

RAPPORT



National Institute
of Nutrition

THE FOOD GROUPS DEBATE: MILK ON TRIAL

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MILK ON TRIAL

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Over the last few years, the ongoing debate surrounding the nutritional value of milk and milk products has resulted in growing confusion among consumers and health professionals. This debate has attracted media attention across Canada, most prominently in Quebec. Committed to providing credible and objective information on food and nutrition issues to health professionals, opinion leaders and consumers, the National Institute of Nutrition sponsored a half-day seminar addressing the conflict surrounding milk and milk products. "The Food Groups Debate: Milk on Trial" was held on March 19, 2002, at the McGill Faculty Club in Montreal, attracting an audience of more than 120 health professionals and media representatives.

The program featured presentations by a number of distinguished Canadian researchers, addressing the key issues at the heart of the milk debate. Following the presentations, participants engaged in an open discussion addressing the impact of the milk controversy on public health and exploring potential solutions. The discussion was moderated by Dr. Jean-François Chicoine, Assistant Professor of the Faculty of Medicine at l'Université de Montréal and pediatrician at l'Hôpital Ste-Justine, and Nicole Doucet, dietitian and President of the Montreal firm Nicole Doucet Communications. This issue of *RAPPORT* provides a summary of the event.



The New Dietary Reference Intakes: Relation to Bone Health

Stephanie Atkinson, Ph.D., RD
Professor, Department of Pediatrics and Director of the Nutrition and Metabolism Group
McMaster University, Hamilton, Ontario

As a member of the Standing Committee for the Scientific Evaluation of the Dietary Reference Intakes (DRIs) (1995–2002) and the Chair of the Panel on Calcium and Related Nutrients (1996–1997), Dr. Stephanie Atkinson's expertise in mineral and bone metabolism is well recognized. Dr. Atkinson highlighted the pioneering approach used to create a joint scientific review process by Canada and the United States. She explained the scientific rigor used to establish applicable reference values for nutrient intakes, before examining the new dietary recommendations for minerals and vitamin D.

The DRIs comprise a set of expanded nutrient recommendations that can be used for planning and assessing diets for healthy populations in

Canada and the United States. DRI is an umbrella term that encompasses four categories of reference values (Table).

Each reference value has a specific application, which must be clearly understood for the values to be used appropriately in diet planning and assessment, food fortification or labelling. The first DRI report on *Calcium, Phosphorus, Magnesium, Vitamin D, and Fluoride* was published in 1997.¹ Tables providing the Recommended Dietary Allowance (RDA), Adequate Intake (AI) and Tolerable Upper Intake Level (UL) values of the DRIs for age- and gender-specific categories, as well as during pregnancy and lactation, can be accessed via www.nin.ca/Consumer/dri.html.

Dietary Reference Intakes (DRIs): Four Categories of Reference Values

EAR = Estimated Average Requirement

- The average daily nutrient intake level estimated to meet the requirement of half the healthy individuals based on specific criteria of nutrient adequacy
- For use with diets of populations

RDA = Recommended Dietary Allowance

- The average daily nutrient intake level sufficient to meet the nutrient requirement of nearly all (97%–98%) healthy individuals (calculated from EAR + 2 standard deviations)
- For use in planning and assessing diets of individuals

AI = Adequate Intake

- A recommended average daily nutrient intake level based on observed or experimentally determined estimates of nutrient intake by a group or groups of healthy people
- To be used when an RDA cannot be determined

UL = Tolerable Upper Intake Level

- The highest average daily nutrient intake level likely to pose no risk of adverse health effects to almost all individuals



Unique Role of Nutrition

Nutrition is one of several factors necessary in optimizing bone health from childhood to senior years. Peak bone mass is typically achieved by late adolescence or early twenties and is largely determined (up to 80%) by genetics.² Factors such as lack of weight-bearing activity, use of medications such as steroid or anti-coagulant drugs, early age of menarche and chronic gastrointestinal diseases can have a negative impact on peak bone mass and contribute to adult-onset osteoporosis.

Although calcium and vitamin D are most commonly associated with bone status, many nutrients play an important role in bone composition, including magnesium, fluoride, phosphorus and zinc. In addition, the interactive effects of calcium with protein, sodium, potassium, phosphorus and caffeine contribute to overall calcium status.

The recent DRI recommendations for AIs of calcium and vitamin D for adolescents and adults are different from the Recommended Nutrient Intakes for Canadians published in 1990. The changes reflect an extensive review of the evidence in the current scientific literature and a philosophical shift toward maximizing health rather than preventing deficiencies. The revised intakes for calcium are based on calcium retention estimates, as well as data from clinical trials that measured bone mineral content in relation to a variety of calcium intakes. Supplements of calcium salt rather than calcium provided by dairy products were used in the majority of the studies. Clinical trials involving children and adolescents

suggest that individuals with the lowest habitual calcium intakes achieved the greatest benefit from increased calcium intakes. Increases in bone mineral density were larger in cortical bone sites (radius and femoral shaft) than in trabecular bone (lumbar spine).^{2,3} The same data suggest that younger children gained more bone density from higher calcium intakes than children experiencing puberty.

In clinical studies conducted in adults, the impact of calcium intervention varied by bone site measurements, menopausal stage, and the habitual calcium intakes of the subjects. For those 70 years of age or older, the recommendation for

AI relied on data from four randomized longitudinal studies published over the last decade, in which bone mass and fracture incidences were measured in response to calcium intervention with or without added vitamin D. In all

studies, supplemental calcium and vitamin D resulted in less bone loss compared to non-supplemented groups. In two studies, there was a significant reduction in fracture incidence; however, the data on fracture rate were not used to determine the DRI.¹

Dairy Foods and Bone Health

The relationship between life-long dietary intakes of calcium, peak bone mass and the risk of developing osteoporosis remains elusive. Definitive evidence of a causal link is unlikely because the association would be obscured by many confounding variables related to genetics, diet and lifestyle that have an impact on bone mass accretion and maintenance.

Optimizing Bone Health⁴

- Achieve genetic potential for peak bone mass
 - gene–nutrient interactions
 - exercise
 - target peripubertal age group and young women
- Ensure balanced nutrition
 - calcium, phosphorus, magnesium, zinc, fluoride; vitamins D, C and K; and low diet acid load are all important to bone mass
 - Ca:protein, Ca:Na and Ca:K ratios in most dairy foods are appropriate for bone health



Dr. Atkinson addressed the question at the vanguard of the controversy: *What is the role of dairy foods in bone health?* On the one hand, she underlined that with respect to milk or yogurt, dairy foods are indeed excellent sources of calcium, phosphorus and protein—key bone-building nutrients. On the other hand, a systematic review of the evidence for promotion of bone health by dairy foods yielded inconsistent findings.⁴ However, nutrient interactions (high intakes of protein, sodium, potassium and vitamin A), as well as the acid–base balance of the diet, may have an impact on the overall calcium balance and thus obscure direct evidence of the benefits of dairy foods on bone health. Compared to milk, other dairy products such as cottage cheese are lower in calcium and higher in sodium and protein, and processed cheeses may have a high sodium content and renal acid load.⁴

Dr. Atkinson concluded by reiterating that dietary calcium is inextricably linked to bone health, particularly during skeletal development. She stressed that calcium must be consumed in balance with other nutrients that interact to influence overall calcium homeostasis and/or are independently important to bone acquisition and maintenance.

Osteoporosis must be appreciated as a disease with a multi-factorial origin, with dietary calcium being only one of the factors.⁵

In her closing remarks, Dr. Atkinson expressed her hopes for future research that will unravel the quintessential combination of diet and lifestyle components that will maximize genetic potential to achieve peak bone mass early in life and minimize the risk of debilitating bone disease in later life.

References

1. Food and Nutrition Board, Institute of Medicine: *Dietary Reference Intakes for Calcium, Magnesium, Phosphorus, Vitamin D and Fluoride*. Washington, DC: National Academy Press, 1997 books.nap.edu/catalog/5776.html
2. Atkinson SA, Ward WE: Clinical nutrition: 2. The role of nutrition in the prevention and treatment of adult osteoporosis. *Can Med Assoc J* 2001; 165:1511–1514 www.cmaj.ca/content/vol165/issue11/index.shtml
3. Wosje KS, Specker BL: Role of calcium in bone health during childhood. *Nutr Rev* 2000; 58:253–268
4. Weinsier RL, Krumdieck CL: Dairy foods and bone health: examination of the evidence. *Am J Clin Nutr* 2000; 72:681–689 www.ajcn.org/cgi/content/full/72/3/681
5. Heaney RP: Calcium, dairy products and osteoporosis. *J Am Coll Nutr* 2000; 19:83S–99S



How Are Canadians Getting Their Calcium?

Katherine Gray-Donald, Ph.D., P.Dt.
Associate Professor and Director, School of Dietetics and Human Nutrition
McGill University, Montreal, Quebec

Dr. Katherine Gray-Donald's long-standing interest in nutritional problems in disadvantaged populations in Canada is reflected in her research and professional activities. The 1997/98 Food Habits of Canadians survey led by this respected researcher provided data on the food and nutrient intake of Canadians aged 13 to 65 years (Figure 1). Dietary survey data in Canada are sparse; however, from 1970 to the present the

existing data suggest that women in all age groups and older men tend to consume less than their recommended intakes of calcium and vitamin D.¹⁻³ Dr. Gray-Donald reported that this pattern has remained consistent in surveys conducted over different time periods. The revised DRIs further emphasize the need for higher intakes of calcium and vitamin D in certain age groups.

Figure 1: Mean Calcium Intake Among Canadians in 1997/98³ (mg/day)

Age (yrs)	13-17	18-34	35-49	50-64
Women	1010	813	764	777
Men	1407	1376	1020	901
AI	1300	1000	1000	1200
UL	2500	2500	2500	2500

- **AI — Adequate Intake**
- Recommended average daily nutrient intake level based on estimates of nutrient intake by a group or groups of healthy people
- **UL — Tolerable Upper Intake Level**
- Highest average daily nutrient intake level likely to pose no risk of adverse health effects to almost all individuals

In the 1990 Santé Québec survey, the following foods were identified as contributing the most to calcium intake: milk and yogurt, cheese, and breads and cereals (Figure 2). Vegetables were not consumed in sufficient quantities to represent a major source of calcium.

An examination of dietary differences among women with low intakes of calcium (lowest tertile) and those with very good intakes (highest tertile) shows striking differences in their intakes of milk (87 mg vs. 568 mg) and cheese (63 mg vs. 201 mg).⁴

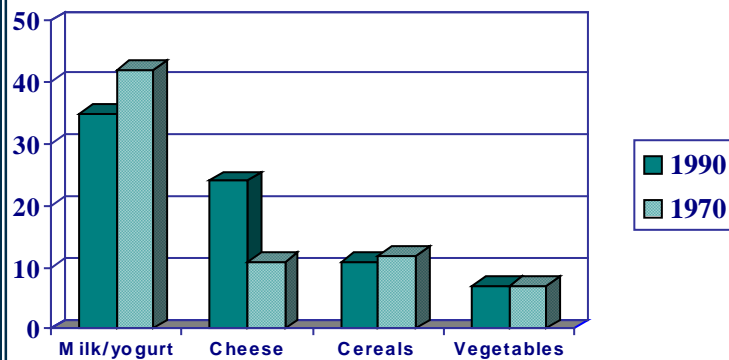
According to Dr. Gray-Donald, increased intake of calcium and vitamin D can be achieved through three different strategies:

- Food-based approach
- Food fortification
- Supplementation

Food-based solutions should focus on the promotion of dairy products. However, given the current problem of obesity in Canada, lower fat dairy choices should be emphasized. Fluid milk is particularly important given its higher level of calcium and fortification with vitamin D.



Figure 2: Sources of Calcium in the Quebec Diet² (%)



Challenges of Food Fortification

Selecting an appropriate vehicle for fortification is a complex task requiring comprehensive risk–benefit analysis. Fortification of flour with calcium, for example, would present difficulties, as those who consume the most—young, active men—typically already have good intakes of calcium. Fortification would increase their calcium intake levels more than in the desired target group of inactive older men and women.

Some fortification scenarios suggest that a substantial number of young men would exceed the UL, while the target group would still not obtain adequate calcium intakes.⁴ Furthermore, Dr. Gray-Donald opposes the fortification of non-nutritious foods (e.g. soft drinks). The Canadian population already obtains 25% to 30% of its energy from foods with little nutritional value.³

What About Supplements?

Supplementation with calcium and vitamin D is the most targeted approach. In the Food Habits of Canadians survey, women who took calcium supplements had insufficient intakes of calcium from diet alone. Cost and compliance may prevent supplementation from becoming a sustainable solution.

Dr. Gray-Donald prefers increasing calcium intake through appropriate food choices (or supplements where warranted). She added that this advice is consistent with key health messages for the prevention of chronic disease; namely, to increase energy expenditure, increase fruit and vegetable consumption, decrease intake of saturated and *trans* fatty acids, and encourage folate supplements for women in the childbearing years.

References

1. Health and Welfare Canada: *Nutrition Canada surveys*. Ottawa: 1970–1972
2. Santé Québec, Bertrand L (ed): *Les Québécoises et les Québécois mangent-ils mieux? Rapport de l'Enquête québécoise sur la nutrition, 1990*. Montréal: Gouvernement du Québec, 1995
3. Gray-Donald K, Jacobs-Starkey L, Johnson-Down L: Food Habits of Canadians: reduction in fat intake over a generation. *Can J Public Health* 2000; 91(5):381–385
4. Idem: unpublished data, 2002

Milk Product Alternatives: Pros and Cons

Geneviève Mailhot, M.Sc., P.Dt. (Ph.D. Candidate)
Assistant Professor, Department of Nutrition
Université de Montréal, Montreal, Quebec

Geneviève Mailhot's research interest in the physiology of calcium and vitamin D brought a knowledgeable perspective on the bioavailability of these nutrients in various foods. Ms. Mailhot identified factors that may motivate consumers to eliminate milk products from their diets and opt for alternatives: personal preferences, vegetarianism, intolerance, or simply looking for added variety.

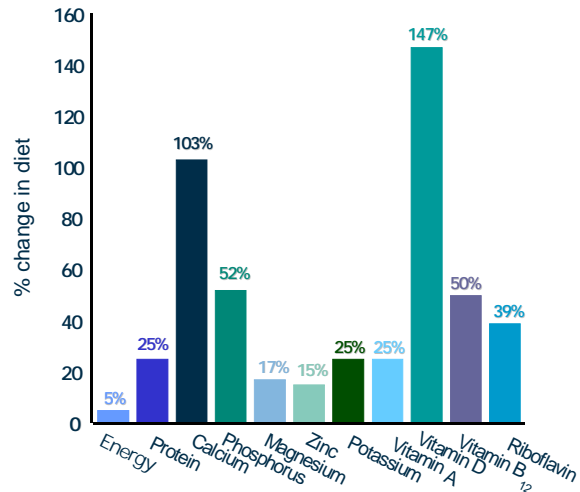
Milk products are a source of high quality protein, a multitude of vitamins and minerals, and conjugated linoleic acid, a fatty acid with anticarcinogenous properties. Adding three servings of low-fat or fat-free milk to the diets of older adults significantly increased their intake of key nutrients (Figure 1).¹ Milk substitutes should provide similar key nutrients specific to milk and milk products.

What Are the Alternatives?

Calcium-fortified soy beverages rank first in the alternative category. Emphasis should be placed on those with added vitamin D. Soy is a complex food with many different components including protein, micronutrients and fibre, as well as non-nutritive components such as isoflavones and phytates.

Soy beverages are a plant source of protein, which is commonly believed to be of lower quality than the animal protein found in milk products. However, they provide all the essential amino acids just like milk, but in smaller quantities.^{2,3}

Figure 1: Increase in Key Nutrients by Adding 3 Daily Milk Servings



Adapted from reference 1

Soy protein and isoflavones (phytoestrogens) may help to prevent certain types of chronic diseases in specific populations. The health effects are not clear-cut, as they exert estrogenic activity in some tissues but anti-estrogenic activity in others and the effects are confounded by timing and length of intake. A recent longitudinal study⁴ demonstrated that consumption of soy protein-based formula as an infant was not associated with premature puberty and fertility problems. However, insufficient data exist to conclude that intake of soy among adults affects the risk of developing breast cancer or the survival of breast cancer patients.⁵

Soy products also have a high phytate content, which limits the bioavailability of numerous minerals, including calcium, iron and zinc. Much remains to be learned about the potential health benefits of soy.

Vegetables such as spinach, kale and broccoli

are frequently suggested as a source of calcium.

However, the bioavailability of calcium is variable because some of them have a high oxalic acid content. Oxalic acid binds with calcium to form an insoluble compound in the digestive tract, preventing calcium absorption. To obtain similar calcium intakes to milk, large quantities of vegetables would be required. Nevertheless, green leafy vegetables are excellent sources of numerous other beneficial nutrients and antioxidants.

Meats and alternatives, as well as grain products, provide negligible sources of calcium with variable degrees of bioavailability. Some types of fish eaten with bones (e.g. salmon and sardines) are an excellent source of calcium as well as vitamin D, high-quality protein and alpha-linolenic acid. Legumes and whole grain products are not the best sources of calcium because their high content of phytate and dietary fibre reduces its bioavailability, through a mechanism similar to that of oxalic acid.

More Options...

The functional food era produced several new fortified products, such as calcium-fortified orange juice and water. Although these foods can increase the intake of calcium, they cannot replace milk

products as they lack several key nutrients found in milk products.



Ms. Mailhot pointed out that alternatives to milk products are not all dietary. The sun is a source of accessible vitamin D. However, our northern latitude and increased use of protective sunscreens to address concerns about skin cancer greatly reduce the skin's photosynthesis of the vitamin.

The use of **vitamin and mineral supplements** can also be considered as an

alternative to milk products. Unfortunately, pills do not offer all the benefits of foods—which contain numerous components with unexplored properties and elements not yet identified.

Few Foods Match Milk

Overall, some alternatives to milk products are nutritious food choices that are worth including in a balanced and varied diet. Their exclusive use requires efficient planning, realignment of culinary practices, as well as some nutrition education. Milk and milk products remain a concentrated source of nutrients that become very difficult to replace by only one specific alternative, in a population with such varying needs.

References

1. Barr SI, Mccarron DA, Heaney RP et al: Effects of increased consumption of fluid milk on energy and nutrient intake, body weight, and cardiovascular risk factors in healthy older adults. *J Am Diet Assoc* 2000; 100(7):810–817
2. Messina MJ: Legumes and soybeans: overview of their nutritional profiles and health effects. *Am J Clin Nutr* 1999; 70: 439S–450S www.ajcn.org/cgi/content/full/70/3/439S
3. Young VR: Soy protein in relation to human protein and amino acid nutrition. *J Am Diet Assoc* 1991; 91:828–835
4. Strom BL, Schinnar R, Ziegler EE et al: Exposure to soy-based formula in infancy and endocrinological and reproductive outcomes in young adulthood. *JAMA* 2001; 286:807–814
5. Messina MJ, Loprinzi CL: Soy for breast cancer survivors: a critical review of the literature. *J Nutr* 2001; 131:3095S–3108S

Dairy Products for Children: a debate in which science has lost its grip

Claude Roy, MD, FRCP(C)

Professor Emeritus, Faculty of Medicine, Université de Montréal, Montreal, Quebec
Gastroenterology Nutrition Division, Centre de recherche de l'Hôpital Ste-Justine

The last 25 years have been marked by consumers' growing concern about the role of nutrition and the effect of certain foods on their health and well-being. According to respected pediatrician Dr. Claude Roy, today's society tends to believe that nutrition's impact on health is beyond what science currently supports.¹ This cult-like approach to nutrition appears to be particularly rampant among the most educated and privileged.

Foods praised by scientists and governments are often considered much more beneficial than they really are, while "foods on trial" are perceived as overly dangerous and risky. Dr. Roy stated: "I aim to challenge this sort of 'magical thinking' by confronting it with current scientific knowledge, and to propose concrete actions to restore a balanced perspective."

Milk on Trial

"Charges against milk and milk products are numerous," declared Dr. Roy. He focused on those that pediatricians are frequently confronted with:

- ◆ **Infant Colic:** Colic is just as prevalent among breast-fed babies as among babies fed cow's milk-based formulas. Controlled-trial studies conducted with soya and protein hydrolysate-based formulas have been inconclusive for the most part. Removing bovine protein from a nursing mother's diet also has not been proven to be effective against infant colic.^{2,3}
- ◆ **Milk Allergies:** Almost 30% of parents believe that their children are allergic to a specific food item and milk is the most commonly mentioned. Surprisingly, statistics reveal that only 2% to 5% of children have such food allergies, including allergy to milk.⁴
- ◆ **Lactose Intolerance:** We are not born with lactose intolerance—in fact, only 12 such cases have been reported in the medical literature world-wide. Following a severe case of gastroenteritis, some children develop temporary lactose intolerance. It must be remembered that only 10% of Caucasians have a permanent intolerance, and it rarely appears before school age.⁵
- ◆ **Leukemia and Cancer:** Breastfeeding for more than 6 months reduces children's risks of leukemia. But we cannot conclude from this that cow's milk causes leukemia.⁶
- ◆ **Insulin-Dependent Diabetes:** There is a correlation between milk consumption and the prevalence of insulin-dependent diabetes. However, it is believed that it is the absence of breast milk that is more likely responsible, in view of the beneficial effect of breast milk on the maturation and immune tolerance of the intestinal mucosa.⁷ Among infants with a significant genetic history, there is an association between cow's milk and the appearance of anti-pancreatic islet cell and anti-insulin antibodies. The question therefore remains: Do they develop these antibodies because of the particular nature of bovine protein or because these antigens are first to come in contact with the digestive tract's immune system, which has not undergone the maturation provided by breast milk?

Regaining the Leadership

“Nutrition is a science, not a religion,” Dr. Roy commented. Any science is in constant evolution and does not claim to hold the absolute truth at any given time. Undoubtedly this uncertainty, lack of consensus and the unrealized promises contribute to the magical thinking behind the anti-milk crusade, under the banner that alleges that diet is to a large extent responsible for health, behaviour, intelligence and even spirituality.

Can science regain the leadership in this crucial debate? “Maybe, if the media weren't so often lured by unfounded declarations and unreliable sources, and were reminded that uncertainty is not necessarily dangerous!” he concluded.

Dr. Roy believes that milk is part of our culture and remains an easily available source of essential nutrients. The time is right for health professionals to deliver clear, strong, science-based information to re-establish the balance in the milk debate, as well as for other food groups on trial.

References

1. Jarvis WT: Food faddism, cultism and quackery. *Am Rev Nutr* 1983; 3:35–52
2. Buchanan P: Effectiveness of treatments for infantile colic. Trial of hypoallergenic milk is not supported by strong enough evidence. *Br Med J* 1998; 317:1451–1452 [Letter] bmj.com/cgi/content/full/317/7170/1451
3. Lucassen PL, Assendelff WJ, Gubbels JW et al: Effectiveness of treatments for infantile colic: systematic review. *Br Med J* 1998; 316:1563–1569 bmj.com/cgi/content/full/316/7144/1563
4. Host A: Cow's milk protein allergy and intolerance in infancy. Some clinical, epidemiological and immunological aspects. *Pediatr Allergy Immunol* 1994; 5(suppl):1–36
5. Shulman RJ, Feste A, Ou C: Absorption of lactose, glucose polymers, or combination in premature infants. *J Pediatr* 1995; 127:626–631
6. Davis MK, Savitz DA, Graubard BI: Infant feeding and childhood cancer. *Lancet* 1988; 13(2):365–368
7. Harrison LC, Honeyman MC: Cow's milk and type I diabetes: the real debate is about mucosal immune function. *Diabetes* 1999; 48:1501–1507

Obesity, Milk and Calcium

Angelo Tremblay, Ph.D.
Professor, Department of Social and Preventive Medicine
Université Laval, Quebec City, Quebec

Dr. Angelo Tremblay is a leading expert in the field of obesity and micronutrients. Current research suggests that higher calcium intakes could help reduce body fat, facilitate weight loss, and improve lipid profiles, thereby reducing the risk of heart disease. His presentation focused on the evidence supporting the relationship between calcium intake and obesity.

Obesity is a multifactorial problem for which the prevalence continues to rise not only in Canada but in most countries.¹ It has been clearly established that obesity is the result of an excess energy intake in relation to energy expenditure over an extended period of time. Yet current understanding

of the problem is not sufficient to accurately identify all of the factors liable to induce a positive energy balance.

Recent research suggests that an inadequate calcium intake may be associated with an increase in adiposity (Table). Studies have confirmed the relationship between high levels of adipocyte intracellular calcium and a corresponding inhibition of lipolysis and increase in fat mass.^{2,3} Furthermore, epidemiological data from the U.S. NHANES III study demonstrate that women with low calcium intake are 6 to 7 times more likely to be in the highest adiposity quartile.³

Effect of Calcium and Dairy Intake on Body Fat			
Quartile (Calcium and Dairy Intake)	Calcium Intake (mg/day) (mean ± SEM)	Dairy Intake (servings/m) (mean ± SEM)	Odds ratio of being in the highest body fat quartile
1	255 ± 20	14.4 ± 1.9	1.00
2	484 ± 13	38.0 ± 1.3	0.75
3	773 ± 28	57.2 ± 1.0	0.40
4	1,346 ± 113	102.8 ± 3.6	0.16

Adapted from reference 3

More Yogurt, Please

Another clinical trial, studying the effects of increased dietary calcium for a period of 12 months on body fat in obese African-American males, indicated that the group supplemented with yogurt (1000 mg Ca/day) showed a body fat loss of 4.9 kg compared to the non-supplemented group.³ Other research supports these observations.⁴⁻⁸

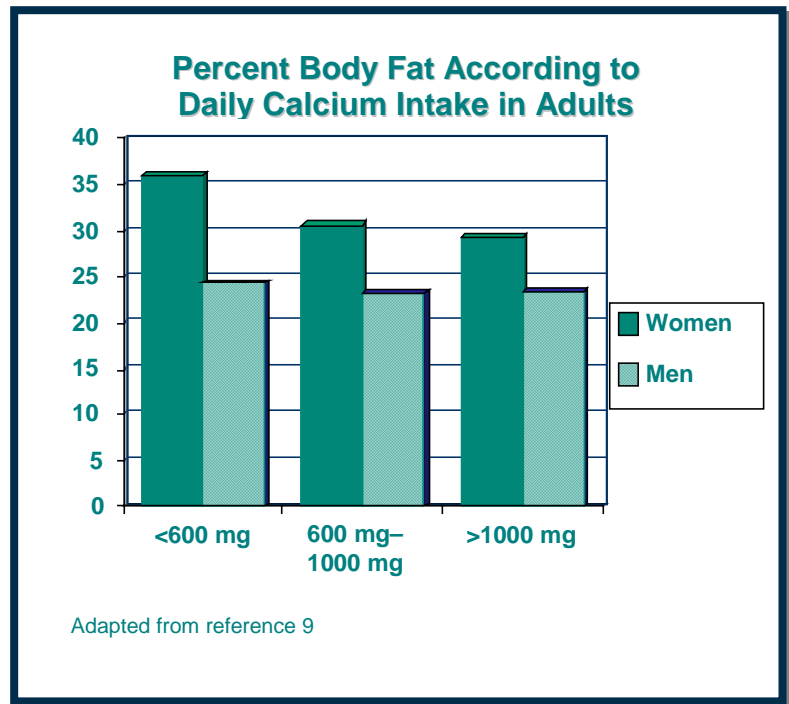
More Calcium, Less Body Fat?

Dr. Tremblay's own research demonstrates an inverse relationship between dietary calcium intake and percent body fat in adults 20 to 65 years of age.⁹ Women with calcium intakes lower than 600 mg/day had a significantly higher body fat percentage and higher Body Mass Index compared to subjects whose daily calcium intake exceeded this amount (Figure).

Calcium and Plasma Lipids– Lipoproteins

Dr. Tremblay reported an interesting new finding from his team's research. Once corrections were made for body fat and waist circumference, evidence showed a significant relationship between dietary calcium intake and certain plasma lipids and lipoproteins (total cholesterol, triglycerides, LDL-cholesterol).⁹ An adequate calcium intake has a positive impact on the lipid profile and reduces the risk of cardiovascular disease.⁹

His team's next step will be to address the actual impact of calcium and/or milk supplementation on appetite control and energy expenditure in obese subjects following a weight loss program. Based on the preceding information, the leading hypothesis suggests that calcium and/or milk



supplementation could help obese individuals with generally low calcium intakes better control their weight.

References

1. Katzmarzyk PT: The Canadian obesity epidemic, 1985–1998. *Can Med Assoc J* 2002; 166(8):1039–1040 www.cmaj.ca/cgi/content/full/166/8/1039
2. Shi H, Halvorsen YD, Ellis PN et al: Role of intracellular calcium in human adipocyte differentiation. *Physiol Genomics* 2000; 3:75–82 physiolgenomics.physiology.org/cgi/content/full/3/2/75
3. Zemel MB, Shi H, Greer B et al: Regulation of adiposity by dietary calcium. *FASEB J* 2000; 14:1132–1138 www.fasebj.org/cgi/content/full/14/9/1132#F1
4. Skinner J, Carruth B, Coletta F: Does dietary calcium have a role in body fat mass accumulation in young children? *Scand J Nutr* 1999; 43(Suppl 34):45S
5. Carruth BR, Skinner JD: The role of dietary calcium and other nutrients in moderating body fat in preschool children. *Int J Obes* 2001; 25:559–566
6. Lin YC, Lyle RM, McCabe LD et al: Dairy calcium is related to changes in body composition during a two-year exercise intervention in young women. *J Am Coll Nutr* 2000; 19:754–760
7. Davies KM, Heaney RP, Recker RR et al: Calcium intake and body weight. *J Clin Endocrinol Metab* 2000; 85:4635–4638 icem.endojournals.org/cgi/content/full/85/12/4635
8. Summerbell CD, Watts C, Higgins JP et al: Randomised controlled trial of novel, simple, and well supervised weight reducing diets in outpatients. *Br Med J* 1998; 317:1487–1489 www.bmj.com/cgi/content/full/317/7171/1487
9. Jacqmain M, Doucet E, Després JP et al: Calcium intake, body composition and lipoprotein-lipid concentrations in adults. *Am J Clin Nutr* 2002 (in press)

LOOKING AHEAD

Milk and the Canadian Diet

Milk and milk products are staple foods in the Canadian diet. Their role is recognized in *Canada's Food Guide to Healthy Eating* where Milk Products are identified as one of the four food groups and daily servings are outlined according to age and energy needs.

Many of the nutrients provided by milk and milk products are not found in large amounts in other foods. They supply almost two thirds of the calcium and vitamin D in the diet of Canadians, and are the second largest source of protein. In addition to offering a range of nutrients, milk products are affordable, readily available and enjoyed by most Canadians, young and old.

However, getting enough calcium does present a challenge for many. NIN's latest Tracking Nutrition Trends consumer survey, released in April 2002, confirmed that Canadian men and women are increasingly concerned about calcium—to a record high of 77% in 2001.

NIN does not consider that a half-day forum can resolve the milk controversy. However, NIN's President Anne Kennedy emphasizes, "The Institute's aim is to present scientific facts to bring about a more balanced perspective on issues relating to milk, milk products and health."

Other Food Groups on Trial

NIN is committed to providing Canadians with accurate, science-based information and will be pursuing consumer misperceptions about other key food groups in future issues of *RAPPORT*.

RAPPORT

Editor

Anne Kennedy, M.H.Sc., RD
NIN President

Author

Nicole Doucet, B.Sc., DtP
Nicole Doucet Communications

Editorial Board

Randy Meltzer, RD, DtP
Nutrition Consultant
Nutrition Matters

Laurie A. Wadsworth, Ph.D., P.Dt., FDC
Assistant Professor
St. Francis Xavier University

Guest Reviewer

Sheryl Conrad, B.Sc., RD
Food & Nutrition Consultant

Editorial Office

National Institute of Nutrition
302-265 Carling Avenue
Ottawa, Ontario K1S 2E1

Phone: (613) 235-3355

Fax: (613) 235-7032

Email: nin@nin.ca

Website: www.nin.ca

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