Nutrition for Family Living

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April, 2005 Topics

Factors that predict fat intake behaviors differ between obese and normal-weight mothers

By Susan Nitzke

A study conducted with WIC mothers in Wisconsin by researchers from UW-Madison's School of Nursing and Department of Nutritional Sciences showed that fat intake behaviors of low-income women were affected by a food's appealing taste, their mood or response to stress, and their degree of concern with weight loss. Obese women's fat intakes were also affected by food prices, the time it takes to make a meal, and the location of grocery stores. Other rationales such as eating low-fat foods to be healthy or looking good were not good at predicting fat intake in either normal-weight or obese women.

The researchers compared factors that might predict fat intake in 581 mothers, both African American and white, in southern Wisconsin who received WIC benefits. They used the PRECEDE-PROCEED theoretical model to develop a survey about these women's rationales for eating certain foods. The survey measured "enabling" factors like the cost and convenience of food, and other factors like the desire to control weight and the sensory pleasure the women found in eating.

Implications for Extension educators: Young mothers with low income or education tend to consume high-fat diets and are at a particularly high risk for unhealthy weight gain. They represent an especially important target audience because of the long-term health implications for their own and their children's dietary quality. Educational programs that emphasize weight control intentions, sensory appeal and dealing with negative mood are important for this target audience. Information about the cost of food, availability of time to prepare food and accessibility to purchase food are likely to be more effective with obese members of this target audience.

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Calcium and Weight

By Heather Harvey

Does drinking more milk help you to lose weight? Is this one of the reasons the *Dietary Guidelines for Americans 2005* calls for the average American to consume 3 cups of low fat milk products each day?

The last few years have seen an increase in research looking at the link between calcium and dairy products[1] (milk, cheese and yogurt) and weight. Recent studies that look specifically at the question of increased calcium and dairy intake on weight and weight loss have shown promising results. One study by Zemel showed that women who were on a calorie-restricted, high-milk products diet for 24 weeks, lost 70% more weight than those on just a calorie-restricted diet. Women on the high-milk products diet also lost more than those on a calorie-restricted diet plus a calcium supplement. Other studies have shown similar results. However, these studies should be considered with caution as the results need to be verified in larger studies.

Other studies whose primary purpose was not related to the effect of calcium and dairy products on weight, but looked at this secondarily, offer up contradictory results. Some studies show a benefit of dairy intake on weight loss, while others show a weight gain. Studies that look at individuals' current intakes of dairy products and their current weight tend to find that people with high milk and milk product intakes have lower body weight. However, it is difficult to say whether it is dairy product intake on its own, or something related to both dairy product intakes and weight, such as increased activity, or increased fruit and vegetable intake. Additionally, these studies all used different methods to collect dietary intake and to measure weight, so comparisons are difficult to make. Clearly, more studies are needed that specifically address the question of calcium and dairy intake on weight before we can draw more definite conclusions.

Considering all studies together, a few key issues do emerge. It appears that it is dairy product intake, not calcium intake alone, that has a beneficial impact on weight. Also, most studies consider a high intake of dairy products to be about the equivalent of 3 cups a day – the current recommendation in the *Dietary Guidelines*. Therefore, it looks as if encouraging people to meet the recommended levels of milk and milk product intake is sufficient. Finally, low-fat milk or milk products are encouraged to reduce calories and saturated fat intakes.

In the *Dietary Guidelines Advisory Committee Report*, experts state, "there is insufficient evidence on which to base a more definitive statement regarding the intake of milk products and management of body weight." Even though the *Dietary Guidelines* are not endorsing the consumption of milk or milk products for weight management, the Guidelines do recommend, "adults and children should not avoid milk and milk products because of concerns that these foods lead to weight gain."

Implications for Extension Educators:
Adequate intakes of milk and milk products may or may not prove to be helpful in losing weight or avoiding weigh gain. However, encouraging people to meet recommendations for low-fat milk and milk products will help to improve their overall diet quality and increase their intake of many important nutrients such as calcium, potassium, vitamin A, magnesium and vitamin D. In addition, a balanced diet that meets the recommendations for milk and milk products and plenty of physical activity will help to protect people from osteoporosis later in life. Educating people that the benefits of consuming enough milk or milk product does not have to come with added

[1] For the purposes of this article the term 'dairy products' is used interchangeably with 'milk and milk products'.

weight gain when low-fat choices are made, may help to overcome some people's reluctance to consume recommended amounts of milk and milk products.

Resources:

2005 Dietary Guidelines Advisory Committee Report. Departments of Health and Human Services and Agriculture. Available at http://www.health.gov/dietaryguidelines/dga2005/report/default.htm. Accessed 03/09/05. (This is essentially the literature review that backs up the Dietary Guidelines for Americans document).

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St. Onge MP. Dietary fats, teas, dairy, and nuts: potential functional foods for weight control. *American Journal of Clinical Nutrition*. 2005; 81:7-15.

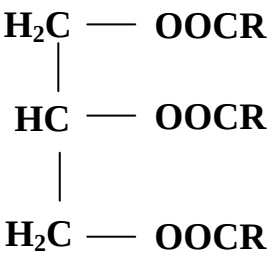
Functional Fat: An Aid in the Struggle for Weight Loss?

Brought to you by Leah Whigham and Sherry Tanumihardjo

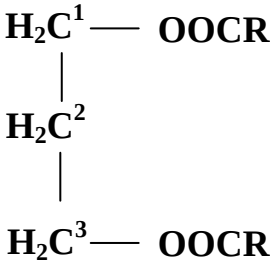
What is ENOVA™? With all the recent attention given to the obesity epidemic, you may have heard of some functional foods that have been investigated for their ability to affect body weight and body fat. Functional foods are currently defined as "foods and food components that provide a health benefit beyond basic nutrition (for the intended population)." One such food is a type of fat called diacylglycerol (DAG). A brand name for this type of fat is ENOVA™. ENOVA™ is made from soy and canola oil and claims to have lower saturated fat than conventional cooking and salad oils. The oil itself is a bland, lightly colored oil with very little flavor of its own. It can be used for frying, baking and in salad dressing just like regular vegetable oil.

What is the difference between ENOVA™ and other oils? While small amounts of DAG can be found in our food supply, the majority of fats and oils are in the form of triacylglycerols (TAGs; three fatty acids attached to a glycerol backbone, see Figure). However, with special processing, TAGs can be converted to DAGs. The ENOVA™ brand of oil claims to be made of 80% DAG with 70% of the DAGs in the 1, 3-configuration as shown in the figure.

Triacylglycerol



1, 3-Diacylglycerol



R = a fatty acid

What is the current status of the research? Several studies show that substituting foods made primarily with DAG for those made with TAG can affect how the body responds to the fat in potentially beneficial ways. For example, normal-weight men had an average decrease in body weight of 2.6 kilograms (almost 6 pounds) when diets included 10 grams/day of DAG in bread, mayonnaise, and shortbread for 16 weeks. The comparison group was provided similar foods containing TAG instead of DAG, and they only experienced an average weight decrease of 1.1 kilograms. There was also a small but significantly greater decrease in waist circumference and abdominal fat, but not total body fat, in the DAG group. In a 24-week study of overweight and obese men and women, DAG replacement in the diet resulted in a greater decrease in body weight (about 3.5% vs. 2.5%), as well as fat mass (about 7.5% vs. 5%), compared to a similar group consuming TAG.

The biological mechanisms behind these changes in body weight have not been definitively determined. The simplest explanations, a difference in energy values or in absorption between the two types of fat, do not appear to be the case. A human study showed no overall difference in energy expenditure, but did show an increase in fat oxidation and improved appetite control. Mechanistic studies indicate that the structural differences between DAG and TAG result in different processing of the fats during absorption by the body. TAG is typically converted to monoglycerides (glycerol with one fatty acid in the 2 position and two free fatty acids), absorbed into the body, and reassembled for distribution in the body for energy or storage as fat. The enzymes responsible for this conversion and reassembly are not as effective when the fatty acids are present only in the 1 and 3 positions, as is the case with ENOVA™'s DAG. As a result, fatty acids do not get preferentially stored as fat, but instead may go to the liver for breakdown to energy. This increase in fat oxidation could explain the effect on appetite.

So what is the bottom line? A diet containing DAG such as ENOVA™ may contribute to weight loss in a small way. However, this needs to be part of an overall effort to decrease total energy intake and/or increase energy expenditure. In other words, ENOVA™ is probably not the magic fat bullet so many Americans are looking for. Fortunately, there do not seem to be any safety concerns with consumption of DAG at levels as high as 0.5 grams/kilograms body weight/day. This would be equivalent to a 70 kilogram (154 pound) person eating 8 teaspoons of the oil per day.

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Weight loss and exercise are cost-effective in the prevention of diabetes

By Gayle Coleman

Research using data from the Diabetes Prevention Project (DPP) shows that it would be cost-effective for society to try to prevent type 2 diabetes in people with pre-diabetes through changes in diet and physical activity. Pre-diabetes is a condition in which blood sugar (glucose) levels are higher than normal but below the level that indicates diabetes. The DPP randomly assigned 3234 persons 25 years of age or older with prediabetes to one of three interventions: placebo, lifestyle-modification, or receiving metformin, a diabetes drug. About half of the participants in the DPP were African American, American Indian, Asian American, Pacific Islander, or Hispanic American/Latino because of the high risk of diabetes in these groups. All participants were given written information on exercise and diet, and an annual 20- to 30-minute individual session that emphasized the importance of a healthy lifestyle. The lifestyle-modification intervention included 16-lessons focused on dietary changes to lower fat and calorie intake, exercise, and behavior modification. The lessons were taught on a one-on-one basis, followed by individual monthly sessions and group sessions. The lifestyle-modification intervention goals were for participants to achieve at least a 7 percent weight loss and get 150 minutes of physical activity per week, such as brisk walking.

The average follow up with participants was 2.8 years. Compared to the placebo intervention, the lifestyle-modification intervention reduced the incidence of type 2 diabetes by 58 percent and the metformin intervention reduced the incidence of type 2 diabetes by 31 percent. In addition, the lifestyle-modification intervention was estimated to delay the development of type 2 diabetes by 11 years and reduce the incidence of diabetes by 20 percent, compared with the placebo intervention. Metformin, the diabetes drug, was estimated to delay the development of diabetes by 3 years and reduce the incidence by 8 percent.

Cost effectiveness of the treatments over a lifetime was determined by using a lifetime simulation model. This model uses direct medical costs such as diabetes education and treatment, quality-adjusted life-years, and assumptions such as the probability of those in the placebo group developing diabetes without intervention to estimate cost effectiveness over a lifetime.

Although the lifestyle and metformin interventions were more expensive than the placebo intervention, delaying or preventing type 2 diabetes delays or prevents the direct medical costs of diabetes. Delaying or preventing diabetes also improves quality and length of life. Preventive steps that cost less the $20,000 per quality-adjusted life-year are generally considered affordable for society. The cost effectiveness analysis showed that over a lifetime, intensive lifestyle interventions for people with pre-diabetes would cost society $8,800 for every quality-adjusted life-year. Therefore the lifestyle intervention is highly cost effective.

Source: W.H. Herman et. al. the Cost-Effectiveness of Lifestyle Modification or Metformin in Preventing Type 2 Diabetes in Adults with Impaired Glucose Tolerance. Ann Intern Med. 2005;142:323-332.