

3rd Annual Canadian Pharmacy Education and Research Conference
69th Annual General Meeting of the Association of Faculties of Pharmacy of Canada



Education and research in pharmacy **CHALLENGES AND SUCCESSES**

June 5 to 7, 2012
Hôtel Château Laurier
Quebec City, QC



UNIVERSITÉ
LAVAL

Faculté de pharmacie



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Introduction

Welcome from Frédéric Calon, Conference Chair, CPERC 2012 Planning Committee

Education and research in pharmacy: challenges and successes
Enseignement et recherche en pharmacie: défis et succès



À tous les participants du 3^{ème} Congrès sur l'enseignement et la recherche en pharmacie au Canada, je vous souhaite la plus cordiale bienvenue dans la ville de Québec!

A recent poll conducted by Environics Research Group confirmed that patients in Canada are more likely to rely on pharmacists as a source of health information than in the UK or USA. Canada was also the only country where a majority of respondents had a positive view of their health system. This means that we must be doing a few things right in pharmacy education. This meeting will thus be a great place to highlight these successes.

We also have to face some challenges. Pharmacy is not practiced the same as it was 20 years ago and it will not be practiced the same 20 years from now. We have to continuously adapt our curriculums to provide key new competencies to our graduates. Within our faculties, we are also facing our own challenges. The recruitment of new faculty members able to perform as well in research and education in pharmacy is becoming very difficult. The growing competition for research funding is threatening the survival of many academic laboratories. The pharmaceutical industry is experiencing changing times as well, as blockbuster drugs are going off patent. Nevertheless, it is mostly a time of new opportunities and responsibilities for pharmacists and pharmacy educators. It is up to us all to live up to these exciting challenges!

For this year's program, we have worked hard to provide a conference that showcases some of these challenges and successes and we hope you will enjoy it. I would like to take the opportunity to thank all the members of the local organizing Committee and our AFPC Executive Director for their commitment, our speakers for their valued contributions, our AFPC President, Council and membership for their insightful input, and finally our Faculty and our sponsors for their support.

I hope that you find our conference program informative and stimulating and that you enjoy the Quebec "joie de vivre"!

Bon congrès!

A handwritten signature in black ink, appearing to read 'F. Calon'.

2012 CPERC Chair
Frédéric Calon, B.Pharm., Ph.D.
Professeur titulaire
Faculté de Pharmacie
Université Laval

Welcome from Ingrid Price, AFPC President



Dear AFPC members, Conference Delegates and Visitors,

Welcome to Quebec City for the AFPC Third Annual Canadian Pharmacy Education and Research Conference (CPERC). This conference has always been an important event to me as a faculty member in Pharmacy as it provides an opportunity for me to connect with my Canadian colleagues to discuss issues and topics relevant to faculty members across the country. The theme for the 2012 conference, “Education and Research: Challenges and Successes” comes at a time when pharmacy practice, education and the nature of academia are changing rapidly. As the scope of practice is broadened, our role as academics is also changing. Sessions planned for this conference are in tune with the current climate in academic pharmacy. During the conference, we will have the opportunity to learn from our colleagues who have moved to an entry-level doctor of pharmacy program (ELPD). Other topics of interest include learning more about specialized residencies for pharmacists and some key research themes around adherence and personalized medicine. Finally, in a panel discussion academics from across the country will respond to the question: What will be the impact of the ELPD on pharmacist-researchers?

In addition to CPERC being a forum for dialogue across the country, the conference also celebrates excellence by showcasing top academics and students through our many awards. Please take the time to acknowledge their achievement by listening to our award presenters.

On behalf of the AFPC members, council and executive, I would like to thank Frédéric Calon and his team from the Faculté de Pharmacie, Université Laval for their work in creating an outstanding conference agenda and selecting a fabulous venue for CPERC 2012. This will truly be a conference to remember.

Enjoy the meeting and your visit to beautiful Quebec City!

A handwritten signature in black ink, appearing to read 'Ingrid Price'.

Ingrid Price, PhD
President, AFPC

Invitation from the Dean, Jean Lefebvre

Dear Delegates,



It is my very great pleasure to welcome you all among us here in Quebec City. Quebec is not only a capital city but it is a great place to live; a place where history and modern life come together, commingling with elegance its European origins and North American influences. The charms of the city so captivated UNESCO that they very much wanted to include it in their list of World Heritage cities.

You will gain a better picture of the city during your stay at the Chateau Laurier hotel where most of the activities listed in the schedule of the Association of Faculties of Pharmacy of Canada (AFPC) conference, are to take place. The hotel's location near the historic fortifications and within walking distance of the St Lawrence River, mean that in the blink of an eye you can be taking in the parliament building where the members of the National Assembly sit, or strolling in the Battlefields Park with the walls of the Citadel spread out in front of you or enjoying the vibrant bustle of Grande-Allée.

The main theme of our conference *Pharmacy Education and Research: challenges and successes* seeks to update progress in the development of the Faculties of Pharmacy in Canada. The inaugural dinner, the General Assembly, the four main presentation sessions, and the poster presentations, along with the annual gala, will provide many opportunities for you to meet colleagues and share ideas.

We ourselves shall take this opportunity to introduce our completely new entry-level Doctor of Pharmacy program to the other Canadian Faculties of Pharmacy. We will focus upon the training of hospital pharmacists, unveil some major research themes and discuss training for the new generation of pharmacists. Finally the conference will culminate in a grand gala at one of the jewels of Quebec City, the chapel of the *Musée de l'Amérique française*.

Have a great conference!

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Jean Lefebvre, Ph.D, Dean
Faculty of pharmacy
Université Laval



CPERC 2012 Planning Committee

Olivier Barbier

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Éric Couture

Benoît Drolet

Chantal Guillemette

Jean Lefebvre

Harold Lopatka

Claude Massicotte

Chantale Simard

Roxane Pouliot

Carmen Vézina

Looking Ahead to the 2013 CPERC in Niagara-on-the-Lake



Photos courtesy of: Vintage Hotels and Niagara-on-the-Lake Bed and Breakfast Association

"The 4th Annual Canadian Pharmacy, Education and Research Conference (CPERC) and 70th AFPC General Meeting will be held in beautiful Niagara-on-the-Lake, Ontario from June 11-13, 2013. The University of Waterloo Pharmacy Host Committee is hard at work planning another exciting CPERC meeting. The main conference hotel will be the Queen's Landing but attendees will have access to all three hotels affiliated with the Vintage Group (www.vintage-hotels.com), including the Pillar and Post and the Prince of Wales.

Niagara-on-the-Lake is located in the prettiest corner of one of Canada's top tourist destinations - the Niagara Region. The Region is steeped in history and folklore and offers excellent opportunities for shopping, theatre going and, of course, wine tasting. Its many walking paths along tree-shaded streets with beautiful old homes will provide the perfect opportunity for rest and relaxation in between the exciting conference activities.

Visit the Niagara-on-the-Lake Tourism website at www.tourismniagara.com to learn more about this wonderful area.

The University of Waterloo School of Pharmacy looks forward to seeing you next year in Niagara-on-the-Lake!"

AFPC Executive & Council

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Program

Opening Dinner



DIANE LAMARRE, President of the Ordre des pharmaciens du Québec

After obtaining bachelor's and master's degrees in Pharmacy, Diane Lamarre has led a professional career marked by various university teaching and research activities. Ms. Lamarre has also devoted herself to humanitarian aid. In addition to serving as the president of Pharmacists Without Borders - Canada since 2007, over the past 10 years she has completed more than 30 missions. An accomplished communicator, she has made it her priority to inform the public about health issues and has made roughly 700 appearances on programs broadcast by various networks. President of the Ordre des pharmaciens du Québec since 2009, Ms. Lamarre is also an owner-pharmacist in the Montérégie region and a clinical professor at the Université de Montréal's Faculté de pharmacie.

CONFERENCE PROGRAM

TUESDAY JUNE 5, 2012

- 9 h – 17 h** **AFPC Council**
George V room
- 15 h – 18 h** **Registration**
Main entrance (close to the front desk)
- 18 h – 19 h** **Opening reception**
Grande-Allée room
- 19 h - 22 h** **Opening dinner**
Abraham-Martin room
*Guest speaker: Diane Lamarre, President,
Ordre des pharmaciens du Québec*


WEDNESDAY JUNE 6, 2012

- 8 h – 16 h** **Registration**
Hall (near elevators)
- 7 h 30 – 8 h 30** **Breakfast**
De la Colline et George V rooms
- 8 h 30** **Host committee welcome**
Abraham-Martin room
- Pharm.D.: the Canadian and US experiences**
Abraham-Martin room
Chair: Carmen Vézina, Université Laval
- 8 h 40** **> Pharm.D. program presentation –**
Université de Montréal
Chantal Pharand, Vice-dean, Academic
- 9 h 30** **> Pharm.D. program presentation –**
Université Laval
Jean Lefebvre, Dean
- 10 h 35** **Break**
- 11 h** **> Pharm.D. program presentation –**
University of Toronto and United-States
Henry Mann, Dean, University of Toronto
- 12 h** **AFPC Annual General Meeting & lunch**
Abraham-Martin room
- 12 h** **Pharmacy Professor: A world of possibilities**
Olivier Barbier, Associate Professor, Université Laval
De la Colline room
- Hospital pharmacy : the Quebec experience**
Abraham-Martin room
Chair: Jean Lefebvre, Université Laval
- 14 h** **> Training of hospital pharmacists in Quebec**
Chantale Simard, Director of The Hospital Pharmacy Program, Université Laval
- 14 h 35** **> Pharmacists specialization**
Marc Parent, Centre hospitalier universitaire de Québec
- 15 h 15** **> Specialized residencies**
*Nancy Sheehan, Clinical Associate Professor
Faculty of Pharmacy, Université de Montréal*
- 16 h** **Departure to the Ferdinand-Vandry building**
- 16 h 30** **Guided tour of Ferdinand-Vandry building and its laboratories for practical training**
- 17 h 30** **Cocktail**
- 18 h 30** **Return trip to the hotel**

CONFERENCE PROGRAM

THURSDAY JUNE 7 2012

- 7 h 45 – 9 h 30** **Registration**
Hall (near elevators)
- 7 h 30 – 8 h 30** **Breakfast**
De la Colline et George V rooms
- 7 h 30 – 10 h** **Poster installation**
- 10 h – 18 h** **Poster session**
Abraham-Martin room
- Research themes in pharmacy**
Grande Allée room
Chair: Roxane Pouliot, *Université Laval*
- 8 h 30** **> Treatment adherence**
Line Guénette, Assistant Professor, Université Laval
- 9 h 10** **> Personalized medicine: what does it mean to pharmacists?**
*Simon de Denus, Assistant Professor
Université de Montréal
Holder of the Chair Beaulieu-Saucier –
Université de Montréal in pharmacogenomics*
- 10 h** **Break**
- 10 h 15** **AFPC National Award Winners' Presentations**
Andrea Cameron, University of Toronto (Chair)
- Suzanne Cadarette, University of Toronto
AFPC New Investigator Research Award*
- Mary Elias, University of Toronto
CFP Graduate Student Award for Pharmacy
Practice Research*
- Sébastien Fortin, Université Laval
GSK Graduate Student Research Award*
- Micheline Piquette-Miller, University of Toronto
Pfizer Research Career Award*
- Lalitha Raman-Wilms, University of Toronto
Leo Pharma National Award for Excellence in Education*
- 12 h** **Lunch**
De la Colline et George V rooms
- Poster viewing and evaluation**
Abraham-Martin room
- 14 h** **Discussion session:**
How to train the future generation of professors?
Grande Allée room
Facilitator: Benoît Drolet, Université Laval
- **The future of Faculties of pharmacy:**
are pharmacist-researchers an endangered species?
 - **What will be the impact of the Pharm.D. on the recruitment of new faculties involved in research?**
- Panelists:**
Pierre Moreau, Dean, Université de Montréal
- Kishor M. Wasan, Vice-dean, Research and Graduate Studies, University of British Columbia*
- Zubin Austin, Associate Professor, University of Toronto*
- 16 h** **Break**
- 16 h 15** **Preparing students for an e-health world – An AFPC-CHI initiative**
Grande Allée room
Donna Pipa, Project Manager
- 17 h – 18 h** **Poster viewing**
Abraham-Martin room
- 18 h 30** **Departure from hotel**
- 18 h 45** **AFPC Awards Banquet**
Chapel of the Musée de l'Amérique française

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Conference Sessions

Wednesday, June 6, 2012



**Chantal Pharand, BPharm, PharmD, Vice-Dean,
Undergraduate Studies**

Faculty of Pharmacy, Université de Montréal, Montréal,
QC

Biography

Dr. Pharand is Professor and Vice-Dean, Undergraduate Studies at the Faculty of Pharmacy of the Université de Montréal, and a Pharmacotherapeutic Specialist at the Hôpital du Sacré-Coeur de Montréal where she has practiced in inpatient and outpatient cardiology for the past 18 years. For the past 9 years, Dr. Pharand has been actively involved in developing and implementing an Entry-Level PharmD Program at the Université de Montréal. First as member of the developing committee

and then as Chair of the implementation committee, Dr. Pharand and her team have gone through the different phases of designing and implementing a competency-based Entry-Level PharmD program, which was to be characterized by an active and guided learning approach and use of integrated courses with some team-teaching. The first cohort of students graduated in 2011 with great results.

Summary of presentation

Designing, developing and implementing an Entry-Level PharmD Program is not an easy task. Many factors must be taken into consideration when designing such a program, such as the number of students admitted, the availability of practice sites and preceptors for clerkships etc. Then, what kind of teaching methods should be chosen? At the Faculty of Pharmacy of the Université de Montréal, we chose to develop a brand new program respecting the three following characteristics: a) competency-based; b) exploiting a self-learning approach; c) based on a physiological system content organization. Knowledge was carefully selected and integrated into multidisciplinary courses. The competency profile to be developed through the course of the program includes 6 generic and 3 vocational competencies. The development of generic competencies is continuously monitored and remedial activities are proposed to the students presenting deficiencies. The program is composed of 33 courses managed by multidisciplinary teams of professors, 6 skill laboratories, and 40 weeks of experiential learning. Our 164-credit program was first implemented for a 200-student cohort in 2007. It is computer-based to facilitate distance-learning. Focus groups held with students and clerkship supervisor after program completion by the first cohort indicated that students were able to better actualize most of the targeted competencies than what was observed with previous B.Pharm. cohorts of student.



Jean Lefebvre, B Pharm, M Sc (hosp), Ph D., Dean

Faculty of pharmacy, Université Laval, Québec, Canada

Jean Lefebvre received his bachelor degree in pharmacy at the Laval University Faculty of Pharmacy (Quebec, Canada) in 1987. After his master of science in hospital pharmacy, he joined the Hypertension Research Clinic of the Centre Hospitalier de l'Université Laval (CHUQ) where he conducted clinical research activities. Between 2000 and 2002, Dr. Lefebvre completed a fellowship in clinical pharmacology at Vanderbilt University, Nashville, Tennessee. Thereafter, he obtained his Ph.D. degree at the Laval University Faculty of Pharmacy. His research area focused mainly on the blood pressure response to antihypertensive drugs and the influence of pharmacogenetic factors in hypertension. Dr. Lefebvre has practiced both community and hospital pharmacy. He has been a member of the Quebec Board of Pharmacists since 1987.

Over the past 20 years, Dr. Lefebvre has actively collaborated on various research projects resulting in the publication of several articles and participations to national or international meetings. His scholarly activities focus on pharmaceutical care practice in cardiovascular patients. Dr. Lefebvre was awarded the Alfred-Emile Francoeur Prize for teaching excellence in 2005. In July 2011, he was appointed Dean of the Laval University Faculty of Pharmacy during an exciting but challenging time: the implementation of the Pharm D program.



Dean Henry J. Mann, Pharm D, PhD, was appointed as the Dean of the Leslie Dan Faculty of Pharmacy at the University of Toronto in July 2009. He received his BScPharm and PharmD degrees from the University of Kentucky where he completed a concurrent ASHP Residency Program. Dr. Mann served as a faculty member at the University of Minnesota for 29 years.

At Minnesota he developed clinical pharmacy services and conducted research in surgery and critical care. He also served as Associate Dean for Professional and External Relations and Associate Dean for Clinical Affairs. He is a fellow of the American College of Critical Care Medicine (FCCM), the American College of Clinical Pharmacy (FCCP), and the American Society of Health-Systems Pharmacists

(FASHP). In 2002, he received the University of Minnesota Pharmacy Alumni Society Faculty Recognition Award and in 2004 he received the Weaver Medal for Outstanding Contributions to the College. In 2009 the University of Kentucky selected him to receive the Paul F. Parker Award which is given to recognize a resident of their program who has made outstanding contributions to pharmacy practice. Dr. Mann has published over 100 articles and abstracts and made more than 300 professional presentations.

The University of Toronto initiated an entry-to-practice PharmD program for all new students in the Fall of 2011. The curriculum provides graduates with the knowledge, skills and experience to fulfill patient care responsibilities with the ultimate goal of improving the efficacy of the health care system and improving the health of patients across the country. The Pharm.D curriculum is a major revision in both content and delivery from our previous BScPharm program last developed in 1994. Key changes include the following:

- * Expansion and redesign of experiential programs to include more varied experiences, greater reinforcement of in-class teaching, and increased exposure to different pharmacy practice environments
- * Increased emphasis in: pharmaceutical care and medication management services, geriatrics, mental health, addiction, professional ethics, patient safety, communication skills, interprofessional skills, diversity competence and professionalism
- * Development and delivery of integrated pharmacotherapy modules that will combine content and application in a problem-solving context
- * Introduction of interprofessional education components in each year of the program
- * Redesign of all pharmacy practice courses with additional content areas
- * Incorporation of a critical appraisal series (including evidence-based medicine)
- * Opportunity for students to specialize in different areas of pharmacy through elective courses

Implementation of this program has resulted in the need to develop a combined BScPharm-PharmD program for our current students and to revise our postgraduate PharmD curriculum. We are also developing new training sites and strengthening relationships with our Toronto Academic Health Sciences Network (TAHSN) partners. These steps have led to hiring new clinician scientists and educators jointly with those health care institutions.



Chantale Simard, B.Pharm., Ph.D., Associate Professor (professeure agrégée) Faculté de pharmacie, Université Laval
Director (Directrice), programme de Maîtrise en pharmacie d'hôpital (Hospital Pharmacy Residency)
Research Scholar (Chercheur-boursier clinicien Junior 2), Le Fonds de recherche du Québec - Santé (FRQS)

FORMATION :

B.Pharm., 1993-97, Faculté de pharmacie, Université Laval
M.Sc. pharmacie d'hôpital, 1997-98, Faculté de pharmacie, Université Laval
Ph.D. Sciences pharmaceutiques, option pharmacologie, 1998-2002, Faculté de pharmacie, Université de Montréal
Postdoctoral Fellowship, 2001-0204, Vanderbilt University

TEACHING :

Pharmacokinetics (Pharmacocinétique)
Pharmacogenomics (Pharmacogénomique)
Drugs biotransformation (Biotransformation des médicaments)

RESEARCH INTERESTS :

Variability in drugs response (Variabilité dans la réponse aux médicaments)
Physiopathological factors influencing drug biotransformation (Facteurs pathophysiologiques influençant la biotransformation des médicaments)
Pharmacokinetics (Pharmacocinétique)
Cardiac pharmacology (Pharmacologie cardiovasculaire)
Pharmacogenomics (Pharmacogénomique)

In the province of Quebec, hospital-based pharmacists have been trained in a formal university program for more than thirty years. In Québec City, hospital-based pharmacy practice was born during the sixties at the Hôpital du St-Sacrement. In 1962, The 'Conseil de l'Université Laval' was authorizing the creation of a formal hospital pharmacy cursus leading to a certification. In 1980, this hospital pharmacy certification was officially recognized as a graduate program (2nd cycle). In September 1989, The certification program was abandoned to become the hospital pharmacy 2nd cycle Diploma. Finally, in April 1992, The Diploma became the hospital pharmacy master program, leading to a Master of Sciences (M.Sc.) degree. Since June 1996, the hospital pharmacy M.Sc. program is certified by the Canadian Hospital Pharmacy Residency Board of the Canadian Society of Hospital Pharmacists. This presentation will focus on the hospital pharmacy program of the Faculté de pharmacie de l'Université Laval. An historical perspective of this program will be presented. The content of the program will also be discussed. The 16-month professional progression of the students will be presented. From an academic perspective, the cursus of the program as well as the research projects driven by the students will be briefly discussed. From the pharmacy practice perspective, the different training and clinical rotations in which students are involved will be presented.



Marc Parent

B.Pharm (1983) University of Montreal
M. Sc. Hospital Pharmacy (1991) Laval University
Clinical Professor, Laval University
Hospital Pharmacist at the CHUQ – Pavillon St-François D'assise since 1988

He is practicing in hospital pharmacy since more than two decades during which he had always been implicated in the l'Association des pharmaciens des établissements de santé du Québec (A.P.E.S.), including as its president from 1995 to 1997. He is particularly involved at the cardiology department of the Hôpital St-François d'Assise (Centre hospitalier universitaire de Québec). He is also on the scientific board of the Conseil du médicament du Québec. Marc's commitments are multiple, but always geared towards the improvement of pharmacy practice. In the recent years, he has been dedicated to achieve recognition of specializations in pharmacy.

Selected Awards :

- Pharmacien d'honneur APES 2011
- Roger-Leblanc de l'APES pour l'excellence de sa carrière en 2004.
- Prix Jacques-Dumas de l'Université Laval pour l'excellence de sa carrière, 2006.
- Prix du mérite du Conseil Interprofessionnel du Québec, 2008.
- Prix du pharmacien de Cœur et d'action – secteur établissement de santé, 2008.



Nancy Sheehan, B.Pharm, MSc, did her undergraduate program and MSc in hospital pharmacy at Université Laval (Québec), completed an HIV specialty pharmacy residency in Toronto and supplementary training in antiretroviral pharmacokinetics at UMC St Radboud (Nijmegen, the Netherlands). She is associate clinical professor at the Faculté de pharmacie, Université de Montréal and primarily teaches in infectious diseases (viral, fungal, parasitic, tropical medicine). She has a joint position with the McGill University Health Centre where she works for the Chronic Viral Illness Service and leads the Québec Antiretroviral Therapeutic Drug Monitoring Program. She also participates in research on drug-drug interactions and PK/PD determinants of virologic response to HIV and HCV antivirals. Since 2006, she co-directs the HIV pharmacy specialty residency with Dr. Alice Tseng (Toronto).

Conference abstract

Pharmacy specialty residency programs, also known as post-graduate year 2 programs (PGY2), are directed, structured, one year clinical programs that allow licensed pharmacists that have already completed a general residency program to develop an expertise in pharmaceutical care for a specific disease state or patient population (ex: oncology, intensive care, cardiology, infectious diseases, geriatrics, primary care). These programs aim to enhance residents' knowledge, skills and competencies in a specialized field. They also offer networking opportunities with specialized pharmacists and physicians, improve research skills and help build confident leaders in the specialty area that will go on to have advanced and innovative practices. In general, approximately 80% and 20% of the resident's time is devoted to pharmaceutical care and research, respectively.

The presentation will contrast specialty and general residency programs and describe benefits and motivations for completing a specialty residency. A handful of specialty residency programs are available in Canada and will be presented. The HIV pharmacy specialty residency program (University of Toronto / Toronto General Hospital / McGill University Health Centre) will be used as an example to illustrate the diversity of clinical settings that are offered to residents, the evaluation process, certification requirements and support that is offered to residents.

At the completion of the session, participants will also be knowledgeable about the requirements for the development of a specialty program and the challenges faced by program directors. Accreditation of specialty programs will be discussed as will the present and potential future involvement of faculties of pharmacy.

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Conference Sessions

Thursday, June 7, 2012



Line Guénette received, from Laval University, a BPharm in 1996 and a PhD in pharmacoepidemiology in 2006. Since March 2011, she is an Assistant Professor at Laval University and a researcher with the Chair on adherence to treatments and with the Population Health Research Unit (URESP). Prior to this academic position, she was a scientific adviser for the *Conseil du médicament du Québec*, now the *Institut National d'excellence en santé et en services sociaux (INESSS)* and practiced several years as a community pharmacist. Her research interests revolve around drug utilization, factors associated with non-optimal use, and interventions and policies to improve their use. She is in charge of the diabetes and cardiovascular diseases' arm of the Chair.

Résumé

For a drug treatment to produce the desired results, it must be used appropriately. Optimal use depends on two key actors: the physician, who prescribes the treatment, and the patient, who has to take the medication as prescribed or, in other words, must adhere to the treatment. However, sub-optimal adherence to drug treatment is relatively frequent. The World Health Organization (WHO) considers that non-adherence to long-term therapy is a worldwide problem of striking magnitude. Some authors believe that increasing the effectiveness of adherence interventions may have a far greater impact on the health of the population than any improvement in specific medical treatments.

The presentation will draw a portrait of research on medication adherence in recent years and of the major advances that have occurred in this area. The most currently used terminology will be presented along with the definitions and related concepts. Examples of work done at the Chair on adherence to treatment of Laval University and by other researchers will illustrate the point. The main determinants of adherence to treatment will be presented to enable identification of possible solutions, which may be useful to those involved in the training of future pharmacists or in continuing education. To this end, a theoretical model for psychosocial determinants of adherence will be presented and intervention strategies that can be applied by pharmacists will be discussed. Finally, interventions to improve adherence to treatments that are currently being developed at the Chair will be discussed.



Simon de Denus, B.Pharm, MSc (Pharm), PhD

Mr. Simon de Denus completed his Bachelor of Pharmacy at the Université de Montréal in 1999 and completed his degree in hospital pharmacy practice at the Université de Montréal in 2000. He then completed a residency in cardiovascular pharmacotherapy at the Hôpital du Sacré-Coeur in Montreal, a first Fellowship University of the Sciences in Philadelphia and a second at the Montreal Heart Institute. He then obtained his PhD in pharmaceutical sciences at the Université de Montréal. He has been an assistant professor in the Faculty of Pharmacy, Université de Montréal since 2006 and a pharmacist and researcher at the Montreal Heart Institute. He holds the Université de Montréal Beaulieu-Saucier Chair in Pharmacogenomics.

The research interests of Mr. de Denus are mainly in the areas of cardiovascular pharmacotherapy and personalized medicine. Mr. de Denus has published over 40 articles and book chapters, and more than thirty abstracts.

Personalized medicine: What does it mean to pharmacists?

In the last decade, human genomics have moved forward at an unprecedented pace. One of the goals behind the exploration of the human genome is the individualization of drug treatments based on genetic information. Pharmacogenomic tests are currently recommended prior to the use of selected drugs. As the evidence of the clinical utility of pharmacogenomic tests continues to accumulate, their widespread integration into clinical practice appears imminent.

Given their clinical expertise in pharmacology and pharmacotherapy, as well as their central role in the proper use of drugs, pharmacists may well be asked to be at the forefront of the personalized medicine revolution. The objective of the presentation is to illustrate how personalized medicine will impact pharmacy practice and education, as well as to describe how pharmacists can participate to pharmacogenomic discoveries and the translation of this new field in clinical practice.



Pierre Moreau, PhD, Dean, has obtained a Baccalaureate in pharmacy from Université de Montréal in 1988. He then trained in cardiovascular pharmacology at Université de Montréal (Ph.D.), Bern University Hospital (post-doc) and Hôtel-Dieu de Montréal (post-doc). In 1997, he was appointed assistant professor at the Faculty of Pharmacy of Université de Montréal, where he initiated his independent research career. During this period, he was awarded several young investigator prizes in the field of hypertension research. He was promoted associate professor in 2002 and full professor in 2007. He has published more than 80 peer-reviewed articles in the best cardiovascular journals, with continuous funding from the Canadian Institutes for Health Research. In 2006, he served as Acting Dean and was nominated Dean in early 2007. Under his leadership, the Faculty of Pharmacy has seen a 40% growth in its student body and operating budget. He is currently pursuing a second mandate as Dean of the Faculty of Pharmacy.

Pharmacist professors – training a new breed and fostering team-teaching

The recruitment of talented professors is a crucial element of the development plan for an academic unit. Indeed, these individuals are very likely to spend a significant amount of years developing their research capacity, while contributing to the core functions of a Faculty. For a Faculty of pharmacy, professors with a pharmacist background is an advantage particularly for teaching purposes, as lectures can be put in context of pharmacy practice. However, pharmacists pursuing scientific careers represent an endangered species. We offer a “honor” program to prepare interested students for a scientific career early on. It is clear, however, that clinically oriented research has more appeal than basic sciences. Population health is also a sphere of interest for pharmacists. With that in mind, we have established a good pipeline of excellent young pharmacy graduates, currently pursuing research training that we follow closely. We have also developed a model of clinical professors that ensures appropriate teaching skills in all aspects of pharmacy education. Moreover, in our Pharm.D. program, our clinical professors work closely with science professors in teaching teams to take advantage of their complementarity in integrated courses. In conclusion, recruiting talented scientific pharmacists is a challenge for which there is not a single cure, but remedies and workarounds to fulfill the long-term needs of a Faculty of pharmacy in the Pharm.D. era.



Dr. Kishor M. Wasan is a Distinguished University Scholar Professor, Director and Co-Founder of the Neglected Global Diseases Initiative at the University of British Columbia in Vancouver, BC, Canada. In the 17 years that Dr. Wasan has been an independent researcher at UBC, he has published over 200 peer-reviewed articles and 240 abstracts in the area of lipid-based drug delivery and lipoprotein-drug interactions. His work was recently highlighted in the January 2008 Issue of Nature Reviews, Drug Discovery. Dr. Wasan did his undergraduate degree in Pharmacy at the University of Texas at Austin and his Ph.D. at the University

of Texas Medical Center in Houston Texas at MD Anderson Cancer Center in Cellular and Molecular Pharmacology. After completing a postdoctoral fellowship in Cell Biology at the Cleveland Clinic, Dr. Wasan joined the Faculty of Pharmaceutical Sciences at UBC.

Dr. Wasan was one of the recipients of the 1993 American Association of Pharmaceutical Scientists (AAPS) Graduate Student Awards for Excellence in Graduate Research in Drug Delivery, the 2001 AAPS New Investigator Award/Grant in Pharmaceuticals and Pharmaceuticals Technologies, the 2002 Association of Faculties of Pharmacy of Canada New Investigator Research Award and recently was named an AAPS fellow in 2006. In addition, Dr. Wasan was awarded a Canadian Institutes of Health Research University-Industry Research Chair in Pharmaceutical Development (2003-2008), was named a University Distinguished Scholar in April 2004 received the 2007 AAPS Award for Outstanding Research in Lipid-Based Drug Delivery and the 2008 AFPC-Pfizer Research Career Award. In April 2009 Dr. Wasan was named CIHR/iCo Therapeutics Research Chair in Drug Delivery for Neglected Global Diseases and on September 30, 2010 Dr. Wasan was named a Fellow of the Canadian Academy of Health Sciences. In May 2011, Dr. Wasan was awarded the Canadian Society of Pharmaceutical Sciences Leadership award for outstanding contributions to Pharmaceutical Sciences in Canada. Currently Dr. Wasan's research is supported by several grants from The Canadian Institutes of Health Research (CIHR), The Natural Sciences and Engineering Research Council of Canada (NSERC) and several Pharmaceutical companies.

Presentation Title

The future of Faculties of pharmacy: Are pharmacist-researchers an endangered species?

Abstract

Over the past 20 years there has been a serious decline in the number of pharmacy graduates that have gone on to graduate school and received their Ph.D. in Pharmaceutical Sciences. This decline has resulted in a lower number of pharmacist-researchers which has had serious impact on both our pharmacy graduate and undergraduate programs. This presentation will discuss the current state of affairs and the future of pharmacist-researchers.



Zubin Austin, BScPhm, MBA, MSc, PhD, is Associate Professor and inaugural holder of the Ontario College of Pharmacists Research Professorship in Pharmacy at the Leslie Dan Faculty of Pharmacy, University of Toronto. His research interests relate to the development and education of health care professionals. He has published over 75 peer reviewed manuscripts and is author of three textbooks. He has won awards for his research from the American Association of Colleges of Pharmacy, the Association of Faculties of Pharmacy of Canada, and the International Migration Society. He is also an award winning educator having received the Province of Ontario's Leadership in Faculty Teaching Award, the University of Toronto's President's Teaching Award, and he has been named undergraduate professor of the year on 11 separate occasions.



Donna Pipa, B.Sc.Pharm, FCSHP, is Project Manager for the AFPC - Canada Health Infoway initiative aimed at developing an on-line educational program for optimizing the use of pharmacy information and information technology. She is a licensed pharmacist in Alberta with considerable experience in informatics. Donna has been involved with Alberta's electronic health record (EHR) initiative for over 10 years, including direct involvement in assisting pharmacists, physicians and other health professionals with implementation of the EHR. She has been recognized for her expertise by being appointed to numerous provincial and national committees relating to informatics. Prior to her work in the area of informatics, she was the Director of Pharmacy at the Alberta Children's Hospital, then Pharmacy Operations Manager for Pediatrics within the Calgary region. Donna has also been professionally active with associations and colleges at the provincial and national levels.

Preparing pharmacy students for an e-health world!

As a professional group, pharmacists are much more familiar with using information technology in their practices than counterparts in other health disciplines. After all, computers have been an integral part of most pharmacy practices for more than 30 years! But are we doing all we can to prepare pharmacy students for practicing in today's *e-health* world?

The Association of Faculties of Pharmacy of Canada (AFPC) and Canada Health Infoway have partnered together to develop a national on-line educational program that will help undergraduate pharmacy students optimize the use of pharmacy and health information and information technology. The project is being undertaken in phases over a 2 year period, concluding in the fall of 2013 with release of the on-line program.

This presentation is intended to provide an update on this exciting initiative AND more importantly, gain YOUR input regarding desired competencies and priority domains for the on-line program!



Award winners

New Investigator Award



Suzanne M. Cadarette, PhD, is Assistant Professor of Pharmacy at the University of Toronto, an Adjunct Scientist of the Institute for Clinical Evaluative Sciences, and Investigator with the Toronto Health Economics and Technology Assessment collaborative. She completed her undergraduate training at the University of Waterloo (BSc), graduate training in epidemiology (MSc) and health services research (PhD) at the University of Toronto, and received post-doctoral training in pharmacoepidemiology at Harvard Medical School with the Division of Pharmacoepidemiology and Pharmacoeconomics, Brigham and Women's Hospital. Dr. Cadarette holds a CIHR New Investigator Award in Aging and Osteoporosis and an Ontario Ministry of Research and Innovation Early Researcher Award. She is a Mentor in the Drug Safety and Effectiveness Cross-disciplinary Training Program (www.safeandeffectiverx.com); and active Member of the

American Society for Bone and Mineral Research (ASBMR), the Canadian Association of Population Therapeutics (CAPT), and the International Society for Pharmacoepidemiology (ISPE).

Statement about Research

I am committed to building a premier pharmacoepidemiologic and health services research program in Aging. Through my research, I aim to reduce the burden of illness due to adverse drug effects, suboptimal treatment, and failure to adhere to preventive pharmacotherapy. My efforts are focused in the area of osteoporosis and fracture prevention.

<http://phm.utoronto.ca/~cadarette>

My research program can be organized into three main areas:

drug safety and effectiveness – focus on comparative drug effects (e.g., osteoporosis drug safety and effectiveness and effects of non-osteoporosis drugs on fracture risk);

adherence to pharmacotherapy (e.g., measuring drug exposure and adherence, methods to study the impact of drug adherence on clinical outcomes); and

osteoporosis management (e.g., documenting the burden of osteoporosis, describing osteoporosis treatment patterns, examining interventions to improve osteoporosis management)

Research methodology and **knowledge translation** are central cross-cutting themes that are apparent in each of my main research areas. In addition to original research papers, I value instructional review papers because they facilitate learning in the classroom, and are useful as a resource to other research scholars. I am passionate about advancing research methods and translating pharmacoepidemiologic results and principles to all audiences.

CFP Graduate Student Award for Pharmacy Practice Research




Mary Elias

From an early age I had an interest in the sciences and thus having received an entrance scholarship from York University, I decided to complete a B.Sc. in Biomedical Sciences. During my final year of undergraduate study, I realized my keen interest and passion for research. I then decided to pursue graduate studies in the Clinical, Social and Administrative Pharmacy program at the University of Toronto, combining my interests in the health sciences, pharmacy and research. As a recent M.Sc. graduate from the University of Toronto, I believe that the knowledge and skills in health services research, epidemiology and pharmaceutical sciences I received during my M.Sc. training will enable me to pursue further research with the overall aim of improving health for Canadians. I am thrilled to be receiving the 2012 AFPC-CFP Graduate Student Award for Pharmacy Practice Research and I hope that my research examining pharmacists' interventions on osteoporosis management will lead the way for more studies addressing the impact of pharmacist interventions on osteoporosis treatment adherence and the feasibility of osteoporosis management in pharmacy practice settings across Canada.

Abstract About Research Career

Introduction: My research career began with investigating chronic diseases at a molecular level. My B.Sc. thesis research work involved examining the gene associated with Parkinson's disease in *Caenorhabditis elegans*. As I became familiar with more types of research, I quickly developed a keen interest for clinical research focused on chronic disease management. I then pursued a M.Sc. from the University of Toronto, with specialization in Clinical, Social and Administrative Pharmacy and a focus on osteoporosis management.

Research Experience: Thus far, my research career has provided me with experience in both qualitative and quantitative analyses, as well as knowledge and skills in epidemiology, the pharmaceutical sciences and health services research. I was fortunate to receive a Frederick Banting and Charles Best Canada Master's Award from the Canadian Institutes of Health Research (CIHR) to fund my M.Sc. work. As part of my graduate research, I focused on pharmacy practice research in the area of osteoporosis and successfully published a systematic review examining pharmacists' interventions in osteoporosis management. This work was selected for an oral presentation at the 2010 Annual National Conference of The Canadian Pharmacists Association, for which I received an Institute of Health Services and Policy Research Travel Award from CIHR. I am also currently receiving the 2012 AFPC-CFP Graduate Student Award for Pharmacy Practice Research for this work. During my time at the University of Toronto, I also taught a few lectures related to pharmacy practice in the Doctorate of Pharmacy and Bachelor of Pharmacy programs at the Leslie Dan Faculty of Pharmacy at the University of Toronto. The rest of my M.Sc. work focused on examining correlates of calcium supplement use in older community-dwelling women in Ontario. Outside of my M.Sc. education, I also pursued part-time work as a research assistant for work that examined the changes in scope of practice for pharmacists and optometrists, as well as the regulation of pharmacy technicians in Ontario.

A decorative header image featuring a vibrant red, abstract, flowing fabric-like texture that transitions into a solid black background.

Future Research Career Aspects: I believe that health is the most valued necessity for an adequate lifestyle, and I recognize that this is becoming even more important with our aging population. I hope to continue to pursue research related to the management of chronic diseases with a focus on improving and efficiently providing care to patients with such diseases.

GSK Graduate Student Research Award



Sébastien Fortin is a postdoctoral researcher in medicinal chemistry at the Université du Québec à Trois-Rivières under the supervision of Drs. Gervais Bérubé and Éric Asselin. He is also a lecturer at the Faculty of Pharmacy at Université Laval.

Dr. Fortin obtained his baccalaureate in chemistry in 2003 and his master's degree in 2005 in pharmacy from Université Laval. He has completed a Ph.D. cotutelle degree involving the Faculty of Pharmacy (Ph.D. in pharmacy) at Université Laval and the Ecole Doctorale des Sciences Fondamentales (Ph.D. in organic chemistry) at Université d'Auvergne 1 in Clermont-Ferrand,

France under the supervision of Drs. Rene C.-Gaudreault and Jean-Claude Teulade. He also completed his first postdoctoral training in medicinal chemistry at Université Laval under the guidance of Dr. C.-Gaudreault. Dr. Fortin has a broad expertise in organic synthesis, medicinal chemistry, molecular modeling, cell biology, molecular pharmacology and mass spectrometry. Dr. Fortin's research program focuses on the developments of new drugs for the treatment of cancer. Dr. Fortin has published 15 scientific manuscripts in high-impact journals including *Journal of Medicinal Chemistry*, *European Journal of Medicinal Chemistry* and *Journal of Pharmacology and Experimental Therapeutics*. He is also the co inventor of 3 patents on new anticancer agents. He was awarded several prestigious academic distinctions scholarships notably Ph.D. and postdoctoral scholarships from FRSQ and CIHR and the FRONTENAC research Program.

Abstract

Sixty-one phenyl 4-(2-oxoimidazolidin-1-yl) benzenesulfonates (PIB-SOs) and thirteen of their tetrahydro-2-oxopyrimidin-1(2H)-yl analogues (PPB-SOs) were prepared and biologically evaluated. The antiproliferative activities of PIBSOs on 16 cancer cell lines are in the nanomolar range and unaffected in cancer cells resistant to colchicine, paclitaxel, and vinblastine or overexpressing the P-glycoprotein. None of the PPB-SOs exhibit significant antiproliferative activity. PIB-SOs block the cell cycle progression in the G2/M phase and bind to the colchicine-binding site on β -tubulin leading to cytoskeleton disruption and cell death. Chick chorioallantoic membrane tumor assays show that compounds **36**, **44**, and **45** exhibited potent antitumor and antiangiogenic activities on HT-1080 fibrosarcoma cells grafted onto chick chorioallantoic membrane similar to combretastatin A-4 (CA-4) without significant toxicity for the chick embryos, making this class of compounds a promising class of anticancer agents.

Janssen Innovation in Education Award



Jason Perepelkin is an Assistant Professor of Social and Administrative Pharmacy, in the College of Pharmacy and Nutrition, University of Saskatchewan (U of S).

In his official capacity with the U of S, Jason teaches in the areas of management, marketing, and policy. His research focuses on marketing and branding in pharmacy, particularly within the context of community pharmacy, but also centring on the profession. The complex interaction between the business and professional obligations and responsibilities within community pharmacy is also an area he researches. He also has a keen interest in curriculum development in social, administrative and managerial pharmacy, with emphasis on methods to increase student engagement in the material and the application to the 'real-world' setting.


Jason is engaged in many facets of the profession. He is currently a member of the Canadian Pharmacists Association/Blueprint for Pharmacy Public Education Steering Committee, Editorial Board Member for the journal Research in Social and Administrative Pharmacy, and Finance Committee Member with the Association of Faculties of Pharmacy of Canada. Jason was Chair of the 2012 Pharmacists' Association of Saskatchewan Conference Committee and Chair of the Saskatchewan College of Pharmacists Public Education Steering Committee.

As an academic, Jason takes it upon himself to actively engage student pharmacists so that they can inform and shape their future practice environment, and encourages them not to simply be passive and/or reactive to changes in the profession; to show that, as health care professionals, pharmacists have the obligation to advocate for their patients and for their profession.

Jason Perepelkin Abstract, 2012

I was nominated for this award by my colleague, Dr. Roy Dobson, for my redesign of the Management in Pharmacy course at the University of Saskatchewan; when he said he wanted to nominate me for this award I was honoured and humbled. When I was notified that I actually won the award, I was very grateful for winning it, and for the fact that AFPC and Janssen sponsor and make available an award for innovation in education. Over many years I have observed that most pharmacy students view management as a filler class, one that was required, but to most students they could not see the relevance to their future professional careers. I felt a need to redesign the course to make it more 'relevant' to students and to take a somewhat pragmatic approach. Prior to the redesign, the course consisted primarily of didactic lectures, with some interactive/applied tutorials; while assessment consisted of in-class and final examinations, as well as a small group project. Major changes in course redesign:

Business plan group project (with business plan competition as a capstone at end of course) in which students create a strategy to implement a new service into an existing practice setting;



Student group led class discussions on pharmacy practice and management journal articles;
Participation log kept by students throughout course to express thoughts and opinions on course subject matter, allowing each student to 'participate' even if they do not participate verbally in class;
Start lectures off by reviewing current events in pharmacy, and end lectures with highlighting the application of the lecture topic to the business plan.

All the changes required extensive research and planning; furthermore, delivering the redesigned course and staying current is much more labour intensive for the instructors, and for students. There is a lot more preparation and grading time required, and students demand more of ones time outside of class time for instructors. The students now meet regularly in groups, are required to do extensive primary and secondary research, engage in course delivery (lead article discussion) without being 'graded', and apply what one learns and simply not memorize and perform an information dump.
A short abstract cannot fully portray what the course redesign was truly about, but I will gladly discuss this redesign as well as implementing a marketing for pharmacists course.

Pfizer Research Career Award



Dr. Micheline Piquette-Miller completed a BSc (Pharmacy) and PhD in Pharmacokinetics at the University of Alberta and continued Postdoctoral training in molecular pharmacology at the University of California in San Francisco. Her research specializes in the area of drug transport and molecular pharmacokinetics. She is currently a Professor at the University of Toronto within the Faculties of Pharmacy and Medicine and an Associate Editor for *Nature's Clinical Pharmacology and Therapeutics*. Dr. Piquette-Miller has been the recipient of numerous prestigious national and international research awards and has held positions on the Board of Directors and Executive Councils of the *American Society of Clinical Pharmacology and Therapeutics*, the *Canadian Society of Clinical Pharmacology* and the *Canadian Society of Pharmaceutical Science*.

Drug Transporters: effect of disease and impact on drug response: Although drug disposition is often altered in patient populations, the impact of underlying disease states has been largely neglected as an important source of inter-subject variability. Inflammation, which is a component of many diseases such as infection, arthritis, atherosclerosis and cancer, has been frequently reported to impart changes in drug disposition and response. Transport proteins play a critical role in the absorption, distribution and clearance for numerous drugs, toxins and their metabolic products and thus may play a role in patient variation. Indeed, our studies in rodent models have demonstrated inflammation-mediated changes in the expression of several of the ABC drug efflux transporters in the liver, intestine and blood brain barrier with corresponding changes to the disposition and tissue accumulation of their substrates. More recent studies in pregnant animal models of highly prevalent inflammatory conditions have seen significant changes in the expression of many transporters in both maternal and fetal tissues. We have found that these changes are associated with alteration in the maternal disposition, placental transfer and fetal exposure of drugs frequently given to pregnant women. As drug transporters are involved in the distribution and elimination of a large number of chemically diverse and clinically important drugs as well as potentially toxic agents, our studies suggest that prevalent co-existing inflammatory conditions are an important source of inter-subject variability and could contribute to adverse outcomes or therapeutic failure. This information is important in the prediction of drug-disease interactions.

Leo Pharma National Award for Excellence in Education




Lalitha Raman-Wilms is an Associate Professor and the Associate Dean of Professional Programs at the Leslie Dan Faculty of Pharmacy, University of Toronto. Her primary responsibilities include the implementation of the new professional curriculum and providing leadership to the Office of Experiential Education. In addition, she coordinates and teaches two Pharmacotherapy courses. At the Faculty and the University levels, she has been involved in various capacities, including, Chair of Curriculum Committee, Co-Chair of the Interprofessional Pain Curriculum (IPC) Committee, Chair of the Evaluation committee for IPC and a member of the Health Sciences Education subcommittee. Her contributions to teaching, as well as curriculum development, have been recognized through Faculty teaching awards, and the University's Northrop Frye award. She is a strong proponent of patient education, and is the Editor-in-Chief of a consumer information book on medications: CPhA's Guide to Drugs in Canada (currently in its 3rd edition). Dr. Raman-Wilms has contributed to the profession through her work with AFPC, CSHP, CJHP, CHPRB, and PEBC. She served as the President of AFPC (2010-11) and has been actively involved in this organization for a number of years. She is a fellow of the Canadian Society of Hospital Pharmacists. Her research interests include Curriculum Development, Interprofessional Education, Osteoporosis, and Geriatrics.

Abstract - Educational career

Dr. Lalitha Raman-Wilms is an Associate Professor and the Associate Dean of Professional Programs, at the Leslie Dan Faculty of Pharmacy, University of Toronto. Her primary responsibilities include the implementation of the new professional curriculum and providing leadership to the Office of Experiential Education. In addition, she coordinates and teaches two Pharmacotherapy courses for undergraduate students.

Dr. Raman-Wilms' career in pharmacy education spans over 18 years and during that time she has served in various capacities at both the University and National levels. She has served as Chair of Curriculum Committee (2000-2) and has been an active member of the Curriculum Committee for many years. As Project Leader for Curriculum Renewal (2007-8), she led the Faculty in the development and approval of a new entry-level PharmD curriculum. She has served as Director of the Division of Pharmacy Practice for a number of years, bringing faculty from the undergraduate and the PharmD programs together, and leading the Division's strategic direction and growth in both teaching and research.

As a teacher, she has led in the development of early web-based support for therapeutics courses, integrated innovative strategies for teaching Therapeutics in a large group, problem-based format, and was a major contributor to the development and implementation of U of T's Interprofessional Pain Curriculum. The University of Toronto Centre for the Study of Pain, Interfaculty Pain Curriculum (UTCSP-IFPC), is an integrated 20-hour mandatory pain curriculum for students from the Faculties of Dentistry, Medicine, Nursing, Pharmacy, Physical Therapy and Occupational Therapy, and is taught to



over 900 students. She has been involved in a leadership capacity for the overall committee (as Co-Chair), and has served as the Chair of the Evaluation Sub-committee. In her latter role, she was also responsible for the development and testing of standardized measures for pain education. Dr. Raman-

Wilms is also a member of the Council of Health Sciences Education Subcommittee, where common educational issues for the 10 health science disciplines are reviewed and implemented.

Her teaching philosophy is collaborative, encouraging students to become more engaged in their own learning, by emphasizing self-directed inquiry and by facilitating a critical thinking process. She has been recognized by students for her teaching through many 'Teacher of the Year' awards (BScPhm program), and a 'Preceptor of the Year' award (PharmD program). Her contributions to innovative work have also been recognized by the University's Northrop-Frye Award, and through her many invited presentations and publications.

Lalitha is a strong advocate for the profession and has been involved at the National level with AFPC, CHPRB, PEBC and CSHP. She has served as the President of AFPC (2010-11) and has been actively involved in this organization for a number of years. She is a fellow of the Canadian Society of Hospital Pharmacists. Lalitha has participated in various task forces and advisory groups related to curriculum, development of competencies, and professional programs.

Dr. Raman-Wilms has continued to be involved in primary care practice, working with geriatric patients and with those with spinal cord injury. She has a strong interest in patient education and is a strong advocate for patients. She is the Editor-in-Chief of a consumer information book on medications: *CPhA's Guide to Drugs in Canada* (currently in its 3rd edition), a comprehensive guide for patients to better understand their medical conditions and how to optimize their drug therapy.

Her research interests include Curriculum Development, Interprofessional Education, Osteoporosis, and Geriatrics.

Merck Post Graduate Pharmacy Fellowship Award



Shirin Rizzardo. B.Sc.(Pharm). M.Sc. Student

University of British Columbia
M.Sc.Pharm candidate (2011 to present)
B.Sc.Pharm (2007)

Shirin completed her Bachelor of Science in Pharmacy at UBC in 2007. She has since worked as a community pharmacist manager and a clinical pharmacist at the BC Cancer Agency. Shirin is currently undertaking her Masters in Pharmaceutical Sciences at UBC under the supervision of Dr. Larry Lynd and is a trainee with the Collaboration for Outcomes Research and Evaluation (CORE). She has received fellowships from the Pharmaceutical Policy Research Committee (PPRC) and Merck Canada. Her primary areas of interest include health economics, health policy and health outcomes. Her research will focus specifically on expensive drugs for rare diseases.

The use of multi-criteria decision analysis in prioritizing patients for treatment with expensive drugs for rare diseases

Expensive drugs for rare diseases are often extremely expensive, costing over \$500,000/patient/year, resulting in challenges for decision-makers due to the high opportunity cost and finite budget. Traditional health-technology assessment is not informative for these decisions as these drugs will not meet current cost-effectiveness thresholds. Instead, funding decisions appear to be entirely value-based. We aim to determine the values and factors used by the British Columbia EDRD committee for prioritizing patients eligible for treatment using multi-criteria decision analysis (MCDA). Once these criteria are determined, ranked and scored, we will have a transparent model which can be applied to upcoming patients for priority-setting and funding approvals. We will also undergo a parallel process with volunteers of the lay-public, whose values the committee aims to represent, in order to inform decision-makers of societal values for these high-cost medications.



**Congratulations to our 10 Winners of the AFPC – Rx and D Pharmacy Student
Research Poster Award!**

SAI KIRAN SHARMA – University of Alberta

GINA CRAGG – University of British Columbia

RANDEEP KAUR – University of Saskatchewan

SARAH WAY – Memorial University

SOPHIE CARTER – Université Laval

DOUGLAS MACQUARRIE – Dalhousie University

NILASHA BANERJEE – University of Toronto

MARYAM VASEFI – University of Waterloo

ARIANE LESSARD – Université de Montréal

STEPHANIE MOROZ – University of Manitoba



Posters

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FAC-3	<i>The effect of Dexrazoxane on cancer cell lines treated with the anthracycline Doxorubicin</i> Gina E. Cragg ¹ , András Szeitz ¹ , Onkar S. Bains ¹ , Joanna M. Lubieniecka ^{1, 2} , Thomas A. Grigliatti ² , Ronald E. Reid ³ , K. Wayne Riggs ¹ ; ¹ Division of Pharmaceutics and Biopharmaceutics, Faculty of Pharmaceutical Sciences, The University of British Columbia, Vancouver, British Columbia, Canada; ² Life Sciences Institute, Department of Zoology, Faculty of Science, The University of British Columbia, Vancouver, British Columbia, Canada; ³ Division of Biomolecular and Pharmaceutical Chemistry, Faculty of Pharmaceutical Sciences, The University of British Columbia, Vancouver, British Columbia, Canada	47
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FAC-1 Organic Anion Transporting Polypeptides (OATPs): A new molecular target for hormone dependent breast cancers

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The purpose of this study is to explore the potential of Organic Anion Transporting Polypeptides (OATPs), a family of membrane associated uptake transporters, as a novel molecular target for imaging and treatment of breast cancers. Estrone-3-sulphate (E3S), an OATP substrate, is the predominant source of tumor estrogen in post menopausal hormone dependent breast cancer patients. Several OATP isoforms are over expressed (up to 10 times) in breast cancer tissues as compared to surrounding normal tissues, suggesting their potential contribution towards the 2-3 times higher tumoral concentration of E3S. Gene and protein expression of seven OATPs (i.e. OATP1A2, OATP1B1, OATP1B3, OATP1C1, OATP2B1, OATP3A1 and OATP4A1) that recognize E3S as a substrate, were compared in normal breast epithelial cells (MCF10A), hormone dependent (MCF7) and hormone independent breast cancer cells (MDA/LCC6-435, MDA-MB-231, MDA-MB-468) by qPCR and immunoblotting. Expression of SLCO1A2, 1B1, 1B3, 2B1 and 3A1 was exclusive, similar or significantly higher in cancer cells compared to MCF10A. Protein expression of OATPs was observed to be either exclusive or higher in cancer cells compared to MCF10A. Specificity of OATP mediated E3S uptake was observed only in cancer cells, with highest total uptake in MCF7 cells. Estimation of the transport kinetics of E3S uptake demonstrated transport efficiency to be 10 times greater in the MCF7 cells, than in the hormone independent cells. Taken together, these data suggest that OATPs could be a potential molecular target, and E3S could serve as a novel ligand for active targeting of hormone dependent breast cancers in post menopausal patients.

FAC-2 Transcriptional control of adipogenesis by OcaB

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Objectives: Using a differential screening by large scale genomics, our team recently discovered that Ocab levels are robustly reduced in WAT upon ageing and obesity. The objective of this study was to determine the role of Ocab in energy metabolism.

Methods: Using the Ocab knockout mouse model, visceral adipose tissue was quantified and glucose and insulin tolerance tests were performed. Circulating proinflammatory cytokines were quantified by milliplex assay. Mouse embryonic fibroblasts (MEFs) were isolated to compare their adipogenic potential, lipolysis was tested using primary adipocytes and adipogenesis was compared between 3T3L1 cells overexpressing Ocab and controls. Molecular mechanism was identified using, co-immunoprecipitation, luciferase assay and GST pull down.

Results: Analyses showed that compared to their wild type counterparts (WT) Ocab-/- animals had more visceral adipose tissue, were more resistant to insulin and had higher levels of circulating proinflammatory cytokines. These findings are supported by ex vivo analyses, which demonstrated that Ocab -/- MEFs were more easily differentiated into adipocytes and that isolated adipocytes have impaired response to insulin, whereas overexpression of Ocab in 3T3-L1 suppresses adipogenesis. Mechanistically, the binding of Ocab to its transcription factor Oct-1 results in the sequestration of RXRalpha. The latter is unable to bind with its partner PPARγ, which causes a reduction of adipogenic gene transcription.

Conclusion: This study reveals for the first time the role of OcaB in lipid metabolism. The results suggest that OcaB could be an interesting pharmacological target for treating fat accumulation observed during aging.

This work was previously presented at the 12th Pharmacy research day at Laval University on April 12th 2012. Study funded by CIHR

FAC-3 The effect of Dexrazoxane on cancer cell lines treated with the anthracycline Doxorubicin

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Although the anthracycline doxorubicin (DOX) is an effective chemotherapy agent in a variety of cancers, its use has been limited due to its cardiotoxicity. To reduce this effect, the drug Dexrazoxane (DEX) is co-administered with DOX in breast cancer patients but this combination has yet to be approved in other types of cancer. While DEX has a protective effect on the heart cells, there remains the concern that the drug may also have a similarly protect cancer cells and reducing the efficacy of DOX treatment. The mechanism by which DEX reduces cardiotoxicity remains unknown but the literature supports that DEX may achieve this through iron chelation, preventing the formation DOX induced reactive oxygen species. This study looks at the cancer derived cell lines PANC-1 (pancreas), H460 (lung), A498 (kidney) and MCF-7 (breast) as well as an immortalized rat heart cell line H9c2. Cell viability was measured by MTT (3-(4,5-Dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide) assay, ROS (reactive oxygen species) production was measured using Carboxy-H₂DCFDA and cell permeability to DOX was measured using LC-MS. We found that DEX decreased the oxidative state of all the cell lines treated with DOX and that DEX protected the H9c2 (heart) and PANC-1 but not the H460, A498 and MCF-7 cell lines. These findings suggest that DOX may be killing some cells through ROS production and others through a different mechanism such as topoisomerase inhibition. Also, although DEX shows promising results, the use of DEX in other cancers does need to be further evaluated to ensure the drug is not decreasing the efficacy of DOX treatment.

FAC-4 The future of nanomedicine: lysine-functionalized nanodiamonds as novel gene delivery agents

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Optimal drug delivery is a concept important to all pharmacists. One of the systems that have potential for delivering medicines of a genetic nature is based on solid core nanoparticles.

Objectives: Detonation nanodiamonds (NDs) are carbon-based nano-materials that are emerging as promising tools for delivering biochemical moieties into cells due to their nano-size (4-5 nm), unique structure and alterable surface chemistry. However, these particles are prone to assemble into micron-sized aggregates in a liquid formulation medium, restricting their biological applications. Therefore, we developed a mechano-chemical approach to achieve disaggregated nano-sized particles and evaluated the applicability of the resultant material as a carrier for DNA and RNA.

Methods: The NDs undergoing mechanical disaggregation were covalently functionalized with lysine and characterized by FTIR, zeta potential, size and atomic force microscopic analyses. The efficacy of lysine modified diamonds to bind and protect genetic materials was investigated by gel-electrophoresis retardation assay, and size and zeta potential measurements. Raman mapping and MTT assay was used to examine *in vitro* internalization ability and cytotoxicity of NDs, respectively.

Results: Our functionalization approach resulted in formation of highly stable hydrosols of NDs with a significant disaggregation of particles from 1280 nm to 20 nm. NDs showed high cellular internalization after 24 h of incubation and were found to be biocompatible in a mammalian cell line. The lysine-modified NDs were able to generate nano-sized complexes of ND-genetic material (diamoplexes) by binding plasmid DNA and small interfering RNA at a NDs/genetic material weight ratios of, 5/1 and 20/1, respectively.

Conclusions: The disaggregation of NDs could be achieved by using a simple mechano-chemical functionalization approach and the resultant lysine substituted NDs possess high potential to act as a

vector for delivering genetic material into the cellular systems.

FAC- 5 Anticholinergic load as a modifiable risk factor in sitter use in acute care hospitals

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Objectives: Prior research has provided evidence that psychotropic drugs are associated with a higher likelihood of sitter use in acute care hospitals. However, the mechanism explaining this association remains unknown. The aim of this study was to assess the association of three potentially modifiable pharmacological mechanisms with sitter use.

Methods: A retrospective case-control study was conducted. All medical patients ≥ 65 years who received a sitter (cases) were selected from a cohort of 43,212 patients admitted to an academic health center in Montreal in 2007-2008. For each case ($n = 143$), one control was randomly selected among patients who did not receive a sitter. For each case and control, we determined the:

- 1) number of psychotropic drugs not adjusted for renal function;
 - 2) total anticholinergic load;
 - 3) number of clinically significant drug-drug interactions.
- Multivariate logistic regression was used to assess the association between sitter use and these three mechanisms.

Results: Compared with controls, patients who were assigned sitters had a higher anticholinergic load, a greater number of drugs not adjusted for renal function, and a larger number of drug-drug interactions, in the period prior to sitter use (i.e., the exposure period). In multivariate analysis, after having adjusted for the effect of patient demographic characteristics and comorbidities, we found that every additional drug with an anticholinergic load of 1 prescribed over the antecedent exposure period increased the likelihood of sitter use by 40% (OR = 1.4; 95%CI: 1.1 - 1.7). The number of drugs not adjusted for the patient's renal function and the number of drug-drug interactions identified over the antecedent exposure period were not significantly associated with sitter use.

Conclusion: The use of patient sitters represents an important financial burden to acute care hospitals. Our

findings indicate that one strategy to potentially decrease the costs associated with sitter use is for physicians to prescribe, when possible, drugs that have a low anticholinergic load.

FAC-6 Reviewing, updating, and improving the content of the Drug Information Resources website

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Objectives: To update and maintain the current DIR website, and prepare for its migration to the CQ5[®] operating system.

Methods: Google Analytics[®] was used to collect website usage data based on number of visits and duration of visit in order to prioritize the order of reviewing categories. All existing external hyperlinks within DIR were verified for accuracy and functionality. New content was analyzed and evaluated; appropriate content was hyperlinked and referenced in the appropriate category. Collage[®] was used to effectively manage new and existing web content. The DIR website was organized in such a way to facilitate its migration to the CQ5[®] operating system, Dalhousie's new content management system.

Results: All 67 categories of DIR were reviewed which involved ensuring that all external hyperlinks were functional and accurate, as well as the addition and deletion of content. Higher priority categories were identified and placed in a "top 10" table on the main page for easy access. This table was updated daily based on statistics from Google Analytics[®]. The concept of Patient Decision Aids was investigated, resulting in their addition to DIR. A comprehensive website inventory was created as per the Dalhousie Web Masters' specifications to facilitate the website's migration to the new operating system.

Conclusion: DIR is a valuable, pharmacy oriented resource for healthcare professionals containing the most recent, up-to-date information with links to databases and the newest journal articles.

FAC-7 Use of methylphenidate formulations in an urban pediatric population

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Background: Attention Deficit Hyperactivity Disorder (ADHD), usually diagnosed in childhood, is commonly treated with stimulant medications, which include methylphenidate. Several formulations of methylphenidate are available on the Canadian market including immediate-release, sustained- and extended-release forms, and an osmotic-release oral system (OROS). The methylphenidate ER-C formulation is considered to be the generic equivalent of the OROS. Costs vary significantly among products. This study describes how methylphenidate is prescribed to a general urban pediatric population with the aim of determining preferential use of certain formulations.

Methods: Retrospective analysis of prescription data collected at a community pharmacy located in an urban area of Manitoba, Canada. All patients filling prescriptions for methylphenidate at the time of the study (2012) were included. Information on patients, prescribers and payers was retrieved. History of methylphenidate use with focus on formulation changes was also recorded. This study received ethics approval by the University of Manitoba Health Research Ethics Board and was conducted in full compliance with the PHIA legislation of the province of Manitoba.

Results: Seventy-nine percent (79%) of patients between the age of 0 to 18 years on methylphenidate were male and half of them were taking the newest OROS formulation. In contrast to what observed for patients older than 18 years, no patients younger than 18 were taking the less expensive generic ER-C formulation. No significant switches from one formulation to another were noted. No treatment gaps and no significant changes in dose were observed. Most prescriptions (72%) were written by specialists (psychiatrist or pediatrician) and 29% of patients were concurrently prescribed other psychotropic medications (antidepressants or antipsychotics). Only 36% of patients appeared to be paying out-of-pocket for their prescriptions, but 80% of them were receiving the OROS formulation.

Conclusion: Male patients younger than 18 years of age were preferentially filling prescriptions for the OROS methylphenidate formulation and paying out-of-pocket

for it. Further studies on larger populations are necessary to define predictors of preferential use in conjunction with therapeutic benefit.

FAC-8 Radiolabeling of anti-CA125 monoclonal antibody and single chain variable fragment for molecular imaging and targeting of ovarian cancer

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Objective: Ovarian cancer is characterized by over-expression of mucinous glycoprotein CA125 that serves as a tumor marker. The present work utilizes anti-CA125 monoclonal antibody (mAb) and single chain variable fragment (scFv) to develop targeted radionuclide-based molecular imaging tools to evaluate CA125 expression by positron emission tomography (PET).

Methods: Anti-CA125 mAb was purified from B43.13 hybridoma by protein G affinity chromatography. Anti-CA125 scFv was produced by recombinant expression in E.coli. NIH:OVCAR3 cells (CA125+ve) and SKOV3 cells (CA125-ve) were used for immunostaining and cell uptake studies. N-succinimidyl 4-[¹⁸F]fluorobenzoate ([¹⁸F]SFB) was used to radiolabel anti-CA125 mAb and scFv. ⁶⁴Cu was obtained in high specific activity from Washington University (St. Louis, MO). pSCN-Bn-NOTA was conjugated to the mAb and scFv as a macrocyclic chelator for ⁶⁴Cu labeling.

Results: Anti-CA125 mAb and scFv were purified in yields of 7 mg/L and 0.6 mg/L from cell cultures. Immunostaining with FITC-labeled anti-CA125 mAb and scFv showed specific binding to OVCAR3 cells and no binding to SKOV3 cells. Radiolabeling with ¹⁸F provided anti-CA125 mAb and scFv in 20% and 35% radiochemical yields respectively. Conjugation of chelator yielded 1.4 NOTA molecules per mAb and 1.8 NOTA per scFv as determined by MALDI-TOF analysis. Radiolabeling with ⁶⁴Cu provided anti-CA125 mAb and scFv in 72% and 42% radiochemical yields respectively. Radiolabeled anti-CA125 mAb and scFv exhibited high and selective uptake in OVCAR3 cells and virtually no uptake in SKOV3 cells.

Conclusion: Radiolabeling of anti-CA125 mAb and scFv using [^{18}F]SFB and ^{64}Cu was accomplished successfully without altering immunoreactivity. This renders them as potential PET probes for targeted in vivo molecular imaging of ovarian cancer.

FAC-9 5-HT7 Receptor Neuroprotection against Excitotoxicity in Hippocampus

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Objectives: The targeting of 5-HT receptors to prevent mental health disease and improve existing treatments for a number of identified mental health diseases is a focal point of current drug development. 5-HT7 receptors are a potential drug target to treat psychosis. In fact, several currently used antipsychotics are antagonists at multiple 5-HT receptors, including the 5-HT7 receptor. The 5-HT7 receptor antagonists may also present a new direction in the development of antidepressants with faster therapeutic onset of action.

Methods: We are using three model systems: the SH-SY5Y neuroblastoma cell line, primary hippocampal cultures, and hippocampal slices. Cell death assays (MAP2, MTT) are used to measure the neuroprotective effects of 5-HT7 and PDGF β receptor activation against glutamate- and NMDA-induced excitotoxicity.

Results: Our results demonstrate that 24-hour treatment with the selective agonist of the 5-HT7 receptor, LP12, increases not only the expression but also the activation of PDGF β receptors via phosphorylation tyrosine 1021, a phospholipase-Cy binding site. This effect is blocked by the 5-HT7 receptor antagonist, SB261940. Overnight treatment with 5-HT7 receptor agonists also changes the expression and phosphorylation of NMDA receptor subunits. Interestingly, acute activation of 5-HT7 receptors, 5 min, robustly enhances NMDA-evoked currents in isolated hippocampal neurons. In addition to long-term effects of 5-HT7 agonists, over the short-term these agents also appear to alter N-methyl-D-(NMDA) receptor signaling. The effects of 5-HT7 agonists on both PDGF and NMDA receptors led us to the hypothesis that these agonists may be

neuroprotective and we have shown that this is indeed the case.

Conclusions: The 5-HT7 receptor has potential for both positive and negative regulation of NMDA signaling. This research is significant in the ongoing advances for the treatment of mental health disorders, such as schizophrenia, and will improve the efficient use of drug therapy for patients to strengthen their overall health.

FAC-10 Home visits – Optimizing Medical Care in the Elderly (HOME Study): A pilot study on the effects of an inter-professional primary care program on emergency room visits and hospital admissions in the frail elderly: Phase 1

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Introduction: In response to an aging population with Introduction complex medical needs, an inter-professional, primary care, home visit program (HVP) was initiated. Housebound patients are seen regularly by a physician, nurse practitioner, pharmacist and/or corresponding learners.

Objective: To examine health utilization trends in frail elderly patients before and after the intervention of the HVP.

Methods: Medical records (electronic and paper) at the Ross Family Medicine Clinic were searched by a pharmacy student to identify patients 1) in the HVP during 2007 or 2008, 2) age ≥ 80 in 2008, 3) with ≥ 3 medical conditions and 4) in usual care at the Ross during 2005-2006. Using a data collection tool, the student recorded descriptive data for pre- and post-HVP including patients' medications, number of ER visits and hospital admissions. Ethics approval was obtained.

Results and discussion: Of the 206 charts screened 37 met the inclusion criteria. The majority of patients were female (68%) Caucasians (97%). When they started the HVP, the majority (63%) of patients were widowed, living alone (49%), had 10 ± 2.5 medical conditions, and were taking 17 ± 6.3 medications. The average number ER visits and hospital visits pre-HVP

were 1.8 ± 1.7 and 0.9 ± 1 respectively, and 1 ± 1.2 and 0.6 ± 1.1 after the start of the program.

Conclusions: HVP patients have high rates of chronic illnesses and medication use. Health care utilization trended downwards after start of the HVP despite patients aging and acquiring more medical conditions. In Phase II, we propose to compare this data to health care utilization of those at Ross but not in the HVP and those in other clinics in the St. John's area.

Basic Research

BR-1 Brain uptake of a fluorescent vector targeting the transferrin receptor: a novel application of *in situ* brain perfusion

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The blood-brain barrier (BBB) is a challenge in the treatment of neurodegenerative diseases. To meet this challenge various strategies were used, such as vectors targeting BBB transporters. *In situ* brain perfusion (ISBP) is one of the most quantitative and sensitive techniques used for measuring the passage of molecules across the BBB. In this study, we used ISBP to quantify the brain uptake of a fluorolabeled vector (Ri7) targeting the transferrin receptor (TfR). The vector Ri7 is a monoclonal antibody against the luminal part of TfR, and we have previously demonstrated its ability to bind the cerebral endothelial cells after the systematic administration. When perfusing 100 µg of Alexa Fluor 750-Ri7, its brain uptake clearance (Clup) was $\sim 0.41 \mu\text{g}^{-1}\text{s}^{-1}$. We observed a linear relationship between apparent brain distribution volume and the duration of perfusion. Moreover, Alexa Fluor 750-Ri7 uptake was decreased to $\sim 0.2 \mu\text{g}^{-1}\text{s}^{-1}$ with the addition of 400 µg of unlabeled Ri7, consistent with a saturable mechanism. Finally, we found a similar decrease of the brain uptake of Ri7 following the addition of 6.25 µM of transferrin. To our knowledge, this is the first use of the ISBP with a fluorescent vector, indicating that it is possible to avoid the use of radioactivity. Furthermore, this study confirms the significant accumulation of the vector Ri7

in the mouse brain through a saturable mechanism at the level of TfR in the mouse.

BR-2 Structural and functional abnormalities of cardiomyocytes in diabetic cardiomyopathy: effect of conjugated linoleic acid

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Objectives : Our laboratory has shown that conjugated linoleic acid (CLA; a naturally-occurring polyunsaturated fatty acid) prevents myocyte hypertrophy *in vitro* and *in vivo*. These cardioprotective effects were mediated through activation of peroxisome proliferator activated receptors (PPARs). Thus, the objectives of this study were to determine the effects of CLA on diabetic cardiomyopathy, and to assess the role of PPARs.

Methods : To model hyperglycemia, adult rat cardiac myocytes were treated with normal (5 mM) and high glucose (25 mM) concentrations. Subgroups of myocytes were also pretreated with vehicle or CLA (30 µM) in the presence and absence of a PPARγ antagonist (GW9662; 1 µM). The effects of CLA on hyperglycemia-induced myocyte hypertrophy were assessed by measuring augmentation of myocyte size, *de novo* protein synthesis, and fetal gene expression. Contractile properties of ventricular myocytes were assessed by measuring maximal velocity of shortening and relengthening using the Ionoptix HyperSwitch Myocyte System.

Results: Treating adult rat cardiomyocytes with high glucose increased cardiomyocyte size and protein synthesis compared to untreated cells. Hyperglycemia-induced cardiac myocyte hypertrophy was attenuated by pretreatment with CLA. The ability of CLA to prevent hyperglycemia-induced hypertrophy was abolished by GW9662. High glucose also impaired contractile function of adult rat myocytes as measured by maximal velocity of shortening and relengthening. Hyperglycemia-induced contractile dysfunction was prevented by pretreatment with CLA.

Conclusions : Collectively, these findings indicate that CLA prevents cardiac myocyte hypertrophy and impairment of contractile function. These

cardioprotective actions of CLA are likely mediated, at least in part, by activation of PPAR γ .

BR-3 Prognostic Impact of Inherited Genetic Variations in SRD5A and Androgen Inactivating UGT2B Genes in Prostate Cancer After Prostatectomy

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Objective : The purpose of our study was investigate the relationship between genetic variations in androgen biosynthesis (SRD5A) and inactivating (UGT2B) genes and the risk of biochemical recurrence (BCR) after prostatectomy.

Methods : We studied a cohort of 526 men with organ-confined and locally advanced cancer. A total of 19 htSNPs distributed across *SRD5A1* and *SRD5A2* genes were studied, reflecting the Caucasian haplotype genetic diversity, as well as copy number variations in *UGT2B17* and *UGT2B28* genes. Each genetic variation found to be associated with BCR was further analyzed by Kaplan-Meier and Cox regression model.

Results : After adjusting for known risk factors, we found a strong association between the risk of BCR and 7 SNPs in *SRD5A* genes. The combination of 2 SNPs were favorable, reducing drastically the risk of BCR for carriers of 3-4 protective alleles (HR=0.34; 95% CI=0.18-0.64; $P=9 \times 10^{-4}$). Other variations, mainly in the *SRD5A2* gene, were associated with an increased rate of BCR, as the coding SNP V⁸⁹L with a HR of 2.12 (95%CI, 1.21-3.75; $P=0.009$) and reaching a relative risk of 4.97 when combined with deleted copies of *UGT2B* genes ($P=2 \times 10^{-5}$). BCR-free survival was reduced to 27% in patients with unfavorable genotypes compared to 75% for other patients ($P=7 \times 10^{-6}$).

Conclusions : Inherited polymorphisms in the *SRD5A* and *UGT2B* genes are independent predictors of biochemical relapse after radical prostatectomy. These findings may ultimately help refine our ability to identify individuals at low or high risk of cancer relapse after surgery.

Supported by Canadian Institutes of Health Research.

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BR-4 Compounds that target the GPER1 as an alternative strategy to 17 β -estradiol for neuroprotection in a mouse model of Parkinson's disease

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There is no cure or treatment to delay progression of Parkinson's disease. Hormonal therapy has been associated with a decrease risk of Parkinson's disease in human. However, there are important limitations to the use of long-term estrogen therapy in patients, including increase risk of cancer, stroke, and thrombosis. Therefore, the search for a compound as potent as 17 β -estradiol against brain damage but with minor effect in reproductive organs is of great interest. In this perspective, agonists that specifically target the newly discovered membrane estrogen receptor GPER1 could be promising compounds, as GPER1 has a minor role in reproductive organs. In this study, the neuroprotective effect of GPER1 specific agonist G1 was compared to those of 17 β -estradiol in the 1-methyl-4-phenyl-1,2,3,6-tetrahydropyridine (MPTP) mice model of Parkinson's disease. Furthermore, by using the selective GPER1 antagonist G15, we have investigated the role of GPER1 in the neuroprotective effect of 17 β -estradiol and raloxifene, a selective estrogen receptor modulator, in MPTP mice. Intact male mice were treated with 17 β -estradiol (1 μ g, B.I.D.), G1 (5 μ g, B.I.D.), G15 (10 ou 50 μ g, B.I.D.), raloxifene (2.5 mg/kg, B.I.D.) or the combination agonist-antagonist during 10 days and received 4 injections of MPTP (4.75 mg/kg) on day 5. Biogenic amine concentrations were measured by high performance liquid chromatography with electrochemical detection. Administration of MPTP decreased striatal dopamine, 3,4-dihydroxyphenylacetic acid (DOPAC) and homovanillic acid (HVA) concentrations. 17 β -estradiol, G1 and raloxifene treatment decreased MPTP toxicity on dopamine, DOPAC and HVA concentrations. Administration of G15 antagonizes the beneficial effect of these compounds. This study shows that the GPER1 specific agonist G1 is as potent as 17 β -estradiol in mediating a protecting

effect against MPTP toxicity and that GPER1 is implicated in the beneficial effect of 17 β -estradiol and raloxifene.

BR-5 Absence of proteinopathy in the cerebellar cortex of essential tremor patients

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Introduction : Recent findings have led to the hypothesis that essential tremor (ET) is a syndrome resulting from a neurodegenerative process.

Objective: Since most neurodegenerative diseases are characterized by the presence of a proteinopathy, characterized by accumulation of misfolded-proteins, we investigated common types of proteic abnormalities in the cerebellar cortex of patients with ET.

Methodology : Tau proteins, TDP-43, α -synuclein and β amyloid precursor (APP/A β) were quantified using Western immunoblotting in TBS-soluble (cytosolic proteins), detergent-soluble (membrane proteins) and insoluble (aggregated proteins) fractions from homogenates of cerebellar cortex of control subjects (n=16), patients with Parkinson's disease (PD) (n=10) or ET (n=9).

Results : However, we did not detect any significant change in the concentrations of total tau, phospho-tau, TDP-43, α -synuclein or APP/A β between groups.

Discussion/Conclusion : In conclusion, our data suggest that the pathogenesis of ET is not associated with the presence of common forms of proteinopathies in the cerebellar cortex.

BR-6 The androgen ablation therapy stimulates androgen metabolism in prostate cancer cells

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Background: Androgen receptor (AR) activation is a crucial event for both prostate cancer (PCa) initiation and progression. An efficient way for androgen inactivation in prostate cells consists in their conjugation with the highly hydrophilic glucuronide moiety. This reaction, catalyzed by the UDP-glucuronosyltransferase (UGT) 2B15 and UGT2B17 enzymes, produces inactive and easily excretable glucuronide derivatives in the human prostate. AR was previously identified as a negative regulator of UGT2B15 and UGT2B17 genes expression.

Aim: Based on these observations, ex vivo and in vivo experiments were performed to test the possibility that the clinically used androgen ablation therapy (i.e. anti-androgens) may affect this AR-dependent down-regulation.

Methods and results: Using the PCa cell models LNCaP and LAPC-4, we showed that AR antagonist Casodex causes a time- and dose-dependent induction of UGT2B15 and UGT2B17 genes expression, as well as an improved androgen glucuronidation. The contribution of AR in these regulatory events was confirmed using LNCaP cells knock-downed for AR, in which Casodex fails to modulate UGTs expression and activity. In addition, tissue microarray experiments demonstrated that PCa samples from patients exposed to neoadjuvant hormonal therapy (i.e Zoladex® or Lupron ®) exhibited increased UGT2B15 protein levels. UGT2B17 levels were transiently increased in patients treated for up to 5 months.

Conclusion: Overall, these observations illustrate an unexpected anti-androgenic effect for the pharmacological blockade of the androgen signalling in prostate cancer cells.

BR-7 D1 but not D2 receptors are involved in the clinical effects of subthalamotomy in dyskinetic MPTP-monkeys

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Parkinson's disease (PD) is a progressive neurodegenerative condition characterized by the presence of motor and non-motor symptoms. Levodopa remains the best and the most efficient among the symptomatic pharmacological treatments available. However, within five years of treatment 50%

of patients will develop important side effects, including levodopa-induced dyskinesias (LID). Subthalamotomy is one of the surgical options for PD patients with LID. It leads to improvement of motor symptoms and allows a reduction of levodopa but its mechanisms remain largely unknown. In this study, four MPTP-treated female monkeys displaying LIDs underwent unilateral subthalamotomy by stereotactic injection of ibotenic acid. Additional brains of eight ovariectomized female monkeys (four controls and four MPTP-treated) were used for comparison. The concentration of dopamine was measured by high-performance liquid chromatography. DA transporter (DAT), D1- and D2-receptors specific bindings were evaluated with [125 I]-RTI-121, [3 H]-SCH-23390 and [3 H]-raclopride respectively. Subthalamotomy had beneficial effects on the motor symptoms in the four lesioned monkeys and allowed a 40% reduction of levodopa. A near complete depletion of striatal dopamine (>99%) was observed in all MPTP-treated monkeys compared to the controls. An increase of D1 receptors was measured in both segments of the striatum of the lesioned side compared to the intact brain side, mainly in the dorsolateral (motor) putamen. No differences were induced by subthalamotomy in DAT and D2 receptor specific bindings. The increase of D1 receptors induced by the lesion may account for the potentiation of the response to levodopa following surgery.

BR-8 Liquid Chromatography-Coupled Tandem Mass Spectrometry Based Assay to Evaluate Inosine-5'-monophosphate Dehydrogenase Activity in Peripheral Blood Mononuclear Cells from Stem Cell Transplant Recipients

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The use of combinations of immunosuppressant drugs is considered the therapeutic gold standard for post-allogeneic hematopoietic stem cell transplantation (HSCT) to prevent rejection and serious complications such as graft versus host disease. However, these drugs have a narrow therapeutic index and wide inter-individual pharmacokinetic fluctuations, resulting in

unpredictable levels of drugs in the blood. The prodrug ester mycophenolate mofetil (MMF) is frequently used in solid-organ and stem cell transplantation settings. A growing body of evidence supports therapeutic monitoring of this immunosuppressant to optimize its efficacy and reduce toxicity. Thus, pharmacodynamic monitoring of MMF is a strategy that could potentially improve patient outcomes. Pharmacodynamic measurements require evaluation of inosine-50-monophosphate dehydrogenase (IMPDH) activity, the target enzyme of the active moiety mycophenolic acid. Various nonradioactive methods using chromatographic separations have been used to quantify xanthosine monophosphate, the catalytic product of the enzyme, to indirectly evaluate IMPDH activity. However, no methods have used mass spectrometry based detection, which provides more specificity and sensitivity. Here, we describe a new liquid chromatography-coupled tandem mass spectrometry (LC-MS/MS) method for the quantification of xanthosine monophosphate and adenosine monophosphate (for normalization) in lysates of peripheral blood mononuclear cells (PBMCs) from hematopoietic stem cell transplant (HSCT) recipients. Linearity, precision, and accuracy were validated over a large range of concentrations for each compound. The method could measure analytes with high sensitivity, accuracy (93-116%), and reproducibility (CV < 7.5%). Its clinical application was validated in PBMC lysates obtained from healthy individuals (n=43) and HSCT recipients (n=19). This reliable and validated LC-MS/MS method could be a useful tool for pharmacodynamic monitoring of patients treated with MMF.

This work has been presented at 12^e Journée recherche, Faculté de pharmacie-Université Laval (12 April, 2012).

BR-9 Transcriptional diversity at the UGT2B7 locus is dictated by extensive pre-mRNA splicing mechanisms

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Objective: UGT2B7 is a key member of the UDP-glucuronosyltransferase (UGT) family that participates in glucuronidation of endogenous compounds and

pharmaceuticals. Much evidence suggests a large interindividual variability of UGT2B7-mediated glucuronidation, which is still unexplained by polymorphisms. We hypothesized that alternative splicing may be responsible for the variability in the UGT2B7 function.

Methods: We carried out a comprehensive scan for additional exons at this locus and discovered multiple alternative splicing events. We then determined transcript expression profiles across a large variety of human tissues and assessed some of these variants for their glucuronidation activity in human cells.

Results: In-depth analysis of the UGT2B7 gene structure led to the discovery of six novel exons. Kidney and liver samples presented the greatest enrichment of tissue-specific splicing, with 21 new UGT2B7 transcripts isolated. Furthermore, transcription from the proximal promoter (exon 1), associated with the active UGT2B7 mRNA isoform 1 (UGT2B7_v1), is most commonly observed in the gastrointestinal tract, whereas a distal promoter (exon 1a) induces the exclusion of the canonical exon 1 and is active in hormone-related tissues. We also showed that novel transcripts with alternative 3' ends could be translated into proteins lacking glucuronosyltransferase activity in human cells but acting as negative regulators on transferase activity when coexpressed with the active UGT2B7 protein.

Conclusion: Our findings point toward a significant variability in structure, abundance, and tissue-specific UGT2B7 transcriptome, in addition to novel functions for UGT2B7-derived proteins, all of which may ensure the production of tissue-specific proteomes and functions.

BR-10 MPEP, an mGluR5 antagonist, reduces development of motor complications in de novo parkinsonian monkeys

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In the long term approximately 80% of levodopa treated patients, the most effective and commonly used treatment for Parkinson's disease (PD), will develop abnormal involuntary movements including levodopa-induced dyskinesias. Brain glutamate overactivity is well documented in PD and

antiglutamatergic drugs have been proposed to relieve PD symptoms and decrease dyskinesias. Metabotropic glutamate receptors are topics of recent interest in PD.

Objectives : This study investigated development of levodopa-induced dyskinesias and its prevention with addition of the metabotropic glutamate receptors type 5 (mGluR5) antagonist MPEP in monkeys lesioned with 1-methyl-4-phenyl-1,2,3,6-tetrahydropyridine (MPTP) to model PD and previously drug-naïve (*de novo* treatment).

Methods : Four ovariectomized female *Macaca fascicularis* MPTP monkeys were treated once daily for one month with levodopa and five with levodopa and MPEP (10 mg/kg); the animals were euthanized 24 hours after the last levodopa administration. Motor behavior was measured for all the duration of the levodopa antiparkinsonian motor effect.

Results: The antiparkinsonian response of MPTP monkeys treated with levodopa+MPEP was maintained during the month as measured with locomotion and antiparkinsonian scores as compared to levodopa alone. Duration of the levodopa antiparkinsonian motor effect decreased only in the levodopa alone treated group modeling wearing-off. The mean dyskinesia score increased over a month in the levodopa alone treated group compared to overall 72% less in levodopa+MPEP treated MPTP monkeys. In addition, nine dopaminergic drug-naïve female ovariectomized monkeys, four monkeys used as normal controls and five MPTP monkeys, were used for biochemical analysis. [³H]ABP688 specific binding to mGluR5 receptors increased significantly in the putamen of levodopa-treated MPTP monkeys compared to control monkeys, untreated MPTP monkeys and MPTP monkeys treated with levodopa and MPEP.

Conclusions : This study showed a beneficial chronic antidyskinetic effect of MPEP in *de novo* levodopa-treated MPTP monkeys supporting the therapeutic use of mGluR5 antagonism in PD to prevent dyskinesias.

BR-11 Endocytosis of a vector targeting the murine transferrin receptor by brain capillary endothelial cells

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Endothelial cells forming the BBB represent one of the most challenging obstacles for brain drug delivery limiting access to most synthetic drugs and biopharmaceutical compounds. However, due to their secretion potential and their close proximity to neurons and astrocytes they also provide unique opportunities in order to treat central nervous system diseases. Moreover, many studies have demonstrated the pathological implication of BCECs in neurodegenerative disorders or stroke. In this study, to demonstrate the therapeutic potential of BCECs, Ri7 a monoclonal antibody targeting the murine transferrin receptor (TfR) and a control IgG (IgG_{2A3}) were conjugated to quantum dot (Qdot) nanocrystals and were intravenously injected to Balb/c mice (n=3-4). Animals were sacrificed 30 min, 1 h, 4 h and 24 h following the injections. Fluorescent microscopic analysis highlighted the colocalisation of Ri7-Qdots complexes with the basal lamina marker collagen IV. Ultrastructural studies conducted by electron microscopy showed the internalization of Ri7 by BCECs. Ri7-Qdots were mostly found within multivesicular bodies (MVBs), small vesicles (~100 nm diameter) and tubular structures suggesting the endocytosis of the complex by endothelial cells. Moreover, quantification analysis demonstrated a significant variation of the number of Ri7-Qdots complexes within the subcellular distribution according to the time of sacrifice post injection. Endothelial distribution was not observed with control IgG. In conclusion, these results demonstrated the endocytosis of the Ri7-Qdots complex and strongly suggest potential application of Ri7 for BCECs drug targeting.

BR-12 Bile acid glucuronidation in human liver and kidney extracts

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Background: Glucuronidation, catalyzed by UDP-glucuronosyltransferase (UGT) enzymes plays an important role in bile acids (BA) detoxification, particularly when bile flow is interrupted such as during cholestasis. *In vitro* analyses have identified the human UGT1A3, 1A4, 2A3, 2B4 and 2B7 isoforms as key enzymes in this process, while *ex vivo* experiments demonstrated the role of nuclear receptors, such as FXR, VDR, PXR, LXR, CAR, PPAR α and PPAR γ , in the regulation of hepatic BA-G formation. Recent studies evidenced a large implication for kidneys in the generation of urinary glucuronide derivatives of endogenous substances.

Hypothesis: Kidney may participate in the formation of urinary BA-G, a process that can be up-regulated by nuclear receptor agonists.

Methods: Expression levels of BA-conjugating UGT enzymes in human liver and kidney were determined using real time RT-PCR. UGT proteins were quantified using Western-blot analyses of commercially available liver and kidney microsomal fractions. *In vitro* enzymatic assays were performed with microsomal fractions to compare the ability of the liver and the kidney to form BA-Gs. *Ex vivo* experiments using FXR, VDR, PXR, LXR, CAR, PPAR α and PPAR γ agonists and primary kidney proximal tubule cells (RPTEC) were achieved to investigate the regulation of BA-G formation.

Results: All hepatic BA-conjugating UGT isoforms were detected at the mRNA levels in human kidney. The presence of UGT2B4 and 2B7 proteins in this tissue was confirmed, while no UGT1A3 proteins were detected. Enzymatic assays revealed that both liver and kidney exhibit similar kinetic parameters for the formation of 10 major BA-G derivatives. The PPAR γ agonist Rosiglitazone, stimulated the formation of BA-G in RPTEC.

Conclusions: This study illustrates the major role of kidneys for BA elimination during cholestasis, and suggests that renal glucuronidation could be considered as a potential pharmacological target for the reduction of BA toxicity in autoimmune diseases such as PBC and PSC.

BR-13 Endothelialized psoriatic skin substitute for anti-angiogenic drug research

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Introduction: Angiogenesis is a hallmark of chronic inflammation in psoriasis. The extension of the superficial microvascular structure and activated proangiogenic mediators in psoriasis seem to be important factors involved in the pathology. The aim of our research is to construct an *in vitro* vascularized psoriatic skin substitute for anti-angiogenic drug development research.

Materials and methods: Psoriatic fibroblasts and keratinocytes were isolated from psoriatic plaque biopsies while healthy fibroblasts and keratinocytes as well as microvascular endothelial cells were isolated from healthy skin biopsies of cosmetic breast surgery. Psoriatic and healthy skin substitutes with and without epidermis were produced using the self-assembly approach. Afterwards the substitutes were examined by histology, immunohistochemistry and three dimensional confocal microscopy.

Results: Masson trichrome staining results and positive immunofluorescence staining of specific markers for endothelial cells (von Willebrand, PECAM-1 and VE-cadherin) and basement membrane component (collagen IV) demonstrated that endothelial cells have the ability to form capillary-like tubes. Moreover, three dimensional (3D) branched structure of capillary like structures were observed by confocal microscopy.

Conclusion: These results suggest that it is possible to observe 3D capillary-like structures in the self-assembled psoriatic skin substitutes which could become a good *in vitro* testing model for anti-angiogenic drug research and to facilitate the study of new mechanisms that could be involved in the development and maintenance of psoriasis.

BR-14 Alternative Splicing in Posttranscriptional Regulation of Drug Metabolism

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UDP-glucuronosyltransferases (UGTs) are major mediators in conjugative metabolism of xenobiotics. Current data suggest that UGTs, which are anchored in the endoplasmic reticulum membrane, can oligomerize with each other and/or with other metabolic enzymes, a process that may influence their enzymatic activities. We previously demonstrated that the *UGT1A* locus encodes previously unknown isoforms (denoted 'i2'), by alternative usage of the terminal exon 5. Although i2 proteins lack transferase activity, we showed that knockdown of endogenous i2 levels enhanced cellular UGT1A-i1 activity. Here we explored the potential of multiple active UGT1A_i1 proteins (UGT1A1, UGT1A3, UGT1A4, UGT1A6, UGT1A7, UGT1A8, UGT1A9, UGT1A10) to interact with all spliced i2's by co-immunoprecipitation. We further studied the functional consequences of co-expressing various combinations of spliced i1's and i2's from highly similar UGTs, namely UGT1A7, UGT1A8 and UGT1A9, based on expression profiles observed in human tissues. The i1 isoform of each UGT1A co-immunoprecipitated its respective i2 homolog as well as all other i2's, indicating that they can form heteromeric complexes. Functional data further support that i2 splice species alter glucuronidation activity of i1's independently of the identity of the i2, although the degree of inhibition varied, suggesting that this phenomenon may occur in tissues expressing such combinations of spliced forms. These results provide biochemical evidence to support the inhibitory effect of i2's on multiple active UGT1As likely through formation of inactive heteromeric assemblies of i1's and inactive i2's. The relative abundance of active/inactive oligomeric complexes may thus determine transferase activity. This poster has been presented at the 11th European regional meeting of the ISSX in Lisbon, Portugal

BR-15 Brain uptake of intravenous immunoglobulins *in vivo*: implication for the treatment of Alzheimer disease.

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Intravenous immunoglobulin (IVIg), a preparation of >98% human IgG purified from the plasma of thousands of healthy donors, is currently evaluated in clinical trials for the treatment of Alzheimer disease (AD). To better understand the mechanisms of action of IVIg, we studied the passage of IVIg through the blood-brain barrier (BBB) in the triple transgenic mouse (3xTg-AD) model of AD. Human IVIg was administered intravenously for the quantification of IVIg in the brain, plasma, liver and spleen. *In situ* cerebral perfusion was used for the measurement of the brain transport coefficient (K_{in}) and the distribution volume (V_D). IVIg was quantified using ELISA and immunofluorescence analyses. After 3 consecutive intravenous injections of human IVIg in the caudal vein, ELISA quantification showed that concentrations of IVIg reached 19.6 ± 1.06 ng/mg in hippocampus of mice compared to 519 ± 103 ng/mg and 476 ± 80 ng/mg for the liver and spleen, respectively (mean \pm SEM). Immunofluorescence analyses on mouse brain section showed that IVIg were mainly localized in microvessels but immunolabeling was also found in brain parenchyma cells. Moreover, *in situ* cerebral perfusion of three doses of IVIg revealed a dose-dependent decrease in the percentage of IVIg reaching the brain (0.0029% versus 0.0009% in 1 minute for 500 μ g and 12 500 μ g of IVIg respectively, One-Way ANOVA analysis, $p < 0.02$) and brain transport coefficient (K_{in}) ($0.0089 \mu\text{l} \cdot \text{g}^{-1} \cdot \text{s}^{-1}$ versus $0.0024 \mu\text{l} \cdot \text{g}^{-1} \cdot \text{s}^{-1}$ for 500 μ g and 12 500 μ g of IVIg respectively, One-Way ANOVA analysis, $p < 0.01$) suggesting that IVIg are transported into the brain by a saturable mechanism. Altogether, these results indicate that a small but significant amount of IVIg can cross the BBB *in vivo*, suggesting the possibility of a direct action of IVIg in the central nervous system of AD patients.

BR-16 Levels of plasma bile acid glucuronide are drastically increased only in patients with severe cholestasis

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Background: Glucuronidation, catalyzed by UDP-glucuronosyltransferase (UGT) enzymes, is thought to play an important role in bile acid (BA) detoxification when bile flow is interrupted (i.e. cholestasis). However, how the different bile acid glucuronides (BA-G) are affected during cholestasis has only been poorly investigated.

Aim: This study aimed at comparing the circulating BA-G profiles in patients with moderate (primary biliary cirrhosis, PBC and primary sclerosing cholangitis, PSC) and severe (biliary stenosis) cholestasis.

Methods: Glucuronides of chenodeoxycholic acid (CDCA-3G and -24G), cholic acid (CA-24G), lithocholic acid (LCA-3G and -24G), deoxycholic acid (DCA-3G and -24G), hyocholic acid (HCA-6G and -24G) and hyodeoxycholic acid (HDCA-6G and HDCA-24G) were quantified using LC-MS/MS in sera from patients with PBC (n=12), PSC (n=6) and biliary stenosis (n=15), and from age- and sex-matched non-cholestatic volunteers (n=20).

Results: BA-G levels were respectively 1.8-, 1.7- and 4.2-fold increased in PBC, PSC and stenosed patients, when compared to non-cholestatic controls. The strong BA-G accumulation in patients with biliary stenosis reflected significant elevation of CDCA-3G (5.5-fold), CA-24G (89-fold), LCA-3G (10-fold), HDCA-6 (1.1-fold) and -24G (2.2-fold) and HCA-24G (2.4-fold). HDCA-24G was the unique significantly increased BA-G in sera from PBC patients (3.9-fold), while PSC samples exhibited higher concentrations of CDCA-3G (3.2-fold) and HDCA-24G (3.9-fold) than controls. Intriguingly, LCA-24G, DCA-3G and HDCA-6G levels were significantly reduced in these PSC samples.

Conclusion: This comparative study establishes for the first time a correlation between the severity of cholestatic diseases and circulating bile acid glucuronides. Furthermore, by determining the profile of 11 glucuronidated acid levels, the current

metabolomic approach reveals the differential manner in which each BA-G species is altered in PBC, PSC and biliary stenosis patients. These differences may be considered as potentially helpful biomarkers for the diagnosis of cholestatic diseases.

BR-17 Fenofibrate modulate bile acid metabolism in humans: clinical evidences.

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Background: Glucuronidation is an important detoxification mechanism for numerous xeno- and endobiotics, including toxic bile acids. This reaction increases the solubility of its substrates, thus favouring their elimination from the human body. Fenofibrate is a triglyceride-lowering agent acting as an activator of the peroxisome proliferator activated receptor alpha. This nuclear receptor was evidenced as a positive regulator of bile acid glucuronidation *in vitro*.

Aim: The present study aimed at evaluating whether fenofibrate interferes with bile acid glucuronidation in a clinical setting with non-cholestatic volunteers.

Methods: Participants (150 men and 150 women) from the Genetics of Lipid Lowering Drugs and Diet Network study completed a 3-week intervention with fenofibrate (160 mg daily). Eleven glucuronide (-G) conjugates of the bile acids, cholic (CA-24G), chenodeoxycholic (CDCA-3G and -24G), lithocholic (LCA-3G and -24G), deoxycholic (DCA-3G and -24G), hyocholic (HCA-6G and -24G) and hyodeoxycholic acids (HDCA-6G and -24G) were profiled using liquid chromatography coupled to tandem mass spectrometry in serum samples drawn before and after fenofibrate treatment.

Results: While the concentrations of CDCA, LCA and DCA glucuronide conjugates were not statistically affected, CA-24G (+17%), HDCA-6G (+77%) and -24G (+28%), and HCA-6G (+36%) and -24G (+50%) levels were significantly increased in post-fenofibrate sera when compared to pre-treatment samples. Consequently, the total glucuronide concentration (+32%) was also significantly increased by fenofibrate. At baseline, the total of glucuronide conjugated acids was significantly lower in women than in men; however,

this difference was corrected after fenofibrate treatment.

Conclusion: This study demonstrates that fenofibrate increases circulating levels of bile acid glucuronides in humans, an effect which may participate to the beneficial properties of the drug in patients suffering from primary biliary cirrhosis and primary sclerosing cholangitis. These patients sustain strong hepatic accumulation of toxic bile acids, and our results suggest that, by stimulating bile acid glucuronidation, fenofibrate may limit this accumulation.

BR-18 A self-amplifying loop between thermogenesis and Alzheimer's disease neuropathology in 3xTg-AD mice.

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We tested the hypothesis that a defect in thermogenesis accelerates Alzheimer's Disease (AD) progression in the 3xTg-AD mouse model of AD. We first found a reduction of core body temperature that was aggravated by aging in 3xTg-AD mice compared to Non-Transgenic mice (NonTg) (↓ 0.7°C, 0.5°C, 1.0°C vs NonTg at 10, 14 et 18 months, respectively). This temperature reduction was associated with increased brown adipose tissue (BAT) activity (↑ 45% ARNm UCP1 and ↑ 25% norepinephrine (NE) vs NonTg) in 14-month-old mice. Cold exposure (4°C) for 24 hours increased BAT activity (↑ 55% vs 22°C) in 3xTg-AD and NonTg mice. However, core body temperature remained lower in 3xTg-AD mice (34.7°C vs 36.0°C NonTg). On the other hand, cold exposure doubled tau phosphorylation in the cerebral cortex at several sites (pSer202, pThr205, pThr181, pSer396, pSer404). Increased phosphorylation was associated with the activation of AKT, JNK, cdk5 kinases and a reduction of PP2B and PP2A phosphatases. Finally, we observed a reduction of synaptic proteins synaptophysin (↓ 47% vs 22°C) and SNAP-25 (↓ 58% vs 22°C) and an increase of the bax/bcl-2 ratio (↑ 85% 3xTg-AD vs 22°C) in cold-exposed

mice. Therefore, our data suggest that AD pathology can contribute to reduced body temperature in old age, which could in turn aggravate neuropathological hallmarks of AD such as tau pathology, synaptic pathology and, possibly, neuronal death.

Education and Teaching Research Abstract

ETR-1 Students' perception of a wiki in problem based learning pharmacotherapy courses

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Objectives: A wiki was implemented in the Doctor of Pharmacy Program to support development of skills required for problem based learning while allowing the acquisition and application of pharmacotherapy at an advanced level. Within a class of 40 students led by one facilitator, each week students were provided a patient case and learning objectives. Students were divided into groups and self-assigned roles; author, reviewer or editor. Authors were responsible for populating the wiki, reviewers for revising content, and editors for summarizing in-class discussions. The objective was to evaluate students' perceptions of the wiki.

Methods: A focus group generated items for a questionnaire to evaluate students' experiences with the wiki. The questionnaire was distributed as part of a course evaluation. The questionnaire consisted of 43 items covering 5 domains: learning, participation, collaboration, skill development and group work. Responses were collected using a 5 point Likert scale.

Results: Thirty five students (88%) completed the questionnaire. With respect to learning, 70% agreed that the wiki facilitated self-directed learning, while 82% indicated the wiki contributed to their understanding of learning objectives. With respect to participation, 91% agreed the wiki provided a framework for class discussion, and 59% felt it provided opportunity to participate where they otherwise would not have. The majority of students (62%) felt the wiki encouraged students to work together, with 82% agreeing that group work was easier as they did not

have to meet face to face. With respect to skill development, 65% agreed the wiki provided an opportunity to develop writing skills, and 94% agreed it provided a forum to critically evaluate literature. The majority (74%) agreed that use of roles facilitated group work, however 94% felt the role of author took the most time.

Conclusion: The students perceived that the wiki facilitated self directed learning and encouraged participation. Students perceived the wiki assisted in the development of writing and critical appraisal skills.

ETR-2 The Interprofessional Health Mentor's Program at the University of British Columbia – delivered to Pharmacy Students as an elective.

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Objectives: The interprofessional (IP) Health Mentors (HM) program brings students from different disciplines (Dentistry, Medicine, Nursing, Occupational Therapy, Pharmacy and Physical Therapy) together to learn with and from a mentor (patient) with a chronic condition or disability. The primary goal of the program is to help students learn about the experience of chronic disease from the patient's perspective and to explore their roles in supporting chronic disease self-management.

Methods: Upon receiving a grant, we set out to implement and evaluate a HM program similar to the concept developed by Jefferson University. Mentors (n=23) were recruited and students (n=72) enlisted in the 16-month program that began September 2012. IP student teams of four visit their mentor twice a semester, selecting a time that is suitable to all, with each visit focusing on specific IP curricular goals. Students write self-reflections after each visit, which are read by faculty supervisors. Students will take part in a Symposium in April where they share their lessons learned. Pharmacy is the only program that offers this rich experience as a 3-cr elective, with students also required to write a research paper that focuses on one of the curricular themes of the program. All other programs offer it as part of an existing course. The

HM program is evaluated through questionnaires, focus groups and individual interviews.

Results: The HM program (mentor/student orientation), handbook, symposium highlights and mid-point evaluation data will be presented.

Conclusions: The HM program is one option for IPE that is flexible; not only in timing but also in the way that academic credit is assigned. Our goal is to double the program in the Fall 2012, with the final phase leading to full implementation of the program for students in all participating programs in 2013.

ETR-3 Preparing Pharmacy Students for Collaborative Practice – an Online Pharmacy-Physician Collaboration Module

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Objectives: Experts recognize the importance of teamwork for optimal patient-centered outcomes, and interprofessional collaboration is becoming more prominent in the healthcare setting. Nevertheless, there are still many barriers hindering successful collaborative relationships between physicians and community pharmacists. This online module is intended to provide third and fourth year pharmacy students with the background required in order to successfully foster collaborative working relationships (CWR) with community-based physicians. Specifically, the goals of the Pharmacy-Physician Collaboration Module (PPCM) are to: Describe the importance of developing a collaborative relationship between pharmacists and physicians to optimize patient care; Identify three common barriers that can impede the collaborative relationship; Identify strategies to overcome these barriers; and Apply appropriate strategies to initiate collaborative working relationships in community practice.

Methods: This project was funded through the Faculty's Summer Student Research Program. Steps taken in its development included:

Conducting a literature scan on collaborative relationships between pharmacists and physicians; Establishing a set of questions to ask

pharmacists and physicians who would be video recorded to speak to the importance of a CWR; Building the module (and exercises) that would focus on potential barriers to CWRs and the strategies that can be implemented to overcome; Developing learning activities for students to conduct while on their clerkships; and Importing the module into Blackboard. The success of the module will be evaluated in September 2012 through a student questionnaire.

Results: The PPCM, implementation plan, and evaluation tools will be presented.

Conclusions: The tools introduced in this module will help to bridge the gap in initiating effective partnerships, while promoting the pharmacist's expertise and transforming the separate practices into a collaborative relationship that will benefit the pharmacist, physician, and ultimately the patient.

ETR-4 The development and implementation of a patient care process as a framework for classroom teaching and experiential learning

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Objectives: In the undergraduate pharmacy curriculum, a need was identified to guide teaching the process of patient care seamlessly in both classroom and experiential settings. The objective of this initiative is to describe the development and implementation of a comprehensive and standardized approach to teach the provision of patient care in pharmacy practice at our institution.

Methods: A patient care process working group was formed with representation from faculty members, hospital practice, ambulatory practice and community pharmacy. The group met over a period of 6 months with the goal of developing a practical framework of care that could be implemented throughout the curriculum. Related literature and frameworks were reviewed initially to generate discussion and ideas.

Results: A patient care process framework was created based on the principles of patient-centered care and

pharmaceutical care. Components of the process included:

- 1) Patient assessment including development of comprehensive medical and medication histories;
- 2) Assessment of drug therapy;
- 3) Care plan outline;
- 4) Documentation guidelines.

The framework document underwent internal review and was approved by the Curriculum Committee in April 2011. The process was disseminated to faculty members, provincial hospitals, the residency program, and ambulatory clinics and information sessions were provided. More recently a module has been created to train preceptors how to reinforce the patient care process during undergraduate experiential rotations.

Conclusions: A patient care process was developed and at least partially implemented into the undergraduate curriculum at our institution. In addition, other key partners such as hospitals, ambulatory and community sites were engaged in the development and have had exposure to this framework. An evaluation of the uptake, usefulness and impact of the framework document is currently underway.

ETR-5 Automatic vs manual grading for the assessment of interactive patient case scenarios in a 3rd year pharmacy course

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Objectives: The overarching goal of our research is to improve students' reasoning skills through increased opportunities for reflective practice. Assessment drives students' behaviour and learning in formal educational settings. Therefore, the development of interactive case scenarios involves designing meaningful assessment. In this study we explore the relationship of computer vs instructor generated grades and feedback on students problem-solving performance.

Method: A cohort of 32 third year students completed a series of 4 cases in a computer learning environment (BioWorld). Solving a patient case requires students to collect evidence while ordering laboratory tests, requesting vitals, as well as articulating the main patient problem and treatment plan. After each case, students received automatic grades and feedback from the computer and from the teacher on their performance. The automatic grades were generated

based on a comparison to the answer written by the instructor. The manual grades were generated by the same instructor analysing the students' written summary justifying their answers. To verify the accuracy and relevance of the automatic grading and feedback we compared the grades and feedback provided by the system to the teacher.

Results: Group averages were similar for each case, however the individual automatic and teacher's grade showed no correlation (ranging from .01 to .2 r^2). Additionally, as the difficulty of the cases increased, students' performance on automatic grades went down while manual grades showed improvement. The nature of the teacher's feedback was oriented towards the reasoning process demonstrated by students' performance whereas the computer generated feedback identified missing components in their answers.

Implications: Although this study involves a small number of students solving a limited number cases, it raises questions regarding the effectiveness of automatic grading based on pre-defined answers. To improve the usefulness of practice done in computer learning environments we need to investigate ways to assess and provide feedback on components of the reasoning process.

ETR-6 An In-Depth Look at Professionalism at the Faculty of Pharmaceutical Sciences at UBC

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Background: Delegates from our Faculty attended the 2009 AACP Curricular Change Summit where they were reminded that although students' traits that relate to professionalism are intrinsic to them before admission, pharmacy education can and should include professionalism outcomes as essential components of the curriculum. In Canada, CCAPP Accreditation Standards recommend that educational programs promote a culture of professionalism and that pharmacy curricula provide activities and venues to address the topic. The expectation is also mandated by the AFPC's Educational Outcomes and The Blueprint for Pharmacy. Subsequent to a 2011 UBC College of Health Disciplines Interprofessional Workshop on professionalism, the subject was discussed at our Faculty and members agreed that, given our

commitment to revise the current Entry-to-Practice curriculum, an in-depth look at professionalism would be undertaken.

Methods: A literature review on professionalism in pharmacy education was conducted. Representatives from other faculties of Pharmacy in Canada and the US and from the UBC faculties of Medicine, Occupational Therapy, Physical Therapy, and Nursing were contacted to learn how professionalism is addressed in their curricula. An internal review of how professionalism is addressed in our curriculum was performed and each Faculty member was interviewed to ascertain their views on professionalism.

Results: The nature and extent of professionalism content within pharmacy curricula were similar across pharmacy schools in Canada. US schools generally devote more integrated time to professionalism and employ more unique activities throughout their curricula. Other health professions at UBC have established core threads of professionalism courses and activities across all years and devote time for reflection and dialogue about what students experience during rotations. The information gathered from the Faculty interviews and a series of recommendations were discussed at a recent series of Faculty meetings.

Conclusions: Our work to-date represents the beginning of a process that will further enhance how we foster and address professionalism. Next steps include prioritizing the recommendations made and developing an action plan for implementation, which will include involvement of stakeholder groups including students.

ETR-7 Using a Curriculum Map to Analyze a Pharmacy Curriculum in Achieving AFPC Educational Outcomes

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Objectives: As part of an overall program evaluation plan, the objective of this study was to analyze our curriculum to determine the weighting of course objectives to achieve AFPC Outcomes, and to describe the progression of student learning and performance throughout the program.

Methods: Each year, pharmacy professors develop course objectives and indicate which AFPC Outcome(s)

they help to achieve. In addition, each course objective is assigned an expected learning level and performance level for students upon completing the course. All data was collated and summarized according to AFPC Outcome, learning level (i.e. Ideas, Connections, Extensions) and performance level (Novice, Functional, Competent) in a curriculum map. As an external comparison, the weighting of course objectives for each Outcome was compared to the weighting of competencies in the PEBC exam blueprint.

Results: The weighting of our pharmacy course objectives in achieving AFPC Outcomes was: Care Provider 35%, Communicator 10 %, Collaborator 8%, Manager 4%, Advocate 6%, Scholar 27%, Professional 11%. These weightings were closely matched to the PEBC blueprint. An analysis of learning level by year showed that objectives were written at an introductory level (“ideas”) for 42% of our objectives in first year, with progression to an advanced level (“extensions”) for 77% in fourth year. The expected level of performance for students was at an introductory level (“novice”) for 98.5% of our objectives in first year, compared with an advanced level (“competent”) for 68% in fourth year.

Conclusions: Our course objectives cover all AFPC Educational Outcomes. The weighting of objectives in our curriculum centers around “Care Provider” and “Scholar” highlighting our emphasis on pharmacy knowledge and its application to pharmacy practice. The weightings were also consistent with the PEBC exam blueprint. There was excellent longitudinal progression in the learning and performance levels in the program. Next steps include gathering additional data on specific areas of the curriculum where there may be gaps or redundancies.

ETR-8 Computer Assisted Testing (CAT) in Pharmacy (Projet Exact): A 360 degrees Satisfaction Survey

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Objectives: After implementing a pilot project of computer assisted testing (CAT), this study aimed to assess, for all users (students, faculties, proctors and managers), the reliability, acceptability and utility of the devices, methods and procedures.

Methods: For faculties, proctors and managers, data was collected through online surveys and day to day encounters. Focus group and online survey was used to gather student feedback. Descriptive data was put together by a project manager from the system database and project documentation.

Results: It was mandatory for all first-year pharmacy students to perform their twelve Fall 2011 semester exams by CAT. The ExamSoft Suite (SofTeach, SofTest and SoftScore) was used for all steps in exam management. Technical flaws during exams were benign and minimal (n=3). 74 of 199 students answered the online survey. Results indicate high satisfaction rate on exam administration issues (94,6%), security issues (95,9%) and reliability issues (94,5%). CAT exams were found as easy or easier to perform (87,5%) then paper and pencil exams (PPE). 75,7% of students preferred CAT exams. Security (80%), scoring (100%), reliability (75-100%) and acceptability (100%) results for faculties (5/8) are promising and supportive of further implementation. But compatibility issues while constructing exams were noticed by professors using Apple products. Proctors (9/9) related positive feedback on security (88,8-100%), efficiency (88,8-100%) and reliability (100%). All proctors (9/9) preferred CAT exams over PPE. For managers, observed efficiency improvement (100%) and reliable security measures (100%) fulfilled the high expectations for CAT.

Conclusions: CAT procedures appears for all user reliable, acceptable, usefull and user friendly. As compared to PPE, this approach shows promising improvement by reducing delays and pitfalls for exam building, scoring and grade publishing. It also provides an environmental gain. However, it raises feasibility concerns for construct response item format. Furthermore, issues remain on providing adequate infrastructures for exam administration and on long term resource investment for technical and administrative support.

ETR-9 iPad Tablets for Tutors and Online Reporting: Benefits and Limitations in Skill Lab Setting

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Objectives: To assess the supportive and pedagogical impact of iPad tablets and Online Reporting during skill lab sessions.

Methods: Data was collected by skill labs teachers/coordinators based on observations and discussions with tutors on day to day encounters during skill lab sessions.

Results: An online reporting system (eLABO) was design to capture students attendance in skill labs and to allow online assessment of the student's performances. Tutors were granted access on and off campus. eLabo enables deeper and thorough communication between tutors, from tutors to skill lab teachers/coordinators and with other online systems. eLabo user-friendly information retrieval procedures allows quick and complete student progress monitoring. eLABO screens show ergonomic and practical documentation features. Three benefits supportive of seamless tutoring. To allow even more flexibility and mobility, an iPad tablet was provided to each tutor during skill lab sessions (8 iPad tablets/8 tutors/skill lab session). The iPad tablet offers the tutor, a live and complete internet access in all situations and all contexts, enables clearer documentation procedures and, in response to environmental awareness, offers quick consultation of numeric files and documents directly on tablet. But managing an iPad tablet pool demands extensive IT involvement due to security and maintenance issues. Wifi connectivity problems on campus were overcome. Due to the single user profil of iPad tablets, sharing tablets between tutors and skill labs demands attentiveness to avoid confidentiality breaches. Reluctant tutors are minimal and few of them raises confidence issues during live (synchronous) online assessment.

Conclusion: Despite minimal resistance attitude toward technology, the pilot projet appears to be a success. A specific session for iPad and eLABO is now part of the tutor's training program. As of next fall semester, more performance assessment rubrics will be made available online for tutors. Data analysis will be perform to monitor student competency development and tutors stringency/leniency profile. Quality improvement interventions will be planned.

ETR-10 One Hundred Years Ago: Pharmacy Education at the Nova Scotia College of Pharmacy

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Background: In 2011-2012 the College of Pharmacy, Dalhousie University marked its centennial. It began in September 1911, with the establishment of the Nova Scotia College of Pharmacy (NSCP) by the Nova Scotia Pharmaceutical Society. In 1917, it was renamed the Maritime College of Pharmacy when the New Brunswick Pharmaceutical Society joined in its operation. The Prince Edward Island Pharmaceutical Association became affiliated in 1950. In 1961, the Maritime College of Pharmacy was incorporated into Dalhousie University and became known as it is today, the College of Pharmacy, Faculty of Health Professions.

Objective: To determine what formal pharmacy education was like in the early years at the NSCP.

Methods: Calendars for NSCP and minutes of its Board of Management, located at the Dalhousie University Archives, were reviewed. Minutes of the Council of NSPS were searched for the time period of NSCP.

Results: NSCP was housed in the Dalhousie building which later was named the Forrest building. A Qualifying course was offered with a Bachelor of Pharmacy made available in 1912-13 and a clerks course begun in 1916. Pharmacy faculty consisted of five or six pharmacists who taught part time while working in drugstores. Their courses included materia medica, pharmacy, dispensing, prescriptions and economics. Dalhousie faculty conducted classes and laboratories including chemistry, botany and microscopy, physics, and physiology. Students had to meet apprenticeship, age and education requirements prior to being accepted and tuition, attendance and conduct requirements once enrolled. Class size averaged 10. Students in the qualifying course had classes and laboratories six or seven hours per day Monday thru Friday and classes on Saturday morning. Some classes were taken with medical students. An optional class in optometry was available. Faculty were male, with the first female students enrolling in the clerks course in 1916.

Conclusions: This research describes early formal pharmacy education in the Maritimes at the NSCP. It is hoped that it will encourage and inspire current pharmacy students and educators.

ETR-11 Digital lecture recordings: Uptake and opinions of faculty

Jon-Paul Marchand, University of British Columbia, Faculty of Pharmaceutical Sciences

Marion L. Pearson, University of British Columbia, Faculty of Pharmaceutical Sciences

Objectives: This study examined faculty members' usage and opinions regarding digital lecture recordings. The research questions addressed were:

- 1) How are faculty members using the lecture recording capability?
- 2) What are faculty members' opinions of the lecture recordings?

Methods: The technology to make digital recordings has been available in specific classrooms where many pharmacy lectures are scheduled since late 2010. The recordings include an audio component, limited to the instructor's voice, sequenced with a visual component, normally limited to the image (e.g., from PowerPoint slides or a document camera) projected onto a presentation screen. Students have access to the recordings through a password-protected course management system. Faculty members may choose to have their lectures recorded or not and course coordinators must negotiate permission for recording with guest lecturers. An on-line questionnaire was administered to all faculty members with instructional responsibilities in the Entry-to-Practice program (n=47) to assess their awareness, usage, opinions, and preferences regarding the recordings.

Results: 34 of 47 faculty members (72%) responded to the survey. Most (71%) had participated in the lecture recording initiative. Of these, most (80%) were either very comfortable or comfortable with being recorded and all (100%) intended to continue being recorded. The majority agreed that asynchronous learning was important to their teaching (67%) and that the recordings enhanced students' learning by supporting different learning styles (78%) and providing opportunities to review important concepts (89%). Most felt that access to the recordings had made no difference to the quality of students' comments and questions (62%), participation in class (88%), or grades (82%). Most also felt that absenteeism, particularly during exam periods, had increased (69%). Some incorporated the recordings into their pedagogical approach (36%) and used the technology to pre-record content (31%).

Conclusions: Faculty members are making good use of and have a positive attitude towards the available lecture recording technology. They consider the recordings a valuable resource for students.

Key words: lecture recordings; educational technology

ETR-12 Development of an educational program for Pharmacy students for the Fetal Alcohol Syndrome Disorder (FASD) Awareness and Prevention Campaign: Engaging Alberta Pharmacists

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Objectives: FASD, 100% preventable, causes life-long disabilities. Pharmacists, highly accessible healthcare providers, were studied to join FASD prevention efforts. A survey conducted in Alberta, showed practicing Alberta pharmacists are interested in becoming involved in the fight against FASD, yet have minimal FASD training. The present study is a component of a knowledge mobilization strategy, with the purpose of developing an educational program designed to prepare pharmacy students to serve as educators for the public regarding FASD. This is the first project to educate pharmacists for a role in FASD awareness, prevention and counseling.

Methods: FASD literature was reviewed and educational template developed. A focus group of thirteen 3rd/4th year pharmacy students explored the baseline knowledge, skills, and attitudes toward playing an educational role in FASD through survey and discussion.

Results: The focus group showed 85% (11/13) were interested in playing a role in FASD as a pharmacist. All students (100%) felt they were not at all to somewhat knowledgeable regarding FASD and its treatment, (100%) felt they could benefit from more education, 92% in FASD epidemiology (12/13), 77% pathophysiology (10/13), 85% prevention (11/13), 100% treatment, 100% counseling and 100% patient education. Most, (85%), were only somewhat comfortable/not comfortable discussing FASD (11/13), no students (0%) were very comfortable discussing FASD, 85% felt FASD is an issue worth counseling (11/13).

Conclusions: Pharmacy students believe it is worth counseling patients about FASD and are interested in playing a role in educating the public. The greatest barriers are lack of communication skills and knowledge regarding FASD. These results support the major educational components of the educational template developed to enable pharmacists to perform their role. Based on these findings an interdisciplinary educational presentation was developed and presented to 3rd year pharmacy students. This program was well accepted by pharmacy students.

Acknowledgements: Supported by Alberta Health and Wellness

Presented 12/2011: Faculty of Pharmacy Research Day UofA

ETR-13 Utilizing Student health professionals for the Understanding and Prevention of Fetal Alcohol Spectrum Disorder (FASD)(USURP FASD)

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Introduction:FASD is a condition resulting from maternal alcohol consumption during pregnancy resulting in brain damage and lifelong disabilities. Although FASD is 100% preventable, FASD affects over 23 000 people in Alberta, costing \$400 million annually through costs to the medical, social and justice systems. There is a great potential for benefit from health professionals intervening to prevent FASD and support individuals with FASD.

Methods: A literature search using Medline, Pub-med, Cochrane and TRIP databases was performed to evaluate interventions performed by health professions to prevent FASD and support individuals with FASD. An FASD educational program was held for the multidisciplinary healthcare students volunteering at the SHINE clinic, a student-run youth clinic in the inner city in Edmonton, a setting serving a population at high risk for FASD. The program included presentations by a pediatrician, pharmacist, educational psychologist, physician/pharmacist, patient with FASD and her parents. Following the presentation, focus group discussions were held by profession including nursing, social workers, physicians, rehabilitation medicine, pharmacists, dieticians and counseling psychologists to

determine student perceptions of the role of their profession. Pharmacy students form the USURP FASD study recorded discussions of focus groups. All groups reconvened to present findings of each individual focus groups and determine how the professions could collaborate to most effectively prevent FASD and support individuals with FASD.

Results/Discussion: These students thought that they could play key roles in educating their patients (men and women) about FASD, screening patients for FASD and risk of drinking in pregnancy, contraceptive planning, nutritional support referral of patients at risk for drinking alcohol in pregnancy, referral of patients affected by FASD and advocacy for those affected by FASD. An interdisciplinary clinic such as SHINE is an ideal place to practice such services due to the close contact and overlap of practice by the different health professionals who work there.

Acknowledgement : Funding by: Alberta Health and Wellness

ETR-14 Reflecting on stories of care: Evaluation of a narrative assignment

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Objectives: Narrative pedagogy is one of a limited number of educational strategies commonly used in health professions education to enhance students' commitment to caring for patients. The goal of this action research study was to evaluate a narrative assignment developed for this purpose. The research questions were 1) What is the nature of students' responses to a narrative assignment about caring? And 2) What are students' attitudes towards this assignment?

Methods: A narrative assignment was developed for 1st year pharmacy students (n=152) that required them to write a personal reflection, responding to a series of guiding questions, for inclusion in a course portfolio. They could choose to reflect on a "heroic" case study provided from the nursing literature or to write and reflect on an autobiographical account of providing or receiving care. Students were invited to participate in the study by submitting an anonymized copy of their assignment and a questionnaire evaluating the assignment.

Results: Among respondents (n=29), 18 (62%) chose the case study and 11 (38%) chose an autobiographical account. For both options, students identified taking initiative, committing time, problem-solving, and being empathic as important elements of caring. Those selecting the case study also noted the importance of competence, observance, assertiveness, respect for patient autonomy, and collaboration with colleagues. Responses were not affected by sex, age, or work experience in a healthcare setting. All respondents enjoyed the assignment and appreciated its value in promoting commitment to care.

Conclusions: The response rate was low, so results should be interpreted with caution. Respondents identified appropriate dimensions of caring in their reflections, which were richer for the case study. This use of narrative pedagogy has potential for helping students develop attitudes needed to care for and about others. "Heroic" narratives involving pharmacists would be a valuable resource.

This work was previously presented at the University of British Columbia Centre for Health Education Scholarship "Celebration of Scholarship" on October 4, 2011.

Key words: narrative pedagogy; caring; reflection

ETR-15 Exploring the predictive validity of admission variables for performance in a Pharmacy program

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Objectives: As part of an overall program evaluation plan, the objective of this study was to explore the predictive validity of admission variables currently in use (incoming GPA and essay score) and other background variables (e.g., number of voluntary withdrawals from previous courses) on subsequent GPA in a Pharmacy program.

Methods: Data from existing records were obtained for two samples. The first sample, to explore the relation between current admission variables and Pharmacy GPA, consisted of 200 students from 4 academic years. The second sample, to explore the relation between current admission and other background variables and

Pharmacy GPA, consisted of 41 students from one academic year.

Results: Looking at current admission variables (n=200), the mean correlation between incoming GPA and Pharmacy GPA, and essay scores and Pharmacy GPA were 0.43 and -0.13 respectively. Collectively, the mean multiple correlation between both predictors and Pharmacy GPA was 0.44. In the second sample (n=41), the most notable background variable was the number of years of university before entering the Pharmacy program (YEARS), which showed a -0.39 correlation with Pharmacy GPA. When YEARS was added to incoming GPA and essay scores, the multiple correlation with Pharmacy GPA increased from .38 to .46.

Conclusions: While Pharmacy GPA was moderately predicted by incoming GPA, the relation was weaker with YEARS and even more so with essay scores. Findings from the smaller sample should be interpreted with appropriate caution. Moreover, one possible reason for the weaker predictability of essay scores and other background variables may be in predicting a global outcome measure such as Pharmacy GPA. Thus, the next steps in this research are to acquire additional data to examine the predictability of other background variables, and to compare predictor variables with more specific academic outcomes such as communication and professionalism.

ETR-16 “Let’s Get Physical”: Lessons Learned from the First Two Years of Teaching Physical Assessment to Pharmacy Students

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Objective and introduction: The objective of this research study was to qualitatively evaluate the implementation of physical assessment into the curriculum of the 4-year entry-to-practice BSc(Pharm) program at the University of British Columbia. The Blueprint for Pharmacy has identified physical assessment as a fundamental skill enabling pharmacy students to properly assess patients and monitor drug therapy. Such skills were introduced into the curriculum during the 2010/2011 academic year by teaching a vital signs and pain assessment tutorial to students in years 1-3. Following the hiring of a Clinical Skills Pharmacist Instructor, "head to toe" patient assessment and

pulmonary tutorials were introduced to students in years 2 and 3 during the 2011/2012 academic year.

Methods: Common themes were identified in the implementation of physical assessment into our curriculum by reviewing relevant course materials and assessment techniques, instructor reflections and informal feedback from students.

Results: Five main themes were identified: motivating students by making them aware of the relevance of these new skills, addressing and overcoming obstacles, assessing outcomes and competency, examining benefits to the student and patient-centered care, and identifying future opportunities.

Conclusions: Based on recommendations from the Blueprint for Pharmacy, physical assessment was implemented and vertically integrated into the curriculum. This process involved the collaboration of pharmacy practice instructors committed to providing students with the skills necessary to fully embrace the larger scope of today's pharmacy practice. Next steps will be to further expand the scope of physical assessment topics taught and to integrate these topics into each year's curriculum course work. The ultimate goal is to produce students who will be able to act as agents of change.

ETR-17 Development of an on-line module for precepting the patient care process

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Objectives: In the undergraduate pharmacy curriculum, a comprehensive and standardized framework to teach the provision of direct patient care in pharmacy practice to students was developed and implemented. Our objectives for preceptors were: 1) To create awareness of this framework, and 2) To develop a module to assist in precepting the patient care process (PCP) with students on experiential rotations.

Methods: An educational consultant was hired to guide the design and delivery of the module. The experiential education team at the faculty developed learning objectives for the module. On-line delivery was used to facilitate preceptor access to the materials. Speakers with expertise in precepting patient care were invited to present on each section of the process to bring

diversity and exposure to different practice areas. Additionally, speakers shared how they precepted patient care in their respective practice settings.

Results: The module consisted of the 2011 PCP document as developed at the faculty, a Preceptor Practice Assessment Worksheet, six presentations focusing on the process and a feedback survey. Powerpoint presentations were audio recorded with a video introduction of each speaker. The presentations included an introduction to the module, developing a patient database, assessing drug therapy, developing a pharmacy care plan, documentation and conclusions. Each presentation had a similar format to promote consistency with a focus on the preceptor role and tips for providing student feedback and evaluation. The module was disseminated to preceptors through e-mail correspondence, live workshops and preceptor manuals. The module was made available on the Faculty of Pharmacy and Pharmaceutical Sciences website at: http://www.pharm.ualberta.ca/Experiential_Education/Preceptors/Training%20and%20Resources/Patient%20Care%20Process%20Module.aspx.

Conclusions: A PCP preceptor module was designed, developed and implemented. An evaluation of the module assessing its usefulness for precepting and delivery format is currently underway.

Pharmacy Practice Research Abstracts

PPR-1 Patient Assessment and Monitoring Program and Building Blocks for Medication Management: changing practice today

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Objectives: To explore the level of readiness, anticipated opportunities, and barriers identified by participant feedback of the Patient Assessment and Monitoring Program (PAMP), rebranded as the Building Blocks for Medication Management (BBMM) program in 2011.

Methods: A survey developed by Dalhousie Continuing Pharmacy Education (Dal CPE) was distributed to pharmacists who completed PAMP in 2010 and the

January to May administration of BBMM in 2011. The survey contained multiple choice and short answer questions. It was created and distributed using Opinio survey software. Questions evaluated participant demographics, program feedback, and facilitators and barriers to practice change.

Results: The survey response rate was 37% (35/93). The majority of respondents were 35 to 54 years of age (65.72%) and primarily female (77%). Most respondents were licensed in Nova Scotia (60%) and 80% of respondents reported practicing in community pharmacy. Modules relating to critical appraisal of literature and documentation were reported to have the largest impact on practice change. Respondents reported increased confidence in performing those skills. Modules involving interpreting lab values and physical assessment were reported to be most difficult to implement. Respondents requested future continuing education programs on these topics. Respondents identified staff support and time as ongoing barriers in practice. After completing the program, relationships with patients and prescribers, previously identified as barriers, were viewed as opportunities to improve patient care.

Conclusions: It was reported that the majority of modules increased confidence in using the skills learned in PAMP and BBMM. Development of future programs will address areas reported as difficult to implement.

Poster was previously presented at the 13th Annual College of Pharmacy Research Day, Dalhousie University, Halifax, Nova Scotia, September 15, 2012, but has not been published.

PPR-2 Green tea for weight loss and weight maintenance in overweight or obese adults: lessons learned

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Objectives: A Cochrane Review was undertaken to assess the efficacy and safety of green tea products for

weight loss/weight maintenance in overweight/ obese adults. Lessons learned will also be presented.

Methods : Eleven databases were searched to identify randomized controlled trials (RCTs), in any language, of at least 12 weeks duration, comparing green tea with placebo in overweight/obese adults. Three authors independently extracted data and assessed studies for quality and risk of bias, with differences resolved by discussion. Heterogeneity of studies was assessed and analyses conducted. Adverse effects were recorded.

Results: Fifteen weight loss and 3 weight maintenance RCTs met inclusion criteria. Meta-analysis of 14 weight loss studies showed a difference in mean weight loss of -0.95 kg [-1.75, -0.15] for green tea compared to control. Meta-analysis of 12 weight loss studies produced a difference in reduction in Body Mass Index of -0.47 kg/m² [-0.77, -0.17] in favor of green tea. Meta-analysis of 2 weight maintenance studies did not show statistically significant results for any measurement. Four studies reported mild to moderate adverse events. The number of non-English studies requiring translation, need for statistician time and diversity in product content were unpredicted factors that impacted the time needed for completion of the review.

Conclusions: Although green tea produced a statistically significant weight loss in overweight/obese adults, it is unlikely to be clinically significant. Adverse events were mostly mild to moderate. Authors planning a review on a natural product topic should consider the need for translation of studies and understanding product content.

Note: This abstract is accepted for presentation at 10th Annual Cochrane Canada Symposium May 9-10, 2012 Winnipeg, MB

PPR-3 "FIFO" The Control of Nearly Expired Drugs

Sroinam Ploysai; Bumrungrad International Hospital, Bangkok, Thailand

Objectives: According to hospital as a tertiary care hospital. We provide World Class Medical Services at the dose up to a more specific situation of each patient is ever more relentless. The high price. Of bringing the value of past losses of 2010 in the pharmacy department. 2010 all short expires valued at 1,203,765.97 and hospitals have lost the cost of the drug. The value of the drug policy of the Hospital

Management (HAP 5.01) is to 885,360.96 baht worth of drugs near the end we can be managed to ensure that drug expires only 318,404.95 Baht 26.45. % of the total dose is near the end of 2010. The target. 1. Incident of the expiration of the medications which is equal to 0% 2. Value of loss (Lost cost) caused by the break near the end of <6 months Must decrease from 2010 (1,232,830.13 baht) for at least 50% and ≤ 600,000 baht 3. Expire near the end of the value of <6 months who can manage to keep up before expiration (Save cost) must rise from 2010 (318,404.95 baht) at least 50% and ≥ 600,000 baht.

Methods: Our systems are color coded to indicate the expiration date to achieve clarity in the filling and dispensing process. We also have a separate sticker lot number 1, 2 and 3, respectively.

Results: For the year 2011% Cost of Nearly expired drugs was found that the cost of the Lost 25%, Save 75% value of the short-lived. So if we do nothing to lose hospital drug costs = 1,198,799.78 baht on our activities to improve the quality of this hospital loss drug charges reduced to 89,649.99 baht.

Conclusions: The collection and use of the system to "First In-First Out" (FIFO) is the "old medicine before - a new drug application later," is how best to protect the drug expires

PPR-4 Utilisation de la minocycline en prophylaxie des éruptions cutanées lors d'un traitement à l'erlotinib (Tarceva) chez les patients atteints d'un cancer du poumon non à petites cellules (CPNPC)

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Problématique : L'erlotinib est un inhibiteur de la tyrosine kinase associée à l'EGFR (epithelial growth factor receptor) utilisé pour traiter le CPNPC de stade avancé (IIIb-IV). Ce médicament est reconnu pour causer des éruptions cutanées d'intensité variable (grade 0 à 3) chez environ 75% des patients. Ces éruptions peuvent affecter la qualité de vie et mener à l'arrêt de l'erlotinib. Objectif: Évaluer l'hypothèse selon laquelle la minocycline réduit les éruptions cutanées associées à l'erlotinib, tout en étant bien tolérée.

Méthodologie : La minocycline à 100 mg deux fois par jour était débutée la journée précédant la 1^{ère} dose d'erlotinib. Un journal de bord était fourni aux patients afin qu'ils notent leurs effets indésirables et ceux-ci étaient aussi notés lors de leurs visites à la clinique d'oncologie. La tolérance à la minocycline et à l'erlotinib a été répertoriée également.

Résultat : 52% des patients ont eu des éruptions cutanées légères. Aucun patient n'a développé de toxicité cutanée de grade 3, seulement 1 patient a eu une toxicité de grade 2 et 45% n'ont pas eu d'éruptions. 18% des patients ont cessé l'erlotinib pour effets indésirables mais ceux-ci n'étaient pas d'origine cutanée dans aucun des cas. 33% des patients ont cessé la minocycline pour effets indésirables. Seulement 15% des patients ont rempli correctement leur journal de bord.

Conclusion : La minocycline diminue l'incidence globale des éruptions cutanées de même que l'incidence des éruptions de haut grade causées par l'erlotinib. La minocycline a été relativement bien tolérée.

PPR-5 Bioidentical Hormone Therapy: Nova Scotia Pharmacists' Knowledge and Beliefs

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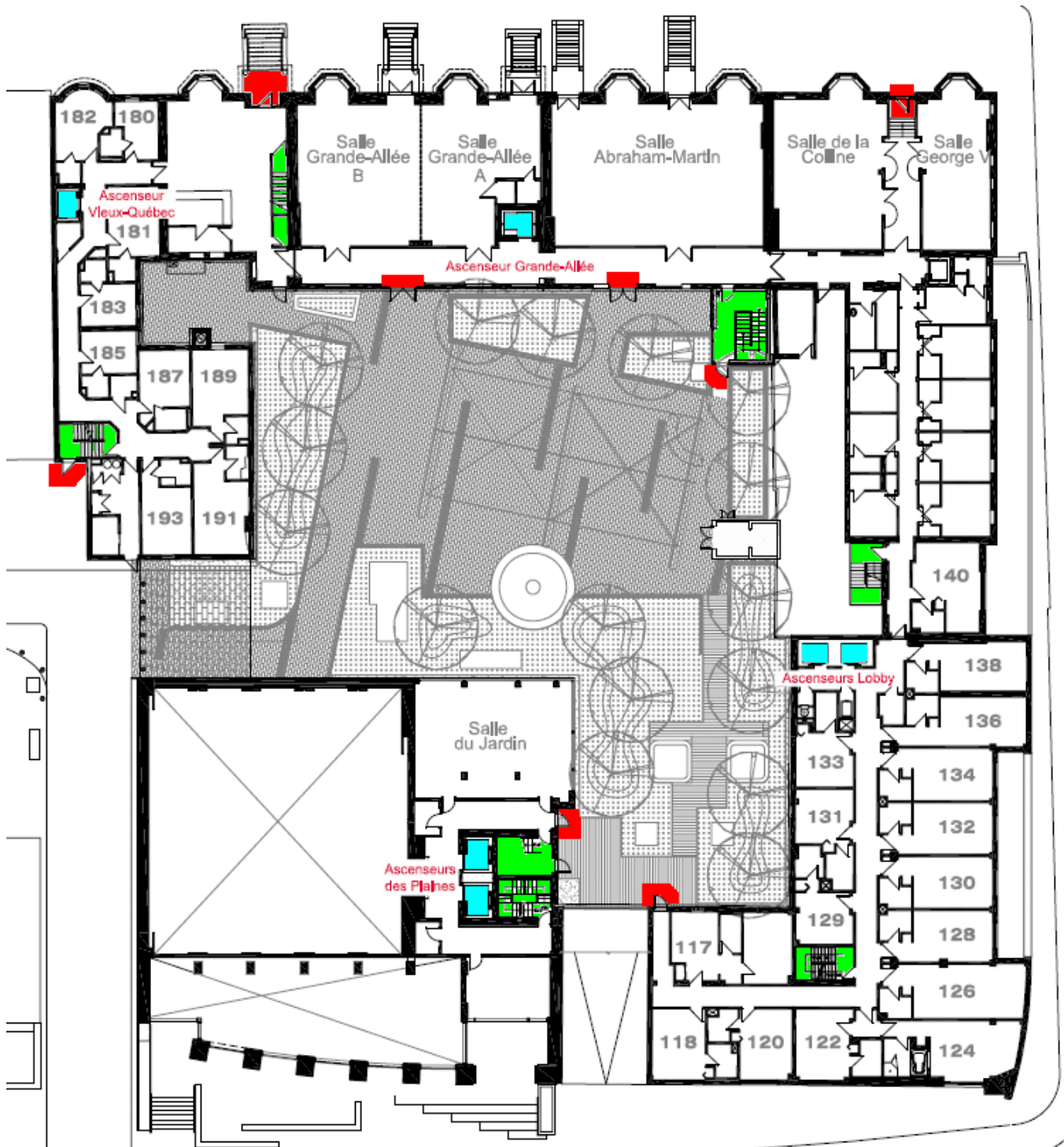
Objectives: To investigate Nova Scotia (NS) pharmacists' knowledge and beliefs regarding the use of bioidentical hormones (BHs) for the management of menopause related symptoms.

Methods: Using Dillman's internet tailored design methodology, an invitation, with reminders, to complete a web-based questionnaire was emailed to pharmacists in NS as part of the Dalhousie College of Pharmacy Continuing Pharmacy Education Department's (CPE) weekly email update. Data was analyzed using descriptive statistics.

Results: Of approximately 1300 emails sent, 113 pharmacists completed the questionnaire (response rate 8.7%). The majority of respondents (94%) knew that BHs were not free from adverse drug reactions, and more than half were aware that conjugated equine estrogens and medroxyprogesterone acetate are not examples of BHs. For seven of eleven knowledge questions, 33-45% indicated that they did not know the answer. When asked about their beliefs regarding BHs, many believed that BHs were similar in efficacy (49%) or more effective (21%) than conventional hormone therapy (CHT) for menopause related vasomotor symptoms. Most respondents also believed that BHs and CHT had similar safety profiles. Respondents indicated that more education would be helpful, especially with regard to the safety and efficacy of BHs as compared to CHT.

Conclusions: NS pharmacists knew BHs were not free of adverse effects, however knowledge was lacking in other areas. This may reflect the low level of coverage of this topic in undergraduate pharmacy curriculums and in current pharmacy literature. Results indicate a need for additional undergraduate and continuing education of NS pharmacists and pharmacy students with respect to BHs.

Map of the Château Laurier



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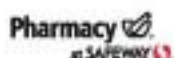
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