

AFPC New Investigator Award: Carolyn Cummins



Dr. Carolyn Cummins completed her undergraduate degree in chemistry at McGill University and her Ph.D. in pharmaceutical chemistry at the University of California San Francisco with Dr. Leslie Z. Benet. During her postdoctoral training at the University of Texas Southwestern Medical Center with Dr. David Mangelsdorf she gained molecular biology, in vivo biology, and receptor pharmacology experience in the area of nuclear hormone receptors. Dr. Cummins is currently an Assistant Professor in the Faculty of Pharmacy at the University of Toronto. Her independent research program is interdisciplinary and focuses on the study of nuclear hormone receptors in diabetes and diabetic complications using a combination of methodologies including analytical chemistry, cell and molecular biology, epigenetics and small animal pharmacology. She is a recent recipient of an Early Researcher Award from the Government of Ontario and a CIHR New Investigator Award.

Research Focus

Nuclear hormone receptors (NRs) comprise a superfamily of ligand-activated transcription factors that regulate reproduction, growth and metabolism by coordinating pathways of gene expression. NRs are attractive pharmaceutical targets because of their intrinsic ability to be activated by small molecule ligands. The Cummins lab focuses on the study of the glucocorticoid receptor and liver x receptors (LXR) emphasizing their molecular mechanisms in physiology with the goal of tailoring novel pharmacologic agents to treat different facets of metabolic disease. Some of the most potent anti-inflammatory drugs on the market target the glucocorticoid receptor. Unfortunately, prolonged activation of this receptor induces major metabolic side-effects that remain a key limitation for the therapeutic use of these drugs. The Cummins lab has recently shown that the nuclear receptor LXR β is required for glucocorticoid-induced hyperglycemia and fatty liver but not for glucocorticoid-mediated anti-inflammatory or immunosuppressive effects. With funding from a Connaught Innovation grant the Cummins lab is working to identify small molecules to target this receptor and determine whether co-administration of glucocorticoids with these compounds can prevent glucocorticoid-induced diabetes.

Primary cell culture and animal models of glucocorticoid induced diabetes are used in the Cummins lab to dissect the complex interplay of different organs in contributing to the pathophysiology of diabetes and diabetic complications. Her research program also investigates the subcellular and molecular interactions that occur between nuclear receptors, co-regulatory proteins and DNA that drive the physiologic responses. Her research program is currently funded by NSERC, CIHR and CFI.



Award Winners

AFPC Graduate Student Research Award:

Erik Orava



Erik Orava received his B.Sc. from Queen's University with a focus in Molecular Biology and his Ph.D. in Pharmaceutical Sciences at the University of Toronto in the laboratory of Dr. Jean Gariépy. During his graduate research he was a member of the Ontario Cancer Institute at Princess Margaret Hospital and subsequently the Molecular Targeting and Therapeutics Lab in the Centre for Research in Image-Guided Therapeutics at the Sunnybrook Research Institute. He is a three time recipient of the Canadian Institute of Health Resources Strategic Training in Biological Therapeutics Grant. His research has focused on the development of oligonucleotides known as aptamers able to bind and block validated therapeutic targets including Tumor Necrosis Factor alpha ($TNF\alpha$) and Carcinoembryonic Antigen (CEA) in addition to investigating their ability to act as diagnostic and targeting agents.

ABSTRACT:

Aptamers are single-stranded oligonucleotides, DNA or RNA, which can bind to a myriad of targets such as ions, peptides, proteins, drugs, organic and inorganic molecules with high affinity and specificity. Tumor necrosis factor-alpha ($TNF\alpha$) is a pivotal component of the cytokine network linked to inflammatory diseases. Protein-based, $TNF\alpha$ inhibitors have proven to be clinically valuable. Here, we report the identification of short, single stranded DNA aptamers that bind specifically to human $TNF\alpha$. One such 25-base long aptamer, termed VR11, was shown to inhibit $TNF\alpha$ signalling as measured using NF-KB luciferase reporter assays. This aptamer bound specifically to $TNF\alpha$ with a dissociation constant of 7.0 ± 2.1 nM as measured by surface plasmon resonance (SPR) and showed no binding to $TNF\beta$. Aptamer VR11 was also able to prevent $TNF\alpha$ -induced apoptosis as well as reduce nitric oxide (NO) production in cultured cells for up to 24 hours. As well, VR11, which contains a GC rich region, did not raise an immune response when injected intraperitoneally into C57BL/6 mice when compared to a CpG oligodeoxynucleotide (ODN) control, a known TLR9 ligand. These studies suggest that VR11 may represent a simpler, synthetic scaffold than antibodies or protein domains upon which to derive nonimmunogenic oligonucleotide-based inhibitors of $TNF\alpha$.

AFPC Canadian Foundation for Pharmacy Graduate Student Award for Pharmacy Practice Research:

Wasem Alsabbagh



Wasem Alsabbagh received his bachelor of science in pharmacy from Damascus University, Syria in 2000. He moved to Canada in 2004, and started the International Pharmacist Program (IPG) at U of T in 2005. He received his PEBC and Ontario license in 2006, and received his NABP with Michigan license in 2007. He practiced as hospital pharmacist in Orillia, Ontario until 2008, when he moved to Saskatchewan to start MSc. in clinical pharmacy at U of S. He transferred to PhD. program in 2010, and expected to graduate in 2013. Wasem is married to Rama and have two boys (Moffa and Moyad).

Wasem Alsabbagh is enrolled in the PhD program at the U of S under the supervision of Dr. David Blackburn. His research is focused on medication adherence, socioeconomic status, and major health outcomes using population-based data from the Saskatchewan Ministry of Health. He has extensive expertise in the design and analysis of pharmacoepidemiological studies. He published a pharmacist practice research and performed a systematic review. The goal of Wasem's future career is to pursue a faculty job where's his research will focus on Pharmacoepidemiology, Pharmacoconomics, drug safety and effectiveness, and delivery of pharmaceutical care in vulnerable populations including patients with low SES.

AFPC Pfizer Research Career Award:

Reina Bendayan



Dr. Reina Bendayan is a Professor, Department of Pharmaceutical Sciences, Leslie Dan Faculty of Pharmacy, University of Toronto. After obtaining a Bachelors of Sciences in Pharmacy and a Hospital Pharmacy Residency Program at the University of Montreal, Dr. Bendayan completed a Doctor of Pharmacy at the University of Florida and a three year Medical Research Council Post-Doctoral Fellowship Program in Clinical Pharmacology and

Membrane Cell Biology at the University of Toronto. Dr. Bendayan's research program at the University of Toronto is primarily focused on Membrane Transport and Therapeutics. She obtained a five-year young career investigator award from the Ministry of Health of Ontario and her research program is primarily funded by the Canadian Institutes of Health Research, Canadian Foundation for AIDS Research and the Ontario HIV Treatment Network, Ministry of Health of Ontario. She is the author of over 70 peer-reviewed manuscripts and has supervised many graduate students and post-doctoral research fellows. She is a member of several scientific associations, in particular, the American Association for the Advancement of Sciences (AAAS), American Society of Pharmacology and Experimental Therapeutics (ASPET), American Association of Pharmaceutical Sciences (AAPS), International Blood-Brain Barrier Society (IBBS), International AIDS Society and Canadian Society of Pharmaceutical Sciences (CSPS). Dr. Bendayan has recently been elected FELLOW of the American Association of Pharmaceutical Sciences (November 2010) and is the recipient of a five-year Career Scientist Award from the Ontario HIV Treatment Network, Ministry of Health of Ontario. Dr. Bendayan served as Graduate Coordinator (1998-2003), Chair and Associate Dean Graduate Education of the Graduate Department of Pharmaceutical Sciences (July 2005-July 2011) and as Acting Dean of the Leslie Dan Faculty of Pharmacy (January 2007-July 2007).

Research Focus

In the past years, Dr. Bendayan's research interests have primarily focused in the field of Human Immunodeficiency Virus (HIV) infection pharmacotherapy. The objectives of the work are to investigate the molecular expression, cellular/subcellular location and functional activity of putative membrane transporters known to play an important role in the disposition of various antiretroviral compounds at several blood-tissue barriers and known sanctuary sites of the infection (i.e., blood-brain barrier, glial cells, blood-intestinal barrier, blood-testicular barrier) in normal physiological conditions as well as in the context of HIV-1 associated inflammatory response and oxidative stress.



Award Winners

AFPC Janssen Innovation in Education Award:

**Hoan Linh Banh, Cheryl Cox, Marlene Gukert, Shirley Heschuk,
Cheryl Sadowski & Lynette Shultz**



Hoan Linh Banh has special interests in developing innovative approach to teaching by creating and presenting course materials that are relevant to patient care and genuinely believe in teaching with concrete and hands-on examples.

Cheryl Cox has an interest in the transitions for students from classroom to practice. This course provides an exciting interface and creates opportunities for students to better understand what influences their knowing and how to see differently.

Marlene Gukert: "I have interest in experiential learning; therefore the Italian course was a good fit as it matched many of my interests."

Shirley Heschuk continues to pursue her interests in nutrition and complementary and alternative medicine.

Cheryl Sadowski has clinical, teaching, and research expertise in geriatrics. She has an interest in advocacy issues related to special populations, and enjoys active teaching strategies. She has a research interest in attitudes toward older adults, falls risks, and geriatric syndromes.

Lynette Shultz, Associate Professor Department of Educational Policy Studies is the Co-Director of the Centre for Global Citizenship Education and Research, University of Alberta.



Award Winners

AFPC Janssen Innovation in Education Award:

**Hoan Linh Banh, Cheryl Cox, Marlene Gukert, Shirley Heschuk,
Cheryl Sadowski & Lynette Shultz**

Abstract:

Pharmacy 453 is an innovative international educational model that optimizes outcomes for students and faculty. As a U of A course taught in an international location we had the advantage of determining course outcomes consistent with the standards and expectations of our curriculum while utilizing the resources of the Italian learning environment. The students walked daily through the town to the classroom which was situated with an ocean view. The classroom activities included daily discussions and group work as well as the students' daily experiences which were immersed in a new culture, language, lifestyle and community. The communities included students and faculty members from the University of Naples, residents of the Italian community, the multi-generational Italian host family, and the community of 36 pharmacy students and faculty members from the U of A.

The course assignments fostered exploration of linkages between pharmacy education and role of pharmacists, of health care models and of obligations of professionals with respect to global citizenship and inequities which can jeopardize human rights. Interdisciplinary teaching has facilitated the integration of complementary forms of inquiry and learning which further support transformational learning. The following comment from the University of Naples illustrates the impact for all involved: *Working in the lab side by side with the students from the U of A and interacting with them during the simulation activities have surely increased the awareness of the Italian students of being in fact part of the same world. This has had a dramatic impact on bringing down the existing barriers between the Canadian and the Italian students due to cultural and linguistic differences, while enriching them all with their different professional, scientific and cultural backgrounds.*



Award Winners

AFPC National Award for Excellence in Education:

James McCormack



James McCormack received his undergraduate pharmacy degree at the University of British Columbia in 1982 and completed a hospital pharmacy residency program at Lion's Gate Hospital in North Vancouver in 1984. He received his doctorate in pharmacy (Pharm.D.) in 1986 from the Medical University of South Carolina in Charleston, South Carolina. He has had extensive experience, both locally and internationally, talking to health professionals and consumers about the rational use of medication, has presented over 300 seminars on drug therapy over the last 20 years. His focus is shared-informed decision-making using evidence based information and rational therapeutic principles. In addition, he has published over 100 articles in the medical literature, mainly in the area of rational drug therapy and has been an editor for two internationally recognized textbooks on appropriate/rational drug therapy. He is also the co-host of a very popular weekly podcast called the Best Science Medicine Podcast. It can be found at therapeuticseducation.org or in the iTunes store.

Research Focus

The main goal of my teaching over the last 25 years has been to provide health care students, pharmacists, physicians, nurses, nurse practitioners, physician assistants, naturopathic physicians, other health professionals, and the public with current, evidence-based, practical and relevant information on rational drug therapy. My overall philosophy has been to encourage clinicians to engage in shared informed decision-making, critical thinking, and exercise some degree of healthy skepticism when it comes to the use of new and old medications.

I try to keep the information useful, practical and relevant for physicians and pharmacists so that they can incorporate this information into their day-to-day practice. Humour (because evidence can be really dull) plays an important role in many of my presentations. I am a strong advocate of shared-informed decision-making and my sessions try to provide information in a way that can be used with patients. Maybe the best way to describe me is as a "Mythbuster" of drug therapy.

AFPC Merck Canada Postgraduate Pharmacy Fellowship Award:

Anil Maharaj



Anil completed his Bachelor of Science with the Faculty of Pharmacy at the University of Manitoba in 2008. Prior to joining the graduate program at the University of Waterloo in 2012, he practiced as a hospital pharmacist at the Victoria General Hospital in Winnipeg, MB. Anil is currently completing his Ph.D under the guidance of Dr. Andrea Edginton at the University of Waterloo's School of Pharmacy. His research interest involves the integration of physiological and anatomical information with compound specific

properties in order to estimate drug pharmacokinetics within special populations (i.e. pediatrics). Children have long been known as an underserved population with regards to drug development research. Anil's current research focusses on use the physiologically-based pharmacokinetic (PBPK) models to aid in pediatric drug development.

Parameterization of an *in silico* Gastrointestinal (GI) Tract Absorption Model: Focus on Pediatrics

Despite an abundance of wealth of information regarding adult drug absorption, very little data exists regarding the pediatric population. In order to estimate the effects of developmental changes to the gastrointestinal tract, an *in silico* absorption model will be developed and parameterized towards a pediatric patient population (ages 0-17 years). The development and application of a pharmacokinetic-based absorption model specifically parameterized towards pediatric patients would decrease the uncertainty around appropriate dosage selection for this unique age group.



AFPC Rx&D Pharmacy Research Student Poster Awards

Congratulations to our 10 winners!

Maria Whelan — Memorial University of Newfoundland

Waheed Asghar — University of Alberta

Lilia Magomedova — University of Toronto

Wesseem Osman — University of Waterloo

Alexandre Melkoumov — University of Montreal

Kathryn Landry — Dalhousie University

Donna Leung — University of British Columbia

Fahad Alzahrani — University of Saskatchewan

Sarita Jha — University of Manitoba

Wael Alata — Laval University