Current AWARENESS

A newsletter by Dairy Management, Inc.™ to provide the dairy industry with current research on nutrition and dairy foods

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June 2010 Vol. 24, No. 6

NDC Research Update

STUDY ASSESSES USING VISIBLE CHEESE AS A STRATEGY TO INCREASE CONSUMPTION OF FOOD GROUPS TO ENCOURAGE IN MIDDLE SCHOOL CHILDREN

Most Americans, including children do not consume enough fruit, vegetables, whole grains, or low-fat and fat-free dairy foods, referred to as "Food Groups to Encourage" (FGTE) in the 2005 Dietary Guidelines for Americans. Since consumption of some of these foods has been associated with reduced risk from several chronic diseases, strategies are needed to encourage consumption of FGTE among children.

This two-part study determined the effects of using visible cheese on the selection and consumption of FGTE in middle school students. Study 1 was conducted in the cafeterias of three middle schools and involved 145 students. Schools were randomly assigned to a one-month menu cycle with visible cheese or without visible cheese. Consumption of fruits, vegetables, and whole grains were scored, and a composite score was computed for consumption of all FGTE. After a two-week washout period participants were crossed-over to the opposite condition for a month. Study 2 was conducted in a laboratory setting and provided side-by-side comparisons of FGTE with and without visible cheese. Seventy-two middle school students participated in this study, and consumed their lunch in a room separate from the cafeteria. Each participant was assessed once a week for three weeks. Results of both studies indicated that the children were not consuming FGTE in recommended amounts.

Results:
Study1

- One hundred eight students completed both menu cycles.
- There were no significant differences in consumption of individual FGTE and the composite score for all FGTE between the visible cheese and no visible cheese menus. Although not statistically significant, the composite score indicated greater levels of FGTE (+16%) consumed when visible cheese was present compared to no cheese. The authors say FGTE may not be a priority for middle school children when there are a wide variety of food choices available.
- There were no significant differences in calorie and macronutrient (carbohydrate, fat, protein) intakes between the menu cycles. However, participants consumed a higher percentage of calories as fat and protein during the visible cheese cycle.

- As compared to the same food item without cheese, a cost analysis indicated that adding cheese increased the cost of a FGTE item by 20-25 cents.
- The majority of participants rated the taste of cheese as more than satisfactory, and 76% rated the appearance of visible cheese as "satisfactory" to "very good".

Study 2

- As compared to the no visible cheese food items, significantly more fruits and whole grains were consumed with visible cheese. Furthermore, the composite score for all FGTE was greater for the visible cheese items as compared to the no visible cheese items.
- There were no significant differences in energy and macronutrient intakes between the visible cheese and no visible cheese items.
- Similar to study 1, the majority of participants reported that the overall taste of the cheese was more than satisfactory. Also, more than 90% of the participants rated the appearance of the cheese highly (satisfactory to very good).

The authors say, "Altering FGTE with visible cheese is a strategy that is quickly accepted by middle school students." They say the increased calories and cost associated with visible cheese "may be reduced with simple alterations to commonly selected foods other than FGTE". [Donnelly JE, et al., *J Child Nutrition & Management*, 34(1): 1-12, 2010]

[Editor's note: This work was supported by grants from Dairy Management, Inc., Midwest Dairy Council, Leprino Foods, and Land O'Lakes]

DAILY INTAKE OF A FERMENTED DAIRY PROBIOTIC DRINK SHOWS PROMISE FOR REDUCING INCIDENCE OF COMMON INFECTIOUS DISEASE IN KIDS

This 90-day double-blind, randomized, placebo-controlled trial among 638 children 3-6 years old in daycare/schools evaluated whether a fermented dairy drink (DanActive) containing the probiotic strain *Lactobacillus casei* DN-114 001 and two traditional yogurt starter cultures (*Streptococcus thermophilus* and *Lactocacillus bulgaricus)* could reduce the incidence of common infectious diseases (CIDs) and the change in activity because of illness as reported by their parents. Participants were randomly assigned to the intervention or control group. Those in the intervention group were instructed to consume one bottle (200 ml) of strawberry-flavored DanActive per day, while those in the control group consumed the same volume of a sweetened, flavored non-fermented acidified dairy drink without the active components of the test product.

Results showed the rate of change of behavior because of illness (i.e. missed school, birthday party, etc.) were similar between the intervention and control groups. However, the overall incidence of CIDs in the intervention group was 19% lower in the intervention group compared with controls. More specifically, when compared to the control group, those in the intervention group had a statistically significant 24% lower incidence rate for gastrointestinal infections, an 18% lower incidence of upper respiratory tract infections, and a 2% lower incidence of lower respiratory tract infections. In addition, the average number of days of medicine use (secondary outcome) was significantly lower in the intervention group compared with controls. The authors note that these differences may not be large enough to be clinically relevant. There were no differences between groups for other secondary outcomes (absences from daycare/school, missed parental work because of sick child, days of diarrhea, vomiting, stomach pain, constipation, runny nose, cough, decreased appetite, fever or rash). The authors

conclude, "Our randomized clinical trial shows that a fermented dairy drink with a characterized probiotic strain holds promise, but has limitations in promoting the health for children aged 3-6 years." [Merenstein D, et al., *European Journal of Clinical Nutrition*, published online May 19, 2010]

STUDY SHOWS A PROBIOTIC FERMENTED MILK LOWERS WEIGHT AND BODY FAT IN JAPANESE ADULTS

Researchers in Japan conducted a multicenter, double-blind, randomized, placebo-controlled intervention trial to evaluate the effects of the probiotic *Lactobacillus gasseri* SBT2055(LG2055) on abdominal fatness, body weight, and other body measures in 87 generally healthy adults (33-63 years) with obese tendencies (body mass index between 24.2 and 30.7 kg/m^2). Participants were randomly assigned to receive either fermented milk (FM) containing LG2055 (active FM group) or fermented milk without LG2055 (control FM group). They were instructed to consume 200 g/day of either the active or control FM, in two portions of 100 g, for 12 weeks while they maintained their habitual diet and exercise patterns. The active FM was prepared using skim milk powder and inoculating with lactic acid starter cultures commonly used for yogurt production (*Streptococcus thermophilus* and *Lactobacillus delbrueckii* ssp. *bulgaricus)* and viable cells of LG2055. The control FM was prepared in the same way, except the LG2055 cells were not added. Both fermented milks were identical in calories, protein, fat, carbohydrate, sodium and calcium. "In this study," say the authors, "intake of the probiotic LG2055 showed significant reductions in abdominal visceral and subcutaneous fat areas, as well as body weight, BMI, waist and hip circumferences, and body fat mass."

Specifically:

- Average calorie and nutrient intake and steps walked did not differ between the active and control groups at baseline and at 4, 8, or 12 weeks during the study.
- "In the active FM group, abdominal visceral and subcutaneous fat areas significantly decreased from baseline by an average of 4.6% and 3.3%, respectively," while no significant changes were observed in the control group.
- In addition, the active FM group demonstrated significant decreases from baseline in body weight (1.4%), BMI (1.5%), waist circumference (1.8%), and hip measurement (1.5%). The control group "showed no significant decrease in any parameter of the measured values at any time point."

The authors attribute their results to the LG2055 cells and/or their metabolites. They speculate that inhibition of fat absorption may be one of the mechanisms for weight/fat loss seen in this study since this was shown in rats fed fermented skim milk with LG2055. Future studies will need to confirm this effect in humans. They say intestinal microbes might also influence energy metabolism, but additional research is needed to clarify the mechanisms underlying the observed effects. [Kadooka Y, et al., *European Journal of Clinical Nutrition, 64:* 636-643, 2010]

STUDY FINDS CARBOHYDRATE AND CHOCOLATE MILK BEVERAGES HAVE SIMILAR EFFECTS ON WHOLE-BODY EXERCISE RECOVERY FOLLOWING HEAVY SOCCER TRAINING

This study compared the effectiveness of chocolate milk and an isocaloric carbohydrate beverage on markers of recovery following a period of increased training among 13 intercollegiate male soccer players. One week of normal baseline training was followed by four days of increased training duration. After each day of increased training participants were randomly assigned to receive either a high-carbohydrate (504 kcal; 122 g carbohydrate, 2 g fat) or isocaloric chocolate milk (504 kcal; 84 g carbohydrate, 28 g protein, 7 g fat) recovery beverage. After a two-week washout period, participants repeated the procedure with the alternate beverage. Results showed that "Overall, the isocaloric chocolate milk and carbohydrate supplements provided similar effects on markers of post-exercise recovery over the four-day period of increased training duration," such as muscle soreness, ratings of energy/fatigue, assessed muscle function or for myoglobin. However, blood levels of creatinine kinase, often used as a broad indicator of muscle damage, were significantly lower following four days of increased training duration with chocolate milk supplementation than with carbohydrate supplementation. The authors say that the modest increase in training duration (12%) in this study "may have been an inadequate stimulus to substantially impair muscle recovery," making it difficult to assess differences between treatment. The authors recommend that future studies use greater increases in training duration over longer periods of time. [Gilson SF, et al., *Journal of the International Society of Sports Nutrition*, published online May 18, 2010]

CHEESE INTAKE WAS ASSOCIATED WITH A LOWER RISK FOR FIRST HEART ATTACK IN SWEDISH WOMEN

This large prospective case-control study among adults enrolled in the Northern Sweden Health and Disease Study investigated the association between blood levels of milk fatty acid biomarkers (15:0, 17:0, and 15:0+17:0) and a first heart attack and risk factors associated with metabolic syndrome. In addition, associations between the intake of selected milk products and first heart attack were also investigated. The study population consisted of 444 men and women who experienced a first heart attack since study inception (cases) and 556 men and women who did not experience a heart attack (controls).

Result highlights:

- "The proportion of milk biomarkers 15:0 and 17:0 and their sum was significantly higher in female controls than in female cases."
- Higher biomarkers of milk fat were associated with a lower risk of first heart attack in women, but not men.
- "Both male and female cases reported numerically lower median intakes (gm/day) of cheese, fermented milk, total dairy products, and fatty acids 15:0+17:0 compared with controls." Women cases had significantly lower intake of cheese and men cases had a significantly lower intake of fermented milk compared to controls.
- In women the highest vs. lowest intake of cheese was associated with a significant 88% lower risk of first heart attack after adjustment for leisure time and occupational physical activity and BMI.

- "Intakes of total milk products and 15:0+17:0 were not related to a first heart attack in this study."

The authors say, "Compared with cases, controls reported generally higher intakes of different milk products. This suggests a potential causal link between low intake of milk products and heart disease." "Apart from cholesterol-raising saturated fats, dairy products contain longer-chained saturated fatty acids (12:0, 14:0, and 16:0), calcium, phosphorus, potassium, magnesium, vitamin D, shorter-chained fatty acids, stearic acid (18:0), whey and casein proteins, and other potentially bioactive compounds that may promote beneficial effects", the authors say. [Warensjo E, et al., *American Journal of Clinical Nutrition*, published online May 19, 2010]

[Editor's note: Laying the groundwork for the above study, in 2004 the same researchers published a prospective case-control study in Sweden examining how the intake of milkfat might influence the risk for a first heart attack. They found that a higher intake of milkfat (as estimated from the concentration of milk fatty acids 15:0 and 17:0 and their sum (15:0 + 17:0) in serum phospholipids and cholesteryl esters) "seems to be associated with a reduced, rather than an increased, risk of developing AMI (acute myocardial infarction)." A higher proportion of milkfat was significantly correlated to a lower serum concentration of "metabolic" risk factors (i.e., plasminogen activator inhibitor-1, tissue-type plasminogen activator, triacylglycerols, insulin, proinsulin, and leptin), suggesting a negative relationship to the insulin-resistance syndrome and risk of coronary heart disease (CHD). [Warensjo E, et al., *British J Nutr*, 91: 635-642, 2004]

STUDY SUGGESTS A POTENTIAL ROLE FOR CERTAIN CHEESES IN SUPPRESSING CANCER CELL GROWTH

"A considerable number of studies have indicated that dairy and natural food products may possess anticancer activity," the authors say. Japanese researchers investigated the potential role of 11 commercial cheese extracts as well as Blue cheese with various ripening periods on the cell growth and induction of apoptotic DNA fragmentation (measure of programmed cell death), using HL-60 human promyelocytic leukemia cell lines as a cancer model. The commercial cheese products tested included 2 wash type (Montagnard and Pont-l'Eveque), 3 mold-ripened types (Brie, Camembert, Danablue), 2 propionic acid bacteria-ripened types (Emmental and Gruyere), and 4 lactic acid bacteria-ripened types (Parmesan, Edam, Gouda, and Mozzarella). Results showed that the 6 cheeses classified as either propionic acid bacteria-ripened types and lactic acid bacteria-ripened types demonstrated no growth inhibition activity. In contrast, the other 6 cheese extracts (Montagnard, Pont-l'Eveque, Brie, Camembert, Danablue, and Blue) displayed significant growth inhibition of more than 50%. Extracts of Montagnard, Pont-l'Eveque, Brie, Camembert, and Blue also induced apoptotic DNA fragmentation when they were incubated with HL-60 cells. In addition, ripeness of the Blue cheeses tested was an important factor in suppressing cancer cell growth. Ripeness was positively associated with growth inhibition of HL-60 cells, and when extracts of Blue cheese ripened 2 and 3 months were incubated for 6 hours, there was an increase of fragmented DNA of HL-60 cells. "In this report," the authors say, "we demonstrated for the first time a potential antiproliferative effect of commercial cheeses using HL-60 human promyelocytic leukemia cells as a model." They conclude, "These results may dictate a potential role of cheese products in suppressive effects on cancer cell growth, and ripeness can be considered a key factor." More work needs to be done to clarify whether bioactive compounds present in these cheeses are responsible for the observed anti-cancer effect. [Yasuda S, et al., *J Dairy Sci*, 93: 1393-1400, 2010]

A LIMITED INCREASE IN RUMINANT TRANS FAT MAY IMPROVE CARDIOVASCULAR RISK FACTORS IN HEALTHY ADULTS

Modifying a cow's diet can proportionately increase the ruminant trans fatty acid content of milk fat while reducing its content of saturated fat. This 4-week randomized, double-blind, controlled study evaluated the impact of three specific ruminant milk fats resulting from modification of the cow's diet on blood lipids in 111 healthy French volunteers (18-50 years). Three experimental dairy fats were obtained from cows fed or not fed linseed extruded grain or oil: 1) dairy fat with the lowest ruminant trans fatty acid (R-TFA)/saturated fat (SF) ratio from cows fed corn silage with cereal-based concentrate and soybean meal and not supplemented with linseed (LO); 2) dairy fat with an intermediate R-TFA/SF ratio from cows supplemented with 4.1% on dry matter basis of extruded linseed (L4); 3) dairy fat with the highest R-TFA/SF ratio from cows grazing on autumn grass (white clover and rye grass) and supplemented with 1 kg of linseed oil (L9). During the first week all participants were asked to consume three different experimental food items incorporating only LO milk fat: butter (20 gm/day), dessert cream (100 gm/day), and cookies (59 gm/day). During the 3-week intervention, participants were randomly assigned to one of the three experimental dairy fat groups and were asked to consume the corresponding food items. The fat intake from these foods was about 2/3 of the total daily fat intake of the participants.

Results:

- There was no change from baseline in plasma concentrations of HDL-cholesterol between groups.
- Compared to the LO diet, the L4 diet significantly reduced total cholesterol, LDL-cholesterol, the LDL-cholesterol/HDL-cholesterol ratio, and the total cholesterol/HDL-cholesterol ratio. The authors calculate that this change is associated with a 9.5% decrease in the risk of heart attack.
- Consumption of the L9 diet "induces no significant changes in plasma markers of cardiovascular disease (CVD)". "The ratio between total and HDL-cholesterol was significantly increased after 3 weeks of the L9-dairy fat compared to the L4 diet."

The authors say, "Our data suggest that whereas mild increase in R-TFA/SFA ratio in milk fat may be beneficial compared to LO diet, further increase in R-TFA/SFA ratio does not provide additional benefit regarding the CVD risk factors." [Malpuech-Brugere C, et al., *European Journal of Clinical Nutrition*, published online May 19, 2010]

LACTIC ACID BACTERIA FOUND TO ENHANCE THE EFFECTIVENESS OF A CHEMOTHERAPEUTIC AGENT ON COLON CANCER CELLS

Colorectal cancer is the second most frequent cause of cancer-related deaths in North America. This study assessed the potential of *Lactobacillus acidophilus* and *Lactobacillus casei* strains to increase the effectiveness of a chemotherapeutic agent, 5-fluorouracil (5-FU) to cause apoptosis (cell death) of cancer cells. Researchers in Canada treated LS513 colorectal cancer cells for 48 hours with increasing concentrations of these lactic acid bacteria in the presence of 100 μg/ml of 5-FU. Results showed that "In the presence of 10^8 CFU/ml of live lactic acid bacteria, the apoptotic efficacy of the 5-FU increased by 40%". This effect was dependent on the dose. When the lactic acid bacteria were inactivated by microwave, the apoptotic capacity of F-FU was

reduced, but not when lactic acid bacteria were inactivated by irradiation. "These results suggest," say the authors, "that live *L.acidophilus* and *L. casei* are able to increase the apoptosis-induction capacity of 5-FU." The authors speculate that lactic acid bacteria "could be used as an adjuvant treatment during anticancer chemotherapy," but more research is needed to identify their mechanism of action. [Baldwin C, et al., *Nutrition and Cancer*, 62(3): 371-378, 2010]

A SYSTEMATIC REVIEW OF LACTOSE MALABSORPTION AND INTOLERANCE

Recognizing that the process of diagnosing lactose intolerance is not straightforward for primary care physicians, the authors conducted a systematic review of the literature summarizing available evidence on value of using gastrointestinal symptoms and self-reported milk (lactose) intolerance to diagnose the condition. They also studied the relationship between lactose malabsorption and intolerance by analyzing the association between results from the lactose hydrogen breath test (LHBT) and the presence of symptoms after lactose ingestion. A total of 26 primary diagnostic studies were included in the review. The authors found:

- "The diagnostic performance of symptoms reported to be associated with lactose intolerance (diarrhea, abdominal pain, bloating, and flatulence) was highly variable."
- "Lactose malabsorption is more likely when a patient is of non-Caucasian ethnic origin."
- "Self-reported milk intolerance and occurrence of symptoms during LHBT were not only found in lactose malabsorbers but also in lactose absorbers."

The authors say the concept of lactose intolerance should be clearly defined as a positive LHBT result plus accompanying clinical symptoms, and primary physicians should be educated about how to accurately assess it. They say, "High quality studies on the diagnosis of lactose malabsorption and intolerance in primary care are urgently needed." [Jellema P, et al., *Q J Med*, published online June 3, 2010]

A NEW RECOMBINANT ENZYME EFFICIENTLY HYDROLIZES LACTOSE IN MILK

The β-galactosidase enzyme is widely employed in the agrofood industry to reduce the lactose concentration in milk products to overcome the barrier of lactose intolerance. In this study, researchers in France cloned, sequenced, and expressed the gene encoding β-galactosidase from the *Streptococcus thermophilus* strain LMD9 (bacterial culture used in yogurt) in *Escherichia coli*. The researchers monitored the lactose hydrolyzing activity of this recombinant enzyme and found that it was optimally active at a wide range of temperatures (25-40 °C) and at pH from 6.5 to 7.5. Immobilizing the recombinant *E. coli* enhanced its enzyme activity and stability throughout a broader range of temperatures (4 and 50 °C) and pH (4.0 to 8.5). Immobilized cells are useful in industry because they can be recycled and used many times. This enzyme demonstrated high efficiency of lactose bioconversion in milk and whey. The authors note that bioconversion of lactose from whey creates a cheap source of D-galactose and D-glucose, which may potentially be used for production of hypocaloric sweeteners. The authors conclude, "The remarkable bioconversion rates of lactose in milk and whey at different temperatures revealed the attractive catalytic efficiency of this enzyme, thus promoting its use for lactose hydrolysis in milk and other dairy products." [Rhimi M, *Research in Microbiology*, published online May 28, 2010]

In Brief…

Study shows daily intake of probiotic in yogurt significantly reduces the risk of the common cold in healthy elderly

Elderly individuals suffer more frequent and severe infections than younger persons. Researchers in Japan evaluated whether the intake of yogurt fermented with *Lactobacillus delbrueckii* spp. *bulgaricus* OLL1073R-1 has an effect on resistance to the common cold in healthy elderly individuals. They conducted two independent studies. One group included 57 participants with a median age of 74.5 years; the second group included 85 participants, with a median age of 67.7 years. "In each study," the authors explain, "the subjects were divided into two groups based on age and sex and instructed to eat 90 g yogurt or drink 100 ml [less than half a cup] milk once per day over an 8- or 12-week period." A meta-analysis of the results of these two studies showed:

- "The risk of catching the common cold was about 2.6 times lower in the yogurt group than in the milk group and the increase of natural killer cell [immune cell] activity was significantly higher in the yogurt group than in the milk group."
- "The quality of life score for the 'eye/nose/throat' system after intake was significantly higher in the yogurt group than in the milk group and the improvement of the score was correlated with the promotion of natural killer cell activity.

The authors say, "We believe that yogurt fermented with *L. bulgaricus* OLL1073R-1 may be a new beneficial food for the elderly." [Makino S, et al, *British J Nutr*, published online May 21, 2010]

Growth-promoting activity found to be dependent on the protein source in young women

Growth hormone (GH), originating from the anterior pituitary gland, is an important regulator of growth and body composition. Low growth hormone concentrations may be associated with obesity, sarcopenia (loss of muscle mass), and growth retardation. This randomized, single blind, placebo-controlled study compared the growth hormone-stimulating capacity of soy protein, gelatin protein, α-lactalbumin protein, and milk protein in 8 healthy women (19-26 years). Results showed, "the GH-promoting activity of protein depends on the protein source," and gelatin protein was the most potent stimulator, likely due to its arginine content. The peak GH concentration in blood was delayed after ingestion of milk (perhaps due to casein), but the GH area under the curve was not different between soy, α-lactalbumin, and milk. [van Vught AJAH, et al., *European Journal of Clinical Nutrition*, 64: 441-446, 2010]

Black girls found to retain more potassium than white girls

Racial differences in the body's handling of potassium may contribute to blacks' higher susceptibility to hypertension, say the authors. This study, performed under highly controlled metabolic conditions, investigated racial differences in the system controlling blood pressure (renin-angiotensin-aldosterone system) and in potassium balance in 30 black and 20 white girls (11-15 years) from Indiana. The metabolic studies were conducted in two 20-day sessions. Participants were randomly assigned to receive a low sodium diet (57 mmol/L /day) or a high-sodium diet (174 mmol/L/day), in a crossover design, with a 2-week washout period between sessions. During the intervention, three meals and two snacks were provided daily that contained fixed amounts of protein, fat, magnesium, phosphorus, and potassium. Racial differences in potassium output and retention by sodium intake were reported. Results showed, "Urinary potassium excretion was lower in blacks than in whites, regardless of sodium intake, with no differences in fecal or sweat potassium excretion." Also, "Potassium retention was significantly higher in the black girls while consuming the lower-sodium diet compared

with whites, but no racial differences were seen while consuming the higher-sodium intake." The authors conclude, "The present study suggests that racial differences in potassium handling in girls are best explained by differences in renal output and less by differences in diet." [Palacios C, et al., *Am J Clin Nutr*, 91: 597-603, 2010]

Dietary pattern may predict risk of colorectal cancer

This review evaluates results from 16 prospective cohort and population-based case-control studies examining associations between dietary patterns and risk of colorectal cancer. Analyzing dietary patterns and their associations with cancer risk can complement or improve current dietary recommendations. Two dietary patterns emerged as modest predictors of colorectal adenoma and cancer risk. A healthier pattern (i.e., greater intakes of fruits and vegetables, as well as higher intakes of one or more of the following food items or groups: whole grains, low-fat dairy products, fish, poultry, olive oil, and legumes, and lower intakes of red and processed meat) was protective against colorectal adenoma and cancer incidence. The findings also suggested that a less healthy pattern (i.e., higher intakes of red and processed meat, potatoes and refined carbohydrates) may increase risk. These findings are in general agreement with previous studies. [Miller PE, et al., *Nutrition and Cancer*, 62(4): 413-424, 2010]

Phytanic acid: a bioactive fatty acid in dairy fat

More than 400 different fatty acids have been identified in milk fat. This review discusses what is known about phytanic acid and its possible preventive effects on metabolic dysfunction. It has been shown, for example, that phytanic acid activates a receptor in the cell nucleus that is involved in metabolic regulation. The major dietary sources of phytanic acid, or its precursor, phytol, are dairy products, ruminant meat, and some marine fats. Dairy foods and meat are the dominating sources in Western culture. Phytanic acid is formed through the metabolism of phytol, which is released from chlorophyll through microbial action in the rumen. Therefore, its concentration is higher in milk from grass fed cows. The concentration of phytanic acid in human serum depends on diet. For example, one study showed that plasma concentrations were highest in British meat eaters, intermediate in lacto-ovo-vegetarians, and lowest in vegans. The authors say, "Although no study exists, in which the effect of phytanic acid on energy balance has been directly studied, literature data indicate a positive correlation between phytanic acid level in the body and energy expenditure." One factor limiting the study of phytanic acid is its high price. However, the authors say, "Several of the reported physiological effects are promising, and deserve further studies." [Hellgren LI, *Annals of the New York Academy of Sciences*, 1190(1): 42-49, 2010]

The effects of high fructose corn syrup is reviewed

Some have raised health concerns about the consumption of high fructose corn syrup (HFCS), an increasingly common food ingredient. The authors, who represent the American Medical Association's Council on Science and Public Health, make the following points:

- "The most commonly used types of HFCS (HFCS-42 and HFCS-55) are similar in composition to sucrose (table sugar), consisting of roughly equal amounts of fructose and glucose."
- The primary difference between HFCS and sucrose is that in HFCS fructose and glucose exist free in solution as monosaccharides, while in sucrose they are in disaccharide form. However, fructose and glucose are absorbed in their free state from both HFCS and sucrose.

- "The advantage to food manufacturers is that the free monosaccarides in HFCS provide better flavor enhancement, stability, freshness, texture, color, pourability and consistency in foods in comparison to sucrose."
- "It appears unlikely that HFCS contributes more to obesity or other conditions than sucrose does."
- "At the present time, there is insufficient evidence to ban or otherwise restrict use of HFCS or other fructose-containing sweeteners in the food supply or to require the use of warning labels on products containing HFCS."

The authors acknowledge the 2005 Dietary Guidelines recommendations to limit the consumption of all added caloric sweeteners. [Moeller SM, et al., *J Am College Nutr*, 28(6): 619-626, 2009] [Editor's note: This is the most recent issue of *JACN* published, since the journal is behind schedule.]

Other Publications of Interest

- *Predicted 25-hydroxyvitamin D score and incident type 2 diabetes in the Framingham Offspring Study. [Liu E, et al., Am J Clin Nutr, published online April 14, 2010]* This case-control study among a group of adults enrolled in the Framingham Offspring Study with an average of 7 years of follow-up found that those with the highest compared to the lowest blood levels of vitamin D (25(OH)D) had a 40% lower incidence of type 2 diabetes after adjustment for potential confounding factors.
- *Calcium intake increases risk of prostate cancer among Singapore Chinese. [Butler LM, et al., Cancer Resesarch, 70(12): 4941-4948, 2010]* This large case-control study of Singapore residents (45-74 years) examined the relationship between calcium intake and prostate cancer risk with diet assessed at baseline. The major sources of calcium in this population were vegetables, not dairy products. Results showed only a modest and nonsignificant increase in prostate cancer risk in those consuming the most calcium (659 mg/d) compared to the least (211 mg/d).
- *Vitamin D and calcium intakes and breast cancer risk in pre- and postmenopausal women. [Anderson LN, et al., Am J Clin Nutr, 91: 1699-1707, 2010]* This case-control study, evaluating the associations and potential interaction between vitamin D and calcium (from food and supplements) and breast cancer risk, found "Vitamin D and calcium intakes from food only and total combined intakes (food and supplements) were not associated with breast cancer risk, although mean intake of vitamin D was low." Women with a vitamin D intake from supplements more than 400 IU/day had a significant 24% lower risk of breast cancer, but there was no clear dose-response relationship.
- *Psychosocial factors influencing calcium intake and bone quality in middle school girls. [Sharma SV, et al., J Am Diet Assoc, 110: 932-936, 2010]* This cross-sectional study identified psychosocial factors influencing calcium intake and bone quality in 717 sixth-grade girls in Texas. Results showed that "knowledge of osteoporosis and calcium-rich foods, calcium self-efficacy, and outcome expectations were all positively correlated with calcium intake." Milk availability at home was significantly correlated with quantity of calcium and milk consumed daily.
- *Vitamin D and multiple sclerosis. [Ascherio A, Mungere KL and Simon KC, The Lancet, 9: 599-612, 2010]* This detailed and extensive review examines the evidence linking various measures of vitamin D, such as sun exposure, dietary sources, and serum concentrations with the risk of developing multiple sclerosis. Though the results of these studies support a protective effect of vitamin D, several questions remain unanswered. The authors say a large randomized trial in adolescents and young adults is needed to establish the safety and efficacy of large-scale vitamin D supplementation.

- *Lack of association between the occurrence of Crohn's disease and occupational exposure to dairy and beef cattle herds infected with Mycobacterium avium subspecies paratuberculosis. [Qual DA, et al., J Dairy Sci, 93: 2371-2376]* Although Crohn's disease (CD), a chronic inflammatory disease of the human intestine, shares some common characteristics with Johne's disease (JD) in cattle, an inflammatory intestinal disease caused by infection with *Mycobacterium avium* subspecies *paratuberculosis (Map),* studies examining a possible link have had conflicting results. This cross sectional survey of producers and veterinarians with CD comparing those with and without contact with *Map*-infected herds found "no statistically significant associations observed between exposure to cattle with Johne's disease and Crohn's disease in producers and veterinarians."
- *Acute and repeated dose (4 weeks) oral toxicity studies of two antihypertensive peptides, RYLGY and AYFYPEL, that correspond to fragments (90-94) and (143-149) from α_{s1}-casein. [Anadon A, et al., Food and Chemical Toxicology, published online April 14, 2010]* This study in rats, evaluating the potential oral toxicity of an acute or repeated dose (4 weeks) of hydrolyzed casein containing new sequences of antihypertensive peptides, found no treatment-related toxicity even at the highest doses investigated.
- *Apoptosis of stomach cancer cell SGC-7901 and regulation of Akt signaling way induced by bovine lactoferrin. [Xu XX, et al., J Dairy Sci, 93: 2344-2350, 2010]* This study investigated whether lactoferrin from whey protein plays a role in inducing apoptosis (programmed cell death) of stomach cancer cell SGC-7901. Results showed that a lactoferrin concentration of 50 μM exhibited the most efficient inhibition of the stomach cancer cells, and induced apoptosis through the Akt signaling pathway. Understanding the mechanism of inhibition, the authors say, "could provide a meaningful way by which people can prevent stomach cancer through daily diet."
- *Dietary cheese whey protein protects rats against milk dextran sulfate sodium-induced colitis: Role of mucin and microbiota. [Sprong RC, Schonewille AJ, and van der Meer R, J Dairy Sci, 93: 1364-1371, 2010]* Researchers in the Netherlands investigated whether cheese whey protein, a rich source of the amino acids threonine and cysteine, protect against colitis in rats. Rats with inflammation of the large intestine, induced by dextran sulfate sodium (DSS), a model for human colitis, were fed a diet containing casein, cheese whey protein, or casein supplemented with threonine and cysteine. Results showed, "Whey protein diminished inflammatory gene expression and protected against diarrhea induced by DSS", and coincided with enhanced mucin synthesis and beneficial microbiota (bifidobacteria and lactobacilli).
- *Nutritional genomics era: opportunities toward a genome-tailored nutritional regimen. [Costa V, Casamassimi A, and Ciccodicola A, Journal of Nutritional Biochemistry, 21: 457-467, 2010]* This review summarizes recent knowledge of how diet interacts with an individual's unique genetic profile to influence disease risk. "Past and also current dietary guidelines," the authors say, "do no consider the differences in the individual response to a diet, reflecting an impaired efficacy of these dietary recommendations." In the future, they say, "most of the individuals affected by chronic metabolic disorders [type 2 diabetes, obesity, cardiovascular disease], displaying dramatic heterogeneity in response to the recommended therapeutic diets, will benefit from individually adjusted dietary recommendations."
- *Calcium, vitamin D, VDR genotypes, and epigenetic and genetic changes in rectal tumors. [Slattery ML, et al., Nutrition and Cancer, 62(4): 436-442, 2010]* This case-control study used tissue data from 750 rectal tumors (identified by specific mutations) from participants (30-79 years) enrolled in the Kaiser Permanente Medical Care Program of Northern California and Utah (cases) and was compared to 1205 healthy controls. Results showed a significant inverse

association between calcium intake and rectal tumors overall as well as for the specific TP53 mutation, and a trend toward lower risk of a TP53 mutation with increased sun exposure.