

*“For scientific endeavor is a natural whole the parts of which mutually support one another in a way which, to be sure, no one can anticipate.”*

—Albert Einstein

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*Nutrition Close-Up* is a quarterly publication for Egg Farmers of Canada, written and produced by the Egg Nutrition Center. *Nutrition Close-Up* presents up-to-date reviews, summaries and commentaries on the latest research on the role of diet in health promotion and disease prevention, including the contributions of eggs to a nutritious and healthful diet.

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# NUTRITION CLOSE-UP

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## Eggs Enhance Weight Loss During Calorie Restriction

Calorie-restricted diets have historically been difficult for individuals to follow long enough to achieve and maintain their goal weight. Much of the difficulty stems from hunger and lack of satiety on traditional low-fat, reduced-calorie diets. In an effort to maximize feelings of satiety and fullness during reduced-energy weight loss diets, many research trials have focused on the satiety effects of specific macronutrients. Protein, fibre, and water content of foods have all been associated with greater satiety; however, certain foods appear to contribute to satiety independent of macronutrient composition or energy density. In 2005, Vander Wal et al. published an acute study showing that eating eggs for breakfast (vs. a bagel breakfast) resulted in higher satiety scores and greater calorie deficits throughout the day for overweight and obese women. Vander Wal and colleagues further hypothesized that eating eggs—vs. a bagel breakfast matched for total energy content, weight, and energy density—would enhance weight loss in overweight individuals following a reduced-calorie diet.

This hypothesis was tested in an 8-week follow-up study that included a total of 152 overweight and obese adults (131 women and 21 men). All were 20-60 years of age with BMIs between 25 and 50 kg/m<sup>2</sup>. Height, weight, waist and hip circumference, BMI, and percent body fat were measured at baseline. Participants returned to the clinic for measurement of weight, waist and hip circumference, and body composition at weeks 2, 4, and 8. Blood was also drawn at baseline to measure serum total cholesterol, HDL-cholesterol, LDL-cholesterol, and triacylglycerol concentrations.

*“In addition to other treatment considerations such as reduced kcal intake and improved nutrient composition and adequacy, simple changes in familiar daily foods may enhance weight loss...[Foods] such as eggs may be used as an adjunct for enhancing results of reduced energy diets.”*

The RAND 36-Item Health Survey was used to measure health-specific quality of life factors such as physical functioning, bodily pain, role limitations due to physical health problems, role limitations due to personal or emotional problems, emotional well-being, social functioning, energy/fatigue, and general health perceptions. Hunger, disinhibition (decreased self-regulation of food intake), and cognitive restraint of eating were measured using the Three-Factor Eating Questionnaire. The survey and questionnaire were completed by all participants at baseline.

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Participants were randomized to one of 4 groups: 1) Egg group, 2) Bagel group, 3) Egg diet group, 4) Bagel diet group. Those randomized to the Egg and Bagel groups were instructed to maintain their normal eating and exercise routine, while those in the Egg Diet and Bagel Diet groups were instructed to follow a calorie-restricted (CR) diet providing 1200-1800 kcals/day, based on BMI at baseline. Those in the Egg and Egg Diet groups were instructed to eat 2 eggs each morning between 7:00 and 8:00 am. Those in the Bagel and Bagel Diet groups were instructed to eat a bagel breakfast (matched to the scrambled egg breakfast for total calories, energy density, and weight) each morning during the same timeframe.

Groups were similar at baseline with respect to anthropometric measures, health-specific quality of life, and indicators of eating restraint, disinhibition, and hunger. Those in the CR Egg Diet group lost 65% more weight ( $P < 0.05$ ) than those in the CR Bagel Diet group ( $P < 0.05$ ). Although the reductions in waist circumference, BMI, and percent body fat were greater in the CR Egg Diet group than in the CR Bagel Diet group, the differences were not statistically significant. Changes in all of these measurements were similar between the Egg and Bagel groups. Changes in total cholesterol, HDL cholesterol, LDL cholesterol, and triacylglycerol concentrations did not differ between groups.

As expected, researchers observed a greater increase in dietary restraint for both calorie-restricted diet groups than for the non-calorie-restricted Egg and Bagel groups ( $P < 0.0001$ ). The CR Egg and Bagel diets resulted in the greatest improvements in disinhibition, but did not differ from each other in this measure. The CR Bagel Diet resulted in the greatest improvements in hunger ratings, followed by the CR Egg Diet, the Egg Diet, and the Bagel Diet.

With regard to health specific quality of life scales, The CR Egg Diet and CR Bagel Diet groups experienced greater improvements in physical functioning than those in the non-calorie-restricted Egg and Bagel groups ( $P < 0.03$ ). Participants in the calorie-restricted groups also felt more energetic and less fatigued ( $P < 0.01$ ), with the CR Egg Diet group experiencing greater improvement than the CR Bagel Diet group ( $p < 0.04$ ). Study investigators hypothesize that this observation could have been a product of the weight loss experienced by these participants.

Over the course of this relatively short-term 8-week study, the CR Egg Diet resulted in the greatest reductions in body

weight, BMI, body fat, and waist circumference, followed by the CR Bagel Diet, the Egg Diet, and the Bagel Diet. It is important to note that while the egg breakfast enhanced weight loss during energy restriction, it did not induce weight loss in participants not following a calorie-restricted diet. To more closely simulate the effects of making breakfast recommendations to a free-living population, dietary counseling was not offered, nor did study investigators attempt to monitor dietary intake or compliance. The breakfasts were matched for calorie content, but not for other nutrients, as the purpose of this study was to assess the relative influence of different breakfast types on satiety and weight loss.

Although the relative superiority of the egg breakfast in inducing weight loss in this study might be attributed to its protein content, the authors note that the egg breakfast contributed only an additional 4 grams of protein. Therefore, other potential mechanisms should be investigated further. The authors conclude that “in addition to other treatment considerations such as reduced kcal intake and improved nutrient composition and adequacy, simple changes in familiar daily foods may enhance weight loss...[Foods] such as eggs may be used as an adjunct for enhancing results of reduced energy diets.” ■

Vander Wal JS, Gupta A, Khosla P, Dhurandhar NV. Egg breakfast enhances weight loss. *International Journal of Obesity* advance online publication, 5 August 2008; doi:10.1038/ijo.2008.130. Internet: <http://www.nature.com/ijo/journal/vaop/ncurrent/pdf/ijo2008130a.pdf> (accessed 10 September 2008)

Vander Wal JS, Marth JM, Khosla P, Jen KL, and Dhurandhar NV. 2005. Short-term effect of eggs on satiety in overweight and obese subjects. *J Am Coll Nutr* 24: 510-515.

## KEY MESSAGES

- Over the course of this relatively short-term 8-week study, the calorie-restricted Egg Diet resulted in the greatest reductions in body weight, BMI, body fat, and waist circumference, followed by the calorie-restricted Bagel Diet.
- The calorie-restricted Bagel Diet resulted in the greatest improvements in hunger ratings, followed by the calorie-restricted Egg Diet.
- Although it did not induce weight loss in participants not assigned to reduced energy diet regimens, the egg breakfast enhanced weight loss in those who were following calorie-restricted diets.

# Emphasis on Protein Intake Prevents Loss of Lean Tissue During Weight Loss

**W**eight loss generally results in many favourable consequences in addition to a reduction in body mass and waist circumference for overweight and obese individuals; however, studies often fail to evaluate the effects of dietary intake during weight loss on changes in body composition. Although the most desirable outcome of weight loss is a reduction of fat stores, most restricted-calorie weight loss diets also result in an unintended loss of lean tissue, a consequence that might be particularly detrimental to the elderly, for whom sarcopenia (age-related loss of muscle mass) is an added concern. To determine whether protein intake influences changes in body composition during weight loss, Kritchevsky et al. examined the impact of dietary protein on changes in body composition in overweight and obese postmenopausal women following reduced-calorie weight loss diets.

This analysis was conducted using an existing dataset from a weight-loss trial that had been conducted previously. In this trial, a total of 70 women aged 50 to 70 years were recruited to participate in a 20-week diet and exercise study. Twenty-four of the women were assigned to follow a reduced-calorie (RC) diet and a low-intensity exercise program. Twenty-two were assigned to follow a reduced-calorie (RC) diet and a high-intensity exercise program. The remaining 24 were assigned to follow the RC diet with no exercise prescription. The RC diets were designed to provide a deficit of 2800 kcal/week for each participant, while low- and high-intensity exercise regimens were designed to provide an additional 400 kcal deficit per week. The macronutrient composition of the RC study diet was 25-30% of energy from fat, 15-20% from protein, and 50-60% from carbohydrate, with absolute protein intake ranging from 0.47-0.8 g/kg body weight per day. Lunch, dinner, and snacks were provided daily to all participants through the clinical research center's metabolic kitchen. Participants in the exercise groups performed their high-or low-intensity exercise 3 days per week under the supervision of an exercise physiologist.

Height, weight, and body composition were measured at baseline. Body composition (including percent body fat, lean mass, appendicular lean mass, and total mass) were measured by dual-energy x-ray absorptiometry. Fitness capacity ( $VO_{2max}$ ) was also measured prior to the initiation of the study. No differences existed between groups at baseline with regard to age, race, or fitness capacity between groups.

The mean daily calorie deficit for all participants was 350 kcal/day with a range of 211-693 kcal/day. The average daily

deficit was greater in the diet only group than in either of the exercise groups. Neither diet composition (52% of energy from carbohydrates, 27% from fat, and 17% from protein), nor absolute protein intake (mean intake of 0.62 g/kg body weight) differed significantly between intervention groups.

The women lost an average of  $10.8 \pm 4.0$  kg ( $-12.2\% \pm 4.2\%$ ) over the course of the study. Mean weight loss was not significantly different between groups. Overall, the relative loss of lean mass was 33%, with no significant differences between groups.

Loss of lean body tissue paralleled reductions in body weight ( $r=0.69$ ,  $P<0.0001$ ). Because the loss of lean mass did not differ between treatment groups, measurements were pooled to analyze for correlations between protein intake and changes in lean mass. The women with higher protein intakes (g/kg body weight/day) maintained lean mass and appendicular lean mass better than those who consumed less protein ( $r=0.3$ ,  $P=0.01$  and  $r=0.41$ ,  $P=0.001$ , respectively.) Those who consumed more protein also lost more fat mass ( $r=0.37$ ,  $P=0.001$ ). Regression analysis showed that women lost 0.62 kg less lean mass for every 0.1 g/kg body weight/day increase in dietary protein, a correlation that remained significant after adjusting for intervention group.

These data are consistent with the findings of previous studies that have shown an association between protein intake and retention of lean body mass during calorie restriction in middle-aged adults, leading the authors to conclude that “the RDA for protein may be inadequate for retaining fat-free mass during caloric restriction.” The authors also noted that since their dataset included a relatively small range of protein intakes—all at or below the current RDA of 0.8 grams/kg body weight—the data suggest, but cannot prove definitively, a linear relationship of protein intake and retention of lean mass during energy restriction at intake levels above the RDA. Additional research is needed in order to determine more ideal levels of protein intake, especially for older adults who might benefit from weight loss. ■

Bopp MJ, Houston DK, Lenchik L, Easter L, Kritchevsky SB, Nicklas BJ. Lean mass loss is associated with low protein intake during dietary-induced weight loss in postmenopausal women. *JADA* 2008;108:1216-1220.

# Mediterranean and Low-Carbohydrate Diets Compare Favourably to Low-Fat Diet for Weight Loss

Recent weight loss trials have demonstrated the efficacy of diets with variable fat, protein, and carbohydrate composition. This research has made a place at the table for higher-protein, low-carbohydrate diets, which have been shown to produce equal weight loss and desirable metabolic changes in overweight patients when compared to the traditional low-fat diet regimen. The Mediterranean diet (moderate in fat and rich in monounsaturated fats) has been associated with improvements in cardiovascular health, but its effect on weight loss has not been directly compared with those of the low-fat and low-carbohydrate diet regimens.

To compare the relative health effects of low-fat, low-carbohydrate, and Mediterranean style diets, researchers in Dimona, Israel, recruited 322 moderately obese men and women to participate in a 2-year Dietary Intervention Randomized Controlled Trial (DIRECT). Participants were randomly assigned to one of three diet groups: 1) a low-fat, reduced-calorie (RC) diet, 2) a Mediterranean style, RC diet, or 3) a low-carbohydrate diet, unrestricted in calories.

The low-fat, RC diet prescription was based on American Heart Association guidelines, with 30% of calories from fat, 10% from saturated fat, and no more than 300 mg cholesterol per day. Calorie goals were 1800 and 1200 kcals/day for men and women, respectively. Participants were encouraged to consume low-fat grains, vegetables, fruits, legumes, and to restrict added fats, added sugar, and high-fat snack foods.

The Mediterranean diet prescription was moderate in fat (35% of calories), but rich in monounsaturated fat (30–45 g of olive oil and <20 g of nuts per day). This diet emphasized poultry and fish and limited red meat (including beef and lamb). Calories were restricted to 1800 kcals/day for men and 1500 kcals/day for women.

The low-carbohydrate diet did not restrict calories, but limited carbohydrates to 20 g/day for a 2-month induction phase, after which carbohydrates were gradually increased to a maximum of 120 g/day. Neither calories, nor fat, nor protein were limited as part of this diet prescription, however, vegetarian protein sources were encouraged and participants were counseled to avoid *trans* fat.

Participants were 40 to 65 years of age (mean of 53 y) and had BMIs > 27 (mean BMI=31), type 2 diabetes, or coronary heart disease. Men made up 86% of the study population. Dietitians met with small groups within each diet cohort at weeks 1, 3, 5, 7, and at 6-week intervals for the remainder of

the study. Lunch—the main meal of the day in Israel—was provided in the workplace cafeteria and food items were labelled for ease of choice for participants in each group. Validated food-frequency questionnaires were administered at baseline, 6, 12, and 24 months to evaluate adherence to diet prescriptions. Blood samples were collected at the same intervals to evaluate blood lipids, inflammatory biomarkers, fasting plasma glucose, glycated hemoglobin (HbA1c), and insulin. Height was measured at baseline to allow calculation of BMI throughout the study. Participants were weighed monthly and blood pressure was measured every three months.

Diet adherence rates at 24 months were 90.4% for the low-fat group, 85.3% for the Mediterranean diet group, and 78.0% for the low-carbohydrate group ( $P=0.04$ ). Energy intake declined significantly for study participants at 6, 12, and 24 months, and was similar regardless of diet group assignment ( $P<0.001$ ). As expected, the low-carbohydrate group consumed less carbohydrate ( $P<0.001$ ), more protein ( $P<0.001$ ), more total fat ( $P<0.001$ ), more saturated fat ( $P<0.001$ ) and more total cholesterol ( $P=0.04$ ) than the other two groups; the low-fat group consumed less saturated fat than the low-carbohydrate group ( $P=0.02$ ); the Mediterranean diet group consumed a higher ratio of monounsaturated to saturated fat than the other groups ( $P<0.001$ ) and had a higher intake of dietary fibre than the low-carbohydrate group ( $P=0.02$ ).

Although all diet groups lost weight, participants in the low-carbohydrate and Mediterranean diet groups lost more than those in the low-fat group ( $P<0.001$  for interaction between diet group and time). At 24 months, participants in the low-fat group had lost  $2.9\pm 4.2$  kg, those in the Mediterranean diet group had lost  $4.4\pm 6.0$  kg, and those in the low-carbohydrate group had lost  $4.7\pm 6.5$  kg. For the 272 participants who completed the entire 24-month intervention, losses were  $3.3\pm 4.1$  kg in the low-fat group,  $4.6\pm 6.0$  kg in the Mediterranean diet group, and  $5.5\pm 7.0$  kg in the low-carbohydrate group ( $P=0.03$  for comparison between the low-fat and low-carbohydrate groups; average changes in BMI were  $-1.0\pm 1.4$  in the low-fat group,  $-1.5\pm 2.2$  in the Mediterranean diet group, and  $-1.5\pm 2.1$  in the low-carbohydrate group ( $P=0.05$  for the comparison among groups). Participants within all diet groups experienced significant decreases in waist circumference and blood pressure, but the groups did not differ with respect to the degree of change.

Although LDL cholesterol levels did not change significantly for any group over the course of the study, HDL levels

increased with weight loss, resulting in a general improvement in lipid profiles for participants in all diet groups. The low-carbohydrate diet resulted in the most positive lipid changes, overall. While HDL levels rose for all groups, the increase for those in the low-carbohydrate group (0.22 mmol/l [8.4 mg/dL]) was significantly greater than for those in the low-fat group (0.16 mmol/l [6.3 mg/dL]), ( $P<0.01$ ). Compared with the low-fat group, in which triacylglycerol (TAG) levels decreased an average of 0.03 mmol/l (2.7 mg/dL), TAG levels decreased significantly (an average of 0.27 mmol/l [23.7 mg/dL]) in the low-carbohydrate group ( $P=0.03$ ). The low-carbohydrate group also experienced the greatest improvement in the ratio of total cholesterol to HDL cholesterol, falling 20% ( $P=0.01$ ) compared with a 12% decrease in the low-fat group.

Levels of high-sensitivity C-reactive protein (hsCRP) decreased significantly and similarly for the Mediterranean and the low-carbohydrate diet groups (by 21% and 29%, respectively;  $P<0.05$ ). In all diet groups, levels of high-molecular-weight adiponectin rose significantly ( $P<0.05$ ) and circulating leptin decreased significantly ( $P<0.05$ ) in step with reductions in body weight observed over the course of the study.

Liver function was assessed by changes in bilirubin, alkaline phosphatase, and alanine aminotransferase levels. Alanine aminotransferase decreased significantly from baseline for the Mediterranean ( $-3.4\pm 11.0$  units per liter) and low-carbohydrate ( $-2.6\pm 8.6$  units per liter;  $P<0.05$ ) diet groups.

The male participants lost an average of 3.4 kg in the low-fat group, 4.0 kg in the Mediterranean diet group, and 4.9 kg in the low-carbohydrate group over 24 months. On average, female participants lost 0.1 kg in the low-fat group, 6.2 kg in the Mediterranean diet group, and 2.4 kg in the low-carbohydrate group ( $P<0.001$  for interaction between diet group and sex).

The reduction in circulating leptin also appeared to be greater in male participants on the low-carbohydrate diet compared to those in the low-fat diet ( $P=0.04$  for the interaction between diet and sex).

The differences noted between men and women in their responses to diet type bear further investigation, especially since the number of women in this study was relatively small. In summary, women tended to lose more weight on the Mediterranean diet, while the low-carbohydrate diet seemed more effective in reducing weight among men. The

low-carbohydrate diet might have had more beneficial effects on men with regard to metabolic parameters as well.

Of the 322 participants, 36 had diabetes. A decrease in fasting glucose levels was observed only in those in the Mediterranean diet group ( $-32.8$  mg/dL). Those in the low-fat group actually experienced an increase in fasting glucose levels of 12.1 mg/dL ( $P<0.001$ ). There were no significant changes in blood glucose among participants without diabetes ( $P<0.001$ ). HOMA-IR (an indicator of insulin sensitivity based on fasting plasma glucose and insulin levels) also decreased more in diabetic participants following the Mediterranean diet ( $-2.3$ ,  $P=0.02$ ) than in those following the low-fat diet regimen ( $-0.3$ ,  $P=0.04$ ). Insulin levels, however, declined significantly and similarly in both diabetic and non-diabetic participants regardless of diet group. A significant decrease in HbA1c was observed in only in diabetic participants assigned to the low-carbohydrate group ( $-0.9\pm 0.8\%$ ;  $P<0.05$ ).

The authors note an interesting trend—that despite the maximum weight loss having been achieved at 6 months, some of the metabolic parameters continued to improve through the end of the study, indicating that these diets had beneficial effects beyond those achieved by weight loss alone. This study demonstrates that reduced-calorie low-fat, low-carbohydrate, and Mediterranean-style diets are equally effective in inducing weight loss, and further, that the Mediterranean diet might especially benefit overweight patients with diabetes. Continued research in this area with an emphasis on recruiting larger numbers of female participants should help clarify the differential responses observed between men and women in this study. ■

Shai I, Schwarzfuchs D, Henkin Y, et al. Weight loss with a low-carbohydrate, Mediterranean, or low-fat diet. *NEJM* 2008;359:229-41.

# Dietary Choline and Betaine Associated with Lower Levels of Inflammatory Markers

Chronic inflammation is thought to be a key component in atherogenesis. Elevated levels of specific inflammatory biomarkers, including C-reactive protein (CRP), interleukin-6 (IL-6), and tumor necrosis factor-alpha (TNF-alpha), are generally associated with an increased risk of cardiovascular disease (CVD). Elevated homocysteine levels have been implicated in CVD and are associated with inflammation and atherosclerosis. Homocysteine levels are generally kept in check by choline and its metabolite, betaine, two dietary micronutrients that convert homocysteine to methionine through methyl donation. Although some research suggests that B vitamins involved in the methylation process are associated with inflammation, it is not known whether dietary choline or betaine are involved in modulating the inflammatory process.

To determine whether a relationship exists between dietary choline/betaine and inflammation, researchers from Athens, Greece, used data from the ATTICA study and newly-available U.S. Department of Agriculture database for the choline contents of common foods. ATTICA is an epidemiologic study that was conducted in the province of Attica (Greece) from May 2001 to December 2002. Participants (n=3042) were free-living healthy adults with healthy histories clear of cardiovascular disease, atherosclerotic disease, chronic viral infection, recent cold, flu, acute respiratory infections, dental problems, or surgery within the week prior to enrollment.

All participants were interviewed and information was gathered relative to socioeconomic status, smoking status, and physical activity. Height and weight were measured and BMI was calculated for each participant. Blood pressure was measured and fasting blood samples were collected for measurement of inflammatory biomarkers. Participants completed a validated semiquantitative food-frequency questionnaire and choline and betaine intake levels were calculated by registered dietitians using data provided by the US Department of Agriculture.

The mean daily choline intake for this population was 291±79 mg for men (ranging from 72 to 852 mg) and 285±75 for women (ranging from 126 to 740 mg). Participants with the highest intakes of choline also consumed more fruit, vegetables, legumes, and red meat. The mean daily betaine intake was 306±118 mg for men (ranging from 52 to 1120 mg) and 681 mg for women (ranging from 79 to 681 mg). Those with the highest intakes of betaine also consumed more fruit, vegetables, legumes, and red meat. They were also older and more physically active. The authors note that the proportion of hypercholesterolemic participants in the highest tertile of choline intake was significantly smaller than that in

the lowest quintile. Conversely, the proportion of hypercholesterolemic participants was significantly higher in the highest quintile of betaine intake vs. the lowest.

Notably, the inflammatory biomarkers examined in this study seemed to have an inverse association with dietary choline intake. Compared to participants with the lowest choline intakes, CRP concentrations were 22% lower ( $P < 0.05$ ), IL-6 concentrations were 26% lower ( $P < 0.05$ ), and TNF-alpha levels were 6% lower ( $P < 0.01$ ) in those who reported consuming >310 mg/d. Likewise, when compared to participants with the lowest betaine intakes, CRP concentrations were 19% lower ( $P < 0.1$ ), TNF-alpha concentrations were 12% lower ( $P < 0.05$ ), and homocysteine levels were 10% lower ( $P < 0.01$ ) in those who reported consuming >360 mg/d.

After adjusting for potential confounders such as age, sex, smoking habits, physical activity level, BMI, and clinical conditions that could influence inflammatory markers, the participants were grouped by choline and betaine intake levels into four groups: high vs. low choline by high vs. low betaine.

The researchers observed the lowest circulating levels of homocysteine, IL-6, and TNF-alpha in participants in the highest tertiles of betaine and choline intake. Although the participants with the highest intakes of choline and lowest intakes of betaine showed the lowest CRP concentrations ( $1.5 \pm 0.4$  mg/L), they were closely followed by those with high choline and high betaine intakes ( $1.8 \pm 0.5$  mg/L) and low choline and high betaine intakes ( $1.8 \pm 0.6$  mg/L). Participants with the lowest intakes of both nutrients had the highest CRP concentrations ( $2.2 \pm 0.2$  mg/L). Further, high choline intakes, high betaine intakes, and the combination of high choline and high betaine intakes were independently associated with lower circulating levels of TNF-alpha ( $P < 0.05$ ).

This study presents the first clear evidence of an inverse association between dietary choline and betaine and inflammatory biomarkers. These findings show that a combination of high choline and high betaine intake is associated with lower circulating levels of homocysteine, CRP, IL-6, and TNF-alpha, suggesting that these micronutrients might have anti-inflammatory benefits. Although the findings are promising, this cross-sectional study can provide no evidence of a causal relationship between low intakes of choline/betaine and inflammation, nor can it provide evidence that supplementing the diet with these micronutrients will result in an anti-inflammatory dose-response effect. More research is needed to replicate these findings and to further clarify the relationship between choline/betaine and the inflammatory process. ■

Detopoulou P, Panagiotakos D, Antonopoulou S, et al. Dietary choline and betaine intakes in relation to concentrations of inflammatory markers in healthy adults: the ATTICA study. *Am J Clin Nutr* 2008;87:424-30.

## The Power of Protein

It's the fat! No, it's the carbs! No, it's the lack of exercise! Everyone's got an opinion and too often that opinion is more like religious belief than scientific judgment. So the low-fat versus low-carb diet debate continues with an ever-increasing body of evidence suggesting that dietary fats are not all bad and that our quest for a fat-free diet paradise was not the best guess ever made by the scientific community. We really should keep scientific guesswork out of the public health policy domain. The cascade of unintended consequences can easily undo any intended benefits and the cure ends up being worse than the risk factors we're trying so hard to change. Just take a look around you and note the size of the problem!

The only macronutrient in the diet that doesn't seem to get picked on much (a least not at the moment) is dietary protein; and—as seen in a couple of articles in this issue of Nutrition Close-Up—protein might actually be responsible for some of the confusion and debate between the opposing fat vs. carb combatants. Eggs for breakfast have a satiety effect which helps dieters maintain their targeted calorie deficit and lose more weight. During weight loss, dieters tend to lose lean tissue as well as fat mass. High-quality protein helps dieters preserve lean tissue and lose more fat. A Mediterranean-style dietary pattern results in greater weight loss. And none of these dietary patterns seem to have the apocalyptic effect of raising LDL cholesterol levels...a result that the dietary sages would surely have predicted. Could it be that one does not have to live on sawdust and woodchips in order to maintain a healthy weight? Is our forty-year obsession with low-fat foods cast aside in favour of flavour? Can satiety replace constant cravings and hunger pains? All interesting questions which have been studiously avoided by the food police in their never-ending quest to change school meal programs, to determine where, when and what we can buy in a fast food chain, and to legislate nutrition for the common good. (Of course, one should know what works for the common good before one writes laws to enforce it.)

Changing the North American diet is a slow, tedious task akin to changing the direction of a large, heavy tanker ship. So we've changed it, made the rules, instituted policies, and produced all the catchy phrases to reinforce them...and in the process have made virtually everyone in the country fat-phobic, cholesterol-phobic and just a touch paranoid. But are

we now going in the right direction? Is our big 300 million plus bodied tanker ship headed where we want it to go? Or have we perhaps spun the wheel too soon, too fast and need to make some course corrections involving fat and cholesterol? And should we now begin to do what we should have done all along—test the soundness of our theories? And let's not forget protein—the non-controversial macronutrient—and the very important role it can play in health, especially high-quality animal protein (you know, what we've been told for so long to avoid). Keep in mind the difference between adequate intake (to avoid insufficiencies) and optimal intake (to promote optimal health). Protein should be the “next big thing” in nutrition and the potential of protein to impact health should be an area of research priority. Among its benefits, protein aids in weight maintenance, slows sarcopenia, helps dieters retain lean tissue, and best of all—it's not a fat or a carb. What a deal! ■

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For more commentary on this and other current issues in nutrition, visit Dr. McNamara's blog at [www.unscramblingthescience.com](http://www.unscramblingthescience.com)