



HUMAN NUTRITION AND HEALTH

Research Highlights
2017 – 2018



Dairy Farmers of Canada, in partnership with Agriculture and Agri-Food Canada and the Canadian Dairy Commission, is supporting 10 research projects in human nutrition and health via the Dairy Research Cluster 2. DFC is also supporting an additional 10 projects via its annual competition NESAC and one project in partnership with the Dairy Research Consortium (Dairy Management Inc., Dairy Australia Ltd, Dutch Dairy Association, CNIEL, and Danish Dairy Research Foundation).



Key Outcomes:

Dairy Fat and Cardiovascular Health

Results from a large multicentre, randomized controlled trial (RCT) where consumption of diets containing saturated fat in the form of cheese and butter were compared with a low fat diet or diets rich in other fatty acids (i.e. monounsaturated and polyunsaturated) revealed that:

- Although both cheese and butter increased LDL-cholesterol (LDL-C), referred to as “bad cholesterol”, they also increased HDL-cholesterol (HDL-C) or “good cholesterol” and they did not have any adverse effect on several other important risk factors for cardiovascular disease.
- Despite increasing LDL-C, cheese did not have an adverse effect on several other risk factors for heart disease, which may explain the lack of association between cheese consumption and increased risk of heart disease seen in several studies.
- Although butter also increased LDL-C, it also increased the capacity of HDL-C to remove cholesterol from the blood, counteracting its effect on raising LDL-C, which may explain the lack of association between butter consumption and increased risk of heart disease seen in other studies.
- Overall, results of this project provide strong evidence for the importance to consider whole foods, not just individual nutrients, as well as their global effects on risk, not just that on LDL cholesterol when developing dietary guidelines for the population.

Role of Dairy on Satiety and Blood Glucose

A total of 11 randomized controlled trials involving both young (aged 20-30 years) and older (aged 60-70 years) adults were carried out providing new knowledge on the role of dairy product consumption and satiety and Blood Glucose levels following a meal. Notably:

- › Dairy consumed with breakfasts of cereal or toast and jam reduced post-meal blood glucose levels.
- › The form of dairy (solid, semi-solid or liquid) is a consideration for managing satiety, glycemia and food intake with cheese being the preferred snack or pre-meal appetizer.
- › Even a single serving of dairy consumed as a snack, immediately before a meal or with a meal is effective for reducing appetite and post-meal blood glucose levels.
- › A dairy yogurt vs. a plant-based yogurt, eaten with granola cereal, resulted in reduced post-meal blood glucose levels.
- This project demonstrated that dairy products, due to their unique composition of nutrients such as protein, fat and carbohydrates, greatly reduce appetite and the rise in blood glucose following meals containing glycemia-inducing carbohydrates.
- This project provides strong evidence for supporting the beneficial impact of dairy products (including milk, yogurt and cheese) in controlling appetite (satiety), food intake and post-meal blood glucose levels, which have implications for prevention of obesity and type 2 diabetes.

Role of Dairy and Type 2 Diabetes

Using data from four prospective cohort studies, this project investigated whether fatty acids in dairy have a role in reducing the risk of developing type 2 diabetes (T2D) via reducing risk factors such as insulin resistance, poor insulin secretion and inflammation.

- Higher levels of fatty acids derived from dairy consumption reduced risk for developing T2D by reducing inflammation and improving insulin secretion and insulin sensitivity.
- Strong mechanistic evidence was provided for the beneficial role of dairy consumption and dairy fat, in reducing the risk of developing T2D as seen in several studies.

Role of Dairy and Metabolic Syndrome

New evidence on the role of dairy and Metabolic Syndrome (MetS) in Canadians aged 12-79 years:

- Prevalence of MetS was 17%, with adolescents having the lowest prevalence (3.5%). Abdominal obesity was the most prevalent (32.5%) characteristic associated with MetS.
- People with MetS consumed significantly more diet soft drinks, but less dairy products, dietary fat and sugar-sweetened beverages compared to people without MetS.
- Diets with high intake of fruits, vegetables, dairy and cereals may protect against the risk of developing MetS.

New knowledge for novel milk product development and dairy processing

- Milk showed antioxidant activity by protecting polyunsaturated fatty acids (PUFA) from oxidation. The antioxidant activity of milk was further increased when combined with other antioxidants, like polyphenol-rich beverages (i.e. grape juice, black/green tea), suggesting a positive interaction between milk components and polyphenols, increasing their beneficial effects on health.
- Microfiltration can be used to reduce undesirable bacteria in milk used to make cheese, lowering biogenic amine production in cheeses with a low salt content. Biogenic amines are compounds produced in cheese that can cause some health issues if they are present in high amounts.
- An easy, rapid technique was developed to assess vitamin B₁₂ content in milk.



Ongoing Projects:

1. Integrated research program on dairy, dairy fat and cardiovascular health – PI: Benoit Lamarche, Université Laval
2. The effect of milk products and novel milk products on satiety, food intake and metabolic control (glycemia) in early and late adulthood – PI: Harvey Anderson, University of Toronto
3. Dairy nutrition and risk of diabetes in vulnerable populations: novel insights from biomarkers-based approach – PI: Anthony Hanley, University of Toronto
4. Beneficial effects of milk and fermented dairy products on intestinal and adipose tissue inflammation, and obesity-linked cardiometabolic diseases – PIs: Denis Roy, Université Laval and Martin Lessard, AAFC-Sherbrooke
5. Association between dietary intakes and cardiovascular risk of Canadians using the Canadian Health Measures Survey cycles 1+2 – PI: Susan Whiting, University of Saskatchewan
6. Role of high dairy diet on bone health outcomes in pregnant women and their offspring in early life (Bone BHIP): A randomized clinical trial – PI: Stephanie Atkinson, McMaster University
7. FAMILY (FAMILY MILK product two-Year) dose-response study to enhance bone health – PI: Hope Weiler, McGill University
8. Nutritional synergy between dairy products and other food nutrients – PI: Michel Britten, AAFC-Saint-Hyacinthe
9. Concentration of biogenic amines in different Canadian cheeses and effect of salt concentration on the type of biogenic amines produced in cheeses – PI: Daniel St-Gelais, AAFC-Saint-Hyacinthe
10. Milk and dairy products, outstanding sources of vitamin B₁₂: a farm to fork approach – PI: Christiane Girard, AAFC-Sherbrooke
11. Impact of buttermilk on immune function and the development of oral tolerance early in life – PI: Catherine Field, University of Alberta
12. Effects of a weight management intervention with increased dairy intake on body composition and bone health in overweight and obese girls – PI: Andrea Josse, Brock University
13. A randomized clinical trial on the effect of dietary calcium intake as compared to calcium supplement on vascular health in postmenopausal women – PI: Suzanne Morin, McGill University
14. Role of milk and alternatives on bone material and strength, body composition and cardio-metabolic risk from childhood to adulthood through the Pediatric Bone Mineral Accrual Longitudinal Study – PI: Hassan Vatanparast, University of Saskatchewan
15. Exercise and dairy protein interactions in the treatment of obesity and adipose tissue inflammation – PI: David Wright, University of Guelph
16. The effect of milk as a recovery beverage after exercise on next day post-prandial triglycerides – PI: Phillip Chilibeck, University of Saskatchewan
17. Genetics, gut microbiome and fatty acid metabolism: A multi-dimensional approach for evaluating the impact of dairy fat on cardiovascular health – PI: Peter Jones, University of Manitoba

18. Enhancement of vitamin B₁₂ content in yogurt using fortification strategies and vitamin producing probiotics – PI: Yvonne Lamers, University of British Columbia
19. Functional role of mechanisms of action of glycomacropeptide: A milk bioactive compound in obesity-related metabolic syndrome – PI: Emile Levy, Université de Montréal
20. Dairy products to prevent sarcopenia in people undergoing treatment for cancer – PI: Vera Mazurak, University of Alberta
21. The impact of low-fat and full-fat dairy consumption on glucose homeostasis – PI: Mario Kratz, Fred Hutchinson Cancer Research Centre, USA

RESEARCH SUCCESS STORIES

Strong evidence was provided from randomized controlled trials for the importance to consider whole foods such as cheese, not just nutrients (such as saturated fat), as well as their global effects on risk (not just that on LDL cholesterol concentrations), when developing dietary guidelines for the population.

Dr. Benoit Lamarche

<https://www.ncbi.nlm.nih.gov/pubmed/28251937>

Strong mechanistic evidence was provided for the beneficial role of dairy consumption and dairy fat, in reducing the risk of developing type 2 diabetes.

Dr. Anthony Hanley

<https://www.ncbi.nlm.nih.gov/pubmed/25411288>

Strong evidence was provided from randomized controlled trials for supporting the beneficial impact of dairy products (including milk, yogurt and cheese) in controlling appetite (satiety), food intake and post-meal blood glucose levels, which have implications for prevention of obesity and type 2 diabetes.

Dr. Harvey Anderson

<https://www.ncbi.nlm.nih.gov/pubmed/28759735> /

<https://www.ncbi.nlm.nih.gov/pubmed/28759734>



"Milk and dairy products have been an integral contributor to the nourishment of populations around the world for over 7,500 years, and should continue to be. Dairy products contain many important nutrients that contribute to human health including high quality protein, vitamins and minerals. Dairy has an established positive role in human health, including reducing risk of chronic diseases (osteoporosis, heart disease, diabetes, stroke and obesity) and regulating body weight and blood glucose response."

*Dr. Harvey Anderson, University of Toronto,
Western Canadian Dairy Seminar*

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