



Plasticizers Bulletin

CIHR Team in Impact of exposure to phthalates, their metabolites and “green” plasticizers on male reproductive health.

Summer 2013

The Executive Committee:

- Bernard Robaire, PI
McGill University
- Peter Chan
McGill University
Clinical Studies
- Barbara Hales
McGill University
Animal Studies
- Milan Maric
McGill University
Chemical Eng. Studies
- Jeff Nisker
Western University
Ethics, Law & Society
- Vassilios Papadopoulos
RI-MUHC
Cell Lines Studies

A Research Project
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CIHR IRSC
Canadian Institutes of Health Research
Institut de recherche en santé
et en services sociaux

From the PI

This second newsletter from our Plasticizer team grant group highlights some of the many advances that have occurred on each front of the project. Analysis by our colleagues in chemical engineering of the potential of many families of chemicals to serve as plasticizers and, therefore, potential replacements for phthalates has allowed for a first level narrowing of “best compounds”. After a comparison of the many cell survival and cell function tests done on testicular, prostate and liver cell lines, a limited number of “least toxic” substances have been selected for our in vivo experiments. These studies have been initiated and the first results were presented at the annual spring meeting. Advances on these fronts were paralleled with the continued recruitment of subjects for our clinical studies and the first analysis of urine for a wide range of phthalates. Our ELS team has completed studies on a range of topics, including “Views of Pregnant Women and Clinicians Regarding Discussion of Phthalate Exposure” and “The Ethics of Biomonitoring”. Results from the past year have been very exciting and significantly move our project forward. We are looking forward to another great year!

— Bernard Robaire

Our Studies

Chemical Engineering Studies: Development of “green” replacement plasticizers and determination of the effects of these “green” plasticizers on the targets of phthalates and their metabolites in cell-based testicular toxicity assays

Cell Lines Studies: Development and use of cell-based toxicity assays to determine the effects of “green” replacement plasticizers on the testis

Animal Studies: Evaluation of the impact of exposure to “green” replacement plasticizers on the developing and adult testis in an animal model

Clinical Studies: Elucidation of the relationship between exposures to phthalates and male infertility

Ethics, Law and Society: Exploration of the ethics, legal, regulatory, social and environmental justice issues regarding phthalates

Our collaborators



McGill



L'Institut de recherche
du Centre universitaire de santé McGill
The Research Institute
of the McGill University Health Centre

Laval University
Université Laval



Western

YORK
UNIVERSITÉ
UNIVERSITY



CONTACT US:

Elise Boivin-Ford, Coordinator
Pharmacology & Therapeutics
3655 Prom Sir-William-Osler
Montreal, QC H3G 1Y6

elise.boivin-ford@mcgill.ca
Phone: 514-398-2584
Fax: 514-398-7120

We're on the Web!

[www.http://www.medicine.mcgill.ca/
cihr-plasticizers/](http://www.medicine.mcgill.ca/cihr-plasticizers/)

Our Publications

- Martinez-Arguelles DB, McIntosh M, Rohlicek CV, Culty M, Zirkin BR, Papadopoulos V. (2013) *Maternal in utero exposure to the endocrine disruptor di-(2-ethylhexyl) phthalate affects the blood pressure of adult male offspring*. *Toxicol Appl Pharmacol*. 266:95-100
- Erythropel HC, Dodd P, Leask RL, Maric M, Cooper DG. (2013) *Designing green plasticizers: influence of alkyl chain length on biodegradation and plasticization properties of succinate based plasticizers*. *Chemosphere*. 91:358-65
- Segura PA, Kaplan P, Erythropel HC, Yargeau V. (2012) *Comparative rapid toxicity screening of commercial and potential green plasticizers using bioluminescent bacteria*. *Industrial and Engineering Chemical Research*. 51:11555-60.
- Kastner J, Cooper DG, Maric M, Dodd P, Yargeau V. (2012) *Aqueous leaching of di-2-ethylhexyl phthalate and "green" plasticizers from poly(vinyl chloride)*. *Science of The Total Environment*. 432:357-64
- Butler J, O'Brien P, Crain S, Yargeau V. (2012) *Determination of DEHP in Culture Media by GC-MS/MS Using PCI Ammonia*. *Thermo Application Note # 52282*
- Piché CD, Sauvageau D, Vanlian M, Erythropel HC, Robaire B, Leask RL. (2012) *Effects of di-(2-ethylhexyl)phthalate and four of its metabolites on steroidogenesis in MA-10 cells*. *Ecotoxicol Environ Saf*. 79:108-15
- Erythropel HC, Maric M, Cooper DG. (2012) *Designing green plasticizers: Influence of molecular geometry on biodegradation and plasticization properties*. *Chemosphere*. 86:759-66
- Shi G, Cooper DG, Maric M. (2011) *Poly(ϵ -caprolactone)-based "Green" Plasticizers for Poly(vinyl chloride)*. *Polym Degrad Stab*. 96:1639-47
- Martinez-Arguelles DB, Guichard T, Culty M, Zirkin BR, Papadopoulos V. (2011) *In utero exposure to the antiandrogen di-(2-ethylhexyl) phthalate decreases adrenal aldosterone production in the adult*. *Biol Reprod*. 85:51-61
- Campioi E, Batarseh A, Li J, Papadopoulos V. (2011) *The endocrine disruptor mono-(2-ethylhexyl) phthalate affects the differentiation of human liposarcoma cells (SW 872)*. *PLOS One*, 6:e28750
- Fan J, Traore K, Li W, Amri H, Huang H, Wu C, Chen H, Zirkin B and Papadopoulos V. (2010) *Molecular Mechanisms Mediating the Effect of Mono-(2-Ethylhexyl) Phthalate on Hormone-Stimulated Steroidogenesis in MA-10 Mouse Tumor Leydig Cells*. *Endocrinology*. 151:3348-62

Our Team

Bernard Robaire, PhD (PI)
Elise Boivin-Ford (Coordinator)

Animal Studies

Barbara Hales, PhD (Project Leader)
Martine Culty, Bernard Robaire, Mike Wade,
Carole Yauk, PhDs

Trainees and personnel

Océane Albert, Post-doctoral Fellow
Gauthier Schang, Summer Student
Claudia Lalancette, Research Associate
Pavine Lefevre, Post-doctoral Fellow
Thomas Nardelli, PhD Trainee

Cell Lines Studies

Vassili Papadopoulos, PhD (Project Leader)
Martine Culty, Makoto Nagano, Bernard
Robaire, Jacques Tremblay, PhDs

Trainees and personnel

Annie Boisvert, Technician
Enrico Campioi, Post-doctoral Fellow
Annick Enangue, PhD Trainee
Steve Johns, PhD Trainee
Daniel Martinez, Post-doctoral Fellow
Deborah Meltzer, PhD Trainee

Chemical Engineering Studies

Milan Maric, PhD (Project Leader)
Richard Leask, Viviane Yargeau, PhDs

Trainees and personnel

Richard Ethier, Summer Student
Hanno Erythropel, PhD Trainee
Roya Jamarani, MSc Trainee

Clinical Studies

Peter Chan, MD (Project Leader)
Linda Dodds, Yong-Lai Feng, PhDs

Trainees and personnel

Lorraine Lavigne, RN

Ethics, Law and Society

Jeff Nisker, MD, PhD (Project Leader)
Roxanne Mykitiuk, JD, Dayna Scott, PhD

Trainees and personnel

Justin Ashley, Medical Student
Alana Cattapan, PhD Trainee
Dolon Chakravartty, PhD Trainee
Lou Chang, PhD, JD Student
Alexandra Hodgson, BMSc Student
Meera Joseph, Medical Student
Robyn Lee, PhD Trainee
Mark Pioro, Research Associate
Faiza Rab, MHSc Trainee
Jennifer Ryder, Unit Administrator
Sapna Sharma, MD, PGY2
Ellen Sweeney, PhD Trainee
Kyoko Wada, MD, PhD Trainee



Plasticizers Research

CIHR Team in Impact of exposure to phthalates, their metabolites and “green” plasticizers on male reproductive health.

Fall 2012

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The Research Institute
of the McGill University
Health Centre

Western University

Université Laval

York University

IWK Health Centre

Health Canada

From the PI

We are pleased to introduce our CIHR multidisciplinary research project on Plasticizers. Our group is committed to finding alternatives to the family of phthalate plasticizers that are now well recognized as endocrine disruptors. Bringing together expertise from colleagues in chemical engineering, analytical chemistry, toxicology, reproductive biology, clinical medicine, policy, ethics, and law, our approach is to identify novel plasticizers and establish their safety prior to promoting them as commercial products. The underlying philosophy of our team is to develop and test chemicals for safety, for humans and the environment, prior to releasing them in the marketplace.

— Bernard Robaire

2012 Annual Spring Meeting of the Plasticizers Group



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Animal: Evaluation of the impact of exposure to “green” replacement plasticizers on the developing and adult testis in an animal model

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Milan Maric (PL)
Richard Leask
Viviane Yargeau

Trainees and personnel

Hanno Erythropel, PhD
Adam Fontaine, MEng
Joshua Kastner, MEng
Pedro Segura, PDF
Logan Smith, MEng
Marie Vanlian, Meng

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Laval University
Université Laval



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