CIHR Institute of Circulatory and Respiratory Health –YI Forum
May 8-10, 2008 - Centre Sheraton, Montreal Hotel

FCIHR Session:

"The Continuum of New Knowledge, Innovation, Commercialization and Social Impacts"

Friday, May 9, 2008 – 8:30 – 11:00 am

PROGRAM

8:30 am	**Chair:** *Dr. Aubie Angel*, President, Friends of CIHR **Co-Chair:** *Dr. Bruce McManus*, Professor & Director, James Hogg iCAPTURE Centre and Providence Heart + Lung Institute at St. Paul's Hospital/University of British Columbia **Welcome:** *Dr. Peter Liu*, Scientific Director, ICRH
8:40 am	**Societal Challenges, Curiosity, Creativity, Consequences** *Dr. Bruce McManus*
8:50 am	**"Knowledge Primes the Innovation Pump"** *Dr. Tara Haas*, Associate Professor Kinesiology and Health Science and Biology, York University
9:05 am	Discussion
9:15 am	**"From Target Validation to Clinical Relevance"** *Dr. David Granville*, Associate Professor, Canada Research Chair Tier II Heart & Lung Institute, St. Paul's Hospital, University of British Columbia
9:30 am	Discussion
9:40 am	**"Validation of Biomarkers as Predictors of Disease"** *Dr. Jean Claude-Tardiff*, Professor & Director Montreal Heart Institute
10:05 am	Discussion
10:15 am	**"Genomic Science for the Public Good"** *Dr. Robert Hegele*, Professor & Director Blackburn Cardiovascular Genetics Laboratory, University of Western Ontario
10:30 am	Discussion
10:50 am	**The Knowledge Continuum – What We Learned Today** *Dr. Pavel Hamet*, Professor University of Montreal – CHUM
11 am	Meeting adjourned

Canadian Institutes of Health Research | Instituts de recherche en santé du Canada | Canada

Young Investigators (YI) Forum

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PROGRAM & ABSTRACTS

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Amis des instituts de recherche en santé du Canada
FCIHR/AIRSC
Friends of Canadian Institutes of Health Research

CIHR IRSC
Canadian Institutes of Health Research | Instituts de recherche en santé du Canada

DIABETES RESEARCH & TREATMENT CENTRE
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WINNIPEG

Opening Remarks

Co-Chair - Bruce McManus, Professor & Director, James Hogg iCAPTURE Centre and Providence Heart + Lung Institute at St. Paul's Hospital/University of British Columbia

I will try to frame the session with comments about residual and emerging heart and lung health challenges, including a Canadian perspective and the more global outlook, and the importance of linking curiosity driven research through creative, biobank-enabled, ethics-enabled, team-based translational research in dynamic cycles of investigation and application towards social and economic outputs and outcomes. Human cultures are *challenged* by many forces - political instability, poverty, social inequities, inadequate public health frameworks, fragile economies, and immense disease burdens. *Curiosity* exemplifies the human condition. The relentless search for understanding of the complexity that makes up our world takes many forms. Such native seeking is often paralleled by enormous *creativity*. The combination yields magic, magic that can overcome even the biggest challenges, including those in healthcare. The creative drive to lessen the adverse impact of society's challenges includes strategies for creation of better environments (physical, social, educational and economic), and the inspired rendering of new preventative and therapeutic modalities. In the current era clinical phenotyping is enabled by high resolution imaging, we can genotype as many as a million single nucleotide polymorphisms at a time, and "omics" platforms yield molecular signatures in a high-performance fashion. With steady improvement in vocabularies that describe both biological and environmental determinants of disease, and with a harnessing of myriad computational tools, we are set for a revolution in the definition of predictive, diagnostic and prognostic indicators of disease outcome. Therapeutic monitoring and management promises to become more precise and personally tailored. The *consequences* of innovations that come from the hypothesis testing engine of basic discovery, and from translational, human-focused studies of well-characterized cohorts of patients and those at risk, should improve quality of life and in some instances life expectancy. An additional challenge that attends this exciting period in the history of health care is how to bring all of the potential for personalization into the mainstream while containing or even reducing costs. Surely the curiosity, creativity and humanity that together characterize health scientists and caregivers will allow health economists and policy makers to breathe a sigh of relief and raise a smile of satisfaction as this dramatic era unfolds.

"Knowledge Continuum - What We Learned Today"

Pavel Hamet, Canada Research Chair in Predictive Genomics, Université de Montréal

We have learned today that there is a need to harmonize societal and governmental expectations with the continuum of innovation based on knowledge for societal progress. In realizing that wealth is derived from health which, in turn, is dependent on knowledge, we have to progress further from disease-oriented medicine to pre-disease, targeted intervention. We are witnesses of the birth of a new medical era on its long path from art to science. As a country, we are privileged to have one of the longest life expectancies, yet we are not doing so well in healthy years prior to any disability. We are fortunate, however, that the leadership of this country realizes the importance of engaging in health research to capture its share of benefits. Using hypertension as an example, we are also realizing that we are frequently lagging behind our capacity to treat in real life implementation. Novel multidisciplinary approaches with current and new therapeutic interventions have to be developed and applied. Year 2007 has been a breaking point in our understanding of human genetic variations based on recently-uncovered sequences of genomes of humans and several animal models and applied to at the single nucleotide level for a large variety of diseases. This will also lead to redefining disease categories and discovering new sub-syndromes prior to "diseasome" comprehension. There is an urgency to arrive at a new understanding of genome and environment interactions in target organs, geo-ethnic groups, in women and men, in young and old. We have to build predictive ecogenomics to foster prevention and optimize therapies on the pathway to personalized, information-based medicine in the context of our psycho-social and biological environments.

"Genome science for the public good?"

Robert A. Hegele, MD, FRCPC, FACP
Schulich School of Medicine and Dentistry, University of Western Ontario

Strategies to define genetic determinants of cardiovascular disease (CVD) have, until very recently, produced underwhelming results. While the genetic basis of many Mendelian CVDs was solved, the genetic determinants of less extreme but clinically more common CVD traits remained a mystery. In 2007, genome-wide association (GWA) studies dramatically fleshed out new genetic determinants of CVD, yielding more progress over the past 18 months than in the preceding 25 years. Technological and analytic advances have ensured the dominance of CVD genomics as a research discipline. The practical consequences appear obvious. For instance, CVD genes can now be routinely identified in a few weeks by a single student who has access to patient phenotypes, DNA samples, public databases, a thermal cycler and an automated DNA-sequencer. Microarray technologies allow study of the expression of >10,000 genes in <1 day. Developments such as mapping genomic copy number variation and alternative splicing have enhanced our understanding of the vast layers of genomic complexity underlying CVD. The inevitable thousand-dollar (or less) genome will allow heretofore unimagined understanding of CVD risk in the individual patient. Gene-based pre-symptomatic prediction of CVD risk and adverse drug response are rapidly emerging. Mainstream medical journals are publishing genomic discoveries and applications at an unprecedented rate, and the therapeutic promise of genomics has re-energized the commercial sector. But while study of the ethical, legal and social implication is routinely built into genomic research, public awareness and acceptance have been inconsistent. Our increased ability to synthesize genomic information to predict CVD risk and response to intervention must be matched by growing efforts of researchers to enhance public understanding of what genomics can and cannot do, and by protecting against potential misuses of this information.

"Knowledge Primes the Innovation Pump"

Tara Haas, PhD, School of Kinesiology and Health Sciences, York University, Toronto, Canada

Canada's Science and Technology Strategy (2007) states that talented, skilled, creative people are the most critical element of a successful national economy. More than 1 million students are enrolled annually in post-secondary programs in Canada. These students represent our society's future educators, clinicians, lawyers, policy makers, entrepreneurs, researchers and innovators. Undergraduate institutions perform the essential role of inspiring and preparing a subset of the student population for future careers in health research and biotechnology. However, an equally important role is that of educating all students in the process of scientific discovery and innovation, in order to improve public knowledge and generate appreciation of the value of health research. This is critical to ensuring that our future generations will commit to ensuring continued national support for health research in Canada. Undergraduate professors contribute directly to the innovation process through maintaining competitive research programs and training of graduate students and research personnel. Additionally, the undergraduate professor has the opportunity to shape the educational experience of both future researchers and research advocates through establishing curriculum that exposes students to, and engages them in, all aspects of the research and innovation process. Opportunities and challenges of meeting these diverse goals will be discussed.

“Translational Research: Target Identification to Clinical Application”

David J. Granville, James Hogg iCAPTURE Centre, Department of Pathology and Laboratory Medicine, Heart and Lung Institute, St. Paul's Hospital, University of British Columbia

In recent years, academic researchers have been increasingly challenged to translate their basic scientific findings into clinical application. In general, a translational researcher can be described as an investigator that is working towards one of the following: 1) improving diagnostic or prognostic capabilities, 2) improving disease prevention or 3) developing new therapies. My laboratory is geared towards the latter in that we are identifying novel targets for the treatment of cardiovascular disease. The current presentation will provide examples and discuss approaches pertaining to target identification and validation and how often in the target validation stage serendipitous findings may open up new avenues of exploration. Once a target is validated, the next step is the development of a panel of compounds that can be tested and screened with the goal of identifying one or more leads that can then be tested in animal models for efficacy, side effects and drug metabolism. This stage can take several years to complete prior to the initiation of Phase I trials. During Phase I, the trials are usually conducted with small numbers with the goal of evaluating the safety and dosage of a potential therapeutic product. Phase II trials determine preliminary efficacy and confirm safety, tolerance and drug disposition. Phase II is then followed by a much larger and expensive Phase III trial in which long term safety, efficacy and cost effectiveness of a new drug is evaluated. Following Phase III, the results are then scrutinized by a regulatory approval body. Following approval, further Phase IV monitoring of safety and adverse events is required. The present lecture will focus primarily on our experiences related to target identification and validation as well as other lessons we have learned regarding the development of a proof of concept/intellectual property package, contract research organizations, commercialization, and how to approach and what to expect when speaking to investors when seeking funding to move from the bedside into patients.

"Validation of Biomarkers as Predictors of Disease"

Jean-Claude Tardif, MD, Director, MHI Research Centre, Montreal Heart Institute, Université de Montréal

An already strained worldwide healthcare system continues to confront a growing prevalence of cardiovascular disease and an expanding population at risk for future events. Traditional biomarkers such as blood pressure and serum cholesterol levels have helped to assess cardiovascular risk and develop effective therapies. Due to the efficiency of current treatment regimens, the size and duration of clinical endpoint trials required to establish an incremental benefit has become daunting. Yet, even our highly effective contemporary treatment regimens do not prevent many cardiovascular events, particularly in high risk individuals. We urgently require tools to assess potential novel therapies and address the residual burden of cardiovascular risk that represents the major challenge to human health worldwide. Increased biomarker research efforts have been fueled by knowledge and unmet medical need. Cardiovascular biomarker research efforts have resulted in the identification of new risk factors and novel drug targets, the establishment of dose ranges, as well as the establishment of treatment guidelines. Government agencies, academic research institutions, and diagnostic and pharmaceutical industries all recognize the important role of biomarkers in advancing therapies to improve public health. In drug development, biomarkers are used to evaluate early signals of efficacy and safety, select dose, and identify the target population. But despite the magnitude of current research efforts, only a few true surrogates of cardiovascular events have up to now undergone rigorous validation. The appropriate application of cardiovascular biomarkers requires an understanding of disease natural history, the mechanism of the intervention, and the characteristics and limitations of the biomarker.