VITAL SIGNS



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SCIENTIFIC COMMENTARY

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SYSTEMS BIOLOGY AND MEDICINE

As science advances in the realms of genomics, transcriptomics, proteomics, metabolomics and other "omics", it will become indispensable for medicine to evolve in the paradigms that it applies to understand pathophysiology, diagnosis and treatment of disease. Medicine must move away from the application of Cartesian reductionism and take into account the different planes which biology encompasses, and particularly the interactions between the different "omics" using clustered nodal networks in order to allow a deeper and more holistic understanding of cause-effect, what is today understood as "systems biology" or "systems medicine". Systems medicine implies the attempt to go from molecule to organelle, cell, tissue, organ, individual, environment, population, ecosystem, integrating the different levels to reveal an emergent behaviour of the biological or pathobiological process that is being considered.

Systems biology integrates genetic, genomic, biochemical, cellular, physiological, and clinical data and generates networks that allow modeling of biological phenomena, either normal or

abnormal, permitting prediction of effects of drugs or mechanisms and manifestations of disease. These networks comprise nodes of linked proteins and genes that underlie biological phenomena and represent the whole system, demonstrating the complex nature and interconnectedness of biological mechanisms that explain the fact that these sometimes provide unexpected effects In a way, these networks are no more than order out of chaos, and explain the "black box" that we have in the past substituted for mechanisms that we did not know about or understand. These complex biological systems are made up of nodes linked with a clustered architecture and variable connectivity. These networks have emergent properties, with unpredictable behaviour when the latter is examined based only on properties of individual nodes. This means that the whole acts differently from its individual parts. Despite this, behaviour of the system may be predictable from partial knowledge of dominant components.

One of many examples of this innovative approach for understanding mechanisms in

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(Continued from page 1 / Systems Biology and Medicine) disease is a recently published paper integrating network analysis of existing genome-wide mRNA expression data, algorithmic prediction of microRNA (miR) targets, previously established concepts of biological pathways involved in pulmonary hypertension, and in vitro and in vivo experimentation.2 Using a systems biology approach, the authors identified miRs associated with multiple pathogenic pathways which play roles in pulmonary hypertension. Specifically, miR-21 was predicted as important in pulmonary hypertension, regulating targets related to bone morphogenetic protein (BMP) and the Rho/Rho-kinase pathway, as well as pathways associated with hypoxia, inflammation, and genetic haplo-insufficiency of BMP receptor type 2 (BMPR2). A network-based bioinformatic approach together with in vivo data allowed thus understanding the participation of miR-21 in the pathophysiology of pulmonary hypertension.

There are many such examples in pharmacology and pathophysiology, of use of the concept of network or systems biology that may allow control of the different elements involved in the response to a drug or progression of disease. With precision (personalized) medicine we should be able to adequately stratify disease and apply a systems biology approach to diagnosis or treatment.

For the complete article, <u>please click</u> <u>here</u>.

References:

- 1. Loscalzo, J. Personalized Cardiovascular Medicine and Drug Development. Circulation. 2012;125:638-645.
- 2. Parikh VN, et al. MicroRNA-21 Integrates Pathogenic Signaling to Control Pulmonary Hypertension: Results of a Network Bioinformatics Approach. Circulation 2012, 125:1520-1532.

THE MUHC PATROL CLINIC - ORPHAN DISEASES AND TRANSITION CARE



Dr. Jennifer S. Landry, Assistant Professor, Respiratory Division &

Dr. Arnold Kristof, Associate Professor, Critical Care and Respiratory Divisions

Imagine suffering from a disease that your doctor has never heard of or can't even spell properly? A rare or "orphan" disease is generally considered to have a prevalence of fewer than 1 in 2,000 people. However, there are more than 7,000 rare disorders that, taken together, affect approximately 3 million Canadians. Therefore, approximately one in ten individuals in Canada have been diagnosed with a rare disorder.

The mission of the MUHC Pediatric to Adult Transition and Orphan Lung disease (PATROL) clinic is focused on the care of patients with disorders of known molecular defect that are primarily manifested in the lung. Many of these diseases manifest themselves in both pediatric and adult populations, whereas others occur mainly in adults. The clinic therefore incorporates patients transitioning from pediatric to adult care and suffering from diseases such as Alpha-1 Antitrypsin Deficiency, Lymphangioleiomyomatosis. Tuberous Sclerosis Complex, Bronchopulmonary dysplasia, Congenital Central Hypoventilation Syndrome and Primary Ciliary Dyskinesia. The clinic is co-directed by Dr. Jennifer Landry (Clinical Director) and Dr. Arnold Kristof (Scientific Director). We are pulmonary clinicianscientists, and our collective expertise incorporates clinical, basic, and translational research.

It is clear that rare diseases comprise a common entity that is poorly addressed in our current health care system, and that the care of patients with rare lung disorders warrants optimal organization. Consistent with this perceived deficiency, patient advocacy groups such as the Canadian Organization for Rare Disorders (CORD) and the *Portail québécois des maladies génétiques orphelines* (PQMGO) have called upon governments to support enhanced newborn screening, establish centers of reference to diagnose and treat patients, develop rare disorders research programs, formulate an orphan drug policy, and stimulate the development of new therapies.

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(Continued from page 2 / PATROL) The PATROL clinic offers specialized care needs for patients with rare lung diseases. These include liaison with community services (e.g., CLSC), access to specialized genetic and molecular diagnostics, access to orphan drugs or innovative therapeutic agents, and referral to organ transplantation services. In addition, molecular abnormalities in patients with rare lung diseases often manifest themselves in other organ systems, and requiring referral to tertiary care clinical consultants. The PATROL clinic also serves as an entry point for pediatric to adult transition care, as well as a platform for integrating clinical and translational (i.e., patientoriented) research initiatives. We act as a hub for patients with rare lung diseases to connect with the existing clinical research networks, sources of high quality information, and specialized clinical services. So far, this McGill University Health Centre clinical initiative has facilitated diagnosis, prognostic evaluation, and treatment of patients with lung disorders that are uncommonly seen in general respiratory medicine practices. More than 80 patients are currently followed at the clinic, with one or two new referrals monthly. Referral to our clinic can be arranged by contacting Dr. Landry by e-mail at Jennifer.landry@mcgill.ca or by faxing a consultation to 514-843-2083.

THE THIRD ANNUAL MCGILL UNIVERSITY DEPARTMENT OF MEDICINE RESEARCH SYMPOSIUM



Dr. James Martin, Interim Chair and Executive Vice-Chair, Faculty Affairs, Department of Medicine

A stimulating third annual research symposium was held in the new and convivial amphitheatre of the Institute of Community and Family Psychiatry on Friday April 27th. A small but interested audience was regaled with talks of the highest quality of medical science, spanning a broad range of topics from the most basic to the applied of medical science. The symposium was hosted by Dr. Ernesto Schiffrin and ably coordinated between Ms. Ranjan Sudra at the JGH and the team of Domenica Cami and Emily Di Lauro at the RVH Office. Dr. Schiffrin opened the meeting by welcoming the speakers and audience and stressing the importance of such events for an academic department. Dr. Stéphane RIchard taught us of the important role of RNA binding proteins in a variety of diseases (sarcomas, neurological syndromes and certain other genetic diseases). He masterfully explained how their exploration is bringing hope for demyelinating disease. Ms. Erin Lafferty, Dr. Salman Qureshi's graduate student and winner of the competition for best oral presentation at the Division of Experimental Research Day, spoke of the role of the protein Unc93b1 in the susceptibility to severe disease following infection with influenza. Using an Unc deficient mouse model of infection, she showed how loss of this protein was protective consistent with the adverse effects of an exuberant host response to infection. We were next treated to the first keynote lecture with a limpid presentation by Dr. Rod McInnes, scientific director of the Lady Davis Institute, on the slow and mysterious process of photoreceptor degeneration with its curious first order kinetics and the promise of emerging therapies for slowing the inevitable march to blindness. Dr. Mamatha Bhat, currently a research fellow in gastroenterology and PhD student of Dr. Nahum Sonnenberg, showed us the results of her experiments on the induction of cell death of hepatomas by metformin. Dr. Momar Ndao educated us on the potential impact of undetected Chaga's disease, a cause of megaesophagus, megacolon and dilated cardiomyopathy, suggesting the improbable strategy of a conversation between the specialists seeing these conditions and their infectious disease colleagues! Dr. Stéphanie Chevalier reminded us of the importance of cachexia in advanced pathologies and the role of insulin resistance in the muscle loss seen in this condition. However she also showed us that an increased supply of amino acids could overcome this problem and reminded us that a high protein diet was indicated for such patients. Dr. Andrey Cybulsky told us of the role of a kinase SLK in kidney ischemia-reperfusion injury through its role in the stress MAP kinase pathway and induction of cellular apoptosis. Dr. Denis Sasseville talked of his success in the use of cluster analysis in determining markers, molecular and clinical, to predict

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the likelihood of progression of cutaneous lymphoma. Dr. Susan Kahn highlighted the problems of post-thrombotic syndrome and the use of catheter-directed thrombolysis in the dissolution of the clots. The second keynote speaker Dr. Vassilios Papadopoulos ended the day on a high note, leading us through a story of many years of highly productive investigation into the role of protein complexes in guiding cholesterol movement intracellularly and steroid biogenesis. Overall the afternoon was a treat of high quality science, ably presented and rendered accessible to all. Our thanks to all participants and to our colleagues who spent the afternoon with us.

Were YOU there?

PROMOTIONS & AWARDING OF TENURE

Congratulations to our Faculty members for their achievements.

ASSOCIATE PROFESSORS WITH TENURE

Dr. Martine Culty is a member of the Division of Endocrinology and is well known for her work on early spermatogenesis and male infertility.

Dr. Michael Reed, a member of the Division of Infectious Diseases and the Centre for Host Resistance, is an expert in the area of host factors determining susceptibility to mycobacterium tuberculosis.

Dr. Robert Sladek, a member of the Division of Endocrinology and an investigator at the Genome Quebec Innovation Centre, is well known for his genome wide association studies of diabetes and other complex diseases.

FULL PROFESSORS

Dr. Marcel Behr is a member of the Infectious Diseases and Respiratory Divisions, a FRSQ chercheur national awardee and internationally known for his work on the genome of mycobacterium tuberculosis.

Dr. Martin Olivier is a member of the Division of Infectious Diseases and the Department of Microbiology and Immunology and he has established himself internationally for his work in host responses to leishmaniasis.

Dr. Jean-Pierre Routy is a member of the Division of Hematology and is internationally

known for his work in HIV infections and associated tumours.

ASSOCIATE PROFESSORS

Dr. Peter Ghali, a member of the Division of Gastroenterology, is noted for his outstanding contributions to teaching and has a strong interest in clinical research in hepatology.

Dr. Brian Gilfix, a medical biochemist, has strong research interests in the area of inborn errors of metabolism and in the development of novel laboratory tests.

Dr. Sameena Iqbal is a member of the Division of Nephrology and her research ranges from the study of chronic kidney disease in aboriginal populations to the evaluation of infection rates in dialysis centres.

Dr. Ronald Postuma is a member of the Division of Neurology and his research is focused principally upon non-motor aspects of Parkinson's Disease, with special emphasis on sleep.

Dr. Juan Rivera is a member of the Division of Endocrinology with particular expertise in the area of neuroendocrinology and neuroendocrine tumors.

Dr. Mark Sherman is the interim Director of the Division of Endocrinology and has research interests that revolve around dyslipidemias.

DEPARTMENT OF MEDICINE AWARDS

Congratulations to this year's recipients!

MUHC Departmental Annual Dinner held Wednesday, May 30, 2012.

Physician-in-Chief Award

For highly distinguished service to the MUHC Department

♦ Dr. Ewa Sidorowicz

Department of Medicine Physicianship Award

Exemplary Physician

Dr. James Stewart

Outreach Award

Attending Staff, Teams or Residents who enhance links between the MUHC and the community

♦ Dr. Suzanne Dubé

Department of Medicine Award

For Innovation in Clinical Care or Quality

♦ Dr. Don Sheppard

Department of Medicine Award

For Research by a Subspecialty Resident

Dr. Stéphane Beaudoin

Department of Medicine Staff Research Award

♦ Dr. Andrey Cybulsky

The Louis G. Johnson Award

For excellence in Teaching by a Medical Resident – selected by RVH Residents

♦ Dr. Patrick Lawlor

The Lorne E. Cassidy Teaching Award

For Excellence in Teaching by a Medical Resident – selected by MGH Residents

Dr. Maral Koolian

The Douglas G. Kinnear Award

Outstanding Clinician-Teacher at the MUHC

♦ Dr. Todd Lee

The W.H. Philip Hill Award

Outstanding Clinician-Teacher at the MUHC

♦ Dr. Peter Ghali

JEWISH GENERAL HOSPITAL Department of Medicine Staff and Residents Year-End Party held Thursday, June 7, 2012.

Dave Feder Award

Resident who practices medicine with most compassion and sensitivity

◆ Dr. Mathew Hannouche

Sheldon Zemelman Memorial Award

For academic excellence and outstanding contribution to patient care

♦ Dr. Daniel Kaud

Dr. Allen Spanier Internal Medicine Award

Resident who exhibits an enduring passion for the practice of medicine.

♦ Dr. John Angelopoulos

Medical Resident Research Award

♦ Dr. Michael Goldfarb

Teacher of the Year voted by the residents

♦ Dr. Gershon Frisch

MCGILL RESIDENCY TRAINING PROGRAM AWARDS

Department of Medicine Award

For Research by a Core Internal Medicine Resident •

Dr. Kristin Popiel

The Ezra Lozinsky Prize

- ♦ Dr. Mathew Hannouche
- ♦ Dr. John Angelopoulos

The Harold Frank Prize

For Excellence in a Clinical Case Presentation (Clinical Vignettes)

♦ Dr. Runye Gan

RECRUITMENT

We are very pleased to welcome **Dr. Anne-Marie Bourgault** as Associate Professor to the Division of Infectious Diseases. Dr. Bourgault has also been hired by the MUHC to fill the newly created position of Medical Director of Clinical Laboratories. The creation of this position marks a major step forward in the integration of the diagnostic labs at the MUHC, bringing together tremendous expertise and resources from across sites and several Departments and Divisions under a single medical leadership. Dr. Bourgault received her M.D. from l'Université de Sherbrooke and then went on to specialize in internal medicine. infectious diseases and microbiology. Dr. Bourgault was on the faculty at l'Université de Montréal and microbiologist at the CHUM for many years. An experienced clinician teacher. supervisor and administrator, she was Scientific Director of the Public Health Laboratory at the Institut national de santé publique du Québec from 2006-2011. A highly productive researcher, Dr. Bourgault has published more than 60 papers in peer-reviewed journals on a variety of infectious diseases of importance such as C. difficile.

HONOURS



Dr. Howard Bergman has been appointed to the position of **Chair of the Department of Family Medicine**, Faculty of Medicine. Professor in the Departments of Medicine (Geriatrics Division), Family Medicine and Oncology, Dr. Bergman is widely known as a force of change in the health

sciences community. Amongst many accomplishments, he cofounded and co-directed *Solidage*, a McGill-UofM Research Group on Frailty and Aging. He was also co-founder and codirector of the JGH-McGill University Memory Clinic and Research Program. He is internationally recognized for his research on integrated care, frailty and chronic disease with over 150 publications. More of this story on Med e-News.

Dr. John Burgess, Professor, interim Director of the McGill Cardiology Division and Emeritus at the MUHC, has been recognized with the **2012 Montreal General Hospital Award of Merit**. This award is given annually by the Award of Merit Committee and the MGH Corporation. The recipients are chosen based on their long-standing and distinguished service to the MGH.



MGH Multimedia

SALARY AWARDS

CIHR New Investigator

♦ Kristian Filion

CIHR Clinician Scientist – Phase 2 renewal

♦ Dr. Dao Nguyen

FRSQ Chercheur Boursier – Junior 1

- ♦ Dr. Carolyn Baglole
- ♦ Dr. Kristian Filion

FRSQ Chercheur Boursier – Junior 2

♦ Dr. Simon Rousseau

FRSQ Chercheur Boursier - Senior

- ♦ Dr. Stéphane Laporte
- ♦ Dr. Don Sheppard

FRSQ Chercheur Boursier Clinicien – Junior 1

- ♦ Dr. Jonathan Afilalo
- Dr. Ariane Marelli
- Dr. George Thanassoulis

FRSQ Chercheur Boursier Clinicien – Junior 2

- ♦ Dr. Kaberi Dasgupta
- Dr. Marie Hudson

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Dr. Gordon Crelinsten, Associate Professor in the Cardiology Division and Associate Physician-in-Chief, RVH site for the MUHC Department of Medicine, received the **Distinguished Service Award** from the **McGill Alumni Association**. This

award recognizes a graduate who has rendered outstanding service to the Alumni Association and the University.

Dr. Michelle Elizov, Assistant
Professor in the General Internal
Medicine Division at the JGH, is the
recipient of the 2nd edition of the JGH
Department of Medicine Auxiliary's
Academic Enrichment Award. This
award was created on the occasion of the
Doctors' Gala in 2008. It allows the recipient to
apply to a leadership or professional development
course offered by a renowned academic

course offered by a renowned academic organization. In addition, Dr. Elizov has been named as the **Richard and Sylvia Cruess Faculty Scholar in Medical Education for 2012-2013**. The goal of this opportunity is to promote scholarship and excellence in medical education at McGill and to contribute to the activities of the Centre for Medical Education.



Dr. Adel Giaid, Professor of Medicine in the Cardiology and Respiratory Divisions and jointly appointed in the Department of Pathology, received the **John D. Award of Excellence** from the **Heart and Stroke Foundation of**

Quebec.

Dr. Phil Gold earned the McGill 2011
Medicine Alumni Global (MAG) Lifetime
Achievement Award. Currently a
Professor of Medicine, Physiology and
Oncology and Executive Director of the
Clinical Research Centre at the MUHC, Dr.
Gold also served as Physician-in-Chief at
the Montreal General Hospital from 1980 to 1995
and Chair of our Department from 1990 to 1995.
He was also the inaugural director of what is now
the Rosalind and Morris Goodman Cancer
Research Centre. More on this story in Medicine
Focus.



The National & Kapodistrian University of Athens will be awarding the title of doctor honoris causa to Dr. David Goltzman, former Chair of our McGill Department and former RVH/MUHC Physician-in-Chief of our Department from 1994 to 2004, current Director of

the Calcium Laboratory at the RVH and Professor of Medicine. In addition, the **Hellenic Physiology Society** will also recognize Dr. Goltzman with its "**Gold Medal**" which was established in memoriam of George Kotzias (Lasker Prize, 1969).

Dr. John Hoffer, Professor in the Divisions of General Internal Medicine and Endocrinology and based at the JGH, is the recipient of the prestigious **2012 Kursheed Jeejeebhoy Award** of the **Canadian Nutrition Society**. This



honour is in recognition of an extraordinary contribution in the application of nutrition research that extends clinical practice beyond the currently adapted boundaries, or that materially expands clinical nutrition practice within those boundaries.



On June 14, **Dr. Tom Hutchinson**, Professor in our Department and Director of McGill Programs in Whole Person Care, was named to the **Faculty Honour List for**

Educational Excellence in recognition of his outstanding contributions to teaching in the Faculty of Medicine.

Dr. Ariane Marelli, Associate
Professor in the Division of
Cardiology and Director of the
MAUDE Unit, is a first-time coauthor of the 6th edition of Perloff's
Clinical Recognition of Congenital



Heart Disease, the most widely sold book on congenital heart disease worldwide. The book's cover depicts a magnetic resonance image of the original Holmes heart described by Dr. Andrew Holmes - McGill's first Dean of the Faculty of Medicine, in 1824, and republished by Maude Abbott in 1936 in the first atlas of congenital heart disease.

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Dr. Errol Marliss, Professor in the Divisions of Endocrinology and Gastroenterology and Head of the McGill Nutrition and Food Science Center, has been named one of **Canada's research stars.** In March

2012, The Globe and Mail published an article about the first Canadian version of HiBAR – or Hirsch-Index Benchmarking of Academic Research. The system provides a broad measurement of which researchers wield the most influence in their fields. It uses a large database of every Canadian university faculty member, and then creates an H-index score for each using raw data from Google Scholar. More on this story.

Dr. Peter McLeod received the 2012
Duncan Graham Award from the
Royal College of Physicians and
Surgeons of Canada for his
outstanding lifelong contribution to
medical education. Dr. McLeod is
Professor in the Departments of Medicine and
Pharmacology, Core Faculty member at the
McGill Centre for Medical Education and member
of the Faculty Development Team. His research
interests relate to clinical teaching in
postgraduate and undergraduate medicine,
understanding the importance of basic principles
of pedagogy and improving lecturer performance.



Dr. Henri Ménard, Professor of Medicine and Director of the Rheumatology Division at McGill and MUHC, was elected a year ago "Foreign Corresponding Member of the Nacional Academia de Medicina de Argentina". He traveled to

Argentina to receive the Honorific Medal and Parchment and deliver a public lecture at the Academia on "Autoimmune systems: a roadmap to personalized medicine in Rheumatoid Arthritis". He also gave a series of lectures and seminars in several university hospitals in Buenos Aires. Recently, in April 2012, he became

the first Canadian to be named **Master of PANLAR** (the Pan American League of
Associations of Rheumatology). PANLAR,
founded in 1943, gathers the scientific societies
of rheumatology, health professionals related to
rheumatic illnesses and rheumatic patient
associations of all 21 countries in the Americas.
Its mission is to stimulate, promote and support
research, prevention, treatment and rehabilitation
of the rheumatic illnesses.

Dr. Judes Poirier, Professor in the Departments of Medicine and Psychiatry, received with Dr. Serge Gauthier, Professor in Psychiatry and Neurology & Neurosurgery the **2012 Hubert-Reeves Award** for their book titled *La Maladie*



d'Alzheimer – Le guide. The Hubert-Reeves Award is given by the Association des communicateurs scientifiques du Québec with the goals of encouraging the production of accessible scientific texts and creating a high-quality scientific culture in Canada. Launched in October 2011, La maladie d'Alzheimer – Le guide quickly became the go-to reference guide for information about Alzheimer's disease, selling over 10,000 copies on its first day. The book has been critically acclaimed as thorough, accessible, and aimed at helping individuals and their families with the disease.



Dr. Mark Wainberg, Professor in the Division of Allergy and Immunology and Director of the McGill AIDS Center at the LDI-JGH, has been awarded **the 2012 Killam Prize in Health Sciences** by the **Canada Council for the**

Arts. The Killam Prize is among Canada's most distinguished research awards and is conferred to a scholar of exceptional ability whose outstanding achievements are clearly demonstrated, and who are expected to make further contributions to the scholarly and scientific heritage of Canada.

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The Department of Medicine's number of successes is prolific. Although every attempt is made to acknowledge them all at the time we go "to press", some announcements may be delayed. Do not hesitate to contact us to let us know of your successes.

Please address questions or comments regarding the newsletter to josee.p.cloutier@muhc.mcgill.ca.