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Message from the Team Leaders

This was an exciting and rewarding year for CCARM.

We welcomed two new CCARM Principal Investigators (PIs) in 2017. Dr. Luc Clair arrived in August and holds our new Agriculture-Health Economist position. Luc will be conducting research that examines the economic benefits of functional foods and natural health products as they relate to both agriculture and health. This work will be of great value for determining the economic impact of food-based interventions on the health care system. His work will also apply to the commercial agri-food sector along the entire production chain from farmers to food processors to food distributors to consumers. Luc is our first PI with an academic position at the University of Winnipeg.

In June, we welcomed Dr. Miyoung Suh and her lab group back to SBRC (they were temporarily located within CCARM from 2009 to 2012 after the Duff Roblin fire). Although the lab is primarily located within the Division of Neurodegenerative Disorders, they are also CCARM members. Miyoung’s group investigates the effects of nutrition on fetal-alcohol spectrum disorder and various conditions affecting the eyes. We extend our congratulations to Miyoung on being honoured with the Scientist of the Year Award from the Korean Foundation of Science and Technology Societies.

In May, we held a celebration to recognize Dr. Michelle Alfa’s retirement. Dr. Alfa and her research team, technologists Pat DeGagne and Nancy Olson, worked together for over 20 years in the lab on the northwest corner of our floor. Their lab was the only one that was not remodelled when the floor was revamped for CCARM. Dr. Alfa has had a very accomplished research career in addition to being a Medical Microbiologist at St. Boniface Hospital. Her research has made important contributions to the latest standards and protocols for the handling and cleaning of duodenoscopes. At CCARM, we are particularly proud that she led the MSPrebiotic Clinical Trial on behalf of a local Manitoba company based in Carberry. This is the first clinical trial completed at CCARM that has provided scientific evidence for a commercial product now on market shelves across Canada.

The inaugural Rapid Fire Research Symposium was held in 2017. Eleven trainees presented their research in seven minutes using seven slides (see award recipients in the list below), and there was a keynote presentation by Life Science Association of Manitoba. Thank you to Dr. Thomas Netticadan for initiating this opportunity for our trainees to communicate their research and to his team of Samantha Pauls and Pema Raj for organizing a very successful event.

CCARM participates annually in Agriculture in the City, which is held at the Forks Market in March. It is one of our main outreach events and provides us with an excellent
opportunity to engage with the public. This year, our display theme was “Berry Berry Good” and highlighted the berry research that is ongoing at CCARM.

We were honoured to receive support from our local community. Mr Cody Friesen, the owner of the No Frills grocery store located at 161 Goulet Street, held a charity drive from February 16 to March 2, and donated the proceeds to CCARM.

2017 was a very productive year for research. CCARM PIs received funding totalling $3,139,946 from 73 different competitive operating, equipment and salary grants. This funding was obtained from a wide range of sources, including national and provincial granting agencies, commodity and international groups, Agriculture and Agri-Food Canada, University of Manitoba and the St. Boniface Hospital Foundation. It supported some 87 students, postdoctoral fellows, and staff in addition to the 15 Principal Investigators at the Centre in 2017. We want to express our thanks to Manitoba Agriculture for the funding that allowed CCARM to obtain a Countercurrent Centrifugal Chromatography system; this unit makes us unique in Canada since it allows the isolation of individual phytochemicals from complex plant extracts for the purpose of chemical characterization and biological testing. We also acknowledge the support from St Boniface Hospital, Agriculture and Agri-Food Canada and the University of Manitoba that makes this unique partnership among a hospital, a federal agriculture department and a university possible. CCARM researchers published 50 peer-reviewed publications and 4 book chapters, gave 43 invited presentations and presented 36 abstracts at local, national and international conferences. The high level of collaborative activity among CCARM PIs is demonstrated by the number of peer-reviewed papers with CCARM co-authors (74 papers reported by individual labs, with 50 of these being unique papers, and 60 abstracts reported by individual labs, with 36 of these being unique abstracts). The reports from each of the individual laboratories highlight the accomplishments, publications, presentations, funding, awards, trainees, technical staff, professional service and outreach of our members. We congratulate everyone on a very successful year.

Training is a very important aspect of research. Congratulations to the 10 MSc students and 1 PhD student who successfully defended their thesis in 2017. We would like to acknowledge and congratulate the trainees who have been successful in receiving various types of awards:

Scholarships:

**BMO Financial Group MSc Research Scholarship for Excellence, St. Boniface Hospital Foundation**: Rokiatou Kone-Berethe (supervisor: M. Moghadasian)

**Canadian Institutes of Health Research**: Veronika Shulgina (supervisor: M. Suh)

**Frederick Banting and Charles Best Canada Graduate Scholarship, Canadian Institutes of Health Research**: Jaime Clark (supervisors: C. Taylor & P. Zahradka)

**J.H. Stewart Reid Memorial Fellowship, CAUT**: Crystal Acosta (supervisor: H. Anderson)
Janet Fabro McComb Scholarship, University of Manitoba: Md. Monirujjaman (supervisor: H. Aukema)

James Gordon Fletcher PhD Fellowship in Functional Foods and Nutraceuticals: Danielle Lee (supervisor: H. Anderson) (declined)

Libyan Program for International Education Scholarship: Basma Aloud (supervisor: T. Netticadan)

Manitoba Graduate Scholarship: Lucien Cayer (supervisor: H. Aukema), Ariful Md Islam (supervisor: H. Aukema); Elaheh NosratMirshekariou (supervisor: M. Suh); Yidi Wang (supervisor: M. Suh)

The Manitoba Training Program for Health Services Research, Government of Manitoba Health, Seniors and Active Living: Olena Kloss (supervisor: M. Suh)

Mindel and Tom Olenick Research Studentship in Medicine, Undergraduate Medical Education Award of the Rady Faculty of Health Sciences, University of Manitoba: Cara Isaak (supervisor: C. Siow)

MITACS: Erin Goldberg (supervisor: M. Aliani); Elaheh Nosrat Mirshekariou (supervisor: M. Suh)

Murphy Foundation Inc. Indigenous Mentorship and Experiential Education Fund: Bradley Feltham (supervisor: M. Suh)

Natural Sciences and Engineering Research Council Undergraduate Student Research Award: Hannah Chan (supervisor: M. Aliani); Meagan Manchur (supervisor: M. Moghadasian); Breanne Semenko (supervisor: M. Moghadasian)

Northern Scientific Training Program Award, Government of Canada Department of Aboriginal Affairs and Northern Development: Olena Kloss (supervisor: M. Suh)

Research Manitoba: Danielle Lee (supervisor: H. Anderson); Pema Raj (supervisor: T. Netticadan)

Queen Elizabeth II Diamond Jubilee Scholarship: Md Monirujjaman (supervisor: H. Aukema); Rianna Tonn (supervisor: M. Suh)

Samuel and Beatrice Faiman Pharmacy Graduate Fellowship: Danielle Lee (supervisor: H. Anderson)

Smerchanski PhD Studentship, St. Boniface Hospital Foundation: Victoria Sid (supervisor: K. O)
MESSAGE FROM THE TEAM LEADERS

**University of Manitoba Graduate Fellowship:** Crystal Acosta (supervisor: H. Anderson); Olena Kloss (supervisor: M. Suh), Mihir Parikh (supervisors: G. Pierce & T. Netticadan); Fatemeh Ramezani (supervisor: M. Suh);

**University of Manitoba Undergraduate Research Award:** Mariam Ragheb (supervisor: H. Aukema)

**Research Awards:**

**University of Manitoba Distinguished Dissertation Award:** Stephanie Caligiuri (supervisor: G.N. Pierce)

**Dr. Ian R. Innes Memorial Award, University of Manitoba Department of Pharmacology & Therapeutics:** Crystal Acosta (supervisor: H. Anderson)

**Major Research Award (Manitoba) in Cardiovascular Biology, Canadian Student Health Research Forum:** Cara Isaak (supervisor: C. Siow)

**Awards for an Oral Presentation at a Conference:**

**Functional Food and Natural Health Product Graduate Research Symposium:** 1st Place – Youjia Du (supervisors: P. Zahradka & C. Taylor); 2nd Place – Jaime Clark (supervisors: C. Taylor & P. Zahradka)

**Rapid-Fire Research Symposium:** Best Presentation & People’s Choice Awards – Jaime Clark (supervisors: C. Taylor & P. Zahradka); 2nd Place – Danielle Lee (supervisor: H. Anderson); 3rd Place – Afroza Ferdouse (supervisor: H. Aukema)

The winners of the inaugural Rapid-Fire Research Symposium – from L-R: Afroza Ferdouse (3rd place), Jaime Clark (Best Presentation & People’s Choice) and Danielle Lee (2nd place)
MESSAGE FROM THE TEAM LEADERS

Awards for Best Poster Presentation at a Conference:

**Manitoba Medical Service Foundation Poster Award:** Danielle Lee (supervisor: H. Anderson)

**Child Health Research Days:** Top Poster (undergraduate) – Lisa Rodway (supervisor: H. Aukema)

Travel Awards:

**Canadian Association of Neuroscience Student Advocacy Travel Award:** Crystal Acosta (supervisor: H. Anderson)

Other:

**Emerging Leaders Award, University of Manitoba:** Olena Kloss (supervisor: M. Suh)

**Teaching Award of Merit (Graduate Student), North American Colleges and Teachers of Agriculture (NACTA):** Chelsey Walchuk (supervisor: M. Suh)

Shan Leng’s (supervisor: H. Aukema) paper in *Journal of Lipid Research* was featured in the *ASBMB Today* magazine

This year the CCARM Team Leaders initiated two new awards to recognize individuals who go above and beyond in their contributions and/or leadership activities which benefit CCARM:

**CCARM Trainee Service Recognition Award:**
Samantha Pauls (supervised by H. Aukema, C. Taylor & P. Zahradka)
Pema Raj (supervised by T. Netticadan)

**CCARM Staff Service Recognition Award:**
Susan Zettler

We are very grateful for all the support and resources that CCARM receives from the “St. B Team” that enables our success. Thank you to Grant Pierce for your enthusiastic support of agri-food research for health and medicine, and the staff in the main office, Susie and Shawna, for administrative and accounting assistance. Thank you to the Information Technology (IT) group (Shawn, Chris, Eric) for keeping all our office and equipment-related computers and networks running smoothly. Thanks to Communications and Media Services (Bill, Rob, Joseph) for promoting our work and providing audio-visual supports for our seminar series and the Rapid Fire Research Symposium. Thank you to Bram Ramjiawan and staff (Karen, Lorie, Angela) for supporting our research activities, and especially, clinical studies via the Office of Clinical Research. Thank you to Randy Aitken and all the staff in the RO Burrell Laboratory for wonderful support with our animal studies. Finally, all of this would not be
possible without the world-class facilities in which we work and the tremendous support of the St Boniface Hospital Foundation. Thank you to all the Foundation staff. We look forward to continued interactions with Foundation staff and the new point persons for CCARM, Garth Johnson and Karen Fowler.

We would like to give a special thank you to our admin staff, Sue and Tracy, for the tremendous support you have provided to everyone at CCARM throughout the year. Thank you to Li for overseeing the common equipment room and to Debbie for dishwashing and autoclaving, important activities in support of our research.

Congratulations to all the CCARM PIs, staff and trainees for a very productive and successful 2017!

Carla Taylor and Peter Zahradka
Principal Investigators and CCARM Team Leaders
# List of Members

1. **Principal Investigators**

   1. **Michelle Alfa, PhD:** Professor, Department of Medical Microbiology, University of Manitoba  
      - **Funding Received:** $0
   2. **Michel Aliani, PhD:** Professor, Department of Food and Human Nutritional Sciences, University of Manitoba  
      - **Funding Received:** $420,800
   3. **Hope Anderson, PhD:** Associate Dean, Faculty of Graduate Studies, University of Manitoba; Vice Dean, Graduate Studies, Rady Faculty of Health Sciences, University of Manitoba; Associate Professor & Graduate Chair, College of Pharmacy, University of Manitoba; Adjunct Professor, Department of Pharmacology and Therapeutics, University of Manitoba  
      - **Funding Received:** $136,627
   4. **Harold Aukema, PhD:** Professor, Department of Food and Human Nutritional Sciences, University of Manitoba  
      - **Funding Received:** $365,712
   5. **Heather Blewett, PhD:** Research Scientist, Agriculture and Agri-Food Canada; Adjunct Professor, Departments of Food and Human Nutritional Sciences & Physiology and Pathophysiology, University of Manitoba  
      - **Funding Received:** $275,862
   6. **Luc Clair, PhD:** Assistant Professor of Economics, University of Winnipeg & Ag/Health Economist  
      - **Funding Received:** $67,909
   7. **Randolph Guzman, MD, FRCSC, FACS, RVT, RPVI:**  
      - Professor of Surgery and Head, Section of Vascular Surgery, University of Manitoba, Max Rady College of Medicine  
      - Regional Lead, Section of Vascular Surgery, WRHA  
      - Site Medical Manager, Department of Surgery, St. Boniface Hospital  
      - **Funding Received:** $0
   8. **Mohammed Moghadasian, PhD:** Professor, Department of Food and Human Nutritional Sciences, University of Manitoba  
      - **Funding Received:** $68,730
   9. **Thomas Netticadan, PhD:** Research Scientist, Agriculture and Agri-Food Canada; Adjunct Professor, Department of Physiology and Pathophysiology, University of Manitoba  
      - **Funding Received:** $201,261
   10. **Karmin O, PhD:** Professor, Department of Animal Science, University of Manitoba; Professor, Department of Physiology and Pathophysiology, University of Manitoba  
       - **Funding Received:** $72,022
   11. **Grant Pierce, PhD:** Executive Director of Research, St. Boniface Hospital; Professor, Department of Physiology and Pathophysiology, University of Manitoba  
       - **Funding Received:** $561,268
<table>
<thead>
<tr>
<th>No.</th>
<th>Name</th>
<th>Title and Affiliations</th>
<th>Funding 2017</th>
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<tr>
<td>12</td>
<td><strong>Chris Siow, PhD</strong></td>
<td>Research Scientist, Agriculture and Agri-Food Canada; Adjunct Professor, Department of Physiology and Pathophysiology, University of Manitoba</td>
<td>$245,648</td>
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<td>13</td>
<td><strong>Miyoun Suh, RD, PhD</strong></td>
<td>Associate Professor, Department of Food and Human Nutritional Sciences, University of Manitoba</td>
<td>$315,639</td>
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<td>14</td>
<td><strong>Carla Taylor, PhD</strong></td>
<td>Team Leader, Canadian Centre for Agri-Food Research in Health and Medicine; Professor, Department of Food and Human Nutritional Sciences, University of Manitoba; Adjunct Professor, Department of Physiology and Pathophysiology, University of Manitoba</td>
<td>$72,375</td>
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<tr>
<td>15</td>
<td><strong>Peter Zahradka, PhD</strong></td>
<td>Deputy Team Leader, Canadian Centre for Agri-Food Research in Health and Medicine; Professor and Division Head, Division of Endocrinology and Metabolic Disease, Department of Physiology and Pathophysiology, University of Manitoba; Professor, Department of Food and Human Nutritional Sciences, University of Manitoba</td>
<td>$336,093</td>
</tr>
</tbody>
</table>

**TOTAL FUNDING RECEIVED IN 2017:** $3,139,946

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### Affiliates

1. **Rotimi Aluko, PhD**: Professor, Department of Food and Human Nutritional Sciences, University of Manitoba
2. **Nancy Ames, PhD**: Research Scientist, Agriculture & Agri-Food Canada, Richardson Centre for Functional Foods and Nutraceuticals; Adjunct Professor, Department of Food and Human Nutritional Sciences, University of Manitoba
3. **Morag Graham, PhD**: Adjunct Professor, Department of Medical Microbiology, University of Manitoba
4. **James D. House, PhD**: Professor and Head, Department of Food and Human Nutritional Sciences, University of Manitoba
5. **Ehsan Khafipour, PhD**: Assistant Professor, Department of Animal Science, University of Manitoba
6. **Edmund Lui, PhD**: Associate Professor and Scientific Director, Ontario Ginseng Innovation and Research Consortium, Ontario Research Excellence Program, Ministry of Research and Innovation; Adjunct Professor, University of Western Ontario
7. **Casey Sayre, PharmD, PhD**: Assistant Professor of Pharmaceutical Sciences, College of Pharmacy, Roseman University of Health Sciences
8. **Garry Shen, PhD**: Professor, Department of Internal Medicine, University of Manitoba
9. **Alphonsus Utioh, MSc**: Research and Development Manager, Food Development Centre (Portage la Prairie)
10. **Gary Van Domselaar, PhD**: Chief, National Microbiology Laboratory, Public Health Agency of Canada
11. **Jeffrey Wigle, PhD**: Associate Professor, Department of Biochemistry and Medical Genetics, University of Manitoba
LIST OF MEMBERS

3. Research Associates
1. Elena Dibrov
2. Omkar Ijare
3. April McElrea
4. Kimberley O’Hara
5. Chelsey Walchuk

4. Postdoctoral Fellows
1. Erin Goldberg
2. Xavier Louis
3. Samantha Pauls
4. Craig Resch

5. Graduate Students
1. Crystal Acosta
2. Bolamle Akinwumi
3. Basma Aloud
4. Sirini Amarakoon*
5. Shatha Alattar
6. Lucien Cayer
7. Jaime Clark
8. Youjia Du
9. Ala’a Eideh
10. Ronak Fahmi
11. Afroza Ferdouse
12. Melissa Gabbs*
13. Nora Ghazzawi*
14. Jo-Anne Gilchrist
15. Jennifer Grant
16. Thomas Hedley*
17. Md Ariful Islam*
18. Cara Isaak*
19. Hibah Khawar
20. Olena Kloss
21. Roxanna Koohgoli
22. Rokiatou Kone Berethe
23. Danielle Lee*
24. Tara Loader*
25. Susara Madduma Hewage
26. Md Monirujjaman
27. Adriana Mudryj*
28. Elaheh Nosrat Mirshekarlou*
29. Mihir Parikh
30. Pema Raj
31. Fatemeh Ramezani
32. Yvette Shang
33. Veronika Shulgina
34. Victoria Sid
35. Alexsandra Stamenkovic
36. Arun Surendran
37. Chelsey Walchuk*
38. Yidi Wang

*Defended Thesis

6. Technical Staff
1. Alex Austria
2. Debbie Brisson
3. Patricia DeGagne
4. Elena Dibrov
5. Jo-Anne Gilchrist
6. Khuong Le
7. Tara Loader
8. Thane Maddaford
9. April McElrea
10. Sasanda Nimalgoda
11. Nancy Olson
12. Raissa Perrault
13. Jay Petkau
14. Suvira Prashar
15. Li Ren
16. Donna Ryland
17. Shiva Ievari-Shariati
18. Jo-Ann Stebbing
19. Le Wang
20. Sawanee Wickramasekara
21. Matthew Wiecek
22. Tanja Winter
23. Brenda Wright
24. Liping Yu

7. Research Nurses
1. Wendy Weighell
8. Undergraduate Students
1. Lucien Cayer
2. Rebecca Cummers
3. Bradley Feltham
4. Allison Ledingham
5. Meagan Mamchur
6. Anne Mendonca
7. David Nelson
8. Jordon Nelson
9. Mariam Ragheb
10. Ryan Ramjiawan
11. Lisa Rodway
12. Breanne Semenko
13. Rianna Tonn

9. Administrative Staff
1. Tracy Ewonchuk
2. Susan Zettler
Thank you to Dr. Thomas Netticadan and his Seminar Assistants Pema Raj & Samantha Pauls for organizing the 2017 CCARM Food for Thought Seminar series. This year’s invited speakers are listed below. Trainees had an opportunity to meet with the external speakers and learn more about their research and career path during lunchtime meetings.

1. Dr. Michelle Alfa, CCARM/University of Manitoba
   *Hospital Acquired Infections: “The Battle of the Bugs”!

2. Ms. Jaime Clark, CCARM/University of Manitoba
   *Beans, Beans … Good for Your Heart

3. Dr. Miyoung Suh, DND/CCARM/University of Manitoba
   *Nutrition Strategies to Protect Age-Related Vision Deterioration

4. Dr. Marcia Bakovic, University of Guelph
   *Antidiabetic and Lipid Lowering Effects of Choline Supplementation

5. Ms. Youjia Du, CCARM/University of Manitoba
   *Role of Oxylipins in Mediating Endothelial Cell Function

6. Dr. Luc Clair, CCARM/University of Winnipeg
   *Health Economics: Theory, Methods and its Applications
Our activities this year focused on finalizing the final experimental testing and writing manuscripts related to our two remaining research projects; 1) the gut microbiome clinical study, 2) the American Society of Gastrointestinal Endoscopy (ASGE) research grant.

A key highlight of our studies in 2017 was completing the experimental work related to the ASGE research grant. There were five publications that were completed and published in 2017 that were related to this project. Dr. Alfa was a member of the Food & Drug Administration (FDA) committee that developed a new validated protocol on sample collection and culture from duodenoscopes that was released in March 2018. Much of the data from our ASGE research project formed the foundation for this FDA/CDC/ASM protocol.

It was with great pleasure that our second manuscript related to the MSPrebiotic Clinical Trial was published in 2017! In addition, Dr. Alfa presented the findings of this clinical trial at the San Diego conference “5th Microbiome R&D & Business Collaboration Forum held Nov 2-3, 2017. We are proud of research project with the MSPrebiotic group from Carberry, Manitoba. This clinical trial is the first one in the CCARM group that has resulted in a commercial product. The MSPrebiotic product is now available on-line as well as in Natural Health Food stores in Winnipeg and across Canada.

With sadness in our hearts, Dr. Alfa retired and the “Alfa Lab” at St. Boniface Research Centre was closed at the end of March 2017. Nancy and Pat did an outstanding job of “decommissioning” the laboratory – despite feeling a bit weird throughout the process (this lab has been “Home” to all three of us for over 20 years)! The Research Centre labs benefitted from all the research equipment and supplies that were “re-distributed” throughout the building! Pat DeGagne has retired and Nancy Olson has stayed at SBRC and now works in Dr. Heather Blewett’s research laboratory. Dr. Alfa remains a Professor in the Dept of Medical Microbiology and continues to provide presentations at various conferences around the world and provide consulting to several companies involved in medical device reprocessing and hospital acquired infection prevention.
<table>
<thead>
<tr>
<th>Name</th>
<th>Organization</th>
<th>Activity/project title/system</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr. Morag Graham</td>
<td>National Microbiology Laboratory</td>
<td>Effects of MSPrebiotic on Gut Health in the Elderly.</td>
</tr>
<tr>
<td>Dr. Gary Van Domselaar</td>
<td>National Microbiology Laboratory</td>
<td>Effects of MSPrebiotic on Gut Health in the Elderly.</td>
</tr>
<tr>
<td>Dr. Rodrigo France</td>
<td>University of Manitoba</td>
<td>Prevention of biofilm formation in duodenoscopes</td>
</tr>
<tr>
<td>Dr. Kazuko Graziano</td>
<td>University of Sao Paulo Sao Paulo, Brazil</td>
<td>Development of Buildup Biofilm models</td>
</tr>
<tr>
<td>Dr. Shani Haugen</td>
<td>Food and Drug Administration Dept of Health &amp; Human Services Collaboration</td>
<td>Development of a protocol for sample collection and culture of duodenoscopes</td>
</tr>
</tbody>
</table>

Pat DeGagne, Nancy Olson & Dr. Michelle Alfa
Publications & Presentations

Peer-Reviewed Articles


Abstracts


Invited Presentations

Farm girl to international researcher: My path to prevent hospital-acquired infections (2017), International CSSD Conference, Hangzhou, China (Keynote Speaker)

Bacteria of concern in duodenoscopes: How to control them? (2017) Olympus Masters Forum, Tokyo, Japan (Keynote Speaker)


Prevention of biofilm accumulation in duodenoscopes varies with the method of reprocessing (2017), DDW Conference, Chicago.

Training/Mentoring

Technical Staff
Pat DeGagne, Research Technologist
Nancy Olson, Research Technologist

Service

Professional Service

Reviewer for – Journal of Hospital Infection, American Journal of Infection Control, Journal of Medical Microbiology, Infection Control and Hospital Epidemiology, Journal of Clinical Microbiology

Food and Drug Administration of USA (FDA): Committee member for developing the FDA guideline on “Standardized sampling of duodenoscopes” 2016 – present.

Canadian Standards Association (CSA), Committee member for Reprocessing (TSC-Z262.34) 2002 - present.

Editorial Advisory Board for Central Sterilisation – Central Service, 2004 - present

Drs. Peter Zahradka and Michelle Alfa at her retirement party (May 12, 2017)
Our multi-disciplinary laboratory largely focuses on Mass Spectrometry and Nuclear Magnetic Resonance (NMR)-based metabolomics, incorporating elements of sensory and clinical research. We are interested in the development of functional foods for use in clinical trials, flavour perception, how diet impacts health, and understanding the disrupted metabolism involved in certain disease states and conditions such as peripheral arterial disease (PAD), cancer, diabetes mellitus and hypertension, in order to provide insights in early detection, monitoring treatment response, and detecting recurrence to improve clinical outcomes.

Current lab members include technicians Shiva Shariati-Ievari, Donna Ryland and Le Wang, research associate April McElrea, PhD Students Ronak Fahmi and Ala’a Eideh, and Postdoctoral Fellow, Erin Goldberg. Ms. Fahmi is currently working on a project with Warburton’s, the largest bread producer in the United Kingdom, and the Canadian International Grains Institute, to develop healthful breads with added pulse flours. Ms. Eideh’s project involves a clinical component, focused on designing low glycemic index foods like yogurt fortified with Manitoba-grown Saskatoon berries, destined for individuals with diabetes mellitus. Dr. Goldberg’s project with Maple Leaf is looking at genetic and metabolic markers to improve pork flavour in Maple Leaf’s meat products. Donna Ryland, our Sensory Specialist, is based on the Fort Garry Campus, in our state-of-the-art, food-grade Weston Sensory and Food Lab, instrumental in the design and execution of our sensory trials.

In 2017, we were excited to publish our book “Bitterness: Perception, Chemistry and Food Processing” that was co-edited with Dr. Michael Eskin and includes three chapters by our group.

Our laboratory will continue to be actively involved in several nutritional, medical and food related metabolomics research activities in collaboration with regional, national and international partners.
## Research Funding

<table>
<thead>
<tr>
<th>Name of Granting Agency</th>
<th>Names of Investigators</th>
<th>Project Title</th>
<th>Funding Amount for Current Year</th>
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<tbody>
<tr>
<td><strong>OPERATING:</strong></td>
<td></td>
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<tr>
<td>Teewinot Life Sciences</td>
<td>M. Aliani</td>
<td>Development of an NMR and QTOF database for cannabinoids</td>
<td>$5,000</td>
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<tr>
<td>CIGI</td>
<td>M. Aliani</td>
<td>Growing the market for pulse flours: Creating innovative bakery products and a pulse database for the food industry</td>
<td>$45,000</td>
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<tr>
<td>Natural Sciences and Engineering Research Council of Canada</td>
<td>M. Aliani</td>
<td>Elucidating the role of low molecular weight peptides (&lt; 1 KDa) as Maillard reactant flavour precursors in selected cooked white and red meats using a flavochemistry approach</td>
<td>$26,000</td>
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<tr>
<td><strong>Agri-Food Research and Development Initiative (ARDI)</strong></td>
<td>M. Aliani, M. Eskin, P. Zahradka &amp; J. Wigle</td>
<td>Genetic markers for flavour selection in pork</td>
<td>$126,000</td>
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<tr>
<td>---------------------------------------------------------</td>
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<tr>
<td><strong>Saskatchewan Pulse Growers</strong></td>
<td>M. Aliani</td>
<td>Growing the market for pulse flours: Creating innovative bakery products and a pulse database for the food industry</td>
<td>$94,300</td>
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<td><strong>Warburtons Canada</strong></td>
<td>M. Aliani</td>
<td>Canadian Agricultural Adaptation Program (CAAP) Pulse research project</td>
<td>$15,000</td>
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<tr>
<td><strong>Canadian Institutes of Health Research</strong></td>
<td>J. Kim &amp; M. Aliani</td>
<td>Rapid non-small cell lung cancer detection and phenotypic subtyping using machine learned metabolomics signatures of blood specimens from Manitoba lung cancer tumour bank</td>
<td>$15,000</td>
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<tr>
<td><strong>Manitoba Agri-Health Research Network</strong></td>
<td>M. Aliani, C. Taylor &amp; P. Zahradka</td>
<td>Urinary and plasma metabolomics studies of fully characterized Saskatoon berry powder (SBP) fortified yogurt in healthy individuals</td>
<td>$40,000</td>
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**SALARY:**

- MITACS: E. Goldberg $50,000
- Canadian Institutes of Health Research: V. Shulgina $11,667 included in funding total for M. Suh
- NSERC USRA: H. Chan $4,500

**TOTAL FUNDING:** $420,800
<table>
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<tr>
<th>Name</th>
<th>Organization</th>
<th>Activity/project title/system</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drs. C. Taylor and P. Zahradka</td>
<td>University of Manitoba</td>
<td>Characterization of selected pulses, development of pulse-fortified food products, metabolomics investigation of biological fluids and tissues after consumption of these products in animal and human populations. Discovering new biomarkers of obesity in urine (a non-invasive tool to monitor the development of obesity, and nutrients and drugs affecting it)</td>
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<tr>
<td>Drs. P. Shand and M. Nickerson</td>
<td>University of Saskatchewan</td>
<td>Micronization of lentil flours as binder to low fat beef burgers</td>
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<tr>
<td>Dr. R. Bell</td>
<td>University of Alberta</td>
<td>Substantiating a health claim for pulses (beans and peas) and cholesterol lowering</td>
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<tr>
<td>Drs. D. Ramdath and T. Wolever</td>
<td>Agriculture Canada Researchers and University of Toronto</td>
<td>Post-prandial metabolomics studies of lentil varieties in healthy adults</td>
</tr>
<tr>
<td>Dr. T. Netticadan</td>
<td>CCARM</td>
<td>Metabolomics studies of resveratrol in hypertensive rat models</td>
</tr>
<tr>
<td>Dr. H. Blewett</td>
<td>Agriculture Canada</td>
<td>Flaxseed</td>
</tr>
<tr>
<td>Dr. J. House</td>
<td>University of Manitoba</td>
<td>Omega-3 eggs</td>
</tr>
<tr>
<td>Dr. M. Suh</td>
<td>University of Manitoba</td>
<td>Effect of egg-derived choline on brain development. Investigation of beta-carotene effects on retina function in rats</td>
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<tr>
<td>Dr. C. Siow</td>
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<td>Lingonberries</td>
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<tr>
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<td>Topic</td>
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<tr>
<td>Drs. V. Dolinsky, G. Hatch, E. Doucette</td>
<td>The Children’s Hospital Research Institute of Manitoba (CHRIM)</td>
<td>Diabetes</td>
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<tr>
<td>Dr. N. Ahmed</td>
<td>Department of Radiology</td>
<td>Metabolic signatures of lung cancer in sputum and exhaled breath condensate detected by 1H magnetic resonance spectroscopy</td>
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<tr>
<td>Dr. C. Kim</td>
<td>Internal Medicine</td>
<td>Pancreatic cancer</td>
</tr>
<tr>
<td>Dr. G. Shah</td>
<td>University of Laval</td>
<td>Lung cell cultures treated with mustard extracts</td>
</tr>
<tr>
<td>Dr. A. Ravandi</td>
<td>Institute of Cardiovascular Sciences</td>
<td>A common project to identify biomarkers of heart attack</td>
</tr>
<tr>
<td>Dr. A. Halayko</td>
<td>The Children’s Hospital Research Institute of Manitoba (CHRIM)</td>
<td>The effect of inhaled statin</td>
</tr>
<tr>
<td>Dr. B. Albensi</td>
<td>Division of Neurodegenerative Disorders</td>
<td>Alzheimer research</td>
</tr>
<tr>
<td>Dr. E. Khafipour</td>
<td>Animal Science and Medical Microbiology</td>
<td>The gut microbiome in several animal models</td>
</tr>
<tr>
<td>Dr. L. Cooper</td>
<td>University of Ohio</td>
<td>Using our developed metabolomics technique to identify markers of aging in “Bats”.</td>
</tr>
<tr>
<td></td>
<td>Warburtons Bread, Saskatchewan Pulse Growers and Canadian International Grains Institute (CIGI)</td>
<td>Recent funding to collaborate with the largest bread industry in the United Kingdom and Canadian industry to incorporate pulses into daily breads.</td>
</tr>
</tbody>
</table>
Publications & Presentations

Peer-Reviewed Articles


Books & chapters


Abstracts


**Invited Presentations**

Pulses and nutritional metabolomics approach (2017) Inaugural Conference on Food and Nutritional Metabolomics and 14th Annual Ohio Mass Spectrometry Conference, Columbus.

Effect of barley variety on the sensory, physical and chemical characteristics of lager beer (2017) The 8th Canadian Barley Symposium, Winnipeg.


Nutritional metabolomics and hypertension, MAAP Summer Symposium, Asian Physicians of Manitoba, Hecla.

**Academic Teaching**

Flavour Chemistry, HNSC 7510, Human Nutritional Sciences
Composition, Functional and Nutritional Properties of Foods, HNSC 2150, Human Nutritional Sciences
Food Product Development Food, FOOD 4510, Food Science

**Training/Mentoring**

**Post-doctoral Fellows**
Erin Goldberg

**Graduate Students - PhD**
Ala’a Eideh
Ronak Fahmi
Jennifer Grant (co-supervised with C. Taylor)
Veronika Shulgina (co-supervised with M. Suh)

**Graduate Students – MSc**
Arun Surendran (co-supervised with A. Ravandi)

**Technical Staff**
Shiva Ievari-Shariati, Technician
Omkar Ijare, Research Associate
April McElrea, Research Associate
Donna Ryland, Technician
Le Wang, Technician
Service

Graduate Student Committees

PhD
Jaime Clark, Food and Human Nutritional Sciences
Cara Isaak, Physiology and Pathophysiology
Ethendhar Rajendiran, Food and Human Nutritional Sciences
Fatemeh Ramezani Kapourchali, Food and Human Nutritional Sciences
Aleksandra Stamenkovich, Physiology and Pathophysiology

MSc
Soumya Alias, Food and Human Nutritional Sciences
Olena Kloss, Food and Human Nutritional Sciences
Michelle Leaf, Food and Human Nutritional Sciences
Tara Loader, Food and Human Nutritional Sciences
Mark Pinder, Food and Human Nutritional Sciences
Umar Rassoul, Animal Sciences

Professional Service

External reviewer, NSERC Discover Grant
Member, Institute of Food Technology (IFT)
Member, Metabolomics Society
Member, Analytical Chemistry
A significant interest of the lab is novel signaling mechanisms that underlie cardiac hypertrophy. One important example is our focus on the endocannabinoid system as a therapeutic target to achieve protection of the heart after hemodynamic stress or injury. This CIHR-funded project constituted the thesis work of Yan Lu, a recent Ph.D. graduate (2016) from the laboratory. Yan discovered that activating cannabinoid receptors results in stimulation of signalling pathways that prevent abnormal growth of the heart. Moreover, Yan did significant work to show that the activated endocannabinoid system leads to protection of mitochondria in heart muscle cells. The mitochondria are responsible for generating energy; since heart muscle cells contract and relax constantly (and this requires a continuous supply of energy), mitochondria are very important. Danielle Lee, a current Ph.D. student in the lab, has completed this work, and the data will be published soon. We are now applying our findings on the cardioprotective actions of CB receptors to the major clinical challenge of atrial fibrillation, a type of irregular heartbeat. To do this, we are collaborating with Dr. Yoram Etzion (Ben-Gurion University, Israel). Dr. Etzion has developed innovative technology to study atrial fibrillation in experimental models, which we will leverage to interrogate cannabinoid receptor-mediated effects.

The role of resistance arteries in hypertension is another important focus of the lab. Blood pressure is influenced by peripheral resistance to blood flow, and resistance increases as the arterial lumen diameter narrows (whether by structural, functional, and/or mechanical mechanisms). An important therapeutic aim, for which we are testing nutritional interventions, is to prevent this narrowing. In past years, we reported the microvascular (and cardiac) effects of resveratrol. Resveratrol is a stilbenoid polyphenol that became popular after putative links to benefits such as increased longevity. There is, in fact, a significant body of evidence that resveratrol might be protective in the context of cardiovascular disease. However, resveratrol exhibits low oral bioavailability and a short half-life. Thus, we recently completed a study investigating stilbenoid compounds with improved bioavailability (i.e. pterostilbene, a dimethylated analog of resveratrol) or a history of medicinal use (i.e. gnetol). We determined that pterostilbene and gnetol indeed exhibit protective effects on arteries and the heart in the spontaneously hypertensive heart failure (SHHF) rat, an experimental model of human hypertension and heart disease. Crystal Acosta (Ph.D. student) and Danielle Lee (then a M.Sc. student) found stilbenoid-dependent improvement of brain and peripheral arteries, respectively, and Bolanle Akinwumi (with Pema Raj – Netticadan lab), detected improved heart structure and function. Interestingly, some of the signalling pathways differ from those induced by resveratrol and from those detected in the spontaneously hypertensive rat (SHR), which models hypertension but not heart failure. These findings were published in the journal

Another project in the lab is predicated on our hypothesis that aberrations of brain-penetrating arterioles contribute to cerebral vascular insufficiency in the context of cardiovascular disease, and that this potentiates the risk of cognitive decline and dementia during heart failure. Crystal Acosta (Ph.D. student) is characterizing these aberrations using a combination of pressure myography and multi-photon laser scanning microscopy in isolated arteries and brain slices. She is also exposing co-cultured cerebral and vascular cells to mechanical strain and assessing signaling effectors by biochemical assays. Crystal is progressing well through her Ph.D. program; in 2017, she has generated a significant body of evidence showing structural and mechanical abnormalities within these arterioles in experimental models at risk of heart failure, and will now have on submitting her findings for publication in a peer-reviewed scientific journal.

Finally, Dr. Anderson was appointed to dual administrative roles at the University of Manitoba in 2017: Associate Dean, Faculty of Graduate Studies (February, 2017) and Vice-Dean, Graduate Studies – Rady Faculty of Health Sciences (May, 2017).
## Research Funding

<table>
<thead>
<tr>
<th>Name of Granting Agency</th>
<th>Names of Investigators</th>
<th>Project Title</th>
<th>Funding Amount for Current Year</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>OPERATING:</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Canadian Institutes of Health Research</td>
<td>H. Anderson</td>
<td>Protective mechanisms of endocannabinoids in cardiac hypertrophy</td>
<td>$120,927</td>
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<tr>
<td>URGP</td>
<td>H. Anderson</td>
<td>Novel strategies to circumvent Anti-HER2-induced cardiotoxicity</td>
<td>$3,750</td>
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</table>

| **SALARY**                      |                        |                                                                               |                                 |
| Research Manitoba               | Danielle Lee           |                                                                               | $5,950                          |
| UMGF                            | Crystal Acosta         |                                                                               | $6,000                          |

**TOTAL FUNDING:** $136,627

## Collaborative Activity

<table>
<thead>
<tr>
<th>Name</th>
<th>Organization</th>
<th>Activity/project title/system</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chris Anderson</td>
<td>University of Manitoba</td>
<td>Aberrant neurovascular coupling during hypertension</td>
</tr>
<tr>
<td>Yoram Etzion</td>
<td>Ben-Gurion University</td>
<td>Protective mechanisms of cannabinoid receptor signaling in atrial fibrillation</td>
</tr>
<tr>
<td>Shawn Owen/Casey Sayre</td>
<td>University of Utah/Roseman University</td>
<td>Novel strategies to circumvent anti-HER2-induced cardiotoxicity</td>
</tr>
</tbody>
</table>
Publications & Presentations

Peer-Reviewed Articles


Academic Teaching

Pharmacy Seminar I, PHRM 7160, College of Pharmacy
Pharmacy Seminar II, PHRM 7170, College of Pharmacy

Training/Mentoring

Graduate Students - PhD
Crystal Acosta
Bolanle Akinwumi

Graduate Students - MSc
Danielle Lee

Technical Staff
Kimberly-Ann Bordun, Technician
Students Who Defended Thesis

MSc
Danielle Lee, Thesis Title: Effect of stilbenoid polyphenols on resistance artery structure and mechanical properties in the spontaneously hypertensive heart failure rat

Honours, Awards, Scholarships

Crystal Acosta
• Dr. Ian R. Innes Memorial Award, Department of Pharmacology & Therapeutics
• J.H. Stewart Reid Memorial Fellowship
• University of Manitoba Graduate Fellowship
• Canadian Association of Neuroscience Student Advocacy Travel Award

Danielle Lee
• Second Prize, CCARM Rapid-Fire Research Symposium
• Samuel and Beatrice Faiman Pharmacy Graduate Fellowship. Research Manitoba Studentship
• James Gordon Fletcher PhD Fellowship in Functional Foods and Nutraceuticals (declined)
• Manitoba Medical Service Foundation (MMSF) Poster Award

Service

Graduate Student Committees

PhD
Jamie Clark, Food and Human Nutritional Sciences
Mihir Parikh, Physiology and Pathophysiology
Maryam Samsamikor, Food and Human Nutritional Science

MSc
Yongbo She, Food and Human Nutritional Science

Academic Committees and Related Administrative Duties

Member – Mentorship Working Group, College of Pharmacy.
Member – University of Manitoba Senate Committee on Instruction and Evaluation
Member – Programs and Guidelines Committee, Faculty of Graduate Studies
Member – Graduate Student Experience Committee, Faculty of Graduate Studies
Member – Master of Physician Assistant Studies Curriculum Committee
Member– Manitoba Training Program Executive Advisory Board
Moderator – University of Manitoba Undergraduate Medical Student Research Symposium
Member – Selection Committees for the University of Manitoba Outstanding Administrator, Outstanding Mentor, and Outstanding Support Staff Awards, Faculty of Graduate Studies
Member – Selection Committees for the University of Manitoba Distinguished Dissertation Award, Governor General’s Gold Medal, and Canadian Association for Graduate Studies Award, Faculty of Graduate Studies
Member – Graduate Studies Sub-Committee of the University of Manitoba Strategic Enrolment Management Planning Committee
Mentor – University of Manitoba, Teaching and Learning Certificate Program
Member – University of Manitoba, Faculty of Health Sciences Graduate Studies Committee
Member – University of Manitoba, Faculty of Health Sciences Research Advisory Committee
Member – University of Manitoba Senate Committee on Academic Review
Member – University of Manitoba Internal Grants Peer Review Committee
Member – Program Evaluation Committee, College of Pharmacy
Member – Faculty Council, Faculty of Graduate Studies
Member – Executive Committee, Faculty of Graduate Studies
Member – College of Pharmacy Curriculum Program Subcommittee (Clinical and Applied Sciences Stream)
Nominated/Elected Member – Advisory Committee to the University of Manitoba President for the search for the position of Dean, College of Pharmacy
Member – Appeals Committee, Faculty of Graduate Studies
Chair – Graduate Studies Committee, College of Pharmacy

Professional Service

Peer Review – Internal Review Committee Member for Canadian Institutes of Health Research Project Grants Stage 1 & Canadian Institutes of Health Research Doctoral Awards
Reviewer - miscellaneous journals
Member, College of Reviewers – Canadian Institutes of Health Research.

Outreach Activity
CCARM blog, reviewer/editor
Featured Principal Investigator - St. Boniface Hospital Foundation Direct Mail campaign.
Bioactive lipids in health and disease

Our laboratory examines the roles of bioactive lipids in normal and diseased tissues and cells. In particular, we study bioactive metabolites called oxylipins that are derived from fatty acids. Prostanoids are one class of oxylipins that are blocked by common drugs such as aspirin. Using a targeted lipidomics approach, our current work is demonstrating that dietary interventions (such as with flax oil, fish oil and soy protein) alter the levels these bioactive compounds.

This year we published studies demonstrating that oxylipins do not always reflect fatty acid patterns. For example, the fact that dietary linoleic acid (LA) does not increase blood arachidonic acid (AA) has allayed concerns regarding dietary recommendations to increase dietary LA. Our studies showed that even though dietary LA does not alter AA, it can alter oxylipins derived from both LA and AA, thus suggesting that dietary recommendations to increase LA may need to be reconsidered. We also showed that although dietary α-linolenic acid (ALA) does not increase tissue docosahexaenoic acid (DHA), it can increase the levels of DHA derived oxylipins. In cell studies, we showed that ALA and its oxylipins can directly modulate macrophage function. These studies provide data on unique ALA functions, having possible implications for dietary ALA and DHA recommendations.

This year we also published studies demonstrating that there are distinct kidney oxylipin patterns in different types of cystic kidney disease, suggesting different potential dietary and pharmacological approaches to treat these disorders. Further, we have been the first to report sex differences in oxylipin profiles in various tissues, and that different dietary oils affect these differently in some tissues.

We also have examined the effects of dietary protein on kidney physiology and oxylipin levels, showing that high protein diets have effects on unique oxylipins. In another study in obese rats, we showed that the effect of high protein on renal pathology is influenced by the type of protein in the diet. These studies also may have implications for dietary recommendations for protein.

In the past year Adriana Mudryj, Md Ariful Islam and Melissa Gabbs graduated.

The following students were honoured in 2017 with the following awards/recognitions:
Lisa Rodway – top poster in the undergraduate category at Child Health Research Days
Afroza Ferdouse – 3rd place award for her oral presentation at the Rapid Fire Symposium
Shan Leng – her paper in Journal of Lipid Research was featured in the ASBMB Today magazine
Lucien Cayer – awarded a Manitoba Graduate Scholarship
Md Monirrujaman – awarded the Janet Fabro McComb Scholarship and the Queen Elizabeth II Diamond Jubilee Scholarship
Samantha Pauls – awarded a CCARM Trainee Service Recognition Award

Research Funding

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<tr>
<td>OPERATING:</td>
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<td></td>
<td></td>
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<tr>
<td>Canadian Institutes of Health Research</td>
<td>H. Aukema, P. Zahradka &amp; C. Taylor</td>
<td>Effects of dietary essential fatty acids on octadecanoid production and biological actions in obesity-induced inflammation: Implications for dietary requirements</td>
<td>$134,793</td>
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<tr>
<td>Natural Sciences and Engineering Research Council of Canada</td>
<td>H. Aukema</td>
<td>Effects of diet on oxylipins</td>
<td>$40,000</td>
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<tr>
<td>Canada-Manitoba Agri-Food Research and Development Initiative</td>
<td>H. Aukema</td>
<td>Effect of dietary flaxseed on alpha-linolenic acid (ALA) metabolism</td>
<td>$28,021</td>
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<tr>
<td>Canada Foundation for Innovation</td>
<td>H. Aukema, R. Aluko</td>
<td>Infrastructure Operating Funds</td>
<td>$23,200</td>
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<tr>
<td>Canada-Manitoba Agri-Food Research and Development Initiative</td>
<td>H. Aukema</td>
<td>Effects of dietary flaxseed protein in kidney disease</td>
<td>$28,990</td>
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<tr>
<td>Children’s Hospital Research Institute of Manitoba</td>
<td>T. Pemberton, H. Aukema</td>
<td>Identification of a modifier locus for cystic kidney disease in the rat</td>
<td>$39,097</td>
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<tr>
<td>Faculty of Science Collaborative Grant</td>
<td>J. Detwiler, H. Aukema</td>
<td>Discovering the mechanisms behind host behavioural changes to trematode infection</td>
<td>$12,000</td>
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<td>SALARY</td>
<td>Manitoba Graduate Scholarship</td>
<td>Lucien Cayer</td>
<td>$5,000</td>
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<tr>
<td>Scholarship/Grant</td>
<td>Student Name</td>
<td>Amount</td>
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<tr>
<td>Manitoba Graduate Scholarship</td>
<td>Md Ariful Islam</td>
<td>$10,000</td>
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<tr>
<td>University of Manitoba Undergraduate Research Award</td>
<td>Mariam Ragheb</td>
<td>$6,000</td>
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<td>University of Manitoba GETS Award</td>
<td>Youjia Du</td>
<td>$7,000</td>
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<tr>
<td>University of Manitoba GETS Award</td>
<td>Roxanna Koohgoli</td>
<td>$7,778</td>
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<td>University of Manitoba GETS Award</td>
<td>Md Monirujjaman</td>
<td>$3,500</td>
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<td>University of Manitoba GETS Award</td>
<td>Afroza Ferdouse</td>
<td>$8,333</td>
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<tr>
<td>University of Manitoba Graduate Fellowship</td>
<td>Md Monirujjaman</td>
<td>$12,000</td>
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</table>

**TOTAL FUNDING:** $365,712
## Collaborative Activity

<table>
<thead>
<tr>
<th>Name</th>
<th>Organization</th>
<th>Activity/project title/system</th>
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<tbody>
<tr>
<td>Jing Zhou</td>
<td>Harvard Medical School</td>
<td>Diet and lipid mediators in polycystic kidney disease</td>
</tr>
<tr>
<td>Tamio Yamaguchi</td>
<td>Suzuka University of Medical Science</td>
<td>Diet and lipid mediators in polycystic kidney disease</td>
</tr>
<tr>
<td>Shizuko Nagao</td>
<td>Fujita Health University</td>
<td>Diet and lipid mediators in polycystic kidney disease</td>
</tr>
<tr>
<td>Matt Picklo</td>
<td>Grand Forks Human Nutrition Centre</td>
<td>Diet and lipid mediators</td>
</tr>
<tr>
<td>Anne Mendonca</td>
<td>Federal University of Uberlândia, Brazil</td>
<td>Diet and sex effects in adipose tissue</td>
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<tr>
<td>Peter Zahradka</td>
<td>U of M</td>
<td>Dietary fatty acids and lipid mediators in obesity and inflammation</td>
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<tr>
<td>Carla Taylor</td>
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<tr>
<td>Trevor Pemberton</td>
<td>U of M</td>
<td>Identification of a modifier locus for cystic kidney disease in the rat</td>
</tr>
<tr>
<td>Jillian Detwiler</td>
<td>U of M</td>
<td>Lipid mediators host behavioural changes to trematode infection</td>
</tr>
<tr>
<td>Nikhil Sidhu</td>
<td>U of Winnipeg</td>
<td>Oxylipins in the jck model of nephronophthisis</td>
</tr>
<tr>
<td>S Caligiuri, A Ravandi, R Lavallee, R Guzman, Parikh, A Stamenkovic, G Pierce</td>
<td>SBRC</td>
<td>Oxylipins in aging, hypertension and cardiovascular disease</td>
</tr>
<tr>
<td>A Ravandi</td>
<td>SBRC</td>
<td>Diet, sex and disease effects in polycystic kidney disease</td>
</tr>
<tr>
<td>A Halayko, A Jha</td>
<td>CHRIM</td>
<td>Lipid mediators in polycystic livers</td>
</tr>
</tbody>
</table>
Publications & Presentations

Peer-Reviewed Articles


Abstracts


Invited Presentations
Diverse effects of diet and sex on rat tissue oxylipins. Canadian Society of Exercise Physiologists. Winnipeg, 2017

Effects of dietary α-linolenic acid on formation of docosahexaenoic acid metabolites (oxylipins). Canadian Nutrition Society Dr Sheila Innis Symposium: Can dietary linolenic acid provide human requirements for long chain n-3 fatty acids? Montreal, 2017

**Academic Teaching**

Graduate Seminar, HNSC 7200, Human Nutritional Sciences
Basic Principles of Human Nutrition, HNSC 2140, Human Nutritional Sciences
Vitamins and Minerals in Human Health, HNSC 3300, Human Nutritional Sciences

**Training/Mentoring**

**Post-doctoral Fellows**
Samantha Pauls (co-supervised with P. Zahradka and C. Taylor)

**Graduate Students - PhD**
Md Monirujjaman
Adriana Mudryj

**Graduate Students - MSc**
Lucien Cayer
Md Ariful Islam
Afroza Ferdouse
Roxanna Koohgoli
Melissa Gabbs

**Undergraduate Students**
Lucien Cayer
Md Ariful Islam
Anne Mendonca
Mariam Ragheb
Melissa Gabbs
Lisa Rodway

**Technical Staff**
Tanja Winter, Technician

**Students Who Defended Thesis**

**MSc**
Melissa Gabbs, Thesis Title: ALA and DHA Rich Oils Alter Blood Oxylipin Profiles Differently in Young Healthy Males and Females

Ariful Md Islam, Thesis Title: Linoleic Acid Derived Oxylipins are Elevated in Kidney and Liver and Reduced in Serum in Rats Given a High Protein Diet

Adriana Mudryj, Thesis Title: Secondary Data Analysis of Nutritional Status of Canadians using the 2 Canadian Community Health Survey and the Canadian Health Measures 3 Survey
Honours, Awards, Scholarships

Lisa Rodway (undergraduate student) won award for top poster in undergraduate category at the Child Health Research Days

Afroza Ferdouse won 3rd place award for oral presentation at the Rapid Fire Symposium held at the St Boniface Research Centre

Shan Leng’s paper in Journal of Lipid Research was featured in the ASBMB Today magazine

Md Monirujjaman Queen Elizabeth II Diamond Jubilee Scholarship, $3600

Md Monirujjaman Janet Fabro McComb Scholarship $1600

Samantha Pauls was awarded a CCARM Trainee Service Recognition Award

Service

Graduate Student Committees
PhD
Youjia Du, Physiology and Pathophysiology
Susara Madduma Hewage, Physiology and Pathophysiology
Ifeanyi Nwachukwu, Food and Human Nutritional Sciences
Zahra Solati, Physiology and Pathophysiology
Maryam Samsamikor, Food and Human Nutritional Sciences
MSc
Alie Johnston, Food and Human Nutritional Sciences
Qian Li, Pathology
Arun Surendran, Physiology and Pathophysiology

Professional Service
CIHR College of Reviewers
Lipids, Associate Editor
Applied Physiology, Nutrition and Metabolism, Associate Editor
Reviewer, NSERC grants
Ad hoc reviewer for Canadian Journal of Physiology and Pharmacology,
Prostaglandins, Leukotrienes and Essential Fatty Acids, Advances in Nutrition, Scientific Reports
Member & Committee Chair, CanU Canada

Outreach Activity
Ag in the City

Representation on behalf of CCARM
Tour the group of conference attendees (Agricultural Bioscience International Conference (ABIC) (with Miyoung Suh)
As an AAFC scientist working at CCARM, my research program is focused on investigating the health benefits of Canadian crops. I have several projects currently underway aimed at filling the gaps in the scientific literature that are necessary to substantiate the following food health claims for the following crops:

- Postprandial glucose reduction: peas, barley
- Satiety: peas, barley
- LDL cholesterol lowering: flax

Dr. Michel Aliani is collaborating on the flax and pea clinical trials performing metabolomics analysis on the plasma and urine samples collected during these trials.

I am a team member of the Manitoba Personalized Lifestyle Research (TMPLR) project, whose overall objective is to bring together an interdisciplinary team to implement a cross-sectional study to identify the complex interactions that exist between lifestyle, genetics, and gut microbiota and explore how these relate to risk factors for chronic conditions in Manitoba. I am the Nutrition project lead with a focus on whether consumption of the “Canadian Climate Advantaged Diet” (diet high in canola, flaxseed, pulses, whole grains (wheat, wheat bran, oats and barley), potatoes, emerging crops (hemp, buckwheat, Saskatoon and other berries), eggs and dairy) correlate with markers of immune function and glucose metabolism.

I also have projects that are investigating the effect of polyphenols extracted from berries on T-cell activation in animal models of hypertension and myocardial infarction (in collaboration with Thomas Netticadan).

One of the highlights for 2017 was presenting the research results from our randomized, controlled, cross-over trial examining the effect of peas on post-prandial glucose response in healthy adults at the Canadian Nutrition Society Annual meeting in Montreal. We found that replacing a portion of a high starch food (white rice) with peas (yellow whole, yellow split and green split) significantly reduced post-prandial glucose response by 29-31% compared to white rice alone, without increasing the post-prandial insulin response. These results support a Function health claim related to the reduction in post-prandial glycaemic response.

I was thrilled to participate in the Research Without Borders program by traveling to Israel to establish an international research collaboration. Dr. Roi Gazit (Ben Gurion University), Dr. Michel Aliani (University of Manitoba) and myself submitted an application studying the impact of alpha-linolenic acid (the omega-3 fat found in flax) on...
hematopoiesis and hematopoietic stem cells. Hematopoietic stem cells are the cells in the bone marrow that make all the cells in your blood.

The Blewett lab maintained the title of best Halloween door in 2017 with a creepy clown theme.

### Research Funding

<table>
<thead>
<tr>
<th>Name of Granting Agency</th>
<th>Names of Investigators</th>
<th>Project Title</th>
<th>Funding Amount for Current Year</th>
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<tbody>
<tr>
<td><strong>OPERATING:</strong></td>
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<tr>
<td>Agriculture and Agri-Food Canada</td>
<td>D. Brown, Y. Siow, T. Netticadan, H.J. Blewett, M. Aliani, E. Lui, &amp; G. Ren</td>
<td>Genetic, metabolomic and health benefit characterization of heritage ginseng</td>
<td>$29,750</td>
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<td>Agriculture and Agri-Food Canada</td>
<td>D. Ramdath, H.J. Blewett, S. Tosh, Q. Liu, R. Cao, M. Aliani, &amp; A. Duncan</td>
<td>Blood glucose attenuation and satiety levels in humans following consumption of whole lentil and yellow pea and their food products; effect of processing and starch fractions.</td>
<td>$60,000</td>
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<tr>
<td>Manitoba Agri-Health Research Network</td>
<td>P. Jones, M. Azad, H. Blewett</td>
<td>Canadian Climate Advantage Diet –Investigation of CCAD food consumption patterns of intake and effect on glucose metabolism and immune function.</td>
<td>$3,500</td>
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</table>
A. Ravandi,
N. Tangri

**SALARY:**

| Agriculture and Agri-Food Canada Salary Support | Technical Support | **$166,832** |

**TOTAL FUNDING:**  **$275,862**

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### Collaborative Activity

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<tr>
<td>Peter Jones, Meghan Azad, Peter Eck, Sharon Bruce, Jared Carlberg, Amir Ravandi, Ehsan Khafipour, Todd Duhamel, Navdeep Tangri, Semone Myrie, Lisa Lix, Diana McMillan, Kristy Wittmeier</td>
<td>University of Manitoba</td>
<td>The Manitoba Personalized Lifestyle Research (TMPLR) Program</td>
</tr>
<tr>
<td>Dan Ramdath</td>
<td>AAFC, Guleph</td>
<td>Blood glucose attenuation and satiety levels in humans following consumption of yellow pea and their food products; effect of processing and starch fractions</td>
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<tr>
<td>Nancy Ames</td>
<td>AAFC, RCFFN</td>
<td>Development of high beta-glucan barley waffles and clinical trial testing of its effect on postprandial glucose and appetite control</td>
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<tr>
<td>Sora Ludwig</td>
<td>St. Boniface Hospital</td>
<td>Barley and pea postprandial glucose response trials</td>
</tr>
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</table>
Publications & Presentations

Peer reviewed articles


Abstracts

Invited Presentations
Substituting peas for rice significantly reduces post-prandial blood glucose response and glycemic index. Canadian Nutrition Society Annual Conference, Montreal, Canada

Training/Mentoring

Graduate Student - PhD
Basma Aloud (co-supervised with T. Netticadan)

Technical Staff
Sasanda Nilmalgoda, Technician
Nancy Olson, Technician
Jay Petkau, Technician
Li Ren, Technician
Jo-Ann Stebbing, Technician

Service

Graduate Student Committees

PhD
Ala’a Eideh, Food and Human Nutritional Science
Gerardo Medina, Food and Human Nutritional Science

MSc
Adriano Cardillo, Food and Human Nutritional Science
Danielle Lee, Pharmacy
Veronika Shulgina, Food and Human Nutritional Science

Academic Committees and Related Administrative Duties

Member of the SBGH-Research General Safety and Bio-Safety Sub-Committee

Member of AAFC’s Human Research Ethics Committee

Adjunct Professor in the Departments of Physiology & Pathophysiology and Human Nutritional Sciences

Professional Service

Associate Editor, Journal of Applied Physiology, Nutrition, and Metabolism

Guest co-Editor, Foods special issue “Sensory Evaluation of Functional Foods”

Committee Member, CIHR Doctoral Research Awards

Outreach Activity

Interview on CTV Morning Live describing the Research without Borders -International collaboration between the St. Boniface Hospital and Ben-Gurion University.
Hosted 1 hour show on CJNU Radio. Human Nutrition & Immunology program at St. Boniface Hospital, Community Champion. The format of the hour is select 10 songs from the CJNU Legacy Library that exemplify my perspective through popular music and highlight my research.

Interview on Virgin 103.1 describing the Human Nutrition & Immunology program at St. Boniface Hospital.

Presented a lecture about my research program to Grade 9 students in the Youth BioLab from across the Winnipeg School Division highlighting how basic and clinical research connect.

**Representation on behalf of CCARM**

Representative at booth at the Reh-Fit Centre highlighting ongoing research at CCARM.

![Receiving award for “Best Halloween Door”](image)

![Dr. Heather Blewett, Jay Petkau, Jo-Ann Stebbing & Nancy Olson](image)
Dr. Luc Clair  
Ag/Health Economist

Dr. Clair’s lab was formed August 1, 2017. He was the only member of the lab between August 1-December 31, 2017. During this time, he was invited to give presentations at Memorial University of Newfoundland, the Bank of Canada, and the College of Pharmacy at the University of Manitoba. He submitted a number of applications for funding, including one to the Manitoba Medical Research Foundation entitled “Estimating the Relationship Between Cardiovascular Health and Dementia”, a collaborative effort between Dr. Clair and Drs. Hope and Chris Anderson.

Dr. Clair’s research interests include health care equity, health technology assessment (HTA), and econometrics (economic statistics). HTA is the process of determining the effectiveness of a given health care intervention (e.g. surgery, drug, diet, supplement, or test) compared to the status quo. The methods used in HTA include cost-benefit analysis, cost-effectiveness analysis, and cost-utility analysis. Each method looks the costs and outcomes of a given intervention and compares them to the costs and outcomes of a standard treatment. Costs are typically measured in dollars and the outcomes measured depend on the method used (e.g. dollars, number of cases of cancer detected, or quality of life improvements). Part of Dr. Clair’s role at CCARM is to apply HTA methods to determine the economic impact of the proposed interventions developed by CCARM basic and clinical scientists. Dr. Clair also has strong statistical skills, publishing his theoretical work in peer-reviewed econometric journals.

Research Funding

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<tr>
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<tr>
<td>Government of Manitoba</td>
<td>L. Clair</td>
<td>Start Up Funding</td>
<td>$67,909</td>
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TOTAL FUNDING: $67,909
Publications & Presentations

Invited Presentations
Health Economics: Theory, Methods, and Applications. CCARM Food for Thought Seminar, December 12, 2017.

Private Supplemental Insurance and Mental Health Care Utilization in Canada - An Investigation Using Nonparametric Estimation Methods. College of Pharmacy, University of Manitoba


Private Supplemental Insurance and Mental Health Care Utilization in Canada - An Investigation using Nonparametric Estimation Methods. Department of Economics Seminar, Memorial University of Newfoundland

Academic Teaching

Intro: Macroeconomics, ECON 1103-001, Economics

Service

Academic committees and related administrative duties
Departmental Committees:
Curriculum Committee, Department of Economics, University of Winnipeg.
Hiring sub-committee, Department of Economics, University of Winnipeg

Professional Service
Journal referee for Advances in Econometrics, Volume 39

Representation on behalf of CCARM
Attended luncheon with Roquette representatives on August 23, 2017
Dr. Randolph Guzman
Vascular Surgery Research

Professor of Surgery and Head, Section of Vascular Surgery
University of Manitoba, Max Rady College of Medicine
Regional Lead, Section of Vascular Surgery, WRHA
Site Medical Manager, Department of Surgery
St. Boniface Hospital

Dr. Randolph Guzman MD, FRCSC, FACS, RVT, RPVI is the Director of the Vascular Clinical Research Program at the Asper Clinical Research Institute, St. Boniface Hospital which consists of a full time Clinical Research Nurse/Coordinator and two part-time Research Assistants. His experience has included various clinical research trials with the vascular/vascular surgery population including outpatient and inpatient pharmaceutical trials, surgical and endovascular interventions and diagnostic imaging on a local, national, and international level. Dr. Guzman has been a principal investigator for 46 research studies and a co-investigator for 25 research studies. Currently, there are nine clinical trials and two research projects ongoing.

For more information, see his webpage:  http://www.sbrc.ca/ccarm/faculty/dr-randy-guzman/

Publications & Presentations

Peer-Reviewed Articles


Training/Mentoring

Technical Staff

Wendy Weighell, Nurse
The Pathology Research Laboratory continues to carry out a series of animal studies to establish metabolic benefits of several functional foods and nutraceuticals. In 2017, we started an investigation of cardiovascular benefits of okra through collaboration with the University of Ibadan, Nigeria. We obtained a University of Manitoba Research Grant to continue our investigation on okra. We also started a new collaboration with Dr. Rosemary Lekalake, Botswana Agriculture and Natural Resources University, Botswana, to investigate 4 Botswana food staples including Mungongo (*Schinziophyton rautanenii*), Kgengwe (*Citrullus Lunatas*), Mogose (*Bauhinia petersiana Bolle subsp. Macrantha (Oliv.)*), and Morama (*Tylosema esculentum (Burch.) A.Schreib*) in our animal models of cardiovascular disease.

In 2017, we were able to establish anti-atherogenic effects of germinated brown rice in LDL-r-KO mice. Ms. Nora Ghazzawi was trained on this project. She successfully completed her MSc degree and graduated in May 2017. In collaboration with Dr. Garry Shen, we also completed a study on anti-inflammatory effects of wild rice; this work was published in the *J Agric Food Chem* 2017 65:9054-9060.

Our okra project came to an end in 2017 and a final report was submitted to the University of Manitoba. Rokiatou Kone-Berethe was trained on this project and she is writing up her thesis. Furthermore, 2 undergraduate summer students were recruited in summer of 2017 through the NSERC summer undergraduate scholarship program. These students learned various aspects of animal experimentation and common laboratory techniques. Another research project with reasonably good success was an investigation of inflammatory components of native aortic valve stenosis in humans with collaboration with Dr. Rizvan Manji. Finally, we collected data on eating behavior of university students. Ms. Hibah Khawar is analyzing these data and is writing up her MSc thesis.

In 2017, we received $23,730 from the University of Manitoba to purchase -80 freezers. We applied for funding to Cancer Research Society and Hemp Cluster, however, our applications were unsuccessful. As a co-PI with Dr. Garry Shen and others we applied to CIHR for funding, but were unsuccessful. In an effort to get ready for submission of funding applications to CAP, we participated in a workshop in December 2017.

In 2017, Kabo Masisi received an offer and started his career at the Botswana Institute for Technology Research and Innovation, Botswana.
### Research Funding

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<tr>
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<td>Bioactive components of wild rice</td>
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<tr>
<td>University of Manitoba</td>
<td>M. Moghadasian</td>
<td>-80 Freezers</td>
<td>$23,730</td>
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<td><strong>SALARY:</strong></td>
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<tr>
<td>Natural Sciences and Engineering Research Council</td>
<td>M. Mamchur &amp; B. Semenko</td>
<td>Undergraduate summer research awards</td>
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<td>St. Boniface Hospital Foundation</td>
<td>R. Kone Berethe</td>
<td>BMO Financial Group MSc research scholarship for excellence</td>
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<td>$68,730</td>
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## Collaborative Activity

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<th>Activity/project title/system</th>
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<tr>
<td>Garry Shen</td>
<td>University of Manitoba</td>
<td>Investigation of cardiovascular benefits of germinated Chinese brown rice and wild rice</td>
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<tr>
<td>Trust Beta</td>
<td>University of Manitoba</td>
<td>Investigation of cardiovascular benefits of germinated Chinese brown rice and wild rice</td>
</tr>
<tr>
<td>Rita Rezzani</td>
<td>University of Brescia, Italy</td>
<td>Functional foods and aging processes</td>
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<tr>
<td>Todd Rideout</td>
<td>Buffalo State University</td>
<td>Efficacy and safety of plant sterols during pregnancy</td>
</tr>
<tr>
<td>Charles Olaiya</td>
<td>University of Ibadan, Nigeria</td>
<td>Cardiovascular benefits of okra</td>
</tr>
<tr>
<td>Rosemary Lekalake</td>
<td>Botswana University of Agriculture and Natural Resources</td>
<td>Cardiovascular benefits of 4 Botswana staple foods</td>
</tr>
</tbody>
</table>

Khuong Le
Publications & Presentations

Peer-Reviewed Articles


Academic Teaching

Nutrition for Health and Changing Lifestyles, HNSC 1210, Food and Human Nutritional Sciences
Nutrition through the Life Cycle, HNSC 2130, Food and Human Nutritional Sciences
Maternal and Child Nutrition, HNSC 4340, Food and Human Nutritional Sciences

Training/Mentoring

Graduate Students - MSc
Nora Ghazzawi
Rokiatou Kone Berethe
Hibah Khawar

Undergraduate Students
Meagan Mamchur
Breanne Semenko

Technical Staff
Khuong Le, Technician
Students Who Defended Thesis

MSc
Nora Ghazzawi, Thesis Title: Cardiovascular benefits of germinated brown rice in LDL-r-KO mice

Service

Graduate Student Committees

MSc
Elizabeth Babawale, Food and Human Nutritional Science
Anthonia Olatinsu, Food and Human Nutritional Science

Academic Committees and Related Administrative Duties

Chair (6 months) and Member, Graduate Studies Committee, FHNS

Chair, PhD Defense Committee of Ikechukwu Asgomoh, Plant Science, University of Manitoba

Reviewer, James Gordon Fletcher Ph.D. Fellowship for Research in Functional Foods and Nutraceuticals, Faculty of Graduate Studies, University of Manitoba

Judge, 7th Graduate Student Symposium on Functional Foods and Natural Health Products, Department of Foods and Human Nutritional Sciences, University of Manitoba

Professional Service

Reviewer, Promotion of Dr. Charles Olaiya, University of Ibadan, Nigeria

Editorial Board member for the following journals:
- Molecular and Cellular Biochemistry
- Transplant Research and Risk Management
- World Journal of Clinical Cases

Reviewer, for various journals

Outreach Activity

Participate in Ag in the City, Forks, Winnipeg, MB, March 2017

With Dr. Beta appeared on UM Website to promote the new Department of FHNS
Representation on behalf of CCARM

Short presentation at Dec. 2017 CCARM PI Meeting
In 2017, the laboratory worked on 5 projects:
(1) Dr. Grant Pierce’s group and my group collaborated on examining the in vivo cardioprotective effects of flax and its components in an animal model of ischemic heart disease – the rat model of myocardial infarction.
(2) Dr. Jeffrey Wigle’s group and my group collaborated on examining the comparative in vivo cardioprotective effects of resveratrol in male vs. female rats subjected to myocardial infarction.
(3) Dr. Jeffrey Wigle’s group and my group collaborated on examining the comparative in vitro cardioprotective effects of resveratrol on male vs. female adult rat cardiomyocytes exposed to norephrinephrine.
(4) We examined the molecular mechanisms of the in vivo effects of ginseng polyphenols in rats subjected to myocardial infarction utilizing the heart tissues from the completed animal study.
(5) We examined the in vivo cardioprotective effects of oat bioactives avenanthramide and beta-glucan in an animal model of hypertensive heart disease – the spontaneously hypertensive rat.

The Rapid-Fire Research Symposium was organized on October 17, 2017 by Dr. Thomas Netticadan along with trainees Pema Raj and Samantha Pauls who were co-organizers. This event showcased the research of trainees who had 7 minutes to present their research project, interpret the findings and its implications for human health. The event also hosted a talk on opportunities for trainees in industry by a Life Sciences Association of Manitoba representative. This was followed by a reception to foster trainee networking, and concluded with trainee awards ceremony.

Rebecca Cummers, a BSc Honours student at the University of Winnipeg joined our laboratory, she is supervised by Dr. Jeffrey Wigle (primary supervisor) and Dr. Thomas Netticadan (Co-supervisor).
## Research Funding

<table>
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<tr>
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<tr>
<td><strong>OPERATING:</strong></td>
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<tr>
<td>Agriculture and Agri-Food Canada</td>
<td>D. Brown, C. Siow, T. Netticadan &amp; H. Blewett</td>
<td>Characterization of heritage ginseng</td>
<td>$12,500</td>
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<tr>
<td>Agriculture and Agri-Food Canada</td>
<td>T. Netticadan, N. Ames, S. Thandapilly, J. Mitchell Fetch</td>
<td>Oats and heart health</td>
<td>$72,878</td>
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<td>Agriculture and Agri-Food Canada</td>
<td>T. Netticadan, G. Pierce</td>
<td>Flaxseed and heart health</td>
<td>$100,000 (included in funding total for G. Pierce)</td>
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<td>Agriculture and Agri-Food Canada Salary Support</td>
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<td>Research Manitoba Fellowship</td>
<td>Pema Raj</td>
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<td>$17,800</td>
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<td>Libyan Program for International Education Scholarship</td>
<td>Basma Aloud</td>
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<td>$18,000</td>
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<td>University of Manitoba GETS Award</td>
<td>Mihir Parikh</td>
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<td>$10,384 (included in funding total for G. Pierce)</td>
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<td>$201,261</td>
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Publications & Presentations

Peer-Reviewed Articles


Invited Presentations

Resveratrol and heart health. 3rd Annual Conference on Food and Health, Fargo

Potential of the polyphenol, cyanidin 3-O-glucoside, in preventing cardiovascular defects in an animal model of hypertensive heart disease. 21st International Congress of Nutrition, Buenos Aires

Training/Mentoring

Graduate Students - PhD
Basma Aloud (co-supervised with H. Blewett) Pema Raj
Mihir Parikh (co-supervised with G. Pierce)

Undergraduate Students
Rebecca Cummers

Technical Staff
Liping Yu, Technician

Service

Graduate Student Committees

PhD
Bolanle Akwumn, Pharmacy
Shivika Gupta, Physiology and Pathophysiology
Danielle Lee, Pharmacy  
Ruchira Nandasari, Food and Human Nutritional Sciences  
Raghu Nagalingam, Physiology and Pathophysiology

**Academic Committees and Related Administrative Duties**

Chair, Local Animal User Committee, St. Boniface Hospital Research Centre

**Professional Service**

Editorial board member of the Journal of Molecular and Cellular Biochemistry

**Outreach Activity**

Organizer, Rapid-Fire Research Symposium

**Representation on behalf of CCARM**

Coordinator, CCARM Visiting Scientist Seminar Series  
Appeared on CJOB  
Given/participated in tours for AAFC dignitaries
Our current research mainly focuses on the molecular mechanisms of metabolic disorders, ischemia-reperfusion induced acute kidney injury (AKI) and health related benefits of agriculture products in humans and animals. Specifically, we investigate molecular mechanisms and cellular targets in multi-experimental models including (1) antioxidant properties using the in vitro and in vivo assays, (2) inflammatory responses by measuring biomarkers to detect inflammation in humans and livestock at the molecular, protein and gene levels, (3) regulation of lipid metabolism, and (4) functional evaluation including blood parameters, lipoprotein profile, enzyme activities, cardiovascular, liver and kidney functions. Understanding the molecular mechanisms that are responsible for abnormalities in blood vessels and multiple organs is important in developing effective strategies for treatment and prevention of cardiovascular disease and renal dysfunction associated with a single or multiple risk factors i.e. hyperhomocysteinemia, obesity, dyslipidemia, fatty liver disease, kidney ischemia-reperfusion injury.

### Funding

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<tr>
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<td><strong>OPERATING:</strong></td>
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<tr>
<td>Natural Sciences and Engineering Research Council</td>
<td>K. O</td>
<td>Biological impact of dietary components on nutrient absorption and metabolism</td>
<td>$28,000</td>
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<td>St. Boniface Hospital</td>
<td>K. O</td>
<td>Impact of acute kidney injury on CVD in females</td>
<td>$30,522</td>
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<td>Smerchanski PhD Studentship</td>
<td>Victoria Sid</td>
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<td>$13,500</td>
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**TOTAL FUNDING:** $72,022
Publications & Presentations

Peer-Reviewed Articles


Abstracts


Invited presentations

Role of agri-food products in balancing health and disease. University of South Queensland, Australia

Fatty Liver: It is not just about fat - Nutritional impact on non-alcoholic fatty liver disease (NAFLD). International Tropical Agriculture Conference, Australia

Academic Teaching

Advanced Animal Science Seminar, ANSC 7390, Animal Science/Agriculture and Food Sciences
Advanced Applied Animal Nutrition, ANSC 7540/ANSC 4540, P Animal Science/Agriculture and Food Sciences

Training/Mentoring

Graduate Students - PhD
Yvette Shang
Victoria Sid

Graduate Student - MSc
Sirini Amarakoon

Students Who Defended Thesis

MSc
Sirini Amarakoon, Thesis title: Regulation of oxidative stress in weaned piglets

Service

Graduate Student Committees

PhD
Gerardo Medina, Food and Human Nutritional Sciences
Olayinka Ayo Olarewaja, Food and Human Nutritional Sciences

MSc
Zhigang Tan, Animal Science

Academic Committees and Related Administrative Duties

Department of Animal Science Graduate Studies Committee
We have had another exciting year of research in 2017. From a numbers standpoint (6 peer reviewed publications), it may not have been our most productive year but from an impact viewpoint, 2017 may have produced some of the most exciting science we have ever generated. Working on patient recruitment for our clinical trial investigating the effects of dietary flaxseed on hypertension, we measured blood pressure levels in over 1000 men and women in the general public. We found alarming levels of high blood pressure and even emergency levels of hypertension in the general public. This work was highlighted in the American Journal of Hypertension. This work also created a spin-off collaboration with Drs. Aukema and Ravandi to identify the role that specific fats called oxylipins play in cardiovascular and cerebrovascular events. Finally, we produced a review of the comparative efficacy of lifestyle, diet, nutritional supplements and drugs in controlling hypertension. Life style and dietary modification can combat hypertension as well as drugs in some cases. Most importantly, we published our work identifying new antibiotics that disrupt infections from Chlamydia trachomatis. This work was as a result of the decade-long collaboration with Dr Pavel Dibrov. This work sets the stage for further investigations into other pathogenic bacteria. We are hopeful that the drugs we have created to specifically inhibit a novel bacterial target protein may be translated into clinical applications in the future. A review on the target protein and our new drugs was also published in 2017 that may represent the most comprehensive treatment of the topic ever.

We are indebted to the grant agencies that made this work possible. This includes CIHR, Western Grain Research Foundation, Saskflax, ARDI and the St Boniface Hospital Foundation. I would also like to personally thank all of our collaborators who provide so much help to our research efforts.
## Research Funding

<table>
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<tr>
<td>Canadian Institutes of Health Research</td>
<td>G. Pierce</td>
<td>Dietary flaxseed as a nutritional intervention for CVD</td>
<td>$382,064</td>
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<td>Western Grains Research Foundation &amp; Agri-Food Research and Development Initiative (ARDI)</td>
<td>G. Pierce</td>
<td>Flaxseed as a nutritional intervention</td>
<td>$58,436</td>
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<td>Flaxseed and heart health</td>
<td>$100,000</td>
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<td>University of Manitoba GETS Award</td>
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## Collaborative Activity

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Publications & Presentations

Peer-Reviewed Articles


Invited Presentations

CropSphere. Saskatoon

Luncheon Speaker. Parliamentary Health Research Caucus, Ottawa

Canada-India Healthcare Summit. New Delhi, India

SupplySide West. Las Vegas, USA

4th European Section Meeting of the International Academy of Cardiovascular Sciences. Pecs, Hungary

Keynote Lecture: Functional Foods Festival. University of Southern Queensland, Toowoomba, Australia
GRANT N. PIERCE – Cell Biology Laboratory

World Non-Communicable Diseases Congress. Chandigarh, India

Hypertension Canada Primary Care CME Day. Winnipeg

Intellectual Property


Training/Mentoring

Post-doctoral Fellow
Craig Resch

Graduate Students - PhD
Mihir Parikh (co-supervised with T. Netticadan) Aleksandra Stamenkovic

MSc
Thomas Hedley

Undergraduate Students
David Nelson Ryan Ramjiawan
Jordan Nelson Allison Ledingham

Technical Staff
Alex Austria, Technician
Elena Dibrov, Research Associate
Jo-Anne Gilchrist, Research Assistant
Thane Maddaford, Technician
Kimberley O’Hara, Research Associate

Students Who Defended Thesis

MSc
Thomas Hedley Thesis Title: The Role of Heat Shock Protein-60 in Vascular Smooth Muscle Cell Proliferation and Atherosclerotic Development

Honours, Awards & Scholarships

Grant Pierce
Identified by the Canadian Journal of Physiology and Pharmacology as one of their Outstanding Reviewers in 2017 (one of 5).
Stephanie Caligiuri  
University of Manitoba Distinguished Dissertation Award

Service

Graduate Student Committees

PhD
Crystal Acosta, Pharmacy  
Pema Raj, Physiology and Pathophysiology  
Victoria Sid, Physiology and Pathophysiology  
Zahra Solati, Physiology and Pathophysiology

Academic Committees and Related Administrative Duties

Chair, Emerging Research Leadership Initiative Committee, Heart and Stroke Foundation of Canada  
Chairman, CIHR Project Grant Competition  
Member, Manitoba Medical Service Foundation / University of Manitoba Adjudication Committee for the MMSF Allen Rouse Basic Science Career Development Research Award.  
Member, Smerchantski/BMO Studentship Review Committee, St. Boniface Hospital  
Chair, Research Review Committee  
Research Without Borders Research Program, St. Boniface Hospital and Ben Gurion University  
Member, CIHR Cardiovascular C Operating Grant Review Panel.  
Chair, Research Program Site Visit Review Panel of Thunder Bay Regional Health Research Institute  
Member, College of Reviewers, Canada Research Chairs, Ottawa  
Member, Alberta Innovates Health Solutions Graduate Studentship Review Committee  
Member, Scientific Advisory Council of the Rajiv Gandhi Centre for Biotechnology, Thiruvananthapuram, India  
Member, Executive Committee of the Scientific Review Committee of the Heart and Stroke Foundation of Canada  
Chairman, Heart and Stroke Foundation of Canada Scientific Review Committee VI Thrombosis/Lipids and Lipoproteins/Fundamental Nutrition Research  
Member, Clinical Research Review Committee, St. Boniface Hospital  
Member (ex officio), Board of Directors, St. Boniface General Hospital  
Chair, Program Committee for the Canadian Centre for Agri-food Research in Health and Medicine, St. Boniface Hospital Research Centre, Winnipeg  
Member (ex officio), Board of Directors, St. Boniface General Hospital and Research Foundation  
Member, Committee for the Institute of Cardiovascular Sciences Awards  
Member, Ron Duhamel Innovation Fund Award Committee, St. Boniface Hospital  
Chair, Hoops from the Heart Steering Committee, Winnipeg
Member, Communications & External Relations Committee, Genome Prairie Board of Directors
Member, Canadian Agrifood Policy Institute Advisory Panel, Ottawa
Member, Integrated Risk Management Steering Team, St. Boniface Hospital
Member, International Academy of Cardiovascular Sciences Awards Committee
Member, Search Committee for Winnipeg Regional Health Authority Medical Director for the Cardiac Sciences Program
Member, St. Boniface Hospital Foundation Myles Robinson Memorial Heart Fund Committee
Member, Executive Committee, Manitoba Medical Service Foundation
Vice Chairman, Awards Assessment Committee, Manitoba Medical Service Foundation
Interviewer, College of Medicine Admissions, University of Manitoba Faculty of Health Sciences
Member, ex-officio, Audit Committee of Manitoba Medical Service Foundation
Member, ex-officio, Nominating Committee, Manitoba Medical Service Foundation
Member, ex-officio, Public Relations Committee, Manitoba Medical Service Foundation
Alternate member, Special (Non-Standing) Committee, Joint MMSF / University of Manitoba Committee
Advisor, Canada Caribbean Heart Health Education Committee
Secretary, Treasurer and Director, Academy of Cardiovascular Sciences Foundation, USA
Member, Academic Health Sciences Network Research Council
Member, Heart and Stroke Advancing Women’s Heart Health Research Steering Committee, Heart and Stroke Foundation of Canada
Chair, Search Committee for Director, Institute of Cardiovascular Sciences, Albrechtsen Research Centre, St. Boniface Hospital
Member, Search Committee for Health / Ag Economist faculty member with CCARM and the University of Winnipeg
Member, Leadership Award Selection Committee, Research Canada
Acting Chair, Scientific Review Committee, Heart and Stroke Foundation of Canada
External Evaluator for faculty promotion, Umm Al-Qura University, Makkah, Saudi Arabia
Member, Research Canada 2017 Leadership in Advocacy Award Selection Committee
External Reviewer for faculty promotion, Division of Biomedical Sciences, Faculty of Medicine, Memorial University of Newfoundland
Member, Manitoba Centre for Nursing and Health Research Advisory Board
Member, Research Enterprise Committee, St. Boniface Hospital

Professional Service

Assistant Executive Director, Manitoba Medical Service Foundation
President, North American Section of the International Academy of Cardiovascular Sciences
Member, Board of Directors, Friends of CIHR
Member, Genome Prairie Board of Directors
Secretary, Board of Directors, Diabetes Research and Treatment Centre
Chief Scientific Officer, KRIM Biopharma Inc.  
Member, American College of Cardiology, American Physiological Society, Canadian Academy of Health Sciences, Canadian Society of Atherosclerosis, Thrombosis and Vascular Biology, International Academy of Cardiovascular Sciences, Royal Society of Medicine, London, England

Joanne Gilchrist, Thane Maddaford, Elena Dibrov, Aleksandra Stamenkovic & Alex Austria
The research focus of our laboratory remains to be Evidence-Based Agri-Food with the aims to study how agri-food and herbal medicinal products exert their effects and to develop innovative strategies for disease prevention and management.

We continued our research into the health benefits of Manitoba lingonberry. Experiments where animals were fed a high-fat diet supplemented with whole lingonberry powder were initiated. The levels of pro-inflammatory biomarkers will be measured in the blood and tissues collected from the experimental groups and will be compared with those from control groups fed with the same diet but not supplemented with lingonberry.

In November at the *International Tropical Agricultural Conference* held in Brisbane, Australia, I chaired a Symposium on “Food: The Key to Health and Wellbeing” (Symposium 3.4), which featured 6 speakers from Spain, Australia, Hong Kong and Canada (pictured). This symposium was very well attended with standing room only and the accolades received from many attendees afterwards indicated that it was a tremendous success. Talks were focused on the contribution of food to health and wellbeing of the population and effects of different food on several disease models were presented. My talk focused on the potential benefits of berry consumption on kidney health and the translated cost savings in healthcare. The last speaker of the symposium described her experience with bringing a commodity used traditionally by the Indigenous community to the Australian market and transferring the benefits back to the community. Although the symposium went overtime, most attendees stayed until my summary which called for a joint effort by food processing industry and medical science to come up with healthier and tastier food as a healthy population translates to a healthy workforce (taxpayers) and also savings in healthcare. Gender parity and cultural diversity for speakers was also achieved for this symposium.

Prior to the conference in Brisbane, I was also invited by Professor Lindsay Brown to give an informal talk to his research group within the School of Health and Wellbeing at the University of Southern Queensland in Toowoomba, Queensland. As most of his research group have not been to Winnipeg previously, I have also taken this opportunity to introduce the research at CCARM and to interact with them.

At the 30th Annual Canadian Student Health Research Forum, my PhD student, Cara Isaak, won one of the Major Research Awards (for Cardiovascular Biology) at a province-wide competition of young scientists. She was again awarded the Mindel and Tom Melnick Research Studentship in Medicine for 2017. And at the end of August 2017, Cara successfully defended her Ph.D. dissertation.
# Research Funding

<table>
<thead>
<tr>
<th>Name of Granting Agency</th>
<th>Names of Investigators</th>
<th>Project Title</th>
<th>Funding Amount for Current Year</th>
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<td><strong>OPERATING:</strong></td>
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<td>Agriculture and Agri-Food Canada</td>
<td>C. Siow &amp; S. Debnath</td>
<td>Canadian lingonberry: health attributes</td>
<td>$67,500</td>
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<td>Agriculture and Agri-Food Canada</td>
<td>Characterization of heritage ginseng</td>
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<td>Agriculture and Agri-Food Canada</td>
<td>Sustainable small fruit production</td>
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<td>C. Siow</td>
<td>Canadian lingonberry: health attributes</td>
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<tr>
<td>University of Manitoba, College</td>
<td>Cara Isaak</td>
<td>Mindel and Tom Olenick Research Studentship</td>
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<td>of Medicine</td>
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Collaborative Activity

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<tr>
<td>Samir Debnath</td>
<td>St John's Research and Development Centre, St John’s, NL</td>
<td>Bioactivity/lingonberry cultivars from Atlantic Canada, Europe and USA</td>
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<td>Karmin O</td>
<td>University of Manitoba</td>
<td>Dogwood, lingonberry and NAFLD</td>
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<td>Thomas Netticadan</td>
<td>University of Manitoba</td>
<td>Evaluation of the health benefits of ginseng berry</td>
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<tr>
<td>Heather Blewett</td>
<td>University of Manitoba</td>
<td>Evaluation of the health benefits of ginseng berry</td>
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Publications & Presentations

**Peer-Reviewed Articles**


**Abstracts**


Invited Presentations

O K, Sid V, Shang Y & Siow YL Fatty liver: It is not just about fat - Nutritional impact on non-alcoholic fatty liver disease (NAFLD). 2017 International Tropical Agriculture Conference, Brisbane, Abstract 176 (invited talk).

Siow YL Research updates on Lingonberry. University of Southern Queensland, Toowoomba, Queensland.

Academic Teaching
Physiology & Pathophysiology for Physician Assistants I, PAEP 7000, Physiology & Pathophysiology
Neurosciences: Neurotransmission & Neurotransmitters, PGY-4, Psychiatry/Health Sciences

Training/Mentoring
Graduate Student - PhD
Cara Isaak Susara Madduma Hewage

Technicians
Suvira Prashar, Technician
Jo-Ann Stebbing, Technician

Students Who Defended Thesis
PhD
Cara Isaak Thesis Title: Manitoba lingonberry (Vaccinium vitis-idaea) protects against ischemia-reperfusion injury

Honours, Awards, Scholarships
Cara Isaak, Major Research Award (Manitoba) in Cardiovascular Biology, Canadian Student Health Research Forum
Cara Isaak, Mindel and Tom Olenick Research Studentship in Medicine, Undergraduate Medical Education Award of the Rady Faculty of Health Sciences, University of Manitoba
Service

Graduate Student Committees
PhD
Victoria Sid, Physiology and Pathophysiology

Academic Committees and Related Administrative Duties

Co-Chair, St. Boniface Hospital Research Centre Safety Committee and Biosafety Sub-Committee

Professional Service

Associate Editor, Canadian Journal of Physiology and Pharmacology
Editorial Board, Journal of Acupuncture and Tuina Science
Founding Board Member and Regional Director, Canadian Institute of Chinese Medicinal Research
Reviewer, Journal of Complimentary and Integrative Medicine

Outreach Activity

Ag in the City

Representation on behalf of CCARM

Participated on the separate tours of CCARM by AAFC’s Dr Frédéric Seppey (Chief trade negotiator, Market Industries Services Branch), Dr Ian Campbell (Corporate Management Branch) and Indigenous Elder, Mervin Traverse.

Susara Madduma Hewage trying out ice fishing during a walk along the River Walk at the Forks
Specific nutrients are required for the proper development and function of a healthy nervous system. Using this basic principle, our lab studies the effects of nutrition on fetal-alcohol spectrum disorder, macular degeneration, diabetic retinopathy, and other retinal deteriorations.

A couple of recent findings from our laboratory have been (i) DHA plays a role in genes involved in antioxidant mechanisms in fetal liver during exposure, and (ii) DHA/Lutein enriched eggs can be an affordable food strategy for preventing retina deterioration in older adults.

Two MSc students (Elaheh Nosrat Mirshekarlou and Chelsey Walchuk) successfully defended their thesis studies and graduated. Chelsey Walchuk (MSc student) received the Teaching Award of Merit (Graduate Student) from the North American Colleges and Teachers of Agriculture (NACTA). Jutika Dattar (former MSc student) published the main work from her thesis, as well as was a co-author on a second peer-reviewed paper. Olena Kloss (PhD student) received an Emerging Leaders Award from the University of Manitoba as well as a University of Manitoba Graduate Fellowship, a Research Fellowship from the Manitoba Training Program for Health Services and the Northern Scientific Training Program Award from the Department of Aboriginal Affairs and Northern Development Canada. Two MSc students, Elaheh Nosrat Mirshekarlou and Yidi Wang received Manitoba Graduate Scholarship funding and Fatemeh Ramezani (PhD) received a University of Manitoba Graduate Fellowship.

Miyoung Suh received the “Scientist of the Year” award from the Korean Foundation of Science and Technology Societies. One undergraduate project ‘Influences on Body Image Satisfaction Among University Students’ completed as a part of her teaching (HSNC 4600) received 2nd place in 5th Health, Leisure & Human Performance Research Institute (HLHPRI) Research Day, University of Manitoba.
<table>
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<tr>
<th>Name of Granting Agency</th>
<th>Names of Investigators</th>
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<tr>
<td>Mitacs Converge</td>
<td>M. Suh, D. Levin, J. Sorensen, B. Hardy</td>
<td>Improving community health in Indigenous Canadian communities through data-driven, sustainable food production systems</td>
<td>$71,666</td>
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<td>Research MB/Canada Israel International Fetal Alcohol Consortium</td>
<td>M. Suh, J. Davie, G. Hicks &amp; M. Eskin</td>
<td>Reduce fetal alcohol spectrum disorder through improved nutrition: Can omega-3 docosahexaenoic acid be a nutrition strategy?</td>
<td>$36,000</td>
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<tr>
<td>Research MB/Canada Israel International Fetal Alcohol Consortium</td>
<td>M. Suh, B. Hardy, G. Hicks, M. Eskin &amp; A. Fainsod</td>
<td>Effect of astaxanthin supplementation on fetal oxidative stress and intrauterine growth restriction induced by prenatal alcohol exposure</td>
<td>$27,000</td>
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<td>Manitoba Liquor &amp; Lotteries Corporation (MLCC)</td>
<td>M. Suh, M. Eskin, A. Chudley &amp; M. Aliani (Epigenetics, FASD Consortium team, G. Hicks, J. Davie &amp; B. Elias)</td>
<td>Global leadership in reducing the impacts of FASD: The role of nutrition in the prevention of FASD</td>
<td>$75,000</td>
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<td>FAFS Endowment</td>
<td>M. Suh &amp; S. Myrie</td>
<td>Skin Caliper and Standing Anthropometric units</td>
<td>$3,806</td>
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<td>Queen Elizabeth II Diamond Jubilee Scholarship</td>
<td>Rianna Tonn</td>
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<td>The Murphy Foundation Inc. Indigenous Mentorship and Experiential Education Fund</td>
<td>Brad Feltham</td>
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Manitoba Training Program for Health Services Research Fellowship

Olena Kloss

$22,500

University of Manitoba Graduate Fellowship

Olena Kloss; Fatemeh Ramezani

$36,000

Manitoba Graduate Scholarship

Elaheh NosratMirshekarlou; Yidi Wang

$10,000

MITACS

Elaheh NosratMirshekarlou

$10,000

Canadian Institutes of Health Research

Veronika Shulgina

$11,667

TOTAL FUNDING: $315,639

Collaborative Activity

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<td>J. Turner &amp; Y. Sauve</td>
<td>University of Alberta</td>
<td>DHA for parenteral nutrition on retina function (national)</td>
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<td>W. Kim</td>
<td>University of Georgia</td>
<td>Adipogenic differentiation potential of fatty acid types (international)</td>
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<td>B. Albensi</td>
<td>University of Manitoba</td>
<td>Dietary creatinine and memory function in 3xTg mice (internal)</td>
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<tr>
<td>C. Taylor &amp; P. Zahradka</td>
<td>University of Manitoba</td>
<td>Abnormal lipid metabolism in the underdeveloped testis</td>
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<tr>
<td>A. Fainsod</td>
<td>University of Hebrew</td>
<td>FASD</td>
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Publications

Peer-Reviewed Articles


Abstracts


knowledge, attitudes and perception of carbohydrates. Dietitians of Canada National Conference, St. Johns.

Invited Presentations

Health Improvement of Canada’s Indigenous People with Smart Farm System. 1st Korea-Canada Joint Committee Meeting on Science, Technology and Innovation Cooperation, Seoul, S. Korea

Nutrition strategies for fetal alcohol spectrum disorders: learning from an animal model. Daegu Catholic University, Daegu, S. Korea

Smart Vertical Farm and its Benefits on Health, Brain to Brain meeting: Canadian Artificial Intelligence Mission to South Korea. Co-hosted by the Embassy of Canada and the Korea Venture Business Association (KOVA) Seoul, S. Korea

Indoor smart vertical farm - a solution for food and nutrition security? “Smart Farms - The Link between Biotechnology and Enhanced Nutrition (Plenary Session)”. Agricultural Bioscience International Conference (ABIC), Winnipeg

Fetal Alcohol Spectrum Disorder-Prenatal Nutrition Strategy for Brain Development. 6th Canada-Korea Conference, The Association of Korean-Canadian Scientists and Engineers (AKCSE) & The Korean Federation of Science and Technology Societies (KOFST), Montreal

Intake of nutrients important to fetal brain development in pregnant women; Implications for FASD. FASD Initiatives, Healthy Child Manitoba Office, Winnipeg, MB

Nutrition strategies to protect age-related vision deterioration. The Canadian Centre for Agri-Food Research in Health and Medicine (CCARM), St. Boniface Albrechtsen Research Centre, Winnipeg

Fatty acid metabolism in underdeveloped testis in an obese rat model, The Division of Endocrine and Metabolic Disease (E&MD). Department of Physiology and Pathophysiology, University of Manitoba, Winnipeg

How technology is helping to further understanding nutrition and health implications of vision loss in diabetes? Canada National First Nations eHealth Conference and 2nd Annual MB First Nation ICT Summit, Winnipeg
Academic Teaching

Nutrition Management of Disease States, HNSC4320, Food & Human Nutr Sci/FAFS
Practice-based Research in Human Nutritional Sciences, HNSC4600, Food & Human Nutr Sci/FAFS
Nutrition, PHARM327, Faculty of Pharmacy and Pharmaceutical Sciences

Training/Mentoring

Post-doctoral Fellow
Xavier Louis

Graduate Students - PhD
Shatha Alattar
Olena Kloss
Fatemeh Ramezani

Graduate Students - MSc
Elaheh Nosrat Mirshekarlou
Veronika Shulgina
Chelsey Walchuk
Yidi Wang

Undergraduate Students
Bradley Feltham
Rianna Tonn

Technical Staff
Chelsey Walchuk (Research Associate)

Students Who Defended Thesis

MSc
Elaheh Nosrat Mirshekarlou Thesis Title: Effect of docosahexaenoic acid supplementation on global gene expression in fetal brain in rats exposed to ethanol prenatally

Chelsey Walchuk Thesis Title: Effects of lutein and docosahexaenoic acid enriched egg consumption on visual function in older adults: implication for age-related macular degeneration

Honours, Awards, Scholarships

Miyong Suh
Scientist of the Year Award, The Korean Federation of Science and Technology Societies (Awarded at 7th Annual CKC meeting, Aug 6-9, 2017, Montreal, Quebec)

Nominee for Outstanding Mentorship of Graduate Students Award, Faculty of Graduate Studies
Yidi Wang
Manitoba Graduate Scholarship

Veronika Shulgina
CIHR-MSc

Elaheh NosratMirshekarlou
Manitoba Graduate Scholarship

Olena Kloss
University of Manitoba Graduate Fellowship

Northern Scientific Training Program Award, from the Department of Aboriginal Affairs and Northern Development Canada

Emerging Leaders Award, University of Manitoba

MB Training Program for Health Services Research Fellowship, PhD

Fatemeh Ramezani
University of Manitoba Graduate Fellowship

Chelsey Walchuk
Recipient of (Graduate Student) Teaching Award from the North American Colleges and Teachers of Agriculture (NACTA), Teaching Award of Merit, Graduate Student Category

Bradley Feltham
The Murphy Foundation Inc. Indigenous Mentorship and Experiential Education Fund

Rianna Tonn
Recipient of the Queen Elizabeth II Diamond Jubilee Scholarship

Service

Graduate Student Committees

PhD
Elaine Aparecida Anjos Biological Sciences
Rex Gwang Seok Yoon, Biological Sciences
Jyoti Sihag, FHNS

MSc
Brianne Collette, FHNS
Yongbo She, FHNS
Academic Committees and Related Administrative Duties

Teaching Mentor for (new) Faculty Members, Teaching and Learning Certificate Program (2 years program), The Centre for the Advancement of teaching and Learning, University of Manitoba (1 in Nursing)
Chair, Program Committee for Human Nutritional Sciences, Faculty of Agricultural and Food Sciences
Committee Member, HNS Curriculum
Committee Member, FAFS Award
Committee Member, FHNS Graduate Program

Professional Service

Associate Editor, Special Issue on FASD, Biochem Cell Biol
Judge for ‘Research Day Program’ Competition (stream 2, Health & Medicine), sponsored by Korea Institute for Advancement of Technology (KIAT), Korea Institute of Geoscience and Mineral Resources (KIGAM), and Korea Institute of Energy Research (KIER), at the 7th Annual CKC meeting, Aug 6-9, 2017, Montreal, Quebec
Judge for Poster Competition, 13th Annual Child Health Research Day, Children’s Hospital Research Institute of Manitoba (CHRIM), Oct 4, 2017, Winnipeg, MB
Committee member, Young Generation, Association of Korean-Canadian Scientists and Engineers, Canada/ Award selection committee
Reviewer, CIHR College of reviewers (Foundation Grant)
Reviewer, Children’s Hospital Research Institute of Manitoba Operating Grant Application (Member, n=4 reviews in 2017)
Reviewer, CIHR Project Grant Review Committee (Member, n=9 reviews)

Representation on behalf of CCARM

Reh-Fit Health Fair
Tour the group of conference attendee (Agricultural Bioscience International Conference (ABIC) (with Harold Aukema)
The Metabolic Nutrition Laboratory focuses on the investigation of dietary components and their effects on metabolism, particularly in the context of obesity and insulin resistance as these are key factors leading to the development of type 2 diabetes and cardiovascular disease. The scientific approach uses dietary interventions in both animal models and human studies, and investigates their effects at the whole body to molecular levels. This continuum of research requires a multi-disciplinary team approach and this has been made possible by a long-term collaboration with Peter Zahradka, and the skills and talents of our trainees and staff. Research studies in progress this year included the effects of different bean types on postprandial responses as well as longer effects on blood vessel health, effects of soybeans on cardiovascular health, effects of omega-3 fatty acids and their oxylipin metabolites on endothelial cells and macrophages, the effects of sex and estrogen on development of obesity and the response to caloric restriction, and the role of adiponectin in obesity development.

This year's publications include a key paper by a former trainee, Azadeh Yeganeh, that shows how adipose tissue responds differently to weight loss induced by trans-10 cis-12 conjugated linoleic acid (CLA; used in weight loss supplements) or caloric restriction (reduced food consumption) in obese mice. This basic science knowledge about adipose tissue is important for developing new ways of managing obesity. Two current trainees, Tara Loader and Jaime Clark, published first author review papers on chlorogenic acid from coffee beans, and cardiometabolic effects of T-cadherin, respectively. We also published a follow-up paper from our mixed pulse clinical trial on the feasibility of incorporating pulse-containing foods into the diet and their tolerability – we wanted to investigate the commonly held perceptions that eating pulses leads to unacceptable gas production (flatulence) and that these foods are difficult to incorporate into typical North American diets. The study participants (individuals with peripheral artery disease) had excellent adherence to the study foods for 8 weeks, they reported either no gastrointestinal side effects or flatulence that resolved by week 4, and improvements in their bowel patterns. By week 8, several participants reported less afternoon snacking or not snacking, indicators of greater satiety. Feedback from participants at the end of the study that they wanted to prepare or purchase pulse-containing foods indicated that the food industry could address this need by having convenient ready-to-eat side dish or entrée options containing pulses in grocery stores and various food establishments.

The other five publications reflect the fruition of several long-standing multi-disciplinary team collaborations of Peter Zahradka and myself with Harold Aukema (advantages of mixed protein diets for kidney structure and function; effects of oxylipins on lipid storage
and adipokine production by adipocytes), Thomas Netticadan (high-oleic canola oil improves diastolic heart function in diet-induced obese rats), Miyoungh Suh (differences in lipid metabolism and transcriptomic profiles in normal and underdeveloped testis of obese Zucker rats), and Michel Aliani (using rooibos tea as a delivery system for antioxidants in Saskatoon berry syrup and for vitamin D fortification).

Trainees are a primary focus in the laboratory and they had a very successful year. I provide the nutritional sciences expertise for their co-supervised multi-disciplinary projects. Four trainees presented a total of 10 abstracts at local and international conferences. Jaime Clark (PhD student) placed first and received the People’s Choice Award in the Rapid Fire Research Symposium for her novel research on the post-prandial effects of beans. Jaime also received 2nd prize at the Functional Food and Natural Health Products Symposium for her oral presentation. Youjia Du (PhD student) was awarded first prize for her oral presentation at the Functional Foods and Natural Health Products Symposium for her work on DHA, an omega-3 fatty acid, and its effects on endothelial cells which line the blood vessel wall. Tara Loader defended her thesis in March. She compared black and navy beans for their effects on vascular properties in spontaneously hypertensive rats and found that black beans had some beneficial effects for arterial remodelling. Tara then worked in the lab with us on some other studies between April and August before leaving for New Zealand. We wish her all the best in her future endeavours and miss her enthusiasm and smile.

Thank you to everyone in our group for your great work, enthusiasm, and making research fun and rewarding! Thank you to our collaborators for adding new research directions to joint projects.

L-R: Susan Zettler, Brenda Wright, Youjia Du, Samantha Pauls, Dr. Peter Zahradka, Tara Loader, Jaime Clark, Raissa Perrault, Dr. Carla Taylor
# Research Funding

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<thead>
<tr>
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<th>Project Title</th>
<th>Funding Amount for Current Year</th>
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<td>Canadian Institutes of Health Research (CIHR)</td>
<td>H. Aukema, P. Zahradka &amp; C. Taylor</td>
<td>Effects of dietary essential fatty acids on octadecanoid production and biological actions in obesity-induced inflammation: Implications for dietary requirements</td>
<td>$134,793 (included in funding total for H. Aukema)</td>
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<tr>
<td>Natural Sciences and Engineering Research Council of Canada (NSERC)</td>
<td>C. Taylor</td>
<td>Metabolic and immune functions of zinc</td>
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<td>Research Manitoba</td>
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<td>$4,375</td>
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<td></td>
<td>$7,000 (included in funding total for H. Aukema)</td>
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**TOTAL FUNDING:** $72,375
### Collaborative Activity

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<tr>
<td>S. West</td>
<td>Penn State University</td>
<td>Vascular Function for Effects of Canola Oil on Body Composition and Lipid Metabolism in Participants with Metabolic Syndrome / Canola Oil – Multi-Centre Intervention Trial (COMIT-II)</td>
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<td>J. Wigle</td>
<td>University of Manitoba</td>
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<td>Metabolites associated with pulse consumption and with obesity</td>
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### Publications

**Peer-Reviewed Articles**


Abstracts


Rodway L, Pauls S, Zahradka P, Taylor CG & Aukema HM (2017) Alpha-linolenic acid alters the production of oxylipins and pro-inflammatory cytokines in classically activated THP-1 macrophages. CHRIM Child Health Research Days, Winnipeg. [Lisa Rodway received a gold medal for her poster in the undergraduate category]


**Invited Presentations**

Improvements in vascular performance by dietary interventions: An overview. First World NCD Congress, Chandigarh, India

LDL-Cholesterol Lowering by Canola Oil in Persons with Mild Hypercholesterolemia is Influenced by Arterial Stiffness. Great Northern Plains Lipids Conference, Winnipeg

Oil Wars: Winners and Losers for Health, Seniors’ Alumni Learning Program, University of Manitoba, Winnipeg
Academic Teaching

Macronutrients and Human Health, HNSC 3310, Human Nutritional Sciences
Seminar in Foods and Nutrition, HNSC 4160, Human Nutritional Sciences

Training/Mentoring

Post-doctoral Fellow
Samantha Pauls (co-supervised with H. Aukema and P. Zahradka)

Graduate Students - PhD
Jaime Clark (co-supervised with P. Zahradka)               Jennifer Grant (co-supervised with M. Aliani)
Youjia Du (co-supervised with P. Zahradka)

Graduate Students - MSc
Tara Loader (co-supervised with P. Zahradka)

Technical Staff
Tara Loader, Technician
Raissa Perrault, Technician
Sawanee Wickramasekara, Research assistant
Matthew Wiecek, Research assistant
Brenda Wright, Technician

Students Who Defended Thesis

MSc
Tara Loader (co-supervised with P. Zahradka) Thesis title: Comparing the effects of black and navy beans on vascular properties in spontaneously hypertensive rats

Honours, Awards, Scholarships

Jaime Clark, The Frederick Banting and Charles Best Canada Graduate Scholarship (CIHR)
Jaime Clark, 1st prize and People’s Choice Award at the Rapid Fire Research Symposium
Jaime Clark, 2nd prize for oral presentations at the Functional Food and Natural Health Products Graduate Research Symposium
Youjia Du, 1st prize for oral presentations at the Functional Food and Natural Health Products Graduate Research Symposium
Carla Taylor, 2017 Canola Award of Excellence, Manitoba Canola Growers’ Association
Service

Graduate Student Committees

PhD
Md Monirujjaman, Food and Human Nutritional Sciences
Haonan Zhouyao, Food and Human Nutritional Sciences

MSc
Kristen Fleet, Food and Human Nutritional Sciences
Amanda Gravelle, Food and Human Nutritional Sciences
Kelsey Mann, Food and Human Nutritional Sciences

Academic Committees and Related Administrative Duties

Research Committee, Department of Food and Human Nutritional Sciences
Member, St. Boniface Research Centre Awards Committee

Professional Service

Associate Editor, Lipids
Associate Editor, British Journal of Nutrition
Co-Editor, for a Special Issue on Nutrients, Bioactives and Insulin Resistance published in Nutrients
Reviewer for Awards Committee, Canadian Nutrition Society
Member, Review Committee for Operating Grants, Children’s Health Research Institute of Manitoba
Member, Organizing Committee, 3rd Annual Great Northern Plains Lipid Conference

Outreach Activity

KT with the public at CCARM booth at Ag in the City, March
CJOB’s Health Report, April

Representation on behalf of CCARM

Team Leader, CCARM
Director, Manitoba Agri-Health Research Network (MAHRN)
St. Boniface Research Centre Awards Committee
Planning Committee & Logistics Sub-Committee, Great Northern Plains Lipids Conference
Agriculture Appreciation Dinner, Portage La Prairie
Agriculture Awareness Expo, Portage La Prairie
Agriculture in the City
Moderator, MSPrebiotic Clinical Trial Results and Information Session with participants and representatives from local government and agencies
Genome Canada Consultation
Agriculture and Agri-Food Canada Food Policy Consultation
Canadian Agricultural Partnership – Research Meetings
Protein Highway Meeting (MAHRN)
Genome Canada Consultation
Regional Workshop – Genomics, Ag Sector Strategy

**Presentations and Tours on behalf of CCARM:**
Tour and Meetings with Manitoba Agriculture Representatives
Tour and Meetings with Roquette (with representatives from the USA and headquarters in France)
Tour and Meeting with Ruitenberg Ingredients
Study Abroad Program Tour with students from the University of Agricultural Sciences, Dharwad, India.

L-R: Jaime Clark, Youjia Du, Samantha Pauls (winners of “Best Group Costume”, SBRC Halloween Party)
Dr. Peter Zahradka  
Molecular Physiology Laboratory

The year 2017 was a year of transitions. On one hand, we saw the completion of a number of works that will be published over the next several years. At the same time, we are gearing up for new and possibly better projects as the funding cycle turns over.

We have now seen the end of Growing Forward 2 (GF2), which supplied a number of opportunities to work on crops important for Manitoba and Canada. As GF2 funding evaporated, 2017 was used to join in the conversation to decide where funding priorities would focus over the next 5 years. Several workshops were held to discuss possible areas for that should be funded by Canadian Agricultural Program (CAP), which will be replacing GF2 in 2018. Attending these discussions was helpful for finding out which areas were being targeted for funding, as well as providing input into areas that would be useful for Manitoba farmers and producers. Of course, being able to influence the decision makers in such a way that it would lead to additional research funding for this lab is not a bad thing either. To this end, we did submit a couple of projects to the CAP call for projects, including one with Roquette America, Inc. The latter represents one hugely positive outcome of having this company move into Manitoba and building a potato processing plant in Portage la Prairie. We are looking forward to having a positive outcome with this application. At the same time, we were able to convince Manitoba Agriculture that there was an opportunity to make significant inroads into understanding how the many compounds present in our crops might affect our health through the application of new technology. Specifically, we had been searching for a means to obtain a Centrifugal Partition Chromatography (CPC) system for CCARM, and Manitoba Agriculture kindly provided the funds for the purchase of this equipment. Our argument was based on the fact there is a gap between profiling of the many thousands of compounds present in most plant material and our ability to test for the biological effects of these compounds. CPC is a high capacity system with high resolution capable of isolating a single compound in gram quantities. This amount makes it possible to characterize the compound chemically as well as use it to treat cells and animals and monitor its biological effects. The availability of the CPC thus bridges the gap between analytical chemistry and biological function, and it makes CCARM unique in its ability to move this field forward.

Attending the First World Non-Communicable Disease Congress in Chandigarh, India, was a way of providing exposure to a larger audience of the research achievements made by the laboratory. The conference had over a thousand attendees, and the topic was ideal for presenting research findings associated with chronic diseases like those this lab investigates. Being able to speak to this type of audience about the potential benefits of research on crops and their products is expected to open a few eyes to the possibilities offered by this type of research versus traditional pharmaceutical research.
Closer to home, we were involved in preparing a submission to the Genomic Applications Partnership Program (GAPP) of Genome Canada along with Koven Technology, Inc. This was aligned with attending several workshops held by Genome Canada to determine priority areas for funding, as well as to provide feedback regarding their funding mechanism. Although the funding did not come through as we had hoped, our work with Koven has yielded some very interesting information regarding the effect of peripheral artery disease on a person’s metabolism.

Our research efforts were led by the hard work of all the lab members, and I want them to realize how much I appreciate their contributions. It was a wonderful achievement to have Tara graduate, and then remain with us to work on a new animal study. Other activities continued and we obtained publications from a couple of lab members who had left in previous years. It was nice to see the work of Azadeh and Alanna finally make it into the scientific literature. We expect to see the work from 2017 get published in 2018 or shortly thereafter. The outcomes of our studies with soybeans and beans look like they will be of great interest to both growers and processors, and so we hope that eventually our findings will get translated and become helpful to all Canadians.

As usual, this lab does not work in isolation, and I want to thank my collaborators, especially Carla, for their valuable assistance and input with my research program. I am looking forward to the next few years as new funding applications bring us the means to move ahead with the novel concepts and ideas that originated during our invaluable discussions.
Jaime Clark being presented the Best Presentation Award at the Rapid-Fire Research Symposium by Dr. Heather Blewett

<table>
<thead>
<tr>
<th>Name of Granting Agency</th>
<th>Names of Investigators</th>
<th>Project Title</th>
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<td>OPERATING:</td>
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<tr>
<td>Canadian Institutes of Health Research (CIHR)</td>
<td>H. Aukema, P. Zahradka &amp; C. Taylor</td>
<td>Effects of dietary essential fatty acids on octadecanoid production and biological actions in obesity-induced inflammation: Implications for dietary requirements</td>
<td>$134,793 (included in funding total for H. Aukema)</td>
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<td>Agri-Food Research and Development Initiative</td>
<td>M. Aliani et al.</td>
<td>Genetic markers for flavor selection in pork</td>
<td>$126,000 (included in funding total for M. Aliani)</td>
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<td>Natural Sciences and Engineering Research Council</td>
<td>P. Zahradka</td>
<td>Molecular mechanisms of gene regulation</td>
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<td><strong>EQUIPMENT:</strong> Manitoba Agriculture and Grain Innovation Hub</td>
<td>P. Zahradka</td>
<td>Spot II centrifugal partition chromatography system</td>
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Invited Presentations

Academic Teaching
Course Coordinator, Endocrine Physiology and Pathophysiology (PHGY 7256), Physiology and Pathophysiology
Lecturer, Endocrine Physiology and Pathophysiology (PHGY 7256), Physiology and Pathophysiology

Training/Mentoring
Postdoctoral Fellow
Samantha Pauls (co-supervised with H. Aukema & C. Taylor)
Graduate Students - PhD
Jaime Clark (co-supervised with C. Taylor)  Dina Johar
Youjia Du (co-supervised with C. Taylor)

Graduate Students - MSc
Tara Loader (co-supervised with C. Taylor)

Technical Staff
Tara Loader, Technician
Raissa Perrault, Technician
Sawanee Wickramasekara, Research assistant
Matthew Wiecek, Research assistant
Brenda Wright, Technician

Students Who Defended Thesis
MSc
Tara Loader (co-supervised with C. Taylor) Thesis title: Comparing the effects of black and navy beans on vascular properties in spontaneously hypertensive rats

Service

Graduate Student Committees
MSc
Melissa Gabbs, Food and Human Nutritional Sciences
Mohamad Reza Aghanoor, Pharmacology and Therapeutics
Nivedita Seshadri, Physiology and Pathophysiology
Bhavya Sharma, Physiology and Pathophysiology

Academic Committees and Related Administrative Duties
Graduate Program Committee, Department of Physiology
Faculty Council, Faculty of Medicine
Chair, Graduate Program Committee, Department of Physiology and Pathophysiology
Faculty Committee for Graduate Studies, Faculty of Medicine
Member, UMGF Ranking Committee, Department of Physiology and Pathophysiology
Member, Appeals Committee, Faculty of Graduate Studies
Member, Guidelines Establishment Committee, CRC in Primary Health Care

Professional Service
Associate Editor, Canadian Journal of Physiology and Pharmacology
Associate Editor, FACETS
Ad hoc Reviewer for Molecular and Cellular Biochemistry
Co-Editor, for a Special Issue on *Nutrients, Bioactives and Insulin Resistance* published in *Nutrients*

**Outreach Activity**

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CJOB Health Report, April

**Representation on behalf of CCARM**

Deputy Team Leader, CCARM
Agriculture Appreciation Dinner (Portage La Prairie)
Agriculture Awareness Expo (Portage La Prairie)
R30 Organizing and Science Conference Committees
Genome Canada Consultation
Canadian Agriculture Partnership – Research Meetings
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Tour and Meetings with Roquette (with representatives from USA and headquarters in France)
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L-R: Dr. Carla Taylor, Youjia Du, Jaime Clark, Dr. Peter Zahradka
Publication

Peer-Reviewed Article