UNIVERSITY OF ALBERTA

Giving a Face to **Obesity** Research

RESEARCH REPORT
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Obesity

RESEARCH

Lorne A Babiuk OC, PhD, DSc
Vice-President (Research)
University of Alberta

MESSAGE FROM THE VICE-PRESIDENT

Obesity is a growing, global epidemic that is having an increased impact on the health and welfare of Canadians. Today, it is becoming clearer that a substantial proportion of the global epidemics of diabetes, heart disease, osteoarthritis and cancer are attributed to obesity. Obesity is a complex condition with multiple health-related, psychosocial and economic consequences, and therefore requires interdisciplinary collaboration among researchers.

The University of Alberta is committed to advancing excellence in prevention and treatment of health, social, and economic problems to benefit the people and communities we serve. This commitment is built on President Indira Samarasekera's vision *Dare to Discover*, which includes a commitment to an enhanced quality of life within a global context.

The University of Alberta is happy to support these initiatives by various faculties, which enable Alberta to take advantage of its unmatched potential. Nearly fifty of our researchers and their teams are working to address a wide range of issues relevant to obesity prevention treatment and policy. This publication highlights a few of these researchers whose collective efforts are contributing to solving one of the greatest health problems facing the world today.

As this document illustrates, obesity research at the University of Alberta covers a wide range of topics from nutritional sciences and neurobiology to the environment. Researchers and clinicians in a wide array of disciplines, crossing many faculties, are exploring new treatments and management strategies for children and adults with excess weight.

As a leading centre for advanced education, the University of Alberta is also training the future leaders in research, health care, policy and industry to confront and find innovative solutions to the global problem of overweight and obesity. The existing expertise in obesity at the University of Alberta is a key resource advantage in enabling our institution to become a leader in this field.

Lorne A Babiuk, , OC, PhD, DSc

UNIVERSITY OF ALBERTA

MESSAGE FROM THE CHAIR

Obesity, a chronic disease that now affects over 600,000 Albertans, significantly impacts the social, cultural, economic and health-related well-being of all Albertans. However, Alberta is not alone with this problem – over 12 million Canadians are now overweight, 5.5 million are obese and over 500,000 are morbidly obese. Most alarmingly, over 500,000 Canadian children are now also obese.

In 2001, obesity costs represented $4.3 billion (2.2% of Canada's total health care) or 0.4% of Canada's GDP. This estimate only accounts for direct and indirect health care costs of obesity. It does not account for productivity loss, reductions in taxation revenue, or increased cost associated with social support programs. This estimate also excludes the financial and social costs borne by individuals, families, and communities who carry the burden of this disease.

Given the substantial costs of obesity to Canadians, governments, health practitioners, and industry stakeholders are now looking for opportunities to solve this epidemic. Whether it is comprehensive policies, innovative surgical techniques or new pharmacological targets, the obesity epidemic requires an influx of evidence-based obesity products and solutions. These solutions require broad and comprehensive stakeholder involvement, political will and community engagement.

This report documents the strengths in obesity research that already exist at the University of Alberta – strengths that can be harnessed to make Alberta a global leader in obesity research and innovations. With projects ranging from cell biology to city building, University of Alberta researchers are already at the forefront of this important and highly-competitive field of research that spans and cuts across conventional interdisciplinary boundaries encompassing fundamental research, applied health sciences, social sciences, nutrition, engineering, and health law.

I am confident that Obesity Research at the University of Alberta will play an important role in creating "Made in Alberta" solutions to the obesity crisis and in training the next generation of obesity researchers, health care workers and policy makers who will pith themselves in the battle against what is by far the greatest health challenge of our times.

Arya M. Sharma, MD, PhD

Arya M. Sharma, MD, PhD

Chair
Obesity Research and Management
University of Alberta

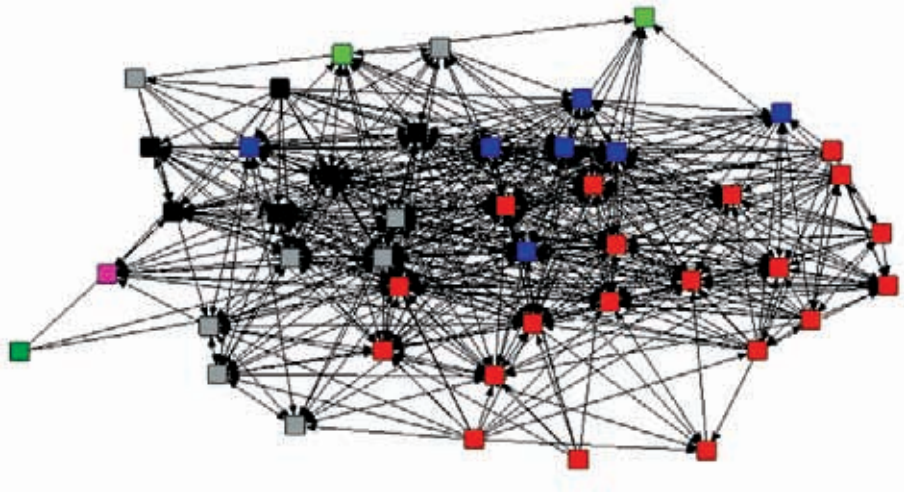
Scientific Director
Canadian Obesity Network

"This report documents the strengths in obesity research that can be harnessed to make Alberta a global leader in obesity research and innovation."

UNIVERSITY OF ALBERTA

SOCIAL NETWORK BETWEEN OBESITY RESEARCHERS AT THE UNIVERSITY OF ALBERTA*

The Obesity Research Chair and the Canadian Obesity Network completed a Social Network Analysis of obesity research at the University of Alberta. The study identified and qualified some of the current relationships between obesity researchers at the University of Alberta.

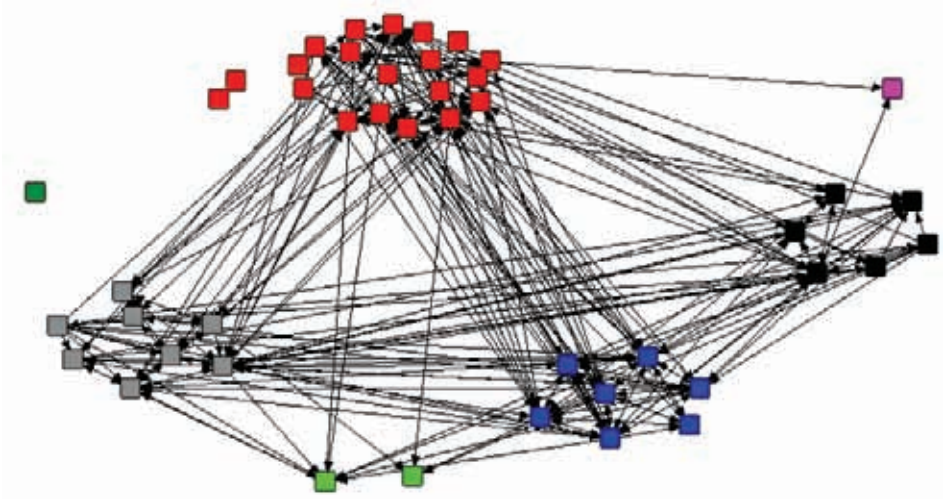


Am Aware of : All Ties

Figure 1: Graphical display of the complex relationship between individual faculty members. Boxes represent one individual while the colours represent their associated faculty. Arrows indicate direction of awareness between faculty members.

* Faculties can not be identified in order to protect the anonymity of the research participants.

A survey was circulated to 54 full-time university faculty who are obesity researchers. 45 individuals completed the survey. The number of arrows directed into a node represents that node's InDegree, while the number of arrows directed away from a node represents its OutDegree. A double-headed arrow between nodes indicates a reciprocal relationship. Nodes without arrows directed in or out have a degree centrality of zero, and are termed "isolates". It is important to remember that these diagrams represent relationships at one point in time.



Co-Applicant : All Ties

Figure 2: Graphical representation of collaborative research efforts between individual faculty members. Boxes represent one individual while the colours represent their associated faculty. Arrow indicate the direction of collaboration on research grants between members.

With projects ranging
from cell biology to city building,
University of Alberta researchers are
already at the forefront of this
important and highly-competitive field
of research that spans and cuts across
conventional interdisciplinary
boundaries encompassing
fundamental research, applied health
sciences, social sciences, nutrition,
engineering, and health law.

In order to improve the care provided to overweight children, youth and their families, there is a need to develop, test and disseminate pediatric weight management programs

Dr. Geoff Ball

Assistant Professor
Pediatrics

University of Alberta

"I'm looking to improve pediatric weight management care by working closely with clinicians and families to develop evidence-based interventions and to understand what works and why."

More than 1.6 million Canadian children and youth are overweight or obese. For those at increased health risk, health services are needed to help families optimize physical, behavioral, and psychosocial outcomes. My primary research focus includes the design, delivery, and evaluation of weight management interventions for families, and the impact of these interventions on lifestyle behaviors, risk factors for type 2 diabetes and cardiovascular disease, and mental health as well as family functioning. My practice-based research at the Stollery Children's Hospital and under Alberta Health Service's Weight Wise program has also led to new research directions for improving clinician-patient interactions, exploring clinician-patient experiences in weight management care, and supporting weight management efforts beyond the clinic to engage families and community partners. This novel program of research has enabled the application of both quantitative and qualitative methods to explore the effectiveness of weight management care from the perspectives of researchers, clinicians, and families.

KEY PUBLICATIONS

Ball GDC, Lenk JM, Barbarich BN, Plotnikoff RC, Fishburne G, Mackenzie KA, Willows ND. *Overweight children and adolescents referred for weight management: Are they meeting lifestyle behaviour recommendations?* ***Applied Physiology, Nutrition and Metabolism***. 33:936-945, 2008.

Holt NL, Moylan BA, Spence JC, Lenk JM, Sehn ZL, Ball GDC. *Treatment preferences of overweight youth and their parents in Western Canada*. ***Qualitative Health Researc***h. 18:1206-1219, 2008.

Franks PW, Huang TTK, Ball GDC. *Lifestyle intervention for type 2 diabetes risk reduction: using the Diabetes Prevention Program to inform new directions in pediatric research*. ***Canadian Journal of Diabetes***. 31:242-251, 2007.

Ball GDC, Huang TT-K, Cruz ML, Shaibi GQ, Weigensberg MJ, Gower BA, Goran MI. *A longitudinal study of pubertal insulin resistance and b-cell function in Caucasian and African-American youth*. ***Journal of Pediatrics***. 148:16-22, 2006.

Shaibi GQ, Cruz ML, Ball GDC, Weigensberg MJ, Salem GJ, Crespo NC, Goran MI. *Effects of resistance training on insulin sensitivity in overweight Hispanic adolescent males*. ***Medicine and Science in Sports and Exercise***. 38:1208-15, 2006.

Goran MI, Ball GDC, Cruz ML. *Obesity and risk of type 2 diabetes and cardiovascular disease in children and adolescents*. ***Journal of Clinical Endocrinology and Metabolism***. 88:1417-1427, 2003.

A spectrum of weight – related disorders in cancer patients: from obesity to cachexia

Professor
Oncology

University of Alberta

Cachexia, from the Greek words 'κακός' and 'hexis' meaning "poor condition", is "a complex metabolic syndrome associated with an underlying illness and characterized by loss of muscle with or without loss of fat mass."

Both weight gain and weight loss are significantly associated with cancer. Obesity associates with increased prevalence or recurrence of several cancers. Involuntary weight loss frequently accompanies advanced cancer and associates with poor treatment response and reduced overall survival. Muscle loss with simultaneous fat gain is reported in cancer patients receiving androgen deprivation therapy and adjuvant breast cancer chemotherapy. Dr. Baracos applies her expertise on nutrition, involuntary weight loss and muscle wasting, to weight-related alterations in patients with different types of cancer.

Recent research focuses on computed – tomography – based assessments of body composition and body composition change in cancer patients (Mourtzakis et al. 2008). Using these approaches, my research group has obtained striking evidence that sarcopenic obesity, resulting from simultaneous muscle loss and fat gain, associates with functional loss and a 10 month reduction in overall survival for patients with solid tumors (Prado et al 2008). Furthermore, sarcopenic patients have a low fat-free tissue mass in proportion to their body body weight and insofar as lean represents volume of distribution for water-soluble drugs, sarcopenia is an important determinant of chemotherapy toxicity Prado e tal 2007) . Chemotherapy is often dosed based on body weight, which ignores potentially important differences in the proportions of fat-free and fat tissues.

RESEARCH TEAM

Dr Carla Prado, Dr Michael Sawyer, Jessica Lieffers, Lisa Martin, Laura Birdsell

KEY PUBLICATIONS

Prado CMM, Leiffers JR, McCargar LJ, Reiman T, Sawyer MB, Martin L, Baracos VE. *Prevelance and clinical implications of sarcopenic obesity in patents with solid tumours of the respiratory and gastrointestinal tracts: a apopulation-based study*. ***Lancet Oncology***. 2008 Jul;9:629-635.

Baracos, VE. *Cancer-Associated cachexia and underlying biological mechanisms*. ***Annual Review of Nutrition.*** 2006;26:435-461.

Mourtzakis M, Prado CMM, Lieffers JR, Reiman T, McCargar LJ, Baracos VE. *A practical and precise approach to quantification of body composition in cancer patients using computed tomography images acquired during routine care*. ***Applied Physiol. Nutrition & Metabolism.*** 2008;33:997-106.

Prado CM, Baracos VE, McCargar LJ, Mourtzakis M, Mulder KE, Reiman T, Butts CA, Scarfe AG, Sawyer MB. *Body composition as an independent determinant of 5-fluorouracil-based chemotherapy toxicity*. ***Clin Cancer Res***. 2007;13:3264-8.

Nutrition and physical activity are the cornerstones of treatment of obesity and type 2 diabetes

Dr. Rhonda Bell

Professor
Agricultural Food &
Nutritional Science

University of Alberta

My research focuses on the role of nutrition in affecting the development of diabetes and its complications, and how nutrition along with physical activity can be integrated into effective, easy-to-deliver lifestyle modification programs to help treat diabetes. More specifically, my focus includes: The effects of nutrition during weaning on physiological processes such as insulin sensitivity and insulin secretion; the role of high fructose intake in promoting the development of diabetic complications in the eye and kidney, and the development and evaluation of practical programs that emphasize nutrition and physical activity as cornerstones of treatment of type 2 diabetes. This research has implications for effectively targeting strategies to prevent type 2 diabetes in later life, and to reduce the complications of diabetes through lifestyle modification.

"The roles of nutrition and lifestyle have huge impacts on the development of obsesity and diabetes."

KEY PUBLICATIONS

Johnson ST and Bell RC (2006). *Solvitur Ambulando – all is solved by walking*. ***Annuals of Internal Medicine.*** 144(9):699.

Johnson ST, Bell G, Harber V, McCargar LJ, Tudor-Locke C, and Bell RC (2006). *Walking faster: Distilling a complex prescription for type 2 diabetes management through pedometry*. ***Diabetes Care.*** 29(7):1654-5.

Johnson ST, McCargar LD, Tudor-Locke C, and Bell RC (2005). *Measuring habitual walking speed of people with type 2 diabetes: Are they meeting recommendations?* ***Diabetes Care.*** 28(1):1503-1504.

Huynh M, Luiken JJP, Coumans W, Bell RC (2008). *Dietary fructose during the suckling period increases body weight and fatty acid uptake into skeletal muscle in adult rats*. ***Obesity.*** 16(8):1755-62.

Johnson ST, Boulé N, Bell G, Bell RC (2008). *Walking: A matter of quantity and quality physical activity for type 2 diabetes management*. ***Applied Physiol Nutr Metabol.*** 33(4):797-801.

Sébert SP, Hyatt MA, Chan LLY, Patel N, Bell RC, Keisler D, Stephenson T, Budge H, Symonds ME, and Gardner DS (2008). *Maternal nutrient restriction between early-to-mid gestation and its impact upon appetite regulation following juvenile obesity*. ***Endocrinology.*** epub ahead of print.

Sutherland LN, Capozzi LC, Turchinsky NJ, Bell RC, Wright DC (2008). *High fat diet induced reductions in adipose tissue mitochondrial content occur independent of changes in AMPK, eNOS and the development of glucose intolerance*. ***American Journal of Physiology (Endocrin. Metabol.).*** 295:1076-1083.

I hope to assist interested bariatric surgeons in developing their technique in the minimal access approach. This will contribute to what they are doing and what they want to do

Associate Professor
Division of Surgery

Director of CAMIS
(The Center for the Advancement of Minimally Invasive Surgery)

University of Alberta

"The use of minimally invasive access surgery lessens blood loss and patient discomfort for severely obese patients."

I was recruited to Edmonton from McMaster University in Ontario to the position of Director of the Centre for the Advancement of Minimally Invasive Surgery because of my experience in minimal access surgery. There's widespread interest in the use of this technique, from surgeons, administrators and patients, the challenge is in making sure CAMIS does things in a comprehensive way that benefits the entire region. I have found this technique highly effective for bariatric surgery on morbidly obese patients. Some of my current research in this area includes: A Multi-Center Feasibility Study to Evaluate the Safety of the Trans-Oral Endoscopic Restrictive Implant System (TERIS) for the Treatment of Obesity and Heated CO_2 With or Without Humidification for Minimally Invasive Abdominal Surgery.

KEY PUBLICATIONS

Mrad BA, Stoklossa CJ, Birch DW. *Does preoperative weight loss predict success following surgery for morbid obesity?* ***Am J Surg.*** 2008May;195(5):570-3; discussion 573-4.

Birch DW, Misra M, Farrokhyar F. *The feasibility of introducing advanced minimally invasive surgery into surgical practice*. ***Can J Surg.*** 2007 Aug;50(4):256-60.

Birch DW. *Characterizing laparoscopic incisional hernia repair*. ***Can J Surg.*** 2007Jun;50(3):195-201.

Wallace T, Birch DW. *A needs-assessment study for continuing professional development in advanced minimally invasive surgery*. ***Am J Surg.*** 2007May;193(5):593-5; discussion 596.

Birch DW, Asiri AH, de Gara CJ. *The impact of a formal mentoring program for minimally invasive surgery on surgeon practice and patient outcomes*. ***Am J Surg.*** 2007May;193(5):589-91; discussion 591-2.

My research program centers on the effect of obesity and physical activity in the treatment and prevention of diabetes. My research interests range from exercise physiology to health promotion

Assistant Professor
Faculty of Physical Education and Recreation
University of Alberta

My current areas of research:

- the integration of physical activity specialists within the diabetes care team;
- interactions between exercise and oral hypoglycemic medications;
- short term effects of exercise on glucose tolerance and glucose absorption;
- survey on the role of different health care professionals in the promotion of physical activity to people with diabetes; and
- various systematic reviews/meta-analyses on predictors of changes in body weight.

"Although exercise has been recommended in people with diabetes for decades, it is especially important for people with type 2 diabetes."

KEY PUBLICATIONS

Boulé NG, Haddad E, Kenny GP, Wells GA, Sigal RJ. *Effects of exercise on glycemic control and body mass in type 2 diabetes mellitus: a meta-analysis of controlled clinical trials*. **JAMA**. 286:1218-27, 2001.

Boulé NG, Bouchard C, Tremblay A. *Physical fitness and the metabolic syndrome in adults from the Quebec Family Study*. **Can J. of Applied Physiology**. 30:140-56, 2005.

Boulé NG, Weisnagel SJ, Lakka TA, et al. *Effects of exercise training on glucose homeostasis: the HERITAGE Family Study*. **Diabetes Care.** 28:108-14, 2005.

Sigal RJ, Kenny GP, Boulé NG, Wells GA, Prud'homme D, Fortier M, Reid RD, Tulloch H, Coyle D, Phillips P, Jennings A, Jaffey J. (2007) *effects of aerobic exercise, resistance exercise, or both on glycemic control in type 2 diabetes*. A Randomized Trial. **Annals of Internal Medicine.** 2007;147(6):I16.

Johnson ST, Robert C, Bell GJ, Bell RC, Lewanczuk RZ, Boulé NG. *Acute effect of metformin on exercise capacity in active males*. **Diabetes, Obesity and Metabolism**. 2007.

Boulé NG, Chaput J-P, Doucet E, Richard D, Després J-P, Bouchard C, Tremblay A. (2007) *Glucose homeostasis predicts weight gain: prospective and clinical evidence*. **Diabetes/Metabolism Research and Reviews**. 2008;24(2):123-9.

The expression of Phosphatidate phosphatase-1 (PAP1), essential enzymes, is associated with the hypertriglyceridemia that occurs in insulin resistance, diabetes and obesity

Professor
Biochemistry

University of Alberta

"I am working towards understanding the role of metabolic functions of lipins."

Lipins (PAP1) are not only essential enzymes of triglyceride synthesis, but they also act as co-transcriptional regulators that increase fatty acid oxidation in insulin resistance and diabetes. Allelic variations in the lipin-1 gene are associated with insulin resistance, adverse changes in energy balance and blood pressure and the development of the Metabolic Syndrome. Our future work is directed to understanding these metabolic functions of the lipins, their roles in controlling hepatic and cardiac metabolism and in the possible prevention of lipotoxicity. PAP1 activity is increased by glucocorticoids (cortisol) in stress conditions, insulin resistance, diabetes and obesity.

RESEARCH TEAM

Meltem Sariahmetoglu, Carlos Pilquil, Sabina Isgandarova, Chifundo Mataya, Cristoforo Gaetano, Nasser Samadi, Boripont Manmontri, Bernard Kok, Jay Dewald

KEY PUBLICATIONS

Zhang P, O'Laughlin L, Brindley DN and Reue K. *Regulation of lipin-1 gene expression by glucocorticoids during adipogenesis*. ***J. Lipid Res.*** 49 (2008) 1519-1528.

Reue K and Brindley DN. *Multiple roles for lipins/phosphatidate phosphatases in lipid metabolism*. ***J. Lipid Res.*** 49 (2008) 2493-2503.

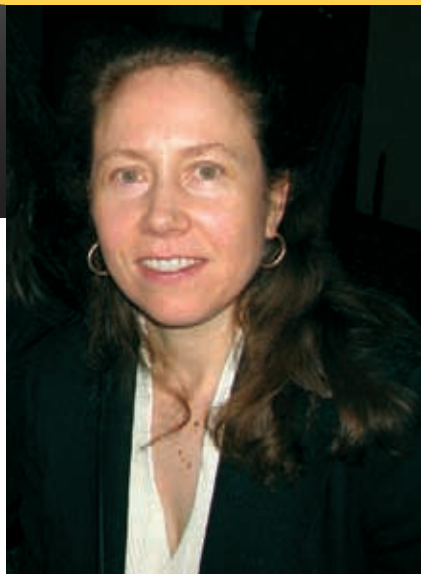
Bou Khalil M, Sundaram M, Zhang H-Y, Links PH, Raven JF, Manmontri B, Sariahmetoglu, Tran MK, Reue K, Brindley DN and Yao Z. *The level and compartmentalization of phosphatidate phosphatase-1 (lipin-1) control the assembly and secretion of hepatic very low density lipoproteins*. ***J. Lipid Res.*** 50 (2008) 47-58.

Donker J, Sariahmetoglu M, Dewald J, Brindley DN and Reue K. *Three mammalian lipins act as phosphatidate phosphatases with distinct tissue expression patterns. Joint corresponding authors*. ***J. Biol. Chem***. 282 (2007) 3450-3457.

Manmontri B, Sariahmetoglu M, Khalil MB, Sundaram M, Yao Z, Reue K, Lehner R and Brindley DN. *Glucocorticoids and cAMP selectively increase hepatic lipin-1 expression and insulin acts antagonistically*. ***J Lipid Res.*** (Papers in press Feb 2, 2008).

Changes in supermarket distribution may have negative consequences for access to healthy foods

Dr. Nairne Cameron



Adjunct Assistant Professor
Centre for Health Promotion Studies and School of Public Health

Since 1970 Canadian obesity rates have increased, along with related health problems. Diet is one factor that has been implicated in the increase. As a major source of healthy foods, Canadian supermarkets have become larger in recent years, with new stores opening and older stores closing. Virtually all food access studies have been static, but this research examines how, over time, shifts in supermarket locations are influenced by demographic trends. Upon closure, there is evidence of some supermarket sites being placed under restrictive covenants, limiting food sales to minimize competition for a chain's nearby stores. While there is little research on restrictive covenants, they may have negative consequences for food access, the neighborhood, and health of residents. In partnership with the local community, this research analyzes the corporate policy of restrictive covenants by assessing their prevalence, effects, and possible interventions in Edmonton, but with wider application to other urban areas.

"Easy accessibility to nutritious food can influence an individual's ability to exercise healthy food choices."

KEY PUBLICATIONS

Smoyer-Tomic KE, Spence JC, Raine KD, Amrhein C, Cameron N, Yasenovskiy V, Cutumisu N, Hemphill E, Healy J. *The association between neighborhood socioeconomic status and exposure to supermarkets and fast food outlets*. ***Health & Place***. Volume 14, Issue 4, December 2008 (in press), Pages 740-754.

How do consumers, producers, and policymakers interact in the marketplace to inf uence a population's health?

Associate Professor
Rural Economy

University of Alberta

"Obesity has become a major public policy issue, but the policy-level determinants of obesity are still not well understood."

My interest on obesity is part of my larger interest in questions of food and health policy. A detailed understanding of both individual and firm behaviour is critical to understanding how public health interventions may work in both desirable and unintended ways. My research also looks at how other food-related policies may have consequences for obesity and public health.

KEY PUBLICATIONS

Annett LE, Muralidharan V, Boxall PC, Cash SB, and Wismer WV (2008). *Influence of information on hedonic evaluation of organic and conventional bread*. ***Journal of Food Science.*** 73(4): H50-H57.

Cash SB and Lacanilao R. 2007. *Taxing food to improve health: Economic evidence and arguments*. ***Agricultural and Resource Economics Review.*** 36(2): 174-182

Cash SB, Sunding DL, and Zilberman D (2005). *Fat taxes and thin subsidies: Prices, diet, and health outcomes*. ***Acta Agriculturae Scand C: Food Economics.*** 2:167-174.

Cash SB, Goddard EW, and Lerohl M (2006). *Canadian health and food: The links between policy, consumers, and industry*. ***Canadian Journal of Agricultural Economics.*** 54: 605-629.

Arnot C, Boxall PC, and Cash SB (2006). *Do ethical consumers care about price? A revealed preference analysis of fair trade coffee purchases*. ***Canadian Journal of Agricultural Economics***. 54: 555-565.

I believe the advances occurring in the field of genetics will have a tremendous, largely positive, impact on health care, the economy, and most important, our basic understanding of human disease and biology

Dr. Timothy Caulfield

Professor
Faculty of Law and School
of Public Health Research

Director
Health Law Institute

University of Alberta

My research focuses on two general areas: biotechnology, ethics and the law; and the legal implications of health care reform in Canada. I have been working on projects that include the regulation of genomic technologies, as well as the exploration of the legal issues associated with obesity and the promotion of healthy lifestyles. I have been the Research Director of the Health Law Institute at the University of Alberta since 1993 and in 2002 was awarded a Canada Research Chair in Health Law and Policy.

RESEARCH TEAM

Tracey M. Bailey, Ron A. Bouchard, Tania Bubela, Peter Carver, Robert L. Duke, Richard Gold, Nina Hawkins, Robyn Hyde-Lay, Karin Kellogg, Lori P. Knowles, Roxanne Mykitiuk, Erin Nelson, Ubaka Ogbogu, Nola M. Ries, Elizabeth C. Robertson, Jacob Shelley, Lori Sheremeta, Barbara von Tigerstrom, Brent Windwick

KEY PUBLICATIONS

Caulfield T, *et.al. Stem cell research ethics: Consensus statement on emerging issues*. ***J. Obs and Gyn Can.*** 2007; 29: 843-848.

McGuire A, Cho M, McGuire S, Caulfield T. *The future of personal genomics.* ***Sci.*** 2007; 317: 168.

Caulfield T, Ogbogu U, Isasi R, *Informed consent in embryonic stem cell research: Are we following basic principles?* ***Can Med Assoc J.*** 2007; 176: 1722-1725.

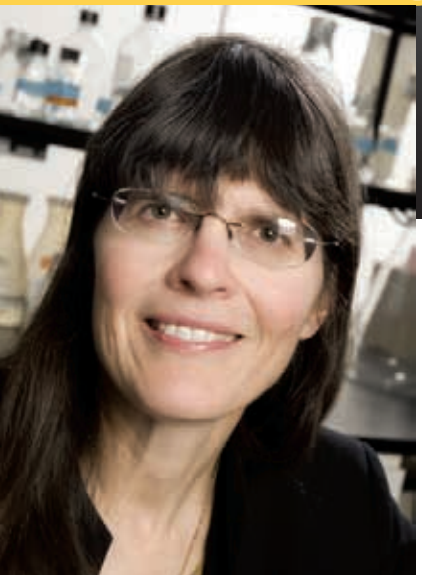
Caulfield T. *Biobanks and blanket consent: the proper place of the public perception and public good rationales.* ***King's Law J.*** 2007; 18: 209-226.

Caulfield T. *Profit and the production of the knowledge: the impact of industry on representations of research results*. (2007) ***Harvard Health Policy Review.*** 2007; 8: 68-77.

"We are in the midst of a scientific revolution, and human genetics deserves its title as the king of the biological sciences."

Dr. Catherine Chan

Determining the links between obesity and type 2 diabetes will help develop "healthy lifestyle" interventions



Professor
Physiology and
Agricultural, Food &
Nutritional Science

University of Alberta

"I have two major interests in obesity. The first is the path-ophysiological links between obesity and type 2 diabetes. The second is developing and implementing "healthy lifestyle" interventions for people with obesity and type 2 diabetes."

A major pathophysiological link between obesity and diabetes is the role of Uncoupling Protein-2 (UCP-2) expressed in pancreatic islets. The functions of UCP-2 in insulin-secreting ß-cells include: overexpression inhibits glucose-stimulated insulin secretion; null expression enhances glucose-stimulated insulin secretion and protects mouse islets from diabetogenic stimuli; expression is up-regulated by fatty acids; the ob/ob mouse has elevated expression of UCP2 prior to developing defects in insulin secretion; induction of UCP2 is also associated with impairment of the maturation of insulin to its most bioactive form. Recently, we showed that UCP2 is also a regulator of glucagon secretion.

My other area of interest is in evaluating the implementation of a physical activity program such as The First Step Program for type 2 diabetic patients, biological and behavioural outcomes were determined to be increased by walking, resulting in improved health and improved health perceptions for adult patients.

RESEARCH TEAM

Jeanine Glassford and Kevin Whitlock

KEY PUBLICATIONS

Diao J, Koshkin V, Allister EM, Lee SC, Bhattacharjee A, Chan CB and Wheeler MB. *UCP2 is highly expressed in pancreatic α-cells and influences secretion and survival*. ***Proc. Natl. Acad. Sci.*** U.S.A. Accepted May 21, 2008.

Chan CB and Tudor-Locke C. *Effect of a community-based pedometer intervention*. ***J. Phys. Act. Health.*** Accepted September 20, 2007. Published online April 2008.

Chan CB, Ryan DAJ and Tudor-Locke C. *Health benefits of a pedometer-based physical activity intervention in sedentary workers*. ***Prev. Med.*** 2004; 39:1215-1222.

Joseph JW, Koshkin V, Zhang C-Y, Lowell BB, Chan CB, and Wheeler MB. *UCP2 knockout mice have enhanced insulin secretory capacity after a high fat diet*. ***Diabetes.*** 2002; 51:3211-3219.

Zhang C-Y, Baffy G, Perret P, Krauss S, Peroni O, Grujic D, Hagen T, Vidal-Puig AJ, Boss O, Kim Y-B, Zheng XX, Wheeler MB, Shulman GI, Chan CB and Lowell BB. *Uncoupling protein-2 negatively regulates insulin secretion and is a major link between obesity, ß cell dysfunction, and type 2 diabetes*. ***Cell.*** 2001; 105:745-755.

Brain membrane structure and function could be altered by early dietary fatty acid intake

Professor
Agricultural, Food &
Nutritional Science
& Medicine (GI)

Associate Chair
Agricultural, Food
& Nutritional Science

University of Alberta

My research program was among the first to demonstrate that dietary fat alters membrane structure and the normal functions of cells. Membrane composition responds to dietary intake and is recognized as a major mechanism through which dietary fatty acids of both essential and non-essential types impact on development of tissues and on many disease processes. Further development of the concept of dietary fatty acid balance indicates that change in dietary fat alters a wide variety of hormone functions including insulin, changes immune functions, and neurotransmitter synthesis at the level of the synaptosomal membrane.

"Dietary fat can alter hormone functions that promote obesity and diabetes"

RESEARCH TEAM

Y.K. Goh, A. Dmytrash, K. Dribnenki, O. Levner, J. Jumpsen, M. Wilke, J. Miklavcic, J. Lambert, T. Duffy, Q. Li, T. Bureyko, E. Ivity, R. Murphy, B. Larsen

KEY PUBLICATIONS

Bureyko T, Hurdle H, Metcalfe JB, Clandinin MT and Mazurak VC (2008). *Reduced growth and integrin expression of prostate cells cultured with lycopene, vitamin E and fish oil in vitro*. ***British Journal of Nutrition.*** (in press).

Agellon LB, Drozdowski L, Li L, Iordache C, Luong L, Clandinin MT, Uwiera RRE, Toth MJ and Thomson ABR (2007). *Loss of intestinal fatty acid binding protein increases the susceptibility of male mice to high fat diet-induced fatty liver*. ***Biochimica & Biophysica Acta.*** 1771: 1283-1288.

Forsythe CE, French MA, Goh YK and Clandinin MT (2007). *Cholesterolemic influence of palmitic acid in the sn-1,3 versus the sn-2 position with high or low dietary linoleic acid in healthy young men*. ***British Journal of Nutrition.*** 98: 337-344.

Park EJ, Suh M, Thomson B, Ramanujam K, Thomson ABR and Clandinin MT (2005). *Dietary ganglioside decreases cholesterol content, caveolin expression and inflammatory mediators in rat intestinal microdomains*. ***Glycobiology***. 15 (10): 935-942.

Clandinin MT, Van Aerde JE, Merkel KL, Harris CL, Springer MA, Hansen JW and Diersen-Schade DA (2005). *Improved growth and development of preterm infants with long-term feeding of infant formulas containing arachidonic acid (ARA) and docosahexaenoic acid (DHA)*. ***J. Peds.*** Vol. 146. Issue 4: 460-467.

Eating, either the right amount, too much or too little, is a behavior, and as such is governed by the brain

Professor
Pharmacology

University of Alberta

"Your brain is making you fat."

Body weight and composition are normally regulated very tightly by the brain over long periods of time, except when calorically-dense, palatable food is abundant. Obesity is a serious and increasingly widespread condition that appears to result more from the excess intake of calories than a reduction in energy expenditure, and so can be seen as a problem in the brain. My laboratory is interested in identifying the changes in the brain that accompany the development of obesity, with the view toward developing novel therapeutic targets to treat obesity. We, and members of our CIHR Team on the Neurobiology of Obesity have been among the pioneers in this field, which is beginning to receive international recognition for the advances in our understanding of the problem of obesity.

RESEARCH TEAM

Nina Pronchuk, Melissa Chee, Chantelle Giesbrecht, Trevor Hamilton

CIHR TEAM

Alain Dagher, Alastair V. Ferguson, Denis Richard, Keith Sharkey

KEY PUBLICATIONS

Colmers WF, Lukowiak KD, and Pittman QJ. *Presynaptic action of neuropeptide Y in area CA1 of the rat hippocampal slice*. ***J Physiol.*** 1987; 383**:** 285-299.

Toth PT, Bindokas V, Bleakman D, Colmers WF and Miller RJ. *Presynaptic inhibition by Neuropeptide Y is mediated by reduced Ca^{2+} influx at sympathetic nerve terminals*. ***Nature.*** 1993; 364: 635-639.

Colmers WF and Bleakman DB. *Neuropeptide Y effects on the electrical properties of neurons*. ***Trends Neurosci.*** 1994; 17: 373-379.

McQuiston AR, Petrozzino J, Connor JA and Colmers WF. *Neuropeptide Y_1 receptors inhibit N-type Ca^{2+} currents and reduce transient Ca^{2+} increases in rat dentate granule cells*. ***J. Neurosci.*** 1996; 16: 1422-1429.

Cowley M, Pronchuk N, Fan W, Dinulescu DM, Colmers WF and Cone RD. *Integration of NPY, AGRP and α-MSH signals in the paraventricular nucleus of the hypothalamus: Evidence of a cellular basis of the adipostat*. ***Neuron.*** 1999; 24: 155-163.

Children born from a complicated pregnancy are known to have later-life complications such as obesity and high blood pressure

Professor
Obstetrics & Gynecology and Physiology

University of Alberta

Obesity is a risk factor for Preeclampsia, a pregnancy specific disorder diagnosed by high blood pressure and proteinuria. My lab is interested in how factors like estrogen, angiotensin II or TNFα affect vascular function resulting in the development of preeclampsia and how these factors affect intra-uterine growth and placental insufficiency, a major cause of fetal growth restriction. Our research could lead to novel therapeutic interventions to improve vascular function, in a number of conditions such as atherosclerosis, thrombosis, hypertensive disorders and preeclampsia.

"... obesity is a risk factor for Preeclampsia, a pregnancy specific disorder diagnosed by high blood pressure and proteinuria."

RESEARCH TEAM

Subhadeep Chakrabarti, Irene Andersson, Jude Morton, Christian Rueda-Clausen, Olga Lekontseva, Joanna Stanley, Sowndramalingam Sankaralingam, Ferrante Gragasin

KEY PUBLICATIONS

Fernandez-Patron C, Radomski MW and Davidge ST. *Vascular matrix metalloproteinase-2 cleaves big endothelin-1 yielding a novel vasoconstrictor*. ***Circ Res.*** *1999;*85:906-911.

Armstrong SJ, Zhang Y, Stewart KG, Davidge ST. *Estrogen-replacement reduces PGHS-2 dependent vasoconstriction in the aged rat*. ***Am J Physiol.*** 2002;283:H893-H898.

Gragasin FS, Xu Y, Arenas IA, Kainth N, Davidge ST. *Estrogen reduces angiotensin II-induced nitric oxide synthase and NAD(P)H oxidase expression in endothelial cells*. ***Arterioscler Thromb Vasc Biol.*** 2003, 23:38-44.

Arenas IA, Armstrong SJ, Xu Y, Davidge ST. *Chronic TNFα inhibition enhances nitric oxide modulation of vascular function in estrogen deficient rats*. ***Hypertension.*** 2005;46:76-81, 2005.

Williams, SJ, Hemmings, DG, McMillen IC, Davidge ST. *Effects of maternal hypoxia or nutrient restriction during pregnancy on endothelial function in adult male rat offspring*. ***J Physiol.*** 2005;565 :125-135.

Breakthroughs in the area of cardiac energy metabolism have helped us to understand better metabolic diseases such as atherosclerosis, obesity, and diabetes

Professor/Director
Pediatrics/Cardiovascular Research Group

University of Alberta

"Information from research focused on cardiac energy metabolism should ultimately lend insights into the pathogenesis of heart failure and certain cardio-myopathies originating in both the adult and newborn heart."

Molecular control of the enzymes involved in regulating cardiac energy metabolism has been linked to metabolic diseases such as atherosclerosis, obesity, and diabetes. These metabolic perturbations have been linked to cardiopathological conditions such as ischemia/reperfusion injury and cardiac hypertrophy. My current funding has allowed me to focus on the defining the effects of specific metabolic enzymes during ischemia/reperfusion injury, and in cardiac abnormalities arising from altered fatty acid handling.

RESEARCH TEAM

Amy Barr, Anita Chan, Karalyn Folmes, Vern Dolinsky, Debby Koonen, Thomas Pulinilkunnil, Grant Masson, Carrie-Lynn Soltys, Miranda Sung

KEY PUBLICATIONS

Koonen DPY, Jacobs RL, Febbraio M, Young ME, Soltys C-LM, Ong H, Vance DE, Dyck JRB. *Increased hepatic CD36 expression contributes to dyslipidemia associated with diet-induced obesity*. ***Diabetes.*** 2007;56(12):2863-71.

Koonen DPY, Febbraio M, Bonnet S, Nagendran J, Young ME, Michelakis ED, Dyck JRB. *CD36 expression contributes to age-induced cardiomyopathy in mice*. ***Circulation.*** 2007;116(19):2139-47.

Folmes KD, Witters LA, Allard MF, Young ME, Dyck JRB. *The AMPK gamma 1 R70Q mutant regulates multiple metabolic and growth pathways in neonatal cardiac myocytes*. ***Am J Physiol Heart Circ Physiol.*** 2007 ;293(6):H3456-64.

Dyck JRB. *The ischemic heart: Starving to stimulate the adiponectin-AMPK signaling axis*. ***Circulation.*** 2007;116(24):2779-8. Editorial.

Koves TR, Ussher JR, Slentz D, Mosedale M, Ilkayeva O, Bain J, Stevens R, Dyck JRB, Newgard CB, Lopaschuk GD, Muoio DM. *Mitochondrial overload and incomplete fatty acid oxidation contribute to skeletal muscle insulin resistance*. ***Cell Metabolism.*** 2008;7(1):45-56.

Chan AYM, Dolinsky VW, Soltys C-LM, Viollet B, Baksh S, Light PE, and Dyck JRB. *Resveratrol inhibits cardiac hypertrophy via AMP-activated protein kinase and Akt*. 2008;283(35):24194-201.

Obesity is now established as a disease that co-exists with chronic inf ammation

Dr. Catherine Field

Professor
Agricultural, Food & Nutritional Science

University of Alberta

Inf ammation is usually associated with T cell dysfunction but this has not been well established in obesity. My interest is to characterize immune dysfunction associated with obesity and then to design and test specific dietary modifications that can improve immune function. Recent discoveries have demonstrated: obesity is associated with a lower ability of T cells to proliferate (response) to stimuli. However, when they respond they respond in a Th-1 skewed manner and produce more inflammatory cytokines. Supplementing the diet a non-essential fatty acid, conjugated linoleic acid (CLA) improved this response; feeding a ruminant-dervied fatty acid, vaccenic acid (VA) for three weeks as 2% of energy, significantly reduced blood triglycerides in an animal model of obesity/metabolic syndrome with elevated blood lipids; and feeding obese JCR:LA cp/cp rats a diet supplemented with fish oil provided long chain polyunsaturated fats at 1.5-3% of energy, significantly improved immune dysfunction.

"T cells dysfunction may contribute to many of the pathologies associated with obesity. Changing the composition of dietary fat can improve these."

RESEARCH TEAM

H. Hosea, M. Ruth, F. Fayyaz, S. Goruk, M. Newell, P. Sorochen, P. Biondo, H. Yu, J. Lau, K. Lee, M. Muzychenko, S. Samuelson, A. Dixon

KEY PUBLICATIONS

Ruth MR, Taylor CG, Zahradka P, Field CJ. *Abnormal immune responses in the fa/fa zucker rat and the effects of feeding conjugated linoleic acid isomers*. ***Obesity.*** (accepted Nov 2007).

Wang Y, Lu J, Ruth MR, Reany M, Goruk S, Vine D, Field CJ, Proctor SD. *Trans-11 vaccenic acid dietary supplementation induces hypolipidemic 1 effects in JCR:LA-cp rats*. Journal of ***Nutrition.*** (revised version submitted July 2008).

Ruth MR, Proctor SD, Field CJ. *Feeding fish oil to obese JCR:LA-cp rats modifies immune function and lipid raft fatty acid composition*. ***British Journal of Nutrition.*** (revision submitted July 2008).

By understanding more about what children think, feel, and experience researchers should be able to produce knowledge that helps improve health

Associate Professor
Physical Education and Recreation

University of Alberta

"I am interested in the prevention and treatment of obesity among children and youth, particularly psychosocial factors and physical activity participation."

Identification of the treatment preferences and needs of overweight children and their families prior to them receiving treatment from a pediatric weight management clinic revealed a complex interaction between individual, familial and environmental factors that impact both behavior change and health services delivery in pediatric weight management. At the family level, parents attempted to influence their children's lifestyle behaviors by using contradictory and inconsistent strategies that reflected extremes of leniency and control. There was resistance to reducing screen time because participants thought that it was important for the children's social lives. Participants desired better help from health care professionals, requested family-centered treatment, expressed a desire for increased social support, and needed policy/program level changes to assist their weight manage-ment efforts. This information offers valuable insight into appropriate treatment strategies for overweight children.

RESEARCH TEAM

Martin Jones, Katherine Tamminen, Bethan Kingsley, Camilla Knight, Danielle Black, Ceara-Tess Addy, Lisa Tink, Zoe Sehn

KEY PUBLICATIONS

Holt NL (Ed., 2008). ***Positive youth development through sport***. London: Routledge.

Holt NL, Tamminen KA, Black DE, Mandigo JL, & Fox KR (in press). *Youth sport parenting styles and practices*. ***Journal of Sport & Exercise Psychology.***

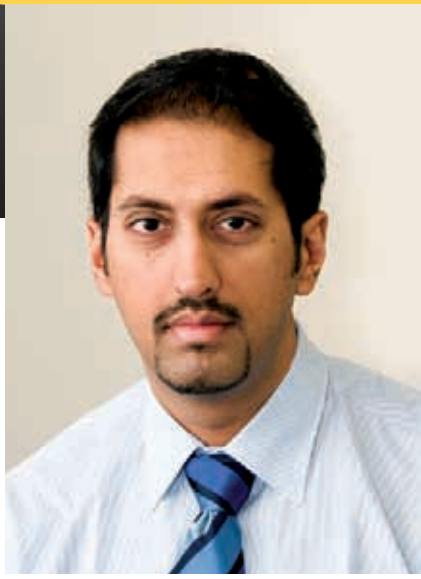
Holt NL, Moylan BA, Spence JC, Lenk LM, Sehn ZL, and Ball GDC (2008). *Treatment preferences of overweight youth and their parents in western Canada*. ***Qualitative Health Research.*** 18, 1206-1219.

Holt NL, Black DE, Tamminen KA, Mandigo JL, & Fox KR (2008). *Levels of social complexity and dimensions of peer experience in youth sport*. ***Journal of Sport & Exercise Psychology.*** *30*, 412-432.

Holt NL, Tink LN, Mandigo JL & Fox KR (2008). *Do youth learn life skills through their involvement in high school sport?* ***Canadian Journal of Education.*** *31*(2), 281-304.

Obesity surgery is currently the best treatment for severe obesity- finding the best surgery for the right patient remains a key challenge

Dr. Shahzeer Karmali



Assistant Professor
Surgery

Minimally invasive and
Bariatric Surgery

University of Alberta

My research interests include developing clinical trials in endoluminal bariatric techniques, laparoscopic sleeve gastrectomy, single incision laparoscopic surgery and natural orifice transluminal endoscopic surgery. Currently we are testing the safety and efficacy of a trans-orally implanted investigational medical device that circumvents the esophageal opening and serves as a restrictive reservoir for food entering the stomach. The device is placed via a trans-oral endoscopic procedure and is intended to create the sensations of satiety and fullness resulting in less food intake.

"Endoscopic surgery may further reduce the risk of bariatric surgery."

RESEARCH TEAM

Centre for the Advancement of Minimally Invasive Surgery (CAMIS)

KEY PUBLICATIONS

Ball CG, Karmali S, Rajani R. *Laparoscopy in trauma: An evolution in progress*. (in press injury).

Karmali S, Sweeney J, Yee K, Brunicardi FC, Sherman V. *The trans-gastric endoscopic rendez-vous technique (TGER) for removal of an eroded molina gastric band*. ***Surg Obes Relat Dis.*** 2008 Jul-Aug;4(4):559-62. Epub 2008 Jun 30.

Laupland KB, Karmali S, Kirkpatrick AW, Crowshoe L, Hameed M. *Distribution and determinants of critical illness among status Aboriginal Canadians. A Population-Based Assessment.* ***J Critical Care.*** 2006 Sep;21(3):243-7.

Kirkpatrick AW, Laupland KB, Karmali S, Bergeron E, Charyk T, Findlay C, Parry N, Khetparpal S, Evans D, *Spill your guts. Perception of Trauma Association of Canada Surgical members on the management of the open abdomen*. ***J Trauma.*** 2006 Feb; 60(2):279-286.

Karmali S, Shaffer EA. *The battle against the obesity epidemic: Is bariatric surgery the perfect weapon?* ***Clin Invest Med.*** Aug 2005; 28 (4): 147-156.

Karmali S, Shaffer EA. *The obesity epidemic: Is bariatric surgery the antidote?* ***Can J Gastro.*** August 2005, 19(8): 479-80.

Obesity currently affects more than 20% of adults in North America and it is a risk factor for hypertension, diabetes and cardiovascular disease

Associate Professor
Pediatrics

Adjunct Associate Professor
Cell Biology Director of the
Group on Molecular and Cell
Biology of Lipids

University of Alberta

"The major goal of our research is to develop novel strategies for lowering blood lipid levels."

Triacylglycerol (TG) is the most concentrated form of energy storage available to mammals and excessive TG storage manifests as obesity. Elevated plasma LDL cholesterol levels are directly correlated with the risk of atherosclerosis. Therefore, there is a substantial pharmacological interest in the enzymes that control TG and cholesterol metabolism in tissues. Our research is focused at elucidating the mechanism by which triacylglycerol and cholesterol are utilized by the cell. We have characterized lipases that are involved in VLDL secretion from hepatocytes and fatty acids and glycerol release from adipose tissue. We have now also generated genetically altered mouse models that have no expression of the lipases and are studying the consequence on lipid metabolism in vivo.

RESEARCH TEAM

Enhui Wei, Michaela Thomason-Hughes, Huajin Wang, Vivien Lo, Johanne Lamoreux, Lena Li, Audric Moses, Barb Tetarenko

KEY PUBLICATIONS

Gilham D, Ho S, Rasouli M, Martres P, Vance DE, Lehner R. *Inhibitors of hepatic microsomal triacylglycerol hydrolase decrease very low density lipoprotein secretion*. ***FASEB J.*** 2003 Sep;17(12):1685-7.

Gilham D, Alam M, Gao W, Vance DE, Lehner R. *Triacylglycerol hydrolase is localized to the endoplasmic reticulum by an unusual retrieval sequence where it participates in VLDL assembly without utilizing VLDL lipids as substrates*. ***Mol Biol Cell.*** 2005 Feb;16(2):984-96.

Wei E, Gao W, Lehner R. *Attenuation of adipocyte triacylglycerol hydrolase activity decreases basal fatty acid efflux*. ***J Biol Chem.*** 2007 Mar 16;282(11):8027-35.

Wang H, Gilham D, Lehner R. *Proteomic and lipid characterization of apolipoprotein Bfree luminal lipid droplets from mouse liver microsomes: implications for very low density lipoprotein assembly*. ***J Biol Chem.*** 2007 Nov 9;282(45):33218-26.

Wei E, Alam M, Sun F, Agellon LB, Vance DE, Lehner R. Apolipoprotein B and triacylglycerol secretion in human triacylglycerol hydrolase transgenic mice. ***J Lipid Res.*** 2007 Dec;48(12):2597-606.

Are the interactions between physical activity, insulin resistance, obesity and cardiovascular parameters such as blood pressure and cardiac output continuous or determined by thresholds?

Professor
Endocrinology
University of Alberta

Two major studies being conducted in this area are the BlackGold Healthy Hearts Project and the 13-C glucose breath test for measurement of insulin resis-tance. The first is a longitudinal cohort study that demonstrates even at very young ages, an increase in age-related body mass index is associated with adverse meta-bolic and cardiovascular changes. Specifically, insulin resistance increases with increasing BMI as does blood pressure. The mechanism of blood pressure increase, however, seems to be an increase in cardiac stroke volume, with compensatory decreases in peripheral vascular resistance and no change in heart rate. Moreover, physical fitness tends to abrogate the adverse effects of obesity, although physical fitness seems to be strongly correlated with a lower weight. The second study is the development of a standardized and non-invasive test to measure insulin resistance that involves ingestion of (non-radioactive) carbon-13 labelled glucose and tracing its elimination as carbon dioxide in the breath.

"Cardiometabolic disease is a societal disease and starts in childhood. It is much easier to prevent disease than to try and "undo" it. Thus, we wish to study the determinants of cardiometabolic disease in children – at a time when it is still preventable or reversible."

RESEARCH TEAM

Jon McGavock, Brian Torrance, Ron Plotnikoff, Geoff Ball, Heather Dean, Sumit Majumdar

KEY PUBLICATIONS

Johnson ST, Robert C, Bell GJ, Bell RC, Lewanczuk RZ, Boule NG. *Acute effect of metformin on exercise capacity in active males.* ***Diabetes Obes Metab.*** (in press).

McGavock JM, Torrance B, McGuire KA, Wozny P, Lewanczuk RZ. *The relationship between weight gain and blood pressure in children and adolescents*. ***Am. J. Hypertens.*** 2007; 20:1038-44.

Torrance B, McGuire KA, Lewanczuk R, McGavock J. *Overweight, physical activity and high blood pressure in children: a review of the literature*. ***Vasc. Health Risk Manag.*** 2007; 3:139-49.

Riess K, Gourishankar S, Dueck A, Jones L, McGavock J, Lewanczuk R, Haykowsky M. *Impaired arterial compliance and aerobic endurance in kidney transplant recipients*. ***Transplantation.*** 2006; 82:920-3.

McGavock J, Anderson TJ, Lewanczuk RZ. Sedentary lifestyle and antecedents of chronic disease in young adults. ***Am. J. Hypertens***. 2006; 19:701-7.

Dr. Lili Liu

Chair
Occupational Therapy
University of Alberta

"In order to help older adults with cognitive, sensory and physical issues age in place health service providers need to consider how clients can access services while living with dignity and a good quality of life in their home environments."

How does obesity affect older adults, their rehabilitation interventions and environmental/equipment design implications?

My interest in technologies began with telerehabilitation, following a study on the DriVR, a virtual reality driving assessment for persons with head injury. I led a study that examined use of technologies by Alberta rehabilitation professionals for continuing education. I was also a member of a national study that developed the Safety Assessment Scale (SAS) for use with people who have dementia and are living at home. Currently, my colleagues and I are examining how continuing care centres can provide efficient care while maintaining homelike environments for elderly residents. I am also interested in universal design as it relates to technologies, products and built environments.

RESEARCH TEAM

Robert Lederer, Doris Milke, Maria Mayan, Suzanne Maisey, Robert Lederer, Gill Chard, Ingrid Barlow, Anne Sales, Angela Sekulic, Susan Burwash, Merrill Semple, Julian Khan, Meghan Sharp, Meaghan Cain, Jennifer Szydlowski

KEY PUBLICATIONS

Chard G, Liu L, Mulholland S (in press). *Strategies to increase engagement in occupations in persons with Alzheimer disease living in an assisted living facility*. ***Physical and Occupational Therapy in Geriatrics***.

Douglas A, Letts L, & Liu L (in press). *Cognitive assessments for older adults: A critical approach*. ***Physical and Occupational Therapy in Geriatrics***.

Douglas A, Liu L, Warren S, & Hopper T (2007). *Cognitive assessments for older adults: Which ones are used by Canadian occupational therapists and why*. ***Canadian Journal of Occupational Therapy***. 5(74), 370-381.

Liu L, Barnfather A, & Stewart M, (2007). *Support for caregivers of older adults with chronic conditions: A Canadian perspective*. ***Geriatrics & Aging***. *10*(6), 397-401.

Liu L, Triscott J, Dobbs B, Strain L, Burwash S, Cleary S, Hopper T, & Warren S (2006). *Distance delivery of geriatric consultation to family physicians in rural Alberta: Preliminary results*. ***Proceedings of the Second IASTED International Conference on Telehealth***. July 3-5, 2006, Banff, AB, pp. 34-37.

The heart needs a constant and plentiful source of fuel to maintain normal pump function. When fatty acids dominate as a source of fuel, it is detrimental to the heart and can compromise heart function

Professor
Pediatrics and Pharmacology

Scientific Director
Mazankowski Alberta Heart Institute

AHFMR Medical Scientist

University of Alberta

My research focuses on the regulation of fatty acid oxidation and the mechanism by which high rates of fatty acid oxidation contribute to ischemic injury, and how alterations in fatty acid metabolism contribute to cardiovascular disease in the diabetic. At a molecular level I have characterized a number of key enzymes important in the regulation of cardiac fatty acid oxidation. We are currently investigating how these molecules can be used for treating obesity and other metabolic disorders.

"One approach to finding better treatments for obesity would be optimizing energy metabolism."

RESEARCH TEAM

John Ussher, Victoria Lam, Wendy Keung, Wei Wang, Tatsujiro Oka, Su Gao, Lyan Zhang, Ken Strydnadka, Cory Wagg, Vaninder Sidu, Victor Samokhvalov

KEY PUBLICATIONS

Yatscoff MA, Jaswal JJ, Grant MR, Greenwood R, Lukat T, Beker DL, Rebeyka IM, Lopaschuk GD. *Myocardial hypertrophy and the maturation of fatty acid oxidation in the newborn human heart*. ***Pediatr. Res.*** 2008; Epub ahead of print.

Koves TR, Ussher JR, Slentz D, Mosedale M, Ilkayeva O, Bain J, Stevens R, Dycj J, Newgard, CB, Lopaschuk GD and Muoio DM. *Mitochondrial overload and incomplete fatty acid oxidation contribute to skeletal muscle insulin resistance*. ***Cell Metabol.*** 2008; 7**:** 45-56.

Lopaschuk GD, Folmes C and Stanley WC. *Cardiac energy metabolism in obesity*. ***Circ. Res.*** 2007; 102: 335-347

Gao S, Kinzig KP, Aja S, Scott KA, Keung W, Kelly S, Strynadka K, Chohan S, Smith WW, Tamashiro KL, Ladenheim EE, Ronnett GV, Tu Y, Birnbaum MJ, Lopaschuk GD, and Moran TH. *Leptin activates hypothalamic acetyl-CoA carboxylase to inhibit food intake*. ***Proc. Natl. Acad. Sci.*** 2007; 104: 17358-63.

Bonnet S, Archer SL, Allalunis-Turner J, Haromy A, Beaulieu C, Thompson R, Lee CT, Lopaschuk GD, Puttagunta L, Bonnet SN, Harry G, Hashimoto K, Thebaud B, Michelakis E. (2007). *A Mitochondria-K+ Channel Axis is suppressed in cancer and its normalization promotes apoptosis and inhibits cancer growth*. ***Cancer Cell.*** *2007* 11:37-51.

We examine cellular function and insulin secretion through the use of state of the art electrophysiological and imaging approaches, combined with molecular biology and in vivo studies

Assistant Professor
Pharmacology

University of Alberta

"Our laboratory studies the mechanisms controlling the function of hormone secreting cells of the pancreatic islets of Langerhans in health and disease."

We are interested in the regulation of insulin secretion from the islet β-cells. Electrophysiological methods include whole-cell, cell attached and excised patch examination of ion channel function and exocytosis/ endocytosis, including a novel assay of single vesicle exocytosis and fusion pore dynamics. We also use laser TIRF and epi-fluorescence microscopy to examine membrane protein localization, signal transduction and intracellular Ca^{2+} responses in single islet cells and intact pancreatic islets. *In vivo* studies include the investigation of glucose tolerance and plasma hormone responses in mouse models of disease.

RESEARCH TEAM

Jocelyn Manning Fox, Nancy Smith, Greg Plummer, Xiao Qing Dai, Xiaohua Dai, Aliya Spigelman, Jelena Kolic, Cathrine Hajmrle

KEY PUBLICATIONS

MacDonald PE, De Marinis YZ, Salehi A, Ramracheya R, Johnson PRV, Eliasson L, Rorsman P. *An intrinsic K_{ATP} channel-dependent pathway regulates glucagon release from mouse and human pancreatic α-cells*. ***PLoS Biology.*** 5(6), e143 doi:10.1371/journal.pbio.0050143, 2007.

MacDonald PE, Rorsman P. *The ins and outs of secretion from pancreatic β-cells: Control of single vesicle exo- and endocytosis*. ***Physiology.*** 22:113-21, 2007.

MacDonald PE, Braun M, Galvanovskis J, Rorsman P. *Release of small transmitters through kiss-and-run fusion pores in rat pancreatic β-cells*. ***Cell Metabolism.*** 4:283-290, 2006.

MacDonald PE, Rorsman P. *Insulin secretion, oscillations and intercellular coupling in pancreatic β-cells*. ***PLoS Biology.*** 4(2):e49, 2006.

Hanna ST, Pigeau GM, Galvanovskis J, Clark A, Rorsman P, Macdonald PE. *Kiss-and-run exocytosis and fusion pores of secretory vesicles in human β-cells*. ***Pflugers Archiv.*** DOI 10.1007/s00424-008-0588-0, 2008.

Associate Professor
General Internal Medicine
University of Alberta

Three examples of the type of research I conduct are: Osteoporosis, we are enrolling a prospective cohort of patients with wrist fractures, to examine outcomes, health-related quality of life, and costs related to fractures. In a controlled trial, we are studying an intervention to improve the care of these patients compared with usual care. Additional studies involving fractures of the hip and spine are in various stages of development and implementation; Diabetes mellitus, we are enrolling a prospective cohort of patients with diabetes in rural communities, to examine outcomes, quality of life, costs, and access. In a controlled trial, we are studying an intervention to improve the treatment of cardiovascular risk factors in these patients compared with usual care; and Chronic cardiovascular disease, we are implementing (and evaluating in a controlled trial) an intervention that uses opinion leader-endorsed guidelines to improve the quality of prescribing for ischemic heart disease and congestive heart failure.

"My current research agenda attempts to answer 3 inter-related questions: (1) Does underuse of proven effective therapies exist? (2) What are the barriers to best practice? (3) How do we change practice and optimize evidence-based prescribing?"

KEY PUBLICATIONS

Majumdar SR, Gurwitz JH, Soumerai SB. *Undertreatment of hyperlipidemia in the secondary prevention of coronary artery disease*. ***J Gen Intern Med.*** 14:711-717, 1999. (with an editorial by MJ Klag entitled "HMG coenzyme reductase inhibitors – good news and bad").

Johnson JA, Majumdar SR, Simpson SH, Toth EL. *Decreased mortality associated with the use of metformin compared to sulfonylurea monotherapy in type-2 diabetes*. ***Diabetes Care.*** 25:2244-2248, 2002. (with an editorial by JL Leahy entitled *Is metformin cardioprotective?*).

Majumdar SR, Chang W, Armstrong PW. *Do the investigative sites that take part in a positive clinical trial translate that evidence into practice?* ***American Journal of Medicine.*** 113:140- 145, 2002. (with an editorial by CD Naylor entitled *Putting evidence into practice*).

Majumdar SR, Guirguis LM, Toth EL, Lewanczuk RZ, Lee TK, Johnson JA. *Controlled trial of a multifaceted intervention to improve the quality of care for rural patients with type-2 diabetes (The DOVE Study)*. ***Diabetes Care.*** 26:3061-3066, 2003.

Majumdar SR, Rowe BH, Folk D, JA Johnson, Holroyd BH, Morrish D, Harley CH, Maksymowych WP, Steiner I, Wirzba B, Hanley DA, Russell AS. *A controlled trial to increase detection and treatment of osteoporosis in older patients with a wrist fracture*. ***Annals Intern Med.*** 141:366-373, 2004.

We need to explore novel aspects of obesity in an effort to inform effective prevention strategies

Professor/Director
Human Nutrition Research Unit

University of Alberta

"Understanding the nutritional status, body composition and energy expenditure of an obese individual plays a major role in also understanding their health risks, and for determining the most appropriate treatment strategies."

Dr. Linda McCargar has been involved in research studying various aspects of obesity relating to nutrient and energy intake, energy expenditure and body composition throughout her academic career. Her research has consisted of longitudinal studies of lifestyle factors affecting pediatric obesity, large epidemiological surveys of adolescents' dietary intake and lifestyle behaviours, studies assessing type 2 diabetes risk factors in children and adolescents, school health promotion and more recently, sarcopenic obesity in disease states.

RESEARCH TEAM

Laura Kennedy, Carla Prado, Heidi Bates, Stephanie Thomas, Shauna Downs, Leanne Haney

KEY PUBLICATIONS

Gingras JR, Fitzpatrick J, McCargar LJ. (2004) *Body image of chronic dieters: Lowered appearance evaluation and body satisfaction*. ***J Am Diet Assoc.*** 104:1589-1592.

Minaker L, McCargar LJ, Lambraki I, Jessup L, Driezen P, Calengor K, Hanning R. (2006) *School region socio-economic status and geographic locale is associated with food behaviour of Ontario and Alberta adolescents*. ***Can J Public Health.*** 97:357-361.

Vance VA, Woodruff SJ, McCargar LJ, Husted J, Hanning RM. (2008) *Self-reported dietary energy intake of normal weight, overweight, and obese adolescents*. ***Public Health Nutrition.*** 29:1-6 Epub ahead of print.

Prado CMM, Baracos VE, McCargar LJ, Mourtzakis M, Mulder KE, Reiman A, Butts CA, Scarfe AG, Sawyer MB. *Body composition as an independent determinant of 5-fluorouracil based chemotherapy toxicity*. ***Clinical Cancer Research.*** 2007; 13:3264-3268.

Prado CMM, Lieffers JR, McCargar LJ, Reiman T, Sawyer MB, Martin L, Baracos VE. *Prevalence and clinical implications of sarcopenic obesity in patients with solid tumors of the respiratory and gastrointestinal tracts*. ***Lancet Oncology.*** 2008; 9:629–635.

Obesity complicates operative procedures and is felt to increase the risk to patients, while prolonging recovery

Dr. John C. Mullen

Professor
Division of Cardiac Surgery
University of Alberta

My research seeks to identify how obesity impacts the patient pre- and post-operatively. We conducted retrospective review of data for heart and lung transplant patients and for patients undergoing coronary artery bypass grafting. In heart transplant patients, those with BMI ≥ 33 and BMI < 18.5 are associated with reduced one- and five-year survival. However, we did not find the same result among lung transplant patients. Intubation was significantly prolonged among lung transplant patients with BMI ≥ 30. Severe obesity (>40 kg/m^2) was found to be a significant predictor of 30-day mortality following coronary artery bypass grafting.

"Obesity is commonly cited as a significant comorbidity in heart and lung transplantation."

RESEARCH TEAM

Patricia Lo and Laurie Arneson

KEY CONFERENCE PRESENTATIONS

Mullen JC, Oreopoulos A, Tam-Chung T, Bentley MJ, Lien DC, Jackson K, Stewart K, Brown P, Taskinen A, Modry DL. *The effect of body mass index on postoperative outcomes and survival in lung transplant recipients.* **Presented at the International Congress on Lung Transplantation Meeting**. Paris, France, September 15, 2006.

Oreopoulos A, Mullen JC, Koshal A, Modry DL, Wang S, MacArthur R, Ross DB, Gelfand ET. *The obesity paradox in coronary artery disease: The effect of body mass index on morbidity and mortality after surgical revascularization.* **Abstracts of the Canadian Cardiovascular Congress Meeting**, Vancouver, British Columbia, October 24, 2006. ***Can J Cardiol.*** 2006; 22 (Suppl D): 168D.

Oreopoulos A, Mullen JC, Becker S, Bentley M, Modry D, Wang S, MacArthur R, Ross D, Gelfand E. *The effect of body mass index on postoperative length of stay and survival in heart transplant recipients.* **Presentated at The International Society for Heart and Lung Transplantation, 27th Annual Meeting**, San Francisco, California, April 28, 2007.

Mullen JC , Oreopoulos A, Becker S, Bentley M, Modry D, Wang S, MacArthur R, Ross D, Gelfand E. *The effect of body mass index on postoperative length of stay and survival in heart transplant recipients.* **Presented at the Canadian Society of Transplantation Annual Meeting**, Banff, Alberta, March 17, 2007.

Mullen JC, Oreopoulos A, Tam-Chung T, Bentley MJ, Lien DC, Jackson KB, Stewart K, Brown P, Taskinen A, Modry D. *The effect of body mass index on postoperative outcomes and survival in lung transplant recipients.* **Presented at the Canadian Society of Transplantation Annual Meeting**, Banff, Alberta March 17, 2007.

The long-term effects of using anti-obesity drugs may not out weigh the risk factors of obesity

Assistant Professor
General Internal Medicine
University of Alberta

"The obesity epidemic is now well documented. The next step is to find effective treatments."

I am a general internist, clinical epidemiologist and clinical pharmacologist. My primary research interest is in the medical/surgical treatment of obesity – particularly severe obesity. Other interests include the epidemiology of obesity in Canada and the metabolic adverse effects of antihypertensive drug therapy. My main areas of methodological expertise are systematic reviews/meta-analysis and health outcomes research using administrative data. Currently, I am conducting a study examining the health outcomes and costs of bariatric surgery and the humanistic and economic ramifications extended wait times for bariatric surgery. I am also interested in studying the effects of bariatric surgery on medication absorption.

RESEARCH TEAM

Arya Sharma, Dan Birch, Carlene Stoklossa, Sumit Majumdar

KEY PUBLICATIONS

Rucker D, Padwal R, Li SK, Curioni C, Lau DCW. *Long-term pharmacotherapy for obesity and overweight: an updated meta-analysis*. ***BMJ.*** 2007; 335:1194-9.

Padwal RS, Majumdar SR. *New Drug Classes: Drug treatments for obesity: orlistat, sibutramine, and rimonabant*. ***Lancet.*** 2007; 369:71-7.

Padwal RS, Kezouh A, Levine M, Etminan M. *Long-term persistence with orlistat and sibutramine in a population-based cohort*. ***Int J Obes.*** 2007; 31:1567-70.

Padwal R, Laupacis A. *Antihypertensive therapy and incidence of type 2 diabetes: a systematic review*. ***Diabetes Care.*** 2004;27:247-55.

Padwal RS, Hemmelgarn BR, McAlister FA, et al. *The 2007 Canadian Hypertension Education Program recommendations for the management of hypertension: Part 1 – blood pressure management, diagnosis and assessment of risk*. ***Can J Cardiol.*** 2007 May 15;23:529-38.

Physical activity behaviour change interventions in the context of ecological frameworks are integral for the prevention and management of diabetes and cardio-vascular disease, and the promotion of healthy body weight and general health

Professor
Centre for Health Promotion Studies

University of Alberta

Over the past decade, my work has focused on four spheres of research (i.e., physical activity/exercise, diabetes/cardiovascular disease, social-cognitive models, and ecological approaches). The 5-10 year research plan in my Physical Activity and Population Health (PAPH) Research Laboratory will be to continue and extend this current research on theory and intervention testing towards the development of efficacious programs on physical activity behaviour change.

RESEARCH TEAM

Laura Flaman, Cynthia Forbes, Nicole Glenn, Ikuyo Imayama, Steve Johnson, Mila Luchak, Haley MacDonald, Ron Plotnikoff, Cathy Pollack, Ivan Todosijczuk, Linda Trinh

KEY PUBLICATIONS

Plotnikoff R, Lightfoot P, Barrett L, Spinola C, & Predy G A. *Framework for tackling the global obesity epidemic locally: The Child Health Ecological Surveillance System (CHESS)*. ***Preventing Chronic Diseases***. (in press).

Peddle C, Plotnikoff R, Wild C, Au H, & Courneya K. *Medical, demographic, and social cognitive correlates of exercise in colorectal cancer survivors: An application of self-determination theory*. ***Supportive Care in Cancer.*** (in press).

Minke S, Raine K, Plotnikoff R, Khalema E, & Smith C. *Resources for health promotion: Rhetoric, research and reality*. ***Canadian Journal of Public Health.*** (in press).

Plotnikoff R, Lippke S, Karunamuni N, Eves N, Courneya K, Sigal R, & Birkett N. *Co-morbidity, functionality and time since diagnosis as predictors of physical activity in individuals with type 1 or type 2 diabetes*. ***Diabetes Research and Clinical Practice.*** (in press).

Vallance J, Courneya K, Plotnikoff R, & Mackey J. *Effects of print materials and step pedometers on physical activity and quality of life in breast cancer survivors: A randomized controlled trial*. ***Journal of Clinical Oncology.*** (in press).

"Physical inactivity is a major public health concern in Canada as the prevalence of obesity and chronic disease continue to rise."

Cholesterol other than LDL-cholesterol can contribute to the 'atherogenic' process that leads to CVD and diabetes

Assistant Professor
Agriculture, Food and Nutritional Sciences

University of Alberta

"Our program utilizes a series of basic methodological approaches (pharmacological, biochemical and physiological) to investigate the impact of diabetes (types 1 and 2) on the development of, and predisposition to, cardiovascular disease (CVD)."

My research involves understanding more about the link between Nutrition and the dietary-related chronic diseases such as Obesity, Diabetes and Cardiovascular Disease (CVD). 'Bad' or LDL-type cholesterol produced by the liver is thought to be the reason that arteries accumulate lipid deposits and become blocked during CVD and diabetes. However, as many as half of the subjects diagnosed with CVD have normal levels of LDL-cholesterol, suggesting that other types of cholesterol can contribute to the 'atherogenic' process. My team is the first to demonstrate that intestinal lipoproteins (chylomicrons) that function to transport dietary cholesterol, are involved in the accumulation of lipid in arterial vessels. I continue to research fundamental questions that surround conditions of accelerated forms of atherosclerosis, including obesity, type-2 diabetes and hyper-cholesterolemia and nutrition, particularly how dietary fat influences these processes.

RESEARCH TEAM

Miriam Jacombe, Sam Warnakula, Flora Wang, Rabban Mangat, Zahara Hassanali, Rain Lu, Ugo Nzekwu, Jenny Su, Akeela Jakura, Danni Shi, Jennifer Lambert, Ann-Marie Biondo, Megan Ruth, Debangshu Bhaumick, Kristina MacNaughton, Sharon Sokolik, Erin Fischer, David Pierce, Jim Russell, Richard Uwiera, David Glimm

KEY PUBLICATIONS

Proctor SD, Kelly SE, Stanhope KL, Havel PJ, and Russell JC. *Synergistic effects of conjugated linoleic acid and chromium picolinate improve vascular function and renal pathophysiology in the insulin-resistant JCR:LA-cp rat*. ***Diabetes, Obesity and Metabolism.*** 9(1):87-95 2007 (IF=2.5).

Proctor SD, Kelly SE, Stanhope KL, Havel PJ, and Russell JC. *Synergistic effects of conjugated linoleic acid and chromium picolinate improve vascular function and renal pathophysiology in the insulin-resistant JCR:LA-cp rat*. ***Diabetes, Obesity and Metabolism.*** 9(1):87-95 2007 (IF=2.5).

Proctor SD and Russell JC. 2006. *JC Macro- and Micro-vascular disease in a pre-diabetic animal model: The JCR:LA-cp rat*." In: ***The Metabolic Syndrome.*** Eds B.C. Hansen and G. Bray, Humana Press, (in press).

Proctor SD, Dreher KL , Kelly SE, and Russell JC. 2006. *Hypersensitivity to fine airborne particulate pollution-induced direct and noradrenergic-mediated vascular contraction in pre-diabetic JCR:LA-cp rats*. ***Toxicological Sciences.*** 90(2):385-391.

Proctor SD, Kelly SE, Stanhope KL, Havel PJ, and Russell JC. 2006. *Synergistic effects of conjugated linoleic acid and chromium picolinate improve vascular function and renal pathophysiology in the insulin-resistant JCR:LA-cp rat*. ***Diabetes, Obesity and Metabolism.*** (in press – online early April 7).

There has been little systematic investigation into environmental and social determinants of obesity and means to address them

PHOTO: HEART & STROKE FOUNDATION

Professor
AHFMR Senior Scholar &
CIHR/HSFC Applied Public Health Chair

Centre for Health Promotion Studies, School of Public Health

University of Alberta

I lead the *Promoting Optimal Weights through Ecological Research* (POWER) team, with the goal to advance understanding of the complex interconnections among the socio-environmental determinants of obesity to inform development of theory-driven multi-level interventions for the promotion of healthy weights. A second, related research program is *Healthy Alberta Communities (HAC)*, a community-based chronic disease intervention project working to promote health in four Alberta communities. HAC evaluates the process of establishing efficacy of socio-environmental strategies for chronic disease prevention and the promotion of healthy weights.

"Obesity is a social problem. My interest is in exploring the social and environmental determinants of obesity with the ultimate purpose of developing interventions to promote healthy weights in the population."

RESEARCH TEAM

John C. Spence, Ron Plotnikoff, Linda McCargar, Noreen Willows, Candace Nykiforuk, Helen Vallianatos, Paul Veugelers, Cam Wild, Don Schopflocher, Arto Ohinmaa, Lisa Purdy, Kate Storey, Susan Buhler, Leia Minaker, Lorian Taylor, Holly Knight, Gillian Osler, Genevieve Selfridge, Sherry Trithart, Tatjana Alvadj

KEY PUBLICATIONS

Smoyer-Tomic KE, Spence JC, Raine K, Amrhein C, Cameron N, Yasenovskiy V, Cutumisu N, Hemphill E, and Healy J. *The association between neighborhood socioeconomic status and exposure to supermarkets and fast food outlets in Edmonton, Canada.* ***Health & Place,*** 14:740-754, 2008.

Raine K, Spence JC, Church J, Boulé N, Slater L, Marko J, Gibbons K and Hemphill E. (2008) *State of the evidence review on urban health and healthy weights.* ***Ottawa: CIHI.*** Release date: March 11, 2008.

Thomson M, Spence, J C, Raine K, & Laing L. *The association of television viewing with snacking behavior and body weight of young adults*. ***American Journal of Health Promotion***. 22 (5):329-335, 2008.

Vallianatos H, Brennand EA, Raine K, Stephen Q, Petawabano B, Dannenbaum D, and Willows N. *Cree Women speak – Intergenerational perspective on weight gain in pregnancy and weight loss after pregnancy*. ***Journal of Aboriginal Health.*** 4(1):6-14, 2008.

Hemphill E, Raine K, Spence JC, & Smoyer-Tomic K. *Exploring obesogenic food environments in Edmonton, Canada: The association between socioeconomic factors related to fast-food access*. ***American Journal of Health Promotion.*** 22(6):426-432, 2008.

Obesity is a critical factor in the growth of chronic diseases in our region. It is essential that we address this issue and help people access evidence-based treatments for obesity

Professor
Endocrinology

Scientific Director
Canadian Obesity Network

University of Alberta

"My research focuses on the environmental and biological causes of obesity and uses an evidence-based approach to managing obese patients."

I am working on the development of novel interventions for treating obese patients and people with a propensity for obesity. I have been focused on the development of obesity and its related diseases such as hypertension and type 2 diabetes. These disorders damage blood vessels, the heart and kidneys. As a result, obese individuals often develop heart diseases, stroke, or kidney problems. The most effective way to reduce these severe health risks is to lose weight. However, most patients fail to achieve long-term weight loss. Genetic factors, the use of medications to regulate hypertension and diabetes, and have increasingly become a focus for understanding the development of obesity and the complexity with which the body regulates and defends its body weight.

RESEARCH TEAM

Raj Padwal, Tara Bond, Danielle Gaubert, Michelle Pachal

KEY PUBLICATIONS

Lacobellis G, Willens HJ, Barbaro G, Sharma AM. *Threshold values of high-risk echocardiographic epicardial fat thickness*. ***Obesity (Silver Spring)***. 2008 Feb 7 (Epub ahead of print).

Lacobellis G, Pellicelli AM, Grisorio B, Barbarini G, Leonetti F, Sharma AM, Barbaro G. *Relation of epicardial fat and alanine aminotransferase in subjects with increased visceral fat*. ***Obesity (Silver Spring)***. 2008 Jan;16:179-83.

Torp-Pedersen C, Caterson I, Coutinho W, Finer N, Van Gaal L, Maggioni A, Sharma AM, Brisco W, Deaton R, Shepherd G, James P; on the behalf of the SCOUT Investigators. *Cardiovascular responses to weight management and sibutramine in high-risk subjects: an analysis from the SCOUT trial*. ***Eur Heart J.*** 2007 Dec;28:2915-23.

Alikhani-Koupaei R, Fouladkou F, Fustier P, Cenni B, Sharma AM, Deter HC, Frey BM, Frey FJ. *Identification of polymorphisms in the human 11beta-hydroxysteroid dehydrogenase type 2 gene promoter: functional characterization and relevance for salt sensitivity*. ***FASEB J.*** 2007 Nov;21:3618-28.

Sharma AM, Davidson J, Koval S, Lacourcière Y. *Telmisartan/hydrochlorothiazide versus valsartan/hydrochlorothiazide in obese hypertensive patients with type 2 diabetes: the SMOOTH study*. ***Cardiovasc Diabetol***. 2007 Oct 2;6:28 Arya M. Sharma, MD/PhD Page 6.

There is a broad range of social determinants and population physical activity patterns that contribute to obesity

Associate Professor
Physical Education and Recreation

University of Alberta

More recently, my work has focused on (a) the physical environment and how it may influence physical activity choices for both children and older adults (e.g., presence of parks and playgrounds), and (b) the effect of media (e.g., popular films) on physical activity and diet. Some of the projects I am currently working on are: State of the evidence review on urban health – healthy weights; The fitscapes project growth assessment study of preschool children: establishing a longitudinal cohort; Children's mental representations of urban physical activity environments; Understanding influences of the media on physical activity and nutrition: an ecological approach; and Charting the foodscapes.

"I'm interested in both the benefits and determinants of physical activity and how physical inactivity is related to obesity."

RESEARCH TEAM

Chad Witcher, Nicoleta Cutumisu, Jong-Gil Lee,Lorian Taylor, Jessica Lyons, Beverly Moylan, Marianne Clark

KEY PUBLICATIONS

Spence JC, Burgess JA, Rodgers W & Murray T. (in press). E*ffect of pretesting on intentions and behaviour: A pedometer and walking intervention*. ***Psychology and Health.***

Spence JC, Cutumisu N, Edwards J, & Evans J. (2008). *Influence of neighbourhood design and access to facilities on overweight and obesity among preschool children*. ***International Journal of Pediatric Obesity***. *3*, 109-116.

Hemphill E, Raine K, Spence JC, & Smoyer-Tomic K. (2008). *Exploring obesogenic food environments in Edmonton, Canada: Are socioeconomic factors related to fast-food access?* ***American Journal of Health Promotion.*** *22*, 426-432.

Holt NL, Spence JC, Sehn ZL, & Cutumisu N. (2008). *Neighborhood and developmental differences in children's perceptions of opportunities to play and be physically active*. ***Health and Place.*** *14*, 2-14.

Taylor LM, Leslie E, Plotnikoff RC, Owen N, & Spence JC. (2008). *Associations of perceived community environmental attributes with walking in a population-based sample of adults with type 2 diabetes*. ***Annals of Behavioral Medicine***. *35*, 170-178.

Dr. Dennis Vance

Mice that lack the liver enzyme PEMT are protected from diet-induced obesity

University Professor
Biochemistry

University of Alberta

"Research on the liver enzyme PEMT could lead to a new treatment of diet-induced obesity."

More than 10 years ago we developed a mouse that lacks the enzyme, PEMT, which converts phosphatidylethanolamine to phosphatedylcholine in the liver. Completely unexpected, when fed a diet high in fat and carbohydrate, they are protected from diet-induced obesity that occurs in wildtype mice. We have recently received a 5 year CIHR grant the major part of which is to study the protective effect of lack of PEMT on diet-induced obesity. We believe that understanding how this enzyme affects liver function can lead to a new treatment of diet induced obesity.

RESEARCH TEAM

René Jacobs, Jelske van der Veen, Gengshu Wu, Laura Cole, Julie Robichaud, Lorissa Niebergall, Nancy Ling, Brian Su, Susanne Lingrell, Randy Nelson

KEY PUBLICATIONS

Jacobs RL, Lingrell S, Zhao Y, Francis GA and Vance DE. *Hepatic CTP: phosphocholine cytidylyltransferase-alpha is a critical predictor of plasma HDL and VLDL*. ***J. Biol. Chem.*** 2008; 283, 2147- 2155.

Li Z, Agellon LB, Allen TM, Umeda M, Jewell L, Mason A and Vance DE. T*he ratio of phosphatidylcholine to phosphatidylethanolamine influences membrane integrity and steatohepatitis*. ***Cell Metabolism.*** 2006; 3: 321-331.

Li Z, Agellon L and Vance DE. *Phosphatidylcholine homeostasis and liver failure*. ***J. Biol. Chem.*** 2005; 280: 37798-37802.

Walkey CJ, Donohue LR, Bronson R, Agellon LB and Vance DE. *Disruption of the murine gene encoding phosphatidylethanolamine N-methyltransferase*. ***Proc. Nat. Acad. Sci. USA***. 1997; 94: 12880-12885.

Cui Z, Vance JE, Chen M, Voelker DR and Vance DE. Cloning and expression of a novel phosphatidylethanolamine N-methyltransferase: A specific biochemical and cytological marker for a unique membrane fraction in rat liver. ***J. Biol. Chem***. 1993; 268: 16655-16663.

We are indeed at a crisis stage, the World Health Organization calls obesity the world's most blatantly ignored public health problem

Associate Professor
Public Health Sciences

Director
Population Health
Intervention Research Unit
School of Public Health

University of Alberta

My main areas of research are the importance of nutrition, healthy lifestyle, socio-economic factors, intervention programs and policies in relation to overweight and chronic diseases. The overarching objective of my research is to advise on and direct new health policies and interventions to prevent chronic diseases and improve quality of life. As the director of the Population Health Intervention Research Unit in the School of Public Health, I am leading initiatives such as the **A**lberta **P**roject **P**romoting active **L**iving and healthy **E**ating in **Schools** *(APPLE Schools)*. This project, operating in 10 Alberta schools, aims to make the healthy choice the easy choice for students by creating and sustaining supportive physical and social environments that foster lifelong health and learning.

"It's about making the healthy choice not the easy choice"

RESEARCH TEAM

Margaret Schwartz, Sara Jane Brown, Carey Lee Gordon, Kristi Jones, Tina Kunec, Andrew McCloskey, Lisa McLaughlin, Jenn Patrick, Billy Smale, Chandra Fisher, Erin Wright, Delone Abercrombie, Stefan Kuhle, Connie Lu, Andrea Cliff, Jessie-Lee Langille, Shawna Thieson, Xiaoyan (Yan) Guo, Kerri Kaiser Gladwin, Fangfang Wang, Jane Woo, Tina Liang

KEY PUBLICATIONS

Wang F, Veugelers PJ. *Self-esteem and cognitive development in the era of the childhood obesity epidemic*. June 2008, accepted for publication in ***Obesity Reviews***.

Florence M, Asbridge M, Veugelers PJ. *Diet quality and academic performance in Nova Scotia grade five students*. ***Journal of School Health.*** 2008; 78: 209-215.

Veugelers PJ, Sithole F, Zhang S, Muhajarine N. *Neighborhood characteristics in relation to diet, physical activity and overweight of Canadian children*. ***International Journal of Paediatric Obesity.*** 2008; 3: 152-159.

Sithole F, Douwe J, Burstyn I, Veugelers PJ. *Body weight and childhood asthma: A linear association?* ***Journal of Asthma.*** 2008;45:473-7.

Colapinto CK, Fitzgerald AL, Taper LJ, Veugelers PJ. *Children's preference for large portions: Prevalence, determinants and consequences*. ***Journal of the American Dietetics Association.*** 2007; 107;1183-90.

Dyslipidemia, insulin resistance and hyperandrogenemia, are complications of obesity that put individuals at increased risk of CVD, Diabetes and Polycystic Ovary Syndrome

Assistant Professor
Alberta Institute for Human Nutrition

University of Alberta

"Obesity is a pre-disposing state to many other metabolic aberrations."

Dr Vine's research program investigates the role of the intestine in whole body lipid metabolism and how it is regulated by metabolic factors in health and chronic disease. Her research also explores the impact dietary lipids have in the modulation of intestinal metabolism of lipids and the development of dyslipidemia in chronic disease, including obesity, the metabolic syndrome and polycystic ovarian syndrome.

RESEARCH TEAM

Akeela Jakhura, Danni Shi, and Laura Hargreaves

KEY PUBLICATIONS

Proctor SD, Vine DF, Botham K, Mamo JCL and Cabezas MC. *Intestinal post-prandial chylomicrons: State of the Union between liver, gut and dyslipidemia?* ***Future Lipidology.*** 2008 3(5):473-480.

Vine DF, Glimm DR, and Proctor SD. Intestinal lipid transport and chylomicron production: Possible links to exacerbated atherogenesis in a rodent model of the metabolic syndrome. ***Atherosclerosis Suppl.*** 2008 9(2):69-76.

Wang Y, Lu J, Ruth MR, Goruk SD, Reaney M, Glimm D, Vine DF, Field CJ and Proctor SD. *Trans-11 vaccenic acid dietary supplementation induces hypolipidemic effects in an animal model of dyslipidemia and the metabolic syndrome*. ***Journal of Nutrition.*** 2008 138(11): 2117-22.

Proctor SD, Kelly S, Vine DF and Russell JC. *Metabolic effects of a novel silicate inositol complex of the nitric oxide precursor arginine in the obese, insulin resistant JCR:LA-cp rat*. ***Metabolism.*** 2007 Oct;56(10):1318-25.

Mangat R, Vine DF and Proctor SD. *Chylomicron and apoB48 metabolism in the JCR:LA corpulent rat, a model for the metabolic syndrome*. ***Biochemical Society Transactions.*** 2007 Jun;35(Pt 3):477-81.

Vine DF, Takechi R, Russell JC and Proctor SD. *Impaired metabolism of intestinal chylomicron metabolism in the atherosclerotic-prone, obese JCR:LA-cp rat model*. ***Atherosclerosis.*** 2007 190(2):282-90.

RECENT CONFERENCE ABSTRACTS

Shi D, Jakhura A, Uwiera R, Dyck M, Proctor S and Vine DF. *Polycystic ovary syndrome: establishment of a spontaneous animal model*. **Alberta Diabetes Institute Research Symposium**, Edmonton, September 2008.

Proctor SD, Russell JC and Vine DF. *Overproduction of Intestinal lymph chylomicrons is associated with hyper-insulinemia in the JCR:LA-cp rodent- a model of the metabolic syndrome*. **CSATVB, Symposium of Chylomicrons in Health and Disease**, Toronto, October 2008

Vine DF, Kelly SE, Hassanali Z, Mangat R, Madsen K and Proctor SD. *Exacerbated production of intestinal lymph chylomicrons is associated with increased intestinal transport of cholesterol during hyper-insulinemia in the JCR:LA—cp rodent*. **Abstract in Proceedings of International Symposium of Chylomicrons in Disease**, Lake Louise, Canada March 2008 Athero. Suppl.

Studies of genetic disorders of brain development provide into the manner in which the brain normally regulates appetite and body weight

Professor
Medical Genetics

University of Alberta

We have identified genes that are altered in Prader-Willi syndrome, a human genetic disease that causes severe obesity, developmental delay and psychiatric illness. Our specific areas of research are: transgenic mouse models of altered nervous system development; coordination of circadian rhythm and appetite; genes important in the development of the hypothalamus; roles of Prader-Willi syndrome genes in normal brain development, neuron maturation and differentiation.

"My research focuses on genes and pathways important in development and implicated in obesity."

RESEARCH TEAM

Alysa Tennese, Jason Bush, Rebecca Mercer, Erin Kwolek, Sara Weselake, Xiao Li, Jocelyn Bischof

KEY PUBLICATIONS

Mercer RE and Wevrick R. *Loss of Magel2, a candidate gene for features of Prader-Willi syndrome, impairs reproductive function in mice*. ***PLoS ONE***. (in press).

Bush JR and Wevrick R (2008). *The Prader-Willi syndrome protein necdin interacts with the E1A-like inhibitor of differentiation EID-1 and promotes myoblast differentiation*. ***Differentiation.*** 76:994-1005.

Tenesse A, Gee CB, and Wevrick R. *Loss of the Prader-Willi syndrome protein necdin causes defective migration, axonal outgrowth, and survival of embryonic sympathetic neurons*. ***Devel. Dyn***. 2008; 20:1935-1943.

Koslov S, Bogenpohl JW, Howell MP, Wevrick R, Panda S, Hogenesch JB, Muglia LJ, Van Gelder R, Herzog ED and Stewart CL. *The imprinted gene Magel2 regulates normal circadian output*. ***Nature Genet***. 2007; 39, 1266-1272.

Bischof JM, Stewart CL, and Wevrick R (2007). *Inactivation of the mouse Magel2 gene results in growth abnormalities similar to Prader-Willi Syndrome*. ***Human Molec. Genet.*** 16: 2713-2719.

O'Neill MA, Farooqi IS, and Wevrick R**.** *Evaluation of Prader-Willi syndrome gene MAGEL2 in severe childhood-onset obesity*. ***Obesity Research***. 2005; 13, 1841-1842.

The environments in which Aboriginal children live contributes to obesity, so understanding, measuring and altering those environments is critical to increasing the number of children with healthy body weights

Associate Professor
Agricultural, Food & Nutritional Science

University of Alberta

"Obesity research must move beyond a narrowly mechanistic focus on energy intake ("don't eat those fries") and energy expenditure ("get off the couch") and examine the economic, social, policy, and cultural context of obesity more broadly."

My research uses anthropological, qualitative and quantitative methodologies for studying key aspects of the nutrition of individuals, families, and communities. I explore the relationships between food and health; cultural meanings of food and health; how food beliefs and dietary practices affect the well-being of communities; and, how socio-cultural factors affect food intake and food selection. She takes a community-based, participatory approach to research, in which community members and researchers work together to find solutions to health problems. Her research focuses predominantly on maternal and child health, and First Nations communities. Currently, I am examining obesity from an ecological perspective in Cree communities in Alberta and Quebec.

RESEARCH TEAM

Geoff Ball, Kim Raine, Anna Farmer, Dru Marshall, Helen Vallianatos, David Dyckfehderau, Dia Sanou, Irene Shankar, Ashlee Pigford

KEY PUBLICATIONS

Ball GDC, Lenk JM, Barbarich BN, Plotnikoff RC, Fishburne GJ, Mackenzie KA, and Willows ND. *Overweight children and youth referred for weight management: Are they meeting lifestyle behaviour recommendations?* ***Applied Physiology, Nutrition and Metabolism.*** 2008;33:936-945.

Monterrosa EC, Frongillo EA, Vásquez-Garibay EM, Romero-Velarde E, Casey LM, and Willows ND. *Predominant breast-feeding from birth to six months is associated with fewer gastrointestinal infections and increased risk for iron deficiency among infants*. ***Journal of Nutrition.*** 2008; 138:1499-1504.

Downs S, Marshall D, Ng C, and Willows ND. *Central adiposity and associated lifestyle factors in Cree schoolchildren*. ***Applied Physiology, Nutrition and Metabolism.*** 2008; 33:476-482.

Vallianatos H, Brennand EA, Raine K, Stephen Q, Petawabano B, Dannenbaum D, and Willows ND. *Cree women speak: Intergenerational perspectives on weight gain during pregnancy and weight loss after pregnancy*. ***J. of Aboriginal Health.*** 2008; 4(1):6-14.

Willows ND, Strawson-Fawcett C, and Downs SM. *Teaching the Mediterranean diet in Italy*. ***J. of Food Science Education*** 2008; 7:30-34.

Downs S, Marshall D, Ng C, McCargar L, Raine K, and Willows ND. *Associations among the food environment, diet quality and weight status in Cree children in Québec*. ***Public Health Nutrition.*** (in press).

Willows ND, Raine K, Veugelers P, and Kuhle S. *Prevalence and sociodemographic correlates of household food insecurity in Aboriginal peoples in Canada*. ***Public Health Nutrition.*** (in press).

Black TL, Raine K, and Willows ND. *Understanding prenatal weight gain in First Nations women*. ***Canadian Journal of Diabetes.*** 2008;32(3):198-205.