



---

# ANNUAL REPORT

April 2009 – March 2010

---

*This report is available as a PDF file from the OGIRC website at [www.uwo.ca/ogirc/governance](http://www.uwo.ca/ogirc/governance)*



## **I. Overview – Year 2 April 2009 – March 2010**

The OGIRC was established in April 2008 and this report covers our accomplishments and the challenges encountered in the second year of operation. The overall goal of OGIRC is to employ a multi-disciplinary approach involving academia, government and private sector partnership to use state-of-the-art technologies for Ontario ginseng agriculture and product development. For this, three major studies have been proposed: i) systematic evaluation of ginseng product quality, ii) development of superior Ontario ginseng cultivars for agriculture, and iii) production of value-added products by advanced processing.

### **Progress of Project**

The year one delay in finalizing the private-sector partnership agreements and collecting the supporting documentation has been resolved. There was a delay in obtaining the first ginseng harvest materials due to a time differential in the start of the project and the regular harvest season. Despite the delays the multi-sector based research has proceeded according to plan with the full participation of all partners. The Year 2 milestones of the three proposed studies have been attained. The research has validated many new technologies which are applicable to ginseng agriculture and R&D as well as generating evidence supporting a wide range of health benefits. Our progress to date suggests that we have been successful in showing how a multi-disciplinary and integrative project could be achieved via a platform technology group concept coupled with strong Central Office and institutional supports. Significant progress has been made in the areas of research, research capacity building, education/training and outreach during year 2 of the project.

### **Impact**

The multi-disciplinary research approach used and the scientific excellence of the participating researchers in this project represent a major step forward in advancing the science of traditional medicine. The successful outcome of our research, based on a multi-sector approach covering all aspects of the R&D of herbal medicines, has provided leadership in this area of research. Moreover, our research model is in line with the new vision of AAFC that emphasizes the role of agricultural bioproducts in human health. This successful partnership will bring together many synergies in the near future.

## **II. Highlights of Year 2**

### ***1. Submission of the Year 1 ORF Progress Report to the Ministry of Research & Innovation May 31, 2009***

The first Annual Progress Report was submitted by the Ontario Ginseng Innovation & Research Consortium (OGIRC) to the Ontario Ministry of Research & Innovation on May 31, 2009, having received prior endorsement by the OGIRC Governance Committee. This report provided a comprehensive background and rationale of the formation and composition of the OGIRC; a detailed description of its research progress to date and future plans; measurements of research capacity building (HQP recruitment); a list of the publications and presentations made by OGIRC researchers

and their knowledge translation and youth/public outreach initiatives. Thank you to our researchers and trainees for their diligent efforts in compiling this information.

2. *2009 Summer Retreat “Identifying Common Ground”*

*July 8, 2009*

The purpose of the inaugural OGIRC Summer Retreat was to identify common ground and foster collaboration. Prior to the Retreat, a compilation of summaries submitted by each investigator was distributed to the membership describing the research objectives of each lab. The retreat began with a tour of Mario Slegers’ Strathroy ginseng farm to introduce the members to the practice of ginseng agriculture. Members left with an appreciation of how ginseng agricultural methods impact the quality of the material used in research. The group reconvened at the Oakwood Inn & Resort in Grand Bend for an afternoon of research discussions. The compilation of research summaries was reviewed so all members would have an understanding of the work carried out across the Consortium and develop a stronger appreciation of the collaborative nature of the OGIRC. Progress was made in identifying needs for standardized practice across OGIRC labs; communication tools such as a website and database; and ongoing discussion and engagement through workshops and Journal Clubs.

3. *2009 OGIRC Annual Conference & Annual General Meeting*

*November 6 – 7, 2009*

The OGIRC 2nd Annual Conference was held on November 6 & 7 at London Hall on the University of Western Ontario campus. The OGIRC met to share research progress, introduce new collaborators and provide trainees with an opportunity to lead a session. The conference was well-attended, gathering over 75 attendees from academia, other research institutions and industry to discuss Plant Biotechnology, Agriculture & Phytochemistry; Pre-Clinical Studies; Metabolomics; Advanced Processing; and Commercialization. The plenary lecturer was Dr. Wei Jia from the Center for Research Excellence in Bioactive Food Components at the University of North Carolina (Greensboro) speaking on “Application of Metabolomics to Medicinal Plant Research”. This lecture was highly topical, as metabolomics was the main theme of a funding application submitted by OGIRC researchers and collaborators in Year 2.

Highlights:

- Research updates from the Platform Technology Groups
- Poster sessions displaying student work
- Trainee-led session "Breeding program to improve Ontario ginseng products"
- Discussion of NHP commercialization, regulations and IP issues

*Annual General Meeting*

The membership was updated on the goals achieved since the 2008 general meeting, including the establishment of new collaborations; the development of the governance structure of the OGIRC, the construction and publication of the OGIRC website ([www.uwo.ca/ogirc](http://www.uwo.ca/ogirc)), and the adoption of a new logo for use on research posters and in outreach activities. The Scientific Director (Dr. Ed Lui) reviewed the funding submissions the OGIRC made in 2009 to expand the research program. The Chairs of the Research Committee (Dr. John Arnason) and the Education & Training Committee (Dr. Subrata Chakrabarti), delivered reports on behalf of their respective committees. A motion was passed

proposing that attendance at Journal Clubs be mandatory for OGIRC HQP located at Western, and that each trainee will lead/present at least one Journal Club during their time with the project.

4. *2009 Royal Agricultural Winter Fair*  
*November 6 – 15, 2009*

The OGIRC in collaboration with the Ontario Ginseng Growers Association exhibited at the Royal Agricultural Winter Fair's "Journey to Your Good Health" exhibit on November 10, 11 and 12, 2009

The objective of our exhibit was to promote the practice of science to the general public with a focus on youth; highlight Ontario's significant contribution to the global ginseng market; and provide information to the general public about the OGIRC. Through exhibits, demonstrations, handouts and presentations, we described our research to improve ginseng agricultural methods, elucidate the health effects of ginseng, and to develop new dosage forms. Visitors to the OGIRC display included agriculturalists, health professionals (dietitians, naturopathic doctors), school-age children with their teachers and parents/guardians, and members of the general public. OGIRC staff, researchers, trainees and associates talked with about three hundred people each day!

Dr. Lui interacted with over 80 dietitians, naturopaths and other health professionals in the "Food for Healthy Aging" themed Health Professionals Day on November 11, 2009 and contributed ginseng tea to the Functional Foods Lunch. Additionally, on November 12, Dr. Lui gave a 30-minute presentation on the Be Healthy Stage titled "Ginseng: Facts and Myths", and took questions from the Royal visitors for the subsequent hour at the "Ask an Expert" booth. Visit <http://royalfair.org/HealthVideos> to see Dr. Lui's video!

5. *2010 WORLDDiscoveries Research Showcase*  
*February 5, 2010*

WORLDDiscoveries, the business development arm of London's extensive research network, sponsored a Research Showcase at the London Convention Centre. This event was a joint exhibit of the potentially commercially applicable research results and inventions created by members of the faculties of Engineering, Science and the Schulich School of Medicine and Dentistry at the University of Western Ontario. The OGIRC exhibited their NHP research model and made some valuable contacts with potential collaborators, industry representatives and the general public.

6. *MRI Site Visit*  
*March 2, 2010*

The OGIRC welcomed Jack Krepel and Paula Psyllakis from the Ontario Ministry of Research & Innovation for a site visit on March 3, 2010. Also participating were representatives from Western's Research Development Services and Research Accounting as well as OGIRC's Scientific Director Dr. Ed Lui, Associate Director Dr. Dan Brown, and Project Manager Wendy Ambrose-Hope.

Ed Lui provided an overview of the project describing the unique agricultural studies and the integration with pre-clinical studies. A tour was conducted of the OGIRC facilities in the Biotron and several labs in the Department Physiology and Pharmacology: 1) Dr. Lui's lab and Central OGIRC lab

that prepares extracts for distribution to member labs; 2) Dr. Feng’s laboratory and presentation by graduate student Yan Wu of her work on the cardio-protective effects of ginseng; 3) Dr. Karmazyn’s laboratory where research personnel demonstrated their work on the effect of ginsenosides on cardiac hypertrophy.

A working lunch meeting was arranged to discuss the research and administrative status of the project. Ed Lui reviewed the overall objectives and interdisciplinary approach of the consortium; showed that training and recruitment are on target; listed new collaborations made and highlighted the many opportunities for undergraduates and youth experience provided through the OGIRC program. Wendy reviewed the status of the private sector agreements and identified the activities taken on by all private sector partners to date.

The site visit ended with the MRI and RD&S representatives being satisfied with the pace of the research progress and contributions of the private sector partners.

#### 7. Journal Club

The OGIRC continued holding Journal Club meetings in Year 2 to provide trainees with an opportunity to present their research proposals or findings, and introduce members from across the Consortium to their research interests, thereby enhancing the inter-disciplinary experience.

Date	Presenter (Supervisor, PTG)	Title
Apr. 15/09	Subhrojit Sen (Subrata Chakrabarti, Pre-Clinical)	“The effects of ginseng ( <i>Panax quinquefolius</i> ) treatment on chronic diabetic complications”
	Kristina McIntyre (John Arnason, Phytochemistry)	“Ginsenoside phytochemical variation”
Nov. 19/09	Chike Azike (Ed Lui, Pre-Clinical)	“Separation and Characterization of Immunomodulatory Polysaccharides of North American Ginseng Root ( <i>Panax quinquefolius</i> L.)”
Dec. 3/09	Juan Guo (Morris Karmazyn, Pre-Clinical)	“Ginsenosides Attenuate Cardiomyocyte Hypertrophy via Na <sup>+</sup> - H <sup>+</sup> Exchange/Calcineurin Inhibition”
Jan. 21/10	Matthew Barnes (Lique Coolen, Pre-Clinical)	“Effects of American Ginseng on erectile function and sexual behaviour”
Feb. 25/10	Megan Migchels (John Ciriello, Pre-Clinical)	“Ginseng effects on sleep apnea and blood pressure”

#### 8. Media Articles

The OGIRC Second Annual Conference received some favourable press in Year 2:

- Western News “Ginseng benefits on the rise”, November 12, 2009
- Today Daily News “OGIRC Second Annual Conference”, November 17, 2009
- 2009 Royal Agricultural Winter Fair Journey to Your Good Health Video. “Myths and facts about ginseng” with Ed Lui, Ontario Ginseng Innovation & Research Consortium. Posted Nov 12, 2009. <http://www.royalfair.org/HealthVideos>

### III. OGIRC Governance

#### *Management Committee*

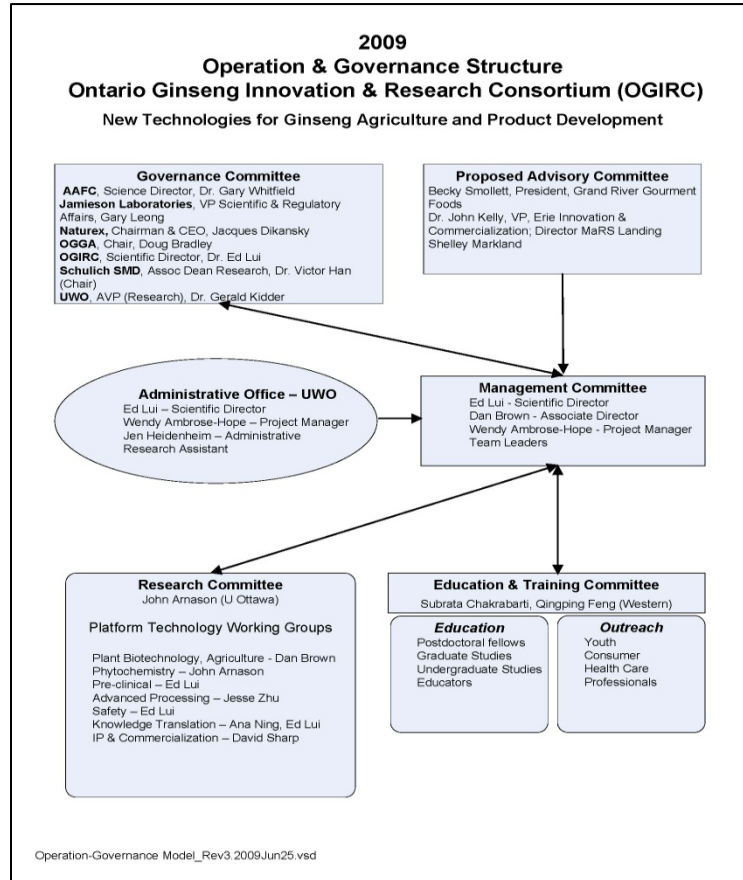
The Management Committee is comprised of the Project Manager, Scientific Director, Associate Director and the Platform Technology Group leaders. The Management Committee's mandate is to oversee the scientific progress of the OGIRC and ensure all Milestones and Deliverables committed to in the ORF Grant Agreement are met.

The Management Committee met in April 2009 to discuss items such as the criteria for reallocating ORF funds; approaching UWO to establish a "Centre for Natural Products and Integrative Medicine" with OGIRC as a component; mechanisms for extending OGIRC membership to new collaborators; and mechanisms for collecting information from the members for inclusion in the ORF Annual Progress Report.

#### *Governance Committee*

The OGIRC Governance Committee's objective is "To provide forward-thinking leadership and guidance, feedback and strategic planning to ensure the performance and fiduciary responsibilities of the Project are met"; and is responsible for providing vision and recommendations for future administrative and managerial actions, providing fiduciary oversight and reviewing and endorsing the Annual ORF Progress report prior to its submission. The committee membership is based on organizational position, and is comprised of representatives from AAFC (Science Director), Jamieson Laboratories (VP Scientific & Regulatory Affairs), Naturex (Chairman/CEO or Scientific Manager), the Ontario Ginseng Growers Association (Chairperson), Schulich School of Medicine & Dentistry (Dean or Associate Dean of Research), and the University of Western Ontario (Vice President – Research & International Relations, or Associate Vice President – Research).

The Governance Committee met in May 2009, prior to the submission of the ORF report to the Ontario Ministry of Research & Innovation. At this meeting, the Management Committee Terms of Reference were reviewed and accepted; the motion to pass the ORF Annual Progress Report to the Ontario Ministry of Research & Innovation was passed unanimously, and a decision was made to strike a new committee to develop communication guidelines such as recommendations for publications and media releases and resolving any IP issues. The Governance Committee expressed enthusiasm for the application to UWO for a "Centre for Natural Products and Integrative Medicine", suggesting we pursue this goal in the later years of the project.



#### IV. Sponsorship

The Ontario Ginseng Innovation & Research Consortium (OGIRC) acknowledges the following sponsors and partners:

##### *Government Sponsors*

- The Ontario Ministry of Research & Innovation
- Agriculture and Agri-Food Canada

##### *Private Sector Sponsors*

- Naturex Inc.
- Jamieson Laboratories Inc.
- A&L Laboratories Inc.
- Ontario Ginseng Growers Association

##### *Institutional Partners*

- The University of Western Ontario
  - Schulich School of Medicine & Dentistry
- The University of Guelph
- McMaster University
- University of Ottawa
- Northern Ontario School of Medicine

## V. OGIRC Membership

### OGIRC Researchers (April 2009 – March 2010)

#### **Plant Biotechnology PTG**

Dan Brown (AAFC)  
Praveen Saxena (U Guelph)

#### **Phytochemistry PTG**

John Arnason  
Paul Charpentier

#### **Pre-Clinical PTG**

Marica Bakovic (U Guelph)  
Subrata Chakrabarti (UWO)  
John Ciriello\* (UWO)  
Lique Coolen (UWO)  
Qingping Feng (UWO)  
Jim Henry (McMaster)  
Morris Karmazyn (UWO)  
Ed Lui (UWO)  
Joachim Madrenas (UWO)  
Earl Noble (UWO)  
Kem Rogers (UWO)  
Zach Suntres (NOSM)  
John Trevithick (UWO)

#### **Advanced Processing PTG**

Jesse Zhu (UWO)  
John Arnason (U Ottawa)  
Paul Charpentier (UWO)

#### **Safety PTG**

Ed Lui (UWO)  
David Bailey (UWO)  
Valter Feyles (UWO)

#### **Knowledge Translation PTG**

Ana Ning (King's College)  
Ed Lui (UWO)

#### **Commercialization & IP PTG**

David Sharp (UWO)

\*Associate Member

### **Researcher Recognition & Awards**

#### • **Dr. Joaquim Madrenas**

- 2009 Professor Pro Tempore, Dept. of Medicine, University of Mississippi Medical Center
- 2009 Schulich Leader Award of Excellence in Education
- 2010 UWO Hippocratic Council Basic Science Teaching Award
- 2010 The University of Western Ontario Faculty Scholar Award

### OGIRC Trainees (April 2009 – March 2010)

#### **Plant Biotechnology PTG**

VS Bhinu (PDF)  
Sijun Zhou (PDF)

#### **Advanced Processing PTG**

Robert Bi  
Raizye Samimihaghgozar

#### **Phytochemistry PTG**

Chike Azike (GS)\*  
Kristina McIntyre (GS)  
Mukund Shukla (PDF)  
Esther Uchendu (PDF)

#### **Safety PTG**

Cheryl Lui (UGS)

#### **Pre-Clinical PTG**

Misagh Alipour (GS)  
Chike Azike (GS)\*  
Matthew Barnes (GS)  
Colin Carruthers (GS)

Jirui Hou (PDF)  
Gillian Hewson (MS)  
Mao Jiang (PDF)  
Megan Migchels (GS)



Luan Chau (T)	Melissa Moey (GS)
Jessica Davie (T)	Hua Pei (T)
Branden Deschambault (GS)	Subhrojit Sen (PDF)
Tomasz Dzialosynski (T)	Ratnesh Singh (PDF)
Mehrbod Estaki (GS)	Judit Toth (MS)
Juan Guo (PDF)	Yan Wu (GS)

PDF = Postdoctoral Fellow; GS = Graduate Student; T = Technician; UGS = Undergraduate Student; MS = Medical Student

\*co-supervised by members of different PTGs

### Trainee Recognition & Awards

- **Branden Deschambault (Bakovic-PhD student).** Sun Life Financial Human Health and Nutritional Sciences Research Scholarship. University of Guelph - F09 (\$4000)
- **Branden Deschambault (Bakovic-PhD student).** Ontario Graduate Scholarship in Science and Technology. University of Guelph. Human Health & Nutritional Sciences. W09. (\$5000)
- **Jirui Hou (Lui-PDF).** Winner of a Travel Award and a Presentation Award with Distinction at the 2nd Annual Cancer Drug Discovery Symposium, Sudbury ON, May 5 2009.
- **Kristina McIntyre (Arnason-MSc student).** CGS NSERC Award (Sept 2009 – Aug 2010).
- **Subhrojit Sen (Chakrabarti-PDF).** Winner of a Travel Award to present at the 8<sup>th</sup> Meeting of the Consortium for Globalization of Chinese Medicine (CGCM), Nottingham, UK, August 25 – 28, 2009.
- **Yan Wu (Feng-PhD student).** Winner of the Outstanding Poster Award at the Recent Development in Chinese Herbal Medicine Conference, Jan 25-26<sup>th</sup>, 2010, Nanyang Technological University, Singapore
- **Sijun Zhou (Brown-PDF)** \$1000 Canada Section Travel Award to attend the International Congress of Plant Biotechnology in St. Louis, MO to present research on ginseng micropropagation.

## VI. New Funding Applications and Networking Activities

The OGIRC sought out new collaborators and funding sources through the following networking activities in Year 2:

- Ontario Research Fund – Global Leadership Round in Genomics & Life Sciences Competition (GL<sup>2</sup>) “Systems Biology Initiative for the Health Effects and Agriculture of American Ginseng”

PI: EMK Lui

#### International Partners

- |   |  |
|---|--|
| <ul style="list-style-type: none"> <li>• William Jia (Shanghai Innovation Research Centre for TCM)</li> <li>• S.L. Chen (Institute of Medicinal Plant Development)</li> <li>• Gane Wong (Beijing Genome Institute)</li> <li>• PC Leung (Chinese University of Hong Kong – Institute of Chinese Medicine)</li> <li>• Ming Zhu (Beijing University of Chinese Medicine)</li> <li>• Ricky Wong (Hong Kong Baptist University)</li> <li>• Wei Jia (University of North Carolina)</li> </ul> | <h4>National Partners</h4> <ul style="list-style-type: none"> <li>• Jeffrey Zidichouski (National Research Council – Life Science Division)</li> <li>• Dan Brown (Agriculture and Agri-Food Canada)</li> <li>• Marica Bakovic (University of Guelph)</li> <li>• David Mutch (University of Guelph)</li> <li>• David Ma (University of Guelph)</li> <li>• Vladimir Vuksan (University of Toronto)</li> <li>• Imre Csizmadia (University of Toronto)</li> <li>• Zach Suntres (Northern Ontario School of Medicine)</li> <li>• Christine Bear (The Hospital for Sick Children)</li> </ul> |
|---|--|

#### National Partners

(Greensboro—Center for Research Excellence in Bioactive Food Components) <ul style="list-style-type: none"> <li>• C.S. Yuan (University of Chicago – Tang Center of Herbal Medicine Research)</li> <li>• Gregory Chass (Bangor University – School of Chemistry)</li> <li>• Z. Howard (National Institute of Health – National Cancer Institute)</li> </ul>	
---	--

- Canada-China International Science & Technology Cooperation (ISTP) Collaborative R&D Project “Technology for production of red American ginseng with enhanced health benefit effects”

Team Canada Lead: EMK Lui	Team China Lead: Guixing Ren (Crop Quality Group, Institute of Crop Science, CAAS)
<ul style="list-style-type: none"> <li>• Lique Coolen (UWO)</li> <li>• Quim Madrenas (UWO)</li> <li>• Subrata Chakrabarti (UWO)</li> <li>• Qingping Feng (UWO)</li> <li>• Jesse Zhu (UWO)</li> <li>• Paul Charpentier (UWO)</li> <li>• Simon Chiu (UWO)</li> <li>• Denton Hoffman (Ontario Ginseng Growers Association)</li> </ul>	<ul style="list-style-type: none"> <li>• Li Lv (The General Hospital of the Chinese People’s Armed Police Forces)</li> <li>• Jianguo Fu (Heilongjiang Dondu Ginseng Company Ltd.)</li> <li>• Jia Feng (Ginseng and Antler Association, Jilin Province)</li> <li>• Gang Zhou (Chengdu University)</li> <li>• Yang Yao (Functional Ingredient Lab, Institute of Crop Science, CAAS)</li> </ul>

- Canada-China International Science & Technology Cooperation (ISTP) Partnership Development Activities “ Sino-Canada Networking for Natural Health Products”

Organizers and contributors:

Team Canada	Team China
PI: EMK Lui <ul style="list-style-type: none"> <li>• D. Brown (Agriculture and Agri-Food Canada)</li> <li>• Jeffrey Zidichouski (National Research Council – Life Science Division)</li> <li>• John Arnason (University of Ottawa)</li> <li>• Praveen Saxena (University of Guelph)</li> <li>• Subrata Chakrabarti (The University of Western Ontario)</li> <li>• Joseph Tai (Children &amp; Women Health Centre, University of British Columbia)</li> <li>• Gary Leong (Jamieson Laboratories Ltd.)</li> <li>• Winnie Pang (Natural Health Products Directorate)</li> <li>• Denton Hoffman (Ontario Ginseng Growers Association)</li> </ul>	<ul style="list-style-type: none"> <li>• Lead: SL Chen (Institute for Medicinal Plant Development, CAMS)</li> <li>• S. Chao Z. Yang (Shanghai Innovation &amp; Research Centre for Traditional Chinese Medicine)</li> <li>• William Jia (Shanghai Innovation &amp; Research Centre for Traditional Chinese Medicine)</li> <li>• Guixing Ren (Crop Quality Group, Institute of Crop Science, CAAS)</li> <li>• PC Leung (Chinese University of Hong Kong – Institute of Chinese Medicine)</li> <li>• Jianguo Fu (Heilongjiang Dondu Ginseng Company Ltd.)</li> <li>• Li Ping (China-Japan Friendship Hospital)</li> <li>• J. Song (Institute for Medicinal Plant Development, CAMS)</li> <li>• X. Zhang (Beijing Institute of Genomics, Chinese Academy of Sciences)</li> <li>• C. Liu (The University of Hong Kong)</li> </ul>

• Network Centres of Excellence – “Natural Products Health Network”

PI: EMK Lui

Participants and supporters:

Agriculture/Forestry/Plant Biotechnology	Traditional Medicine
<ul style="list-style-type: none"> <li>• D. Brown (AAFC)</li> <li>• P. Saxena (U Guelph)</li> <li>• D. MacKenzie (Memorial U, AAFC)</li> <li>• M Abou-Zaid (Natural Resources Canada – Forestry)</li> <li>• S. Cameron (Natural Resources Canada)</li> <li>• T. Noland (Ontario Ministry of Natural Resources – Forestry)</li> <li>• S. Chen (IMPLAD, WHO)</li> <li>• P. Krishna (UWO)</li> <li>• J. Arnason (U Ottawa)</li> <li>• F. Shahidi (Memorial U)</li> <li>• G. Wong (U Alberta, BGI-Shenzhen)</li> </ul>	<ul style="list-style-type: none"> <li>• S. Murch (UBC Okanagan)</li> <li>• G. Chass (U Wales, Hong Kong U)</li> <li>• R. Obomsawin (NAHO)</li> <li>• P. Haddad (U Montreal)</li> <li>• D. Li (Ryerson U)</li> <li>• H. Boon (U Toronto, IN-CAM)</li> <li>• P. Li (China-Japan Friendship Hospital)</li> <li>• M. Chung</li> <li>• S. Aung (U Alberta)</li> </ul>
Clinical	Pre-Clinical
<ul style="list-style-type: none"> <li>• Y. Siow (U Manitoba, AAFC)</li> <li>• C. Bear (Sick Kids Research Institute)</li> <li>• J. Gagnier (U Michigan)</li> <li>• S. Chiu (LHSC)</li> <li>• JP. Collet</li> <li>• S. Lamb</li> <li>• V. Vuksan (U Toronto)</li> <li>• T. Jurgens</li> <li>• S. Vohra (U Alberta)</li> <li>• M. Borrie</li> </ul>	<ul style="list-style-type: none"> <li>• Ed Lui (UWO)</li> <li>• Y. Gong (U Manitoba)</li> <li>• J. Tai (UBC)</li> <li>• K. Rosenthal (McMaster)</li> <li>• A. El-Sohemy (U Toronto)</li> <li>• M. Bakovic (U Guelph)</li> <li>• J. Madrenas (UWO)</li> <li>• L. Coolen (UWO)</li> <li>• S. Chakrabarti (UWO)</li> <li>• W. Jia (BC Cancer Institute)</li> <li>• P. Choy (U Manitoba)</li> <li>• H. Lee (NE Ontario Regional Cancer Centre)</li> <li>• K. Hill (UWO)</li> </ul>
NHP Product Quality	Toxicology
<ul style="list-style-type: none"> <li>• K. Boniface (AAFC)</li> <li>• Paula Brown (BCIT)</li> </ul>	<ul style="list-style-type: none"> <li>• Brian Foster (Health Canada)</li> <li>• David Bailey (UWO)</li> </ul>
Engineering	Discovery
<ul style="list-style-type: none"> <li>• J. Zhu (UWO)</li> <li>• P. Charpentier (UWO)</li> </ul>	<ul style="list-style-type: none"> <li>• G. Leong (Jamieson Laboratories)</li> <li>• J. Zidichouski (NRC-INH)</li> <li>• J. Zhang (NRC-INH)</li> </ul>
Other	
<ul style="list-style-type: none"> <li>• D. Sharp (IP &amp; Commercialization)</li> <li>• M. Daley</li> <li>• M. Perry</li> </ul>	

## VII. Publications & Presentations:

### *Publications*

In Year 2, the following articles were published by OGIRC members on their ginseng research:

- **M. Bakovic** and **M. D. Fullerton** (2009) *Pcyt2* deficient mice as a new model for the metabolic syndrome, *J. Diabetes*, Vol.1, Suppl. 1-p. 239.
- **Chau LA**, McCully ML, Brintnell W, An G, Kasper KJ, Vinés ED, Kubes P, Haeryfar SMM, McCormick JK, Cairns E, Heinrichs DE, **Madrenas J.** TLR2 Ligands on the Staphylococcal Cell Wall Down-regulate Superantigen-Induced T Cell Activation and Prevent Toxic Shock Syndrome. *Nature Medicine* 2009; 15: 641. (Highlighted as Exceptional Paper in Faculty of 1000 Medicine: [www.f1000medicine.com/article/id/1161383/evaluation](http://www.f1000medicine.com/article/id/1161383/evaluation). Also, paper featured in *The Economist* June 13/2009 issue, p.84).
- Fullerton M.D., Hakimuddin F., Bonen A. and **Bakovic M.** (2009) The development of a metabolic disease phenotype in CTP:phosphoethanolamine cytidyltransferase deficient mice. *J. Biol. Chem.* 284(38):25704-13.
- Hayworth J L, Kasper KJ, Leon-Ponte M, Herfst CA, Yue D, Brintnell WC, Mazzuca DM, Heinrichs DE, Cairns E, **Madrenas J**, Hoskin DW, McCormick JK, Haeryfar SMM. Attenuation of Massive Cytokine Response to the Staphylococcal Enterotoxin B Superantigen by the Innate Immunomodulatory Protein Lactoferrin. *Clin Exp Immunol* 2009; 157: 60.
- Teft WA, **Chau TA**, **Madrenas J.** Structure-Function analysis of the CTLA-4 interaction with PP2A. *BMC Immunol* 2009; 10: 23.
- Xiao W, Hong H, Kawakami Y, Kato Y, Wu D, Yasudo H, Kimura A, Kubagawa H, Bertoli LF, Davis RS, **Chau LA**, **Madrenas J**, Hsia CS, Xenocostas A, Kipps TJ, Hennighausen T, Iwama A, Nakauchi H, Kawakami T. Tumor suppression by phospholipase C- $\beta$ 3 via SHP1-mediated dephosphorylation of Stat5. *Cancer Cell* 2009; 16: 161.
- Zhu L, Michel V and **M Bakovic** (2009) Regulation of the mouse CTP: phosphoethanolamine cytidyltransferase gene *Pcyt2* during myogenesis, *Gene*, 447: 51-59

### *Submitted Manuscripts*

The following manuscripts had been submitted for publication by the end of Year 2:

- **Misagh Alipour**, Abdelwahab Omri, and **Zacharias E. Suntres.** The Effects of Ginseng Extracts on the Motility, Attachment, and Secretion of Virulence Factors of *Pseudomonas aeruginosa*. *Plos Pathogen*.
- J. Borland, K.A. MacKay, L. E. Robinson, T.E. Graham, **M.Bakovic** and A.M. Duncan (2010)The effect of whole grain wheat sourdough bread consumption on serum lipids in healthy normoglycemic/ normoinsulinemic and hyperglycemic/hyperinsulinemic adults depends on presence of the APOE E3/E3 genotype. *Nutrition & Metabolism*
- **B. Deschambault**, A. Borland and **M. Bakovic** (2010): Functional Foods, Nutraceuticals and Degenerative Disease Prevention” (Dr. M.Bakovic, Dr. G. Palyath, and Dr. Kalidas Shetty Eds), Blakwell Sci.
- Nutritional Genomics in Obesity Prevention & Treatment. **B R Deschambault; M B Bakovic; D M Mutch.** In: “Obesity Prevention: The role of Brain and Society on Individual Behavior (A Handbook

for Integrative Science, Policy and Action to Stop the Progression of the Obesity Pandemic)”. Eds: Dube, L. Elsevier. Accepted for publication September 2009.

- Fullerton M & **Bakovic M** (2010) Complementation of the metabolic defect in CTP: phosphoethanolamine cytidyltransferase (*Pcyt2*) deficient primary hepatocytes, *Metabolism* (in press).
- Alice Luu, Brian C. Foster, **Kristina L. McIntyre**, Teresa W. Tam, **John T. Arnason**. Pharmacogenetics in Potential Herb-Drug Interactions: Effects of Ginseng on *cyp3a4* and *cyp2c9* Allelic Variants.
- **Kristina L. McIntyre**, Alice Luu, Cathy Sun, **Dan Brown**, **EMK Lui**, **John T. Arnason**. Ginsenoside Variation Within and Between Ontario Ginseng Landraces: Relating Phytochemistry to Biological Activity.
- **Sen, Subhrojit**; Chen, Shali; Feng, Biao; Wu, Yuexiu; **Lui, Edmund**; **Chakrabarti, Subrata**. Preventive effects of American Ginseng (*Panax quinquefolius*) on glucose-induced endothelial cell injury and associated oxidative stress. *Free Radical Research*.
- **Ratnesh Kumar Singh**, Morgan D. Fullerton, **Marica Bakovic**. Mechanisms of hypertriglyceridemia in CTP: phosphoethanolamine cytidyltransferase (*Pcyt2*) deficient mice. Abstract submitted to *Atherosclerosis, Thrombosis and Cardiovascular Disease*.
- Chao Sun, Ying Li, Qiong Wu, Hong-Mei Luo, Yong-Zhen Sun, Jing-Yuan Song, **EMK Lui** and Shi-Lin Chen. 2010. Sequencing and de novo analysis of American ginseng root transcriptome using GS FLX Titanium platform to discover putative genes involved in ginsenoside biosynthesis. *BMC Genomics* 11:262 doi: 10.1186/1471-2164-11-262.

#### Presentations

OGIRC members and HQP have attended national and international conferences to present their ginseng research:

- John Arnason and Kristina McIntyre presented at the American Society of Pharmacognosy conference in Hawaii and at the Phytochemical Society of North America in Maryland in Aug/09.
- Jirui Hou, Hua Pei, Chike Azike and Ed Lui presented at the 2<sup>nd</sup> Annual Cancer Drug Discovery Symposium, Sudbury ON, August 2009. **Travel award winner**.
- Subhrojit Sen – presented at the 8<sup>th</sup> Meeting of the Consortium on Globalization for Chinese Medicine, Nottingham UK, August 2009. **Travel award winner**.
- Ed Lui presented at the 4<sup>th</sup> International conference of TCM on diabetes. Beijing, August 2009.
- Ed Lui presented at the International Conference & Exhibition of the modernization of Chinese Medicine and Health Products. August 2009.
- Marica Bakovic with Branden Deschambault and Ratnesh Singh co-authored three presentations at the Canadian Lipoprotein Conference, Windsor ON, September 2009
- Marica Bakovic - invited talk at the MCBL retreat, U Alberta, n September 29, 2009.
- Subrata Chakrabarti, Sijun Zhou & Dan Brown and Qingping Feng (on behalf of Yan Wu) presented at the “Recent Developments in Chinese Herbal Medicine” Conference on January 25-26 2010, in Nanyang, Singapore. **Yan Wu won an Outstanding Poster Award**.

#### Technical Reports

**Lui, EMK** (2009). Annual report of the OGIRC to the Ontario Ginseng Growers Association.

**Ontario Ginseng Innovation & Research Consortium  
Financial Report  
April 1, 2009 to March 31, 2010**

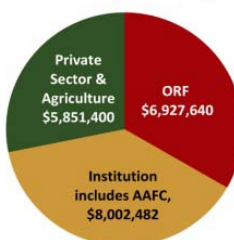
<b>Cash/In Kind Expenses Reported Year Two April 1, 2009 to March 31, 2010</b>					
	ORF	Institution	Industry		Total
			Cash	In Kind	
PI Salaries & Benefits		431,466			431,466
Personnel Salaries & Benefits	503,137	270,412		989,172	1,762,721
Facilities		196,072			196,072
Equipment					0
Research Expenses	274,184	124,090		1,214,879	1,613,153
Conference	1,957	4,000	19,002		24,959
Travel / Visitors	18,231			349	18,580
Mgmt & Admin - S&B	129,132			35,601	164,733
Mgmt & Admin - Other	4,035				4,035
Youth Outreach	4,250		1,000		5,250
Audit	9,148				9,148
<b>Total Cash Expenses</b>	<b>944,074</b>	<b>1,026,040</b>	<b>20,002</b>	<b>2,240,001</b>	<b>4,230,117</b>
<b>Total Overhead (Cash/In Kind)</b>	<b>377,630</b>	<b>1,314,417</b>	<b>*</b>		<b>1,692,047</b>
<b>Total Cash/In Kind Expenses</b>	<b>1,321,704</b>	<b>2,340,457</b>	<b>20,002</b>		<b>5,922,164</b>

\* Institution makes in kind contribution by not assessing overhead on Industry \$'s

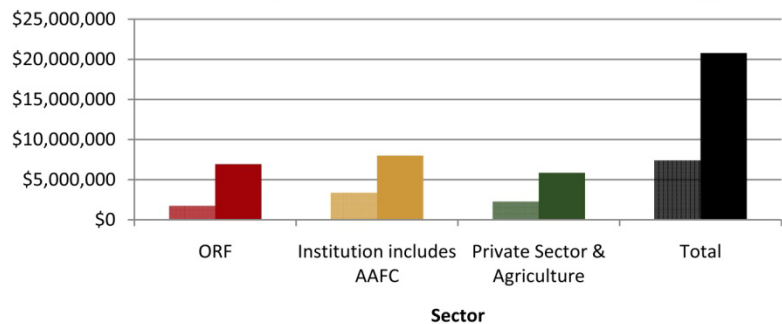
**Actual Expenses to March 31, 2010 by Sector**



**Total Project Budget**



**Year 2 Expenses Relative to Total Budget**



Note: Auditors' Report dated November 10, 2010 for Year ended March 31, 2010 available