTMENT, TENURE AND CONTINUING APPOINTMENTS

Sandy Boag (*Chair*)  
Bruce Elliott  
Peter Greer  
Mohamed Khalifa  
David LeBrun  
Lois Mulligan  
Cynthia Pruss  
(*graduate student*)  
John Rossiter  
Andrew Schell (*resident*)  
Sherry Taylor

### GRADUATE PROGRAM COMMITTEE

Peter Greer (*Chair*)  
Harriet Feilotter  
Leda Raptis  
Fiona Rawle (*graduate student*)  
John Rossiter  
Barbara Saunders  
Ted Wright (*graduate student*)  
Iain Young (*ex officio*)

### ANATOMIC AND GENERAL PATHOLOGY RESIDENCY TRAINING COMMITTEE

Caroline Rowlands (*Chair*)  
Sandy Boag  
Tim Childs  
Christine Collier  
David Dexter  
Brian Gannon (*resident*)  
Robert Liao

Marosh Manduch (*resident*)  
John Rossiter  
Andrew Schell (*resident*)  
Lorne Seargeant  
Lois Shepherd  
Greg Twemlow  
Iain Young (*ex officio*)

### HEMATOPATHOLOGY RESIDENCY TRAINING COMMITTEE

Dilys Rapson (*Chair*)  
Hessah Al-Sulami (*resident*)  
David Dexter  
David LeBrun  
David Lee  
David Lillicrap  
Kristine Roland (*resident*)  
Danny Salloum  
Iain Young (*ex officio*)

### SEAMO FINANCE COMMITTEE

Iain Young (*Chair*)  
Sandy Boag  
David Dexter  
Harriet Feilotter  
Dilys Rapson  
Sandip SenGupta  
Dick Zoutman

### CANADIAN COLLEGE OF MEDICAL GENETICISTS STANDING FELLOWSHIP COMMITTEE

Karen Harrison (*Chair*)  
Harriet Feilotter  
Mohamed Khalifa  
Jennifer MacKenzie  
Sherry Taylor

## INTERNAL APPOINTMENTS AND REPRESENTATION ON UNIVERSITY COMMITTEES

Susan Cole  
*Re-elected as Faculty Senator for the Faculty of Health Sciences*  
*Re-elected to University Senate*  
*Member, Board of Directors, PARTEQ Innovations, Inc.*  
*Member, Senate Promotion Advisory Committee*  
*Elected Senate Representative to the International Centre Council*  
*Member, Senate Search Committee on Academic Development*  
*Elected Member, Academic Colleague for Queen's,*  
*Council of Ontario Universities*  
*Member, Standing Committee on Government and Community*  
*Relations, Council of Ontario Universities*

Christine Collier  
*Faculty Coordinator, Teaching Improvement Project System (TIPS)*  
*Member, Council on Employment Equity*  
*Member, Human Rights Office Advisory Council Committee*  
*Member, Instructional Development Network Committee*

Roger Deeley  
*Director, Queen's University Cancer Research Institute*  
*Director, Division of Cancer Biology and Genetics,*  
*Queen's University Cancer Research Institute*

David Lillicrap  
*Member, Chancellor's Research Awards Adjudicating Committee*

Samuel Ludwin  
*Associate Dean, Research, Faculty of Health Sciences*  
*Vice-President, Research Development, Kingston General Hospital*

Lois Mulligan  
*Director, CIHR Transdisciplinary Training Program*  
*in Cancer Research*

Sandip SenGupta  
*Member, University Promotions Committee*

Sherry Taylor  
*Director, Phase I Undergraduate Medical Curriculum*  
*Chair, Biohazard Safety Committee*

Lewis Tomalty  
*Assistant Dean, Continuing Professional Development*  
*Associate Dean, Medical Education*

Dick Zoutman  
*Appointed Chair of the Division of Infectious Diseases*  
*in the Department of Medicine*



# Education Programs

## UNDERGRADUATE PROGRAM

The Department of Pathology and Molecular Medicine holds a unique position in the Faculty of Health Sciences as it serves to bridge the interface between basic medical science

and clinical medicine. The Department fulfills this role in a range of undergraduate curricula.

### COURSES

#### MEDICINE

Phase I Pathology General Pathology  
(Coordinator: Sherry Taylor)

Medical Science Rounds  
(Coordinator: Sherry Taylor)

Phase II Pathology Integrated, systems-based curriculum

#### LIFE SCIENCES

Pathology 410 General Pathology for Non-Medical Students  
(Coordinator: John Rossiter)

Pathology 425 Current Topics in Human Genetics  
(Coordinator: Lois Mulligan)

Pathology 430\* Molecular Basis of Disease  
(Coordinator: Iain Young)

Pathology 499 Research Project in Pathology  
(Coordinator: David Lillicrap)

Life Sciences 422 Cellular and Molecular Neuroscience  
Sections taught by Faculty in Pathology and Molecular Medicine

\* alternate year course last given in 2004

## GRADUATE PROGRAM, Peter Greer, Program Coordinator, Barb Saunders, Program Assistant

Our faculty supervised 38 graduate students in 2005; more than 35% of whom were pursuing their PhD.

The last appraisal of the Program was conducted by the Ontario Council on Graduate Studies in June 2004. At that time, Drs. Paul Lasko (McGill University) and Brian Clarke (McMaster University), OCGS consultants, assessed our MSc/PhD Program as "good quality." In keeping with their suggestions, the Research Seminar Series was registered as a graduate course (Path 830/930) in 2005, enabling graduate students to include it in their course requirements.

The Department participated in two CIHR-funded Training Programs: the Protein Function Discovery Training Program,

and the Transdisciplinary Training Program in Cancer. In the 2005 calendar year, these Programs supplied approximately \$64,000 in full or partial funding to six Pathology students.

The Robert Kisilevsky Fund for Research Education provides a bursary for first year PhD students in Pathology and Molecular Medicine. In September 2005, Rosanne Arulanandam, Taranjit Gujral, Doug Richardson and Andrew Slot each received a \$5,000 award.

The Pathology Studentship, offered to a highly competitive applicant to graduate studies in the Department, was awarded to Mohamad Qadura who accepted a position as a Master's student in Dr. David Lillicrap's laboratory.

### COURSES

#### PATHOLOGY

Pathology 822 Experimental Cancer Diagnostics and Therapeutics  
(Coordinator: Bruce Elliott)

Pathology 823\* Cancer Biology  
(Coordinator: Bruce Elliott)

Pathology 824 General Pathology for Non-Medical Students  
(Coordinator: John Rossiter)

Pathology 826\* The Molecular Basis of Disease  
(Coordinator: Iain Young)

Pathology 827 Research Project in Pathology  
(Coordinator: Peter Greer)

Pathology 830/930 Research Seminar Course  
(Coordinator: Peter Greer)

\* alternate year course last given in 2004

#### REHABILITATION THERAPY

Physical Therapy Master's Program, Sections in several courses taught by faculty from Pathology and Molecular Medicine

## GRADUATE STUDENTS

### PHD STUDENTS (Supervisor)

Kristin Albert (Leda Raptis) *Stat3 regulation by the caveolae protein, Cav-1, in breast cancer Lilia Antonova (Christopher Mueller) Stress and breast cancer: regulation of BRCA1 expression by hydrocortisone*

Taranjit Gujral (Lois Mulligan) *Molecular modeling of ret: mutations and mechanisms*

Brandy Hyndman (David LeBrun) *Acetylation and protein – protein interactions involving the protein E2A*

Glenn MacLean (Martin Petkovich) *Cloning of Cyp26B1 and its role during murine embryogenesis*

Cynthia Pruss (David Lillicrap) *The role of von Willebrand factor in arterial thrombosis*

Andrew Slot (Susan Cole) *Multidrug resistance protein*

Patrick Smith (Peter Greer/Tassos Anastassiades) *Metabolic and gene expression modulation in cultured articular chondrocytes by N-acylation of GlcN*

Peter Truesdell (Peter Greer) *Understanding the diverse roles of the fps tyrosine kinase*

Ted Wright (Bruce Elliott) *Inhibiting hepatocyte growth factor interaction with its receptor met in breast carcinoma cells*

### MSC STUDENTS (Supervisor)

Aikaterini Anagnostopoulou (Leda Raptis) *The effect of Stat3 in normal and tumor cells and in the differentiation of mammary epithelial cells*

Paul Bandler (Roger Deeley) *Investigation of elements involved in plasma membrane targeting of human multidrug resistance proteins, MRP1 and MRP2*

Audrey Boros (Scott Davey) *Characterizing the cellular defects associated with attenuated hRad9 function*

Crystal Chan (Susan Cole) *Pharmacogenetic analyses of MRP-related organic anion transporters*

Sara Flemming (Xiaolong Yang) *Isolation and characterization of both the LATS1 and LATS2 promoter regions*

Cheryl Foster (David LeBrun) *Identification of prognostic biomarkers and elucidation of molecular mechanisms involved in low to high grade transformation in B-cell lymphomas*

Morgan Jarvis (Scott Davey) *Investigation of Rad9 C-terminal tail function in the Rad9-Rad1-Hus1 checkpoint complex in fission yeast*

Jonathan Krieger (Lois Mulligan) *Development of novel inducible neural models to study the ret receptor tyrosine kinase and Hirschsprung disease*

Andrea Lai (Lois Mulligan) *The occurrence and functionality of ret isoform heterodimers*

Joe Oliver (Bruce Elliott) *Role of cell matrix adhesion in an in vitro model of human breast cancer*

Shawna Organ (Protein Function Discovery Program) *Proteomic analysis of the Met receptor tyrosine kinase and cell adhesion signaling cascades involved in breast cancer metastasis*

Jeff Ovens (Don Maurice) *The role of cyclic nucleotide phosphodiesterases in endothelial cell permeability*

Michelle Sam (Bruce Elliott/Chris Mueller) *The regulatory effects of stat3 signaling on autocrine HGF expression in breast cancer*

Brian Simo (Lois Mulligan) *Differential signaling between the wild type ret tyrosine kinase (TK) receptor and the multiple endocrine neoplasia (MEN) Type 2B ret TK receptor*





Jayda Sutton (*Don Maurice*) PDE interactions with PKA and Epac relevance to cAMP inhibition of angiogenesis

Ashley Theis (*Roger Deeley*) Higher order structure of MRP1: application of cysteine-based techniques

Xuefei Tian (*Lois Mulligan*) Characterization of newly developed ret antibodies and application in ret-related tumours

Stephanie Vander Pol (*David Lillicrap*) Induction of immunological tolerance to factor VIII through tolerogenic antigen presentation

Stacy Visser (*Xiaolong Yang*) Interaction of LATS and PAK1 and its roles in regulating cell migration

#### MSC TO PHD TRANSFER – MINI MASTERS PROGRAM (Supervisor)

Rozanne Arulanandam (*Leda Raptis*) Mechanism of Stat3 activation by cell-to-cell adhesion

Leo Mok (*Roger Deeley*) Elucidation of ABCA1 ATPase activity and the function of regulatory domain 1 using the *Spodoptera frugiperda* 21 cell line

Doug Richardson (*Lois Mulligan*) Ret internalization and sub-cellular localization: effects on downstream signaling

#### GRADUATING STUDENTS

##### MSC STUDENTS (Supervisor)

Zoya Shapovalova (*Peter Greer*) Involvement of *fps* and *fer* tyrosine kinases in neuronal cytoskeletal remodeling

Sara Sharifpoor (*Bruce Elliott*) Characterization of the function and regulation of Stat3 in autocrine HGF expression

Taranjit Gujral (*Lois Mulligan*) Molecular modeling of ret: mutations and mechanisms

##### PHD STUDENTS (Supervisor)

Fiona Rawle (*David Lillicrap*) Improving hemophilia A treatment: increasing efficacy and decreasing immunogenicity

Adina Vultur (*Leda Raptis*) Role of chaperones upon transformation and differentiation

Kevin Weigl (*Susan Cole*) Biochemical investigations of MRP1: analysis of glycosylation and topology

#### GRADUATE STUDENT PRESENTATIONS

**A. Anagnostopoulou, R. Arulanandam, A. Vultur, R. Jove, J. Turkson and L. Raptis.** Novel pathway of Rac1, Stat3 and p53 interaction. *The American Society for Cell Biology 45th Annual Meeting*. San Francisco, California, December 2005.

**A. Anagnostopoulou, A. Vultur, R. Arulanandam, J. Turkson, R. Jove and L. Raptis.** Differential effects of Stat3 inhibition in sparse vs confluent cells. *The American Society for Cell Biology 45th Annual Meeting*. San Francisco, California, December 2005.

**L. Antonova and C.R. Mueller.** The BRCA1 gene: A possible mediator of the effect of the stress hormone hydrocortisone on breast cancer development. *70th CHSL Symposium, Molecular Approaches to Controlling Cancer*, Cold Spring Harbor, New York, June 2005.

**R. Arulanandam, A. Vultur, A. Anagnostopoulou, B. Elliott and L. Raptis.** A novel mechanism of Stat3 activation. *American Association for Cancer Research 96th Annual Meeting*. Anaheim, California, April 2005.

**R. Arulanandam, A. Vultur and L. Raptis.** A novel mechanism of Stat3 activation. Signal transduction in cancer. *2005 Miami Nature Biotechnology Winter Symposium*. Miami, Florida, February 2005.

**A. Boros and S. Davey.** Characterizing the cellular defects associated with attenuated HRAD9 function. *8th Annual Scientific Meeting for Health Sciences Research Trainees*, Faculty of Health Sciences, Queen's University, Kingston, Ontario, May 2005.

**L.M. Mulligan and T.S. Gujral.** Ret receptor signalling: dissecting receptor function and dysfunction. *1st International Meeting on Pheochromocytomas*, Bethesda, Maryland. October 2005. *Selected for Oral Presentation*

**T.S. Gujral, J.R. Krieger, Z. Jia and L.M. Mulligan.** Structural basis of ret kinase domain mutations in Hirschsprung disease. *8th Annual Meeting For Health Sciences Research Trainees*. Kingston, Ontario, May 2005. *Selected for Oral Presentation*

**J.R. Krieger, T.S. Gujral and L.M. Mulligan.** Generating a novel neural inducible model for ret in Hirschsprung disease. *Queen's University Cancer Research Institute Retreat*. Gananoque, Ontario, January 2006.

**S.L. Organ, T.S. Gujral, J.R. Krieger, B.E. Elliott and L.M. Mulligan.** A proteomics approach to studying receptor tyrosine kinases. *Cancer Research Across the Spectrum: National Meeting for Trainees*. Mont Tremblant, Quebec, May 2005.

**S.L. Organ, T.S. Gujral, J.R. Krieger, B.E. Elliott and L.M. Mulligan.** A proteomics approach to studying receptor tyrosine kinases. *Eighth Annual Meeting for Health Sciences Research Trainees*, Kingston, Ontario, May 2005.

**J.D. Ovens, P. Malenfant and J.J.A. Holden.** VGLUT2 as a candidate locus for autism spectrum disorders. *Queen's Health Sciences Research Trainees Meeting*, Kingston, Ontario, May, 2005.

M. Shibata, **F. Rawle**, A. Labelle, C. Andrews, C. Hough, A. Yoshioka and D. Lillicrap. Characterization of recombinant canine Factor VIII and quantitative determination of Factor VIII in canine plasma. *XXth Congress of the ISTDH*, Sydney, Australia, August 2005.

S.D. Andrew, **D.S. Richardson**, J.L.V. Shaw and L.M. Mulligan. Ret degradation: the role of Src and Cbl. *Australian Society for Medical Research (New South Wales) Scientific Meeting 2005*. Sydney, Australia. Won the post-doctoral research prize for best poster presentation.

**D.S. Richardson**, A.Z. Lai, S. Nita, J.H. Horton and L.M. Mulligan. Characterization of ret receptor tyrosine kinase ligand-induced internalization. *Queen's Health Sciences Research Trainees Meeting*, Kingston, Ontario, May 2005. Selected for Oral Presentation

**D.S. Richardson**, A.Z. Lai, S. Nita, J.H. Horton and L.M. Mulligan. Characterization of ret receptor tyrosine kinase ligand-induced internalization using a multi-disciplinary approach. *American Association of Cancer Research Annual Meeting 2005*. Anaheim, California.

**A.J. Slot**, I.J. Létourneau, R.G. Deeley and S.P.C. Cole. Mutation of proline 1158 to alanine in cytoplasmic loop 7 significantly alters the substrate specificity of human MRP2(ABCC2). *2nd Annual North American ABC Genetic Workshop*, NCI-Frederick, Frederick, MD, September 2005.

**X.F. Tian**, S.D. Andrew, P. Isotalo and L.M. Mulligan. Characterization and application of newly developed ret antibodies. *Cancer Research Across the Spectrum: National Meeting for Trainees*. Mont Tremblant, Quebec, May 2005.

**H. Visram**, A. Ableson, P. Truesdell, E. Eisenhauer, R.L. George, P.A. Greer and W. Sangrar. Cell signaling and cancer: a systems biology approach. *8th Annual Scientific Meeting for Health Research Trainees*, Kingston, Ontario, May 2005.

**T. Wright**, J. Tsai, A. Jia and B.E. Elliott. Inhibition by copper (II) binding of hepatocyte growth factor interaction with its receptor Met in breast carcinoma cells. *USAMRMC Era of Hope 2005 Conference*. Philadelphia, PA, June 2005.

**E.J. Wojcik**, **S. Sharifpoor**, P. Cheung, **T. Wright**, R. Watering, E.A. Tremblay, C.R. Mueller and B.E. Elliott. A novel role of c-Src and Stat3 in autocrine HgF expression in invasive breast cancer. Presented at the *Annual Meeting of the American Association of Cancer Research*, Anaheim, CA, April 2005.

#### GRADUATE STUDENT PUBLICATIONS

**A. Anagnostopoulou**, **A. Vultur**, **R. Arulanandam**, J. Cao, J. Turkson, R. Jove, J.S. Kim, M. Glenn, A. Hamilton and L. Raptis. Role of Stat3 in normal and SV40 transformed cells (Review). *Research Trends*. Submitted July 2005.

**A. Anagnostopoulou**, **A. Vultur**, **R. Arulanandam**, J. Cao, J. Turkson, R. Jove, J.S. Kim, M. Glenn, A. Hamilton and L. Raptis. Differential effects of Stat3 inhibition in sparse vs. confluent normal and breast cancer cells. *Cancer Letters*. (in press)

**A. Vultur**, **R. Arulanandam**, J. Turkson, G. Niu, R. Jove and L. Raptis. Stat3 is required for full neoplastic transformation by the Simian Virus 40 Large Tumor antigen. *Mol. Biol. Cell*. 16, 8: 3832-3846, 2005.

J. Cao, **R. Arulanandam**, **A. Vultur**, T. Preston, E. Jaromczyk, K. Tomai, K. Zandi and L. Raptis. Adenovirus-5 E1A suppresses differentiation of 3T3 L1 preadipocytes at lower levels than required for induction of apoptosis. *Mol. Carcinog*. 43, 1: 38-50, 2005.

**R. Arulanandam**, **A. Vultur** and L. Raptis. Transfection techniques affecting Stat3 activity levels. *Anal. Biochem*. 338, 1: 83-89, 2005.

O. Loudig, **G. MacLean**, N. Dore, L. Luu and M. Petkovich. Transcriptional co-operativity between distant Retinoic acid response elements in regulation of Cyp26A1 inducibility. *Biochem. J*. 392, 241-248, 2005.

B. Gu, **C.M. Pruss**, A.T.Gates and S.S. Khandekar. The RNA-unwinding activity of Hepatitis C virus non-structural protein 3 (NS3) is positively modulated by its protease domain. *Protein and Peptide Letters* 12(4): 315-321, 2005.

D.H. Freed, R.H. Cunningham, A.L. Dangerfield, **J.A. Sutton** and I.M.C. Dixon. Emerging evidence for the role of Cardiotrophin-1 in cardiac repair in the infarcted heart. *Cardiovascular Research* 65(4): 782-92, 2005.

L. Payen, M. Gao, C. Westlake, **A. Theis**, S.P.C. Cole and R.G. Deeley. Functional interactions between nucleotide binding domains and LTC4 binding sites of multidrug resistance protein 1 (ABCC1). *Mol. Pharmacol*. 67: 1944-1953, 2005.



## POSTGRADUATE PROGRAM,

Caroline Rowlands, *Program Coordinator and Director, Anatomic and General Pathology Programs*, Lois Shepherd, *Director, Hematopathology Program*

Under the umbrella of Laboratory Medicine the department offers training in Anatomical Pathology, General Pathology and Hematopathology for careers in both the academic and community sectors. Programs are approaching capacity with 13 of the 15 available residency positions now being filled. The postgraduate programs underwent the Royal College Accreditation process in 2005 and the Anatomical Pathology Program achieved full accreditation. Constructive recommendations for optimizing administrative processes within the Hematopathology Program were made by the accreditation team. These recommendations were implemented and have led to process improvements. As there were no residents in the General Pathology program in 2005, the program was deemed inactive and consequently did not undergo review. We anticipate recruiting at least two trainees into this program in 2006.

Our success in resident recruitment in the last several years has led to the re-establishment of our postgraduate research program. In 2005, residents made seven presentations of their scholarly work at international, national and provincial meetings.

In order to accommodate the recent growth in our postgraduate programs, the department has made significant

### POSTGRADUATE RESIDENTS

#### RESIDENT RESEARCH (Supervisor)

Patricia Farmer (*Harriet Feilotter and David LeBrun*) *Development of combined clinical and biomarker prognostic factors in follicular lymphoma.*

Patricia Farmer (*David LeBrun*) *Tissue microarrays as a quality assurance tool in lymphoma immunodiagnosis.*

Brian Gannon (*Tim Childs*) *Tissue microarray analysis of protein expression patterns in leiomyomas and leiomyosarcomas.*

Brian Gannon (*Tim Childs*) *Analysis of the epithelial and mesenchymal components of uterine carcinosarcomas.*

Kristine Roland (*Dilys Rapson, David Lillicrap and Paula James*) *Genetic testing of Type II von Willebrand disease.*

Kristine Roland (*Harriet Feilotter and David LeBrun*) *Utilization of RNA from formalin-fixed paraffin embedded tissue for gene microarray studies.*

Andrew Schell (*Sherry Taylor and Iain Young*) *Mutational analysis of the BRAF signaling pathway and mutation analysis in hormone refractory prostate carcinoma.*

### RESIDENT PRESENTATIONS

**P. Farmer**, S. Virk, B.F. Burns and D.P. LeBrun. Use of a tissue microarray to assess the accuracy of lymphoma classification by needle biopsy. 47th *American Society of Hematology Annual Meeting and Exposition*, Atlanta, GA, December 2005.



### RESIDENTS

#### ANATOMIC PATHOLOGY (AP), HEMATOPATHOLOGY (H)

(l-r) Reza Behjati(AP), PGY3, Jerry Chen(AP), PGY2, Christopher Davidson(AP), PGY2, Maria Abi Daoud(AP), PGY1, Patricia Farmer(AP), PGY6, Brian Gannon(AP), PGY4, Marosh Manduch(AP), PGY3, Navid Nasserri(AP), PGY3, Andrew Schell(AP), PGY3, Nafisa Ursani(AP), PGY1, Hessah Al-Sulami(H), PGY4, Kristin Roland(H), PGY5, Danny Salloum(H), PGY1

improvements to educational space, workstations and teaching equipment. The now excellent facilities also allow us to accommodate an increasing demand for electives by students and external residents.

**B. Gannon**, A. Sharkawy, G. Swain, P. Isotalo and D. Dexter. Gastric toxoplasmosis in aplastic anemia: A case report and review of the literature. *Canadian Association of Pathologists Annual Meeting*, Victoria, BC, July 2005.

**B. Gannon**, D. Dexter, D. Petsikas and P. Isotalo. Mediastinal thymolipoma: A rare occurrence with striated myoid cells. *Canadian Association of Pathologists Annual Meeting*, Victoria, BC, July 2005

**M. Manduch**, D. Dexter, D. Jalink, J. Louw, S. Vanner and D. Hurlbut. Osteoclast-like giant cell tumour of pancreas with osteo-chondroid differentiation: case report and literature review. *Canadian Association of Pathologists Annual Meeting*, Victoria, BC, July 2005.

**K. Roland**, N. Gallo, D. LeBrun and H. Feilolter. Comparison of RNA extracted from matched formalin-fixed paraffin-embedded tissue and frozen tissue: use in microarray analysis. *Canadian Association of Pathologists Annual Meeting*, Victoria BC, July 2005.

**A. Schell**, J. Veinot, P. Isotalo, I. Young and C. Rowlands. Hypocalcemic cardiomyopathy secondary to pseudo-hypoparathyroidism Type IA. *Canadian Association of Pathologists Annual Meeting*, Victoria, BC, July 2005.

#### RESIDENT PUBLICATIONS

N. Poonai, S. van Diepen, A. Bharatha, **M. Manduch**, T. Deklaj and S.M. Tarlo. Barriers to diagnosis of occupational asthma in Ontario. *Can. J. Public Health*, 96(3): 230-3, 2005.

## POSTDOCTORAL TRAINING PROGRAM IN CLINICAL AND LABORATORY GENETICS

Karen Harrison, *Cytogenetics Coordinator*, Sherry Taylor, *Molecular Genetics Coordinator*

**K**ingston General Hospital and Queen's University are together accredited by the Canadian College of Medical Geneticists to provide postdoctoral training programs in clinical and laboratory genetics. The clinical genetics program provides training to physicians in the diagnosis and management of genetic conditions. The laboratory genetics

program provides in-depth training in the technology and application of diagnostic cytogenetics and molecular genetics to clinical service.

#### TRAINEE IN LABORATORY GENETICS

Shulin Zhang

## OUTREACH EDUCATION PROGRAMS

Fiona Rawle, *Coordinator of Enrichment Courses*

**C**urrently, the Department of Pathology and Molecular Medicine, in cooperation with the Office of Enrichment Studies, is the only department at Queen's University that is actively involved with the organization and teaching of enrichment courses targeting three different grade levels: Grades 5-6, Grades 7-8, and Grades 11-12. These courses have been developed solely by graduate students in the Department of Pathology and Molecular Medicine and each year they are coordinated by taught by current graduate students. The programs challenge the students to higher levels of learning, expose the students to the university setting, create an opportunity for the students to meet new peers, and expose the students to new subject topics and content. All courses are advanced instructional programs that engage the students by using diverse teaching methods and hands-on activities.

The ABC program (Grades 5-6; two day duration) involves fun and interactive classes that are a direct extension of the elementary science curriculum. Also known as "*That is so gross! Human Anatomy and Forensic Science*"; this course uses plastinated specimens and detailed computerized "body tours" to teach the students about biological systems, and how disease can occur. Students are also exposed to basic forensic techniques, such as fingerprint analysis and crime scene searching. Through interactive exercises, the students gain an understanding of how the organs, muscles, nervous system, circulatory system and skeletal system of the body work together to perform the functions needed for life. The students then use this information to solve their own forensic cases.

The SEEDS (Seven-Eight Enrichment Day Studies) program (Grades 7-8; three day duration) focuses predominantly on

disease processes and forensic pathology. The students are introduced to anatomy, genetics, and infectious disease and are also introduced to the techniques of fingerprint analysis, DNA analysis, blood detection, and detailed crime scene searching. The students then apply these techniques to solving forensic cases, and use the knowledge they've learned to engage in "*CSI: FACT OR FICTION*" competition wherein the students determine if what happens on the prime-time TV show is indeed possible.

During the e=mc<sup>2</sup> program (Grades 11-12; five day duration), also known as "*Hands-On Forensic Pathology*"; students are introduced to the multifaceted world of pathology. Students are each assigned a forensic case (to determine cause of death) and a diagnostic case (to determine the disease present) at the beginning of the program, and use the information they learn during the week to solve their cases by the week's end. Students are exposed to elements of forensic pathology, gross anatomy, human genetics, cancer pathology, viruses, gene therapy, infectious diseases, epidemiology, immunology, and ethics. Students will also conduct experiments which are commonly performed in forensic laboratories, such as isolating and analyzing DNA, blood detection, fingerprint analysis, and chromatography. Students also learn the detailed science behind the prime time *CSI* show and use this knowledge to participate in "*CSI-FACT OR FICTION*" competitions.

#### GRADUATE STUDENT INSTRUCTORS

Taranjit Gujral, Jon Krieger, Andrea Lai, Cyndi Pruss, Fiona Rawle, Doug Richardson, Ashley Theis, Stephanie Vander Pol, and Ted Wright



# Research

The principal themes of the research programs in the Department include drug and radiation resistance in cancer, cancer biology and genetics, molecular hemostasis, amyloidogenesis and cholesterol metabolism. An emerging focus is translational oncologic research. Recent departmental initiatives in supporting the development of translational research programs have included the establishment of laser capture microdissection and tissue microarray facilities; equipment modernization in the gene microarray facility; and, the establishment of a frozen tissue tumour bank through a partnership with the Ontario Cancer Research Network.

Departmental research funding continued to grow progressively and total funding reached almost \$6.3M in 2004/2005. Over the course of the last five years, our total funding has increased 80% and funding received from the major national agencies has grown by more than 60%.

The quality and significance of the research conducted by our faculty is very high. In 2005, Susan Cole and Roger Deeley were co-recipients of the Robert L. Noble Prize of the Canadian Cancer Society/National Cancer Institute of Canada, an annual award given in recognition of outstanding achievements in cancer research.



TOTAL RESEARCH FUNDING (2005-2005)	\$ 6,285,846
TOTAL NUMBER OF AWARDS	77
CANADIAN INSTITUTES OF HEALTH RESEARCH/ MEDICAL RESEARCH COUNCIL OF CANADA	\$ 2,192,329
NATIONAL CANCER INSTITUTE OF CANADA	\$ 434,498
HEART AND STROKE FOUNDATION OF ONTARIO/CANADA	\$ 318,864
INDUSTRY	\$ 1,807,450
OTHER	\$ 1,532,705

## POSTDOCTORAL RESEARCH,

Harriet Feilletter, *Director, Queen's Microarray Facility*,  
David LeBrun, *Director, Experimental Pathology Unit*

### POSTDOCTORAL RESEARCH FELLOWS (Supervisor)

Gwenaelle Conseil (Susan Cole)	Lei Qin (Roger Deeley)
Yan Gao (Peter Greer)	Alice Rothnie (Susan Cole)
Roma Gurusankar (Scott Davey)	Yinfei Tan (Peter Greer)
Tozammel Hogue (Susan Cole)	Bin Wang (Susan Cole)
Akio Nakajima (Susan Cole)	Peng Wu (Susan Cole)
Maha Othman (David Lillicrap)	Jessica Wyles (Susan Cole)

## RESEARCH FUNDING

RESEARCHER	SPONSOR	TITLE
Tim Childs	Queen's University	Tissue microarray analysis of immunohistochemical profiles in leiomyosarcomas and leiomyomas
Tim Childs	Canadian Institutes of Health Research	Evaluation of natural killer cell contributions to the known elevated risk for pre-eclampsia in diabetic pregnancy
Susan Cole and David Lillicrap	Canadian Institutes of Health Research	Training grant in proteomics
Susan Cole	Canadian Institutes of Health Research	Protein function discovery resource infrastructure
Susan Cole	Canadian Institutes of Health Research	Novel aspects of nitroglycerin action: nitrate transport, apoptosis and nitrosative stress
Susan Cole	National Cancer Institute of Canada	Investigations of DNA topoisomerase II and drug resistance
Susan Cole and Roger Deeley	Canadian Institutes of Health Research	Investigations of MRP-mediated drug resistance and xenobiotic transport
Christine Collier	Queen's University	Elevated homocysteine in dementia: a randomized, double blind, placebo controlled, pilot treatment trial with B-vitamins
Christine Collier	Industry	Estimating functional testosterone: the importance of biological variation
Scott Davey	National Cancer Institute of Canada	DNA damage response in fission yeast
Scott Davey and Harriet Feilotter	Canadian Breast Cancer Foundation, CBCF, Ontario Chapter	Assessment of BRCA1 and BRCA2 functional status through genomic and radiobiological analyses
Scott Davey	Canadian Institutes of Health Research	Cell cycle checkpoint control
Roger Deeley	Heart and Stroke Foundation of Ontario	Functional studies of the ATP binding cassette transporter, ABCA 1
Roger Deeley and Susan Cole	Canadian Institutes of Health Research	MRP mediated multidrug resistance
Bruce Elliott, Susan Cole, Scott Davey, Roger Deeley, Peter Greer, David LeBrun, and David Lillicrap	Canadian Institutes of Health Research	Multi-user maintenance and equipment for flow cytometry, confocal microscope, microinjection and intraviral microscopy facility
Bruce Elliott	Canadian Breast Cancer Research Alliance	Novel interaction between Met and cell adhesion signalling in invasive cancer. A possible therapeutic target
Bruce Elliott	Canadian Institutes of Health Research	Targeting a novel activating role of Stat 3 in HGF expression in breast cancer; a possible therapeutic target
Bruce E. Elliott, Susan Cole, Scott Davey, Roger Deeley, Peter Greer, David LeBrun and David Lillicrap	Canadian Institutes of Health Research	Maintenance grant for multi-user equipment: flow cytometer and confocal microscope
Harriet Feilotter	Ontario Cancer Research Network	Ontario cancer biomarker network
Harriet Feilotter, Dilys Rapson, Lois Shepherd, Karen Harrison and Kristine Roland	Ontario Association of Medical Laboratories	Investigation of non-random gene mutation associations in chronic myeloid disorders.
Harriet Feilotter	Queen's University	Investigation of non-random gene mutation associations in chronic myeloid disorders
Harriet Feilotter, Karen Harrison and David LeBrun	Ontario Cancer Research Network	Multi-dimensional profiling of follicular lymphoma



RESEARCHER	SPONSOR	TITLE
Harriet Feilotter and Scott Davey	Queen's University	Assessment of BRCA1 and BRCA2 functional status through genomic and radiobiological analyses
Peter Greer, Susan Cole, Scott Davey, Roger Deeley, Bruce Elliott, David LeBrun, and Lois Mulligan	Canadian Institutes of Health Research	Multi-user multi-modal imaging system
Peter Greer	National Cancer Institute of Canada	A genetic and molecular analysis of the fps/fes proto-oncogene
Peter Greer	Canadian Institutes of Health Research	A molecular and genetic analysis of the murine fer proto-oncogene
Peter Greer	Canadian Institutes of Health Research	Genetic and cell biological analysis of calpain
Karen Harrison, Phillip Isotalo and Sandip SenGupta	Queen's University	Molecular cytogenetic screening of breast cancers for HER-2/neu gene amplification: comparison of fluorescence and chromogenic in situ hybridization
Karen Harrison, Harriet Feilotter, and John Rossiter	Queen's University	Molecular investigation of oligodendrogliomas using CGH microarray and molecular cytogenetic technology
Karen Harrison, Phillip Isotalo and Sandip SenGupta	Queen's University	Molecular cytogenetic screening of breast cancers for HER-2/neu gene amplification using chromogenic in situ hybridization
David Hurlbut	PSI Foundation	Sentinel lymph node mapping in colon cancer
David Hurlbut	Queen's University	Sentinel lymph node mapping in colon cancer: a feasibility study
Phillip Isotalo	Queen's University	Treatment variation and treatment effectiveness in differentiated thyroid cancer
Phillip Isotalo	Ontario Cancer Research Network	Tissue bank contract
Phillip Isotalo and Bruce Elliott	Kingston General Hospital	Gene expression profiles associated with met and Stat3 signaling networks in invasive human breast cancer
Phillip Isotalo and Bruce Elliott	Queen's University	Ezrin and met expression profile in invasive human breast cancer
Robert Kisilevsky	Heart and Stroke Foundation of Ontario	Acute phase SAA and cholesterol metabolism during inflammation
Robert Kisilevsky	Canadian Institutes of Health Research	SAA2.1 peptide therapeutics: two lead drug development candidates for the prevention and/or regression of atherosclerosis
Robert Kisilevsky	Canadian Institutes of Health Research	Amyloidogenesis: an analysis of the causative factors in an experimental murine model
David LeBrun	National Cancer Institute of Canada	The role of acetylation in regulating the leukemogenic protein E2A-PBX1
David LeBrun	Canadian Institutes of Health Research	Biophysical characterization of the E2A-CBP protein-protein interaction in acute lymphoblastic leukemia
David LeBrun	Industry	Companion studies in a clinical trial of bevacizumab in advanced colorectal cancer
David Lillicrap	Heart and Stroke Foundation of Ontario	Influence of genotype and environment on endothelial cell expression of von Willebrand factor

RESEARCHER	SPONSOR	TITLE
David Lillicrap	Canadian Institutes of Health Research	Gene therapy for hemophilia A: studies of efficacy and the host immune response
David Lillicrap	Canadian Institutes of Health Research	Pathophysiologic mechanisms of von Willebrand factor biosynthesis
David Lillicrap	National Centers of Excellence	Genetically modified, autologous stem cell populations for hemophilia A
David Lillicrap	Heart and Stroke Foundation of Ontario	Collaborative studies of hemostasis, fibrinolysis and vascular cell growth and function
David Lillicrap	Canadian Hemophilia Society	Impact of von Willebrand disease in the primary care setting
David Lillicrap	Heart and Stroke Foundation of Ontario	The role of von Willebrand factor in arterial thrombosis
David Lillicrap	Canadian Institutes for Health Research	Evaluation of novel therapies in a unique canine model of hemophilia A
David Lillicrap	National Centers of Excellence, Stem Cell Network	Stem cell-based gene therapy for hemophilia A
David Lillicrap	US National Institutes of Health	The molecular genetic pathology of Type 1 von Willebrand disease
David Lillicrap	Association of Hemophilia Clinic Directors of Canada	National hemophilia mutation testing laboratory
Lois Mulligan Susan Cole, Roger Deeley, Bruce Elliott, Peter Greer, D. LeBrun and Scott Davey	Canadian Institutes of Health Research	Transdisciplinary training program in cancer research
Lois Mulligan	Canadian Institutes of Health Research	Developing and characterizing models for RET receptor function
Lois Mulligan	SWEP	Molecular biology research assistant
Lois Mulligan	SWEP	Research assistant: Pathology and Molecular Medicine
Lois Mulligan, Susan Cole, Roger Deeley and Peter Greer	Canadian Institutes of Health Research	Transdisciplinary training program in cancer research
Christopher Nicol	Kingston General Hospital and Dering Cancer Research Grant	Mechanisms of peroxisome proliferator-activated receptors influence on breast cancer
Christopher Nicol	Cancer Care Ontario	PPARs and cancer
Christopher Nicol	Queen's University	Biochemical and molecular mechanisms of peroxisome proliferator-activated receptors (PPARs) influence on carcinogenesis
Christopher Nicol	Canada Foundation for Innovation	Biochemical and molecular mechanisms of peroxisome proliferator-activated receptors (PPARs) influence on carcinogenesis
Caroline Rowlands	Queen's University	Department of Pathology and Molecular Medicine
Dilys Rapson	Industry	Waveform analysis of the aPTT in critically ill hospitalized patients
Dilys Rapson	Canadian Intensive Care Foundation	The relationship between insulin resistance, coagulation, inflammation, and clinical outcomes
Dilys Rapson and David Lillicrap	Queen's University	Prospective investigation of non-VWD bleeders
Lorne Seargeant	Queen's University	Glycosylation disorders

RESEARCHER	SPONSOR	TITLE
Lorne Seargeant and David Lillcrap	Queen's University	Disorders of glycosylation in patients with unexplained disorders of hemostasis
Lorne Seargeant	Garrod Association of Canada	Glycan analysis in patients with bleeding disorders
Lois Shepherd	CTRNet	CTRNet data interface project
Lois Shepherd	Industry	Multiple Phase I/II/II clinical trials of chemotherapeutic agents
Lois Shepherd	Industry	Tumour bank data project
Lois Shepherd	Industry	Fellowship funding
Sherry Taylor	Ontario Women's Health Council	Genetics education for health care provinces
Sherry Taylor	Ontario Women's Health Council	Research on a new genetic mutation screening technique for hereditary breast and ovarian cancer
Sherry Taylor	Canadian Institutes of Health Research	Transdisciplinary cancer research training grant
Sherry Taylor	Queen's University	A phase II study of BAY 43-9006 (NSC 724772) in patients with hormone refractory prostate cancer
Xiaolong Yang	Canadian Institutes of Health Research	Molecular and cellular functions of tumor suppressor gene LATS
Xiaolong Yang	Queen's University	Tumor suppressors and cancer
Xiaolong Yang	Ontario Research Fund	Molecular and cellular functions of tumor suppressor genes
Xiaolong Yang	Canadian Foundation for Innovation	Molecular and cellular functions of tumor suppressor genes
Xiaolong Yang	Queen's University	Identification of tumour suppressor LATS kinase substrates
Iain Young	National Cancer Institute of Canada Clinical Trials Group	Tumour bank contract
Dick Zoutman	Health Canada	Canadian surgical wound surveillance
Dick Zoutman	Health Canada	Clostridium difficile: national surveillance project
Dick Zoutman	Health Canada	Epidemiology of febrile respiratory infection in acute hospitals
Dick Zoutman	Community and Hospital Infection Control Association of Canada	Resources for infection control in long-term care facilities





## VISITING LECTURERS

Michael Bookman  
*Fox Chase Cancer Center,*

Sean Egan  
*Hospital for Sick Children, Toronto, ON*

Richard Fahlman  
*University of British Columbia,  
Vancouver, BC*

Nathalie Lamarche  
*McGill University, Montreal, QC*

Peter McPherson  
*McGill University, Montreal, QC*

Farah Moid  
*Ohio State University, Columbus, OH*

William Muller  
*McGill University, Montreal, QC*

Linda Penn  
*Ontario Cancer Institute, Toronto, ON*

Peter Siegel  
*McGill University, Montreal, QC*

Timothy Triche  
*University of Southern  
California/Childrens Hospital Los Angeles,  
Los Angeles, CA*

William Trimble  
*University of Toronto, Toronto, ON*

James Turkson  
*University of South Florida, Tampa, FL*

John Veinot  
*University of Ottawa, Ottawa, ON*

## THE NATHAN KAUFMAN LECTURE

**N**athan Kaufman was born in Lachine, Quebec and educated at McGill University graduating with a medical degree in 1941. He interned at the *Royal Victoria Hospital* and then served as a Medical Officer to a tank battalion in Western Europe and was honoured with an MBE. After 18 months as a pathology resident at the *Jewish General Hospital* in Montreal he moved with his wife Rita to the *Cleveland Metropolitan General Hospital* to complete his residency. He then joined the Faculty at *Case Western* and quickly began a successful and satisfying career in iron metabolism research, medical education and laboratory administration. In 1967 after seven years as a Professor at *Duke University*, he was recruited by Dean Harry Botterell to succeed Bob More as the Head of Pathology at *Queen's*.

His accomplishments at *Queen's* were numerous. They included the development of the *NCIC Cancer Research Unit*, recruitment and nurturing of many senior faculty, distinguished service to senior committees of the Hospital, University and the *Medical Research Council of Canada*, and expansion of our research and training programs. During his twelve years at *Queen's*, Dr. Kaufman became internationally recognized for his distinguished leadership as Editor of

*Laboratory Investigation*, President of the *US-Canadian Academy of Pathology* and the *International Academy of Pathology*. On leaving *Queen's* he moved to Augusta as the first full-time Secretary/Treasurer of the *USCAP*. He has been recognized by the *USCAP* for his numerous contributions and was honoured with the establishment of the *Nathan Kaufman Timely Topics Lecture* which is delivered annually at the *USCAP* meeting.

Through this lectureship the Department honours Nathan Kaufman's extraordinary influence in shaping the scholarly life of our department and his international contributions to academic pathology.

- 2004 Dietrich Keppler, *German Cancer Centre, University of Heidelberg, Heidelberg, Germany*
- 2003 Ulf Lindahl, *Uppsala University, Uppsala, Sweden*
- 2002 Janet Rossant, *Samuel Lunenfeld Research Institute, Mount Sinai Hospital, Toronto, ON*
- 2000 Errol Friedberg, *Southwestern Medical School, TX*

## THE M. DARIA HAUST LECTURE

**M**. Daria Haust was born in Poland, and graduated summa cum laude from medical school of *Heidelberg University* in 1951. After emigrating to Canada with her husband in 1952, she entered a rotating internship at the *Kingston General Hospital*. She undertook a year of atherosclerosis research with Dr. Robert More and then enrolled in the general pathology residency program at *Queen's*. In 1959 she achieved specialty certification from the *Royal College of Physicians and Surgeons* and also obtained an MSc-degree from *Queen's*. Following a postdoctoral fellowship in pediatric pathology with Dr. Benjamin Landing at the *Cincinnati Children's Hospital*, Dr. Haust joined the Faculty at *Queen's* in 1960. She successfully nurtured two sons, embarked on a career in experimental atherosclerosis and pediatric pathology and, in 1967, moved to the *University of Western Ontario* where she remains active as Professor Emeritus.

Dr. Haust has had a distinguished career in basic research in several areas including atherosclerosis, the process of elastogenesis, and the pathogenesis of several genetic diseases. She is a highly regarded educator and has played important roles in the establishment of national and international scientific societies. She also served on a number of Editorial Boards of scientific journals and was invited to lecture around the globe on countless occasions. Her scientific contributions have been honoured by a multiplicity of distinctions (e.g., the *Canada Council Killam Prize in Medicine*; Gold Medal Award from the *International Atherosclerosis Society*; Honorary membership of the *Academy of Science of Heidelberg*; Best Teacher Awards at the *University of Western Ontario*; the William Boyd Lectureship of the *Canadian*

*Association of Pathology*; the Andreas Vesalius Medal by the *University of Padua*; Honorary Professorship of Medicine from the *University of Chile*, and many others). Dr. Haust's biography, as one of the Founders of *Pediatric Pathology*, appeared in 2001, and a Festschrift in her honour with contributions from 14 international scientists was published in a scientific journal in 2002. In 2004 she received the Distinguished Pathologist Award from the *US/Canadian Academy of Pathology*. She is the recipient of honorary degrees in medicine from three mediaeval Universities (*Jagiellonian University, Krakow*; *Charles University, Prague*; *Havana University, Havana*).

Through this lectureship the Department honours Daria Haust's scholarly achievements, her contributions to her profession, and her continuing passionate devotion to our department and to *Queen's University*.

- 2005 Timothy Triche, *Professor of Pathology and Pediatrics, University of Southern California, and Head, Department of Pathology, Childrens Hospital Los Angeles, Los Angeles, CA*
- 2003 Luc Oligny, *Pediatric and Molecular Pathologist, Department of Pathology and Cellular Biology, Université de Montréal and Hôpital Sainte-Justine, Montréal, P Q*
- 2001 Kurt Benirschke, *Emeritus Professor of Pathology and Reproductive Medicine, University Medical Center, San Diego, CA*

## INVITED LECTURES AND PRESENTATIONS BY FACULTY

### Susan Cole

Markey Cancer Center, University of Kentucky, Lexington, KY  
School of Pharmacy, University of North Carolina, Chapel Hill, NC  
*13th Meeting on Pollution Responses in Marine Organisms*, Alessandria, Italy  
*John Roder 25th Anniversary Symposium*, Mount Sinai Hospital, Toronto, ON  
NCIC/CCS Robert L. Noble Prize Lecture, Queen's University, Kingston, ON  
*12th Annual MDIBL Environmental Health Sciences Symposium*, Salisbury Cove, ME  
*2nd Annual North American ABC Genetic Workshop*, Frederick, MD

### Christine Collier

Canadian Society of Nephrologists, Calgary, AB

### Roger Deeley

*2005 FASEB Summer Research Conference*, FASEB, Saxtons River, VT  
NCIC/CCS Robert L. Noble Prize Lecture, Queen's University, Kingston, ON

### David Dexter

*Ontario Coroners' Meeting*, Niagara Falls, ON

### Bruce Elliott

le Centre de Recherche en Cancerologie de l'Université Laval, Quebec City, QC

### Peter Greer

The Hospital for Sick Children, Toronto, ON  
The Blood Centre of Southeastern Wisconsin, WI  
Ottawa Health Research Institute, Center for Cancer Therapeutics, Ottawa, ON

### Karen Harrison

Michener Institute, Toronto, ON

### Robert Kisilevsky

Council of Academic Hospitals of Ontario, Toronto, ON

### David LeBrun

Ottawa Hospital Research Institute, Ottawa, ON

### David Lillicrap

Hemophilia Products: Safety, Function and Alternative Administration, London, UK

Department of Genetics, McGill University, Montreal, QC

Department of Pathology and Molecular Medicine, McMaster University, Hamilton, ON

*Fifth Bari International Conference on Hemophilia and Allied Disorders*, Foggia, Italy

Mayo Clinic, Rochester, MN

Imperial College School of Medicine, London, UK

Sir John Dacie Lecture, *37th Annual Advances in Haematology Course*, Imperial College, London, UK

International Society on Thrombosis and Hemostasis, Sydney, Australia

*Hemophilia Foundation of Australia Annual Conference*, Melbourne, Australia

Baxter Bioscience, Toronto, ON

US National Hemophilia Foundation 57th Annual Meeting, San Diego, CA

University of Nevada, Department of Pediatrics, Las Vegas, NV

Genzyme Inc, Boston, MA

Canadian Stem Cell Network Annual Meeting, Calgary, AB

### Sam Ludwin

Multiple Sclerosis Update, Philadelphia PA  
*19th Annual Meeting of the Consortium of Multiple Sclerosis Centres*, Orlando, FL

*40th Meeting of the Canadian Congress of Neurological Sciences*, Ottawa, ON

*Symposium on the Role of T Cells in Pathological and Clinical Events*

*in Multiple Sclerosis*, Carolinas Healthcare System, Charlotte, NC

### Lois Mulligan

AACR, Anaheim, CA  
*First International Symposium on Pheochromocytoma*, Pheochromocytoma Research Support Organization (PRESSOR), Bethesda, MD

### Lois Shepherd

Canadian Society of Transfusion Medicine, St. John's, NFLD

### Sherry Taylor

Faculty of Law, Health Law Day, University of Toronto, Toronto, ON

### Iain Young

University of Toronto, Toronto, ON  
St. Michael's Hospital, Toronto, ON

### Dick Zoutman

*SEO Symposium on Emergency Preparedness*, Healthcare Network of SEO, Kingston, ON  
*Ontario Hospital Association Symposium on Hospital Infections*, Ontario Hospital Association, Toronto, ON  
*Community & Hospital Infection Control Association-Canada Annual Meeting*, Winnipeg, MB

## PATENTS GRANTED

### Susan Cole and Roger Deeley

Multidrug Resistance Protein: Japanese Patent

### Robert Kisilevsky

Method for Treating Amyloidosis: Japanese Patent  
Method for Treating Amyloidosis: European Patents (2)

### David Lillicrap

Canine Factor VIII cDNA Gene Therapy – US Patent

## LICENSES GRANTED

### Susan Cole and Roger Deeley

Solvo Biotechnologies



## PUBLICATIONS

- R. Leong, B.R. Gannon, **T.J. Childs**, **P.A. Isotalo**, H. Abdollah. *Aspergillus fumigatus* pacemaker endocarditis: a case report and review of the literature. *Canadian Journal of Cardiology* (in press).
- C.J. Westlake, **S.P.C. Cole** and **R.G. Deeley**. Role of the NH<sub>2</sub>-terminal membrane spanning domain of MRP1/ABCC1 in protein processing and trafficking. *Mol. Biol. Cell* 16: 2483-2492, 2005.
- L. Payen, M. Gao, C. Westlake, A. Theis, **S.P.C. Cole** and **R.G. Deeley**. Functional interactions between nucleotide binding domains and LTC<sub>4</sub> binding sites of multidrug resistance protein 1 (ABCC1). *Mol. Pharmacol.* 67: 1944-1953, 2005.
- D-W. Zhang, K. Nunoya, M. Vasa, H-M. Gu, **S.P.C. Cole** and **R.G. Deeley**. Mutational analysis of polar amino acid residues within predicted transmembrane helices 10 and 16 of multidrug resistance protein 1 (ABCC1): effect on substrate specificity. *Drug Metab. Disp.* doi.10.1124.dmd.105.007740.
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## BOOK CHAPTERS

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# Laboratory Medicine and Clinical Services

**T**hrough its divisions of Anatomic Pathology, Hematopathology, Clinical Chemistry, Microbiology, and Genetics, the department provides services in Laboratory Medicine, Transfusion Medicine, Infection Control and Clinical Genetics to both the *Academic Health Sciences Centre* and the broader region of southeastern Ontario.

In 2005, there were a number of exciting changes and developments in the Clinical Laboratories, most notably involving new staff and new equipment. Due to a departure and some retirements at the management level, we started the year with a new Administrative Director and new Managers in Core Lab and Microbiology/Infection Control. We created several new senior and charge technologist positions throughout the Labs and continued our focus on having front-line staff participate through Continuous Quality Improvement teams to address some process and structural issues in the Labs. Our department has been congratulated by the hospital for our excellent quality assurance program and we continue to be a model for others to strive towards.

The provincial government provided \$3.48 million to our region to purchase diagnostic medical equipment and, as a result, we obtained a total of 46 new instruments for our region's hospital laboratories. Locally, this included coagulation analyzers, blood gas analyzers, a variant hemoglobin analyzer, automated bacterial identification and sensitivity system, automated blood bank system, automated immunohistochemistry stainers, histology slide stainer, labeler and an embedding centre. PCR instrumentation was introduced to the Microbiology Laboratory, where its initial application has been the identification of methicillin resistant *Staph aureus*, and expanded in diagnostic molecular genetics. With funding from the OCRN, we began operating a Tumour Bank which harvests fresh tissue from the Operating Room for the cancer research. Renovations to the Autopsy Suite, including the installation of x-ray equipment, were virtually completed in 2005, permitting us to improve the efficiency and quality of the work done in our Regional Forensic Unit. Our Infection Control Program continues to grow: we added a fourth Infection Control Practitioner and, at a regional level, we played a lead role in the development of a regional Infection Control program which has received significant new funding from the provincial government.

## CLINICAL LEADERSHIP

Iain Young, *Department Head*  
Sandip SenGupta, *Deputy Head and Medical Director, Clinical Laboratories*

### DIVISION OF ANATOMIC PATHOLOGY

Sandy Boag, *Service Chief*  
David Dexter, *Clinical Director, Regional Forensic Unit and Autopsy Service*  
Caroline Rowlands, *Clinical Director, Cytology*

### DIVISION OF HEMATOPATHOLOGY

Dilys Rapson, *Service Chief*  
Lois Shepherd, *Clinical Director, Blood Bank and Transfusion Medicine*

### DIVISION OF CLINICAL CHEMISTRY

Lorne Seargeant, *Service Chief*

### DIVISION OF MICROBIOLOGY

Dick Zoutman, *Service Chief and Clinical Director, Infection Control*

### DIVISION OF GENETICS

David Lillcrap, *Service Chief*  
Karen Harrison, *Laboratory Coordinator and Clinical Director, Cytogenetics*  
Sherry Taylor, *Clinical Director, DNA Diagnostics*

### REGIONAL LABORATORY

#### OUTREACH PROGRAM

Sandip SenGupta, *Clinical Director*  
David Dexter, *Laboratory Director, Kingston MDS Laboratories*  
Dilys Rapson, *Laboratory Director, Lennox and Addington Hospital*  
Mike Raymond, *Laboratory Director, Weeneebayko Regional Hospital*  
Sandip SenGupta, *Laboratory Director, Perth/Smiths Falls Hospital and Ongwanada*  
Dick Zoutman, *Laboratory Director and Medical Director of Infection Control, Providence Continuing Care Centre*



# Awards, Honours and Achievements



## ROBERT L. NOBLE PRIZE PRESENTATIONS AND LECTURE

Wednesday, November 16, 2005, 5:00 P.M.  
BOTTERELL HALL, ROOM B139

### RECIPIENTS OF THE 2005 ROBERT L. NOBLE PRIZE



Susan P.C. Cole  
Ph.D., F.R.S.C.

Canada Research Chair in Cancer Biology  
Professor of Pathology & Molecular Medicine,  
Pharmacology & Toxicology, and Oncology  
Senior Scientist of Cancer Care Ontario

Roger G. Deeley  
Ph.D.

Stauffer Research Professor  
Professor of Pathology & Molecular Medicine,  
Biochemistry, and Oncology  
Director, Queen's Cancer Research Institute  
Director, Research, Cancer Care Ontario

#### Lecture Title

**"Multidrug Resistance Protein 1...and Friends"**

*The Robert L. Noble Prize is sponsored by the Canadian Cancer Society and awarded by the National Cancer Institute of Canada for outstanding achievements in cancer research*



Canadian Cancer Society  
Société canadienne du cancer



National Cancer Institute of Canada  
Institut national du cancer du Canada

## FACULTY

### PERSONNEL AWARDS

**Susan Cole**, Canada Research Chair, Tier I, Cancer Biology.

**Scott Davey**, Cancer Care Ontario Scientist Salary Award.

**Roger Deeley**, Stauffer Research Professor, Faculty of Health Sciences, Queen's University.

**David Lillicrap**, Canada Research Chair, Tier I, Molecular Hemostasis.

**David Lillicrap**, Career Investigator Award, Ontario Heart and Stroke Foundation.

### INTERNATIONAL

#### Susan Cole

Elected to the Nominating Committee of the American Association for Cancer Research.

Elected Co-Chairperson, 2007 Gordon Research Conference on "Multi-Drug Efflux Systems".

Member, Scientific Advisory Board, Federation of European Biological Societies.

Co-organizer, FEBS Special Meeting on ABC Proteins – ABC 2006, Federation of European Biological Societies.

Member, External Advisory Board, Roswell Park Cancer Institute.

#### Christine Collier

Program Chair (President Elect), Upstate NY-American Association of Clinical Chemists.

Councillor, International Association of Therapeutic Drug Monitoring and Clinical Toxicology.

#### Robert Kisilevsky

Board of Director, Member at Large, International Society of Amyloidosis.

Ad Hoc Consultant, Project Program Review, National Institute of Health.

Member, Advisory Committee, XIth International Symposium on Amyloidosis.

Member, Scientific Advisory Board, Institute for the Study of Aging.

Member, Editorial Board, *Amyloid: The Journal of Protein Folding Disorders*.

#### David Lillicrap

Chairperson, Gene Therapy and Novel Technology Committee, World Federation of Hemophilia.

Co-Chairperson, Scientific Standardization Committee Subcommittee on Von Willebrand Factor, International Society for Thrombosis and Hemostasis.

Presented the Inaugural Sir John Dacie Lecture at the Imperial College School of Medicine, London, UK

Presented the Arosenius Lecture "Genetic and Cellular Therapies for Hemophilia" to the Swedish Hemophilia Society.

#### Samuel Ludwin

Delivered the lecture, "Oligodendrocytes and Tissue Repair in MS" at the 2005 MS Update Meeting, Philadelphia, PA.

Delivered the lecture, "Understanding MS through Pathology", at the 19th Annual Meeting of the Consortium of MS Centres, Navigating the World of MS, Orlando, Florida.

Delivered the lecture, "Current Understanding of the Evolution of Cellular Pathology in MS", at the Symposium on the Role of T Cells in Pathological and Clinical Events in MS by the Carolinas HealthCare System, Charlotte, NC.

Invited Chair/Organizer, Ectrimis/Actrimis Annual Meeting, Thessaloniki, Greece.

#### Lois Shepherd

Member, Group Banking Committee, US National Cancer Institute.

Member, International Development Project, Breast International Group.

## NATIONAL

### Susan Cole

Co-recipient of the Robert L. Noble Prize of the Canadian Cancer Society/National Cancer Institute of Canada.  
Elected Researcher of the Week (February 16, 2005) by Canadians for Health Research.  
Member, College of Reviewers, Canada Research Chair Program.  
Member, Research Advisory Committee, Cancer Care Ontario.

### Christine Collier

Received the 2005 Canadian Association of Medical Education (CAME) Certificate of Merit.  
President, Ontario Society of Clinical Chemists.

### Roger Deeley

Director, Division of Research, Cancer Care Ontario.  
Co-recipient of the Robert L. Noble Prize of the Canadian Cancer Society/National Cancer Institute of Canada.

### Phillip Isotalo

Received the award for Best Poster Presentation at the 2005 *Canadian Surgery Forum*.

### Robert Kisilevsky

Recipient of the Award of Excellence – Emerging Technology (AtheroChem) of the Kingston Technology Council.

### David Lillicrap

Chair, von Willebrand Disease Scientific Subcommittee of the Association of Hemophilia Clinic Directors of Canada.

### Samuel Ludwin

Chair, Medical Advisory Committee, Canadian Multiple Sclerosis Society.

### Dilys Rapson

Vice Chair, Examination Board for Hematological Pathology, RCPSC.

### John Rossiter

Vice-Chair, Neuropathology Fellowship Examination Board, RCPSC.

### Lois Shepherd

Vice-President, Canadian Society of Transfusion Medicine.  
Physician Coordinator of Multicentered Phase III Clinical Trials, National Cancer Institute of Canada – Clinical Trials Group.  
Member, Management Committee, Canadian Tumour Repository Network.  
Member, Clinical Advisory Committee in Transfusion Medicine, Canadian Blood Services.

### Sherry Taylor

Chair, Laboratory Genetics Fellowship Review Committee, Ontario Ministry of Health.

### Dick Zoutman

Co-Chair, Provincial Infectious Diseases Advisory Committee.

## UNIVERSITY

### David Hurlbut

Received the Department of Pathology and Molecular Medicine R.S.A. Prentice Award for Excellence in Teaching.

### Lewis Tomalty

Received the Reddick Award for excellence in nursing education from the School of Nursing

## RESIDENTS

### R.S.A. PRENTICE AWARD

Kristine Roland, for best presentation

## GRADUATE STUDENTS

### ACADEMIC HONOURS AND AWARDS

### QUEEN'S UNIVERSITY GOVERNOR GENERAL'S ACADEMIC GOLD MEDAL

Adina Vultur, received upon graduation

### DARIA HAUST AWARD

Zoya Shapovalova

### ROBERT KISILEVSKY AWARD

Rozanne Arulanandam  
Taranjit Gujral  
Doug Richardson  
Andrew Slot

## POSTDOCTORAL FELLOWS AND TRAINEES

### GEORGE CHRISTIAN HOFFMAN FELLOWSHIP

Takayuki Murase  
Akio Nakajima  
Maha Othman

### NOVO NORDISK CANADA

### INC-CHS-AHCDC FELLOWSHIP

Maha Othman, for congenital and acquired bleeding disorders.

### MOH-LTC LABORATORY GENETICS FELLOWSHIP

Shulin Zhang