

**The Nutrition News © from IAACN 2010 #16**

Publication or duplication of the Nutrition News© without written consent from Barbara Zeitlin Kravets is prohibited by law.

www.iaacn.org  
972-407-9089

We are transmitting this in email and also including a WORD attachment of the document with active hyperlinks of references for those who have the ability to receive and download this format. NOTE: Some hyperlinks may be expired or no longer be active.

**The NutritionNews © from IAACN 2010 #16**

The NutritionNews © 2000 is a gift to IAACN members in good standing from our most esteemed colleague, Barbara Zeitlin Kravets CCN LNC. The NutritionNews © supplies important research information for clinical nutritionists that credibly supports the use of nutrition and we sincerely appreciate Barbara’s continuous efforts in supporting IAACN and its members. Links are listed if available within the NutritionNews © and will guide you to the source for the article on the web for added viewing

Barbara Zeitlin Kravets CCN LDN,  
Licensed Dietitian Nutritionist,  
Certified Clinical Nutritionist,  
Medical Nutrition Therapy,  
Phone 1 973 556 5499, Fax 1 847 239 6724,

Also send to my other email licnutrition@msn.com  
Web site www.findanutritionist.com/practitioners/licnutrition  
Editor of The NutritionNews ©, internationally distributed, cutting edge, peer reviewed, journal abstract, email nutrition newsletter

**The NutritionNews © 2000 Barbara Zeitlin Kravets CCN LDN 4 17 2010**

---

**TABLE OF CONTENTS**

Low Calorie Dieting Increases Cortisol.....PAGE 03  
Low-Cal Diets May Make You Gain Weight.....PAGE 03  
Study surprise: Low-carb dieters eat more, lose weight.....PAGE 05  
How Not to Become Part of the Obesity Epidemic: Ignore the USDA’s "My Pyramid" .....PAGE 07  
Short-Term Effect of Eggs on Satiety in Overweight and Obese Subjects .....PAGE 12  
Egg Nutrition Center.....PAGE 13  
Consuming eggs for breakfast influences plasma glucose and ghrelin, while reducing energy intake during the next 24 hours in adult men .....PAGE 16  
Egg breakfast enhances weight loss.....PAGE 17  
Low glycemic index breakfasts and reduced food intake in preadolescent children. ....PAGE 19  
The effect of high and low-fibre breakfasts on hunger, satiety and food intake in a subsequent meal....PAGE 20  
Breakfasts high in protein, fat or carbohydrate: effect on within-day appetite and energy balance.....PAGE 21  
Nutrient Physiology, Metabolism, and Nutrient-Nutrient Interactions.....PAGE 22  
Low glycemic index breakfasts and reduced food intake in preadolescent children. ....PAGE 23  
Hint 2047: Egg breakfast fills you up longer. ....PAGE 25  
Menstrual Cycle and Voluntary Food Intake in Young Chinese Women.....PAGE 25  
Reduced sensitivity to glucocorticoid feedback and reduced glucocorticoid receptor mrna expression in the luteal phase of the menstrual cycle.....PAGE 26  
Enhanced cortisol production rates, free cortisol, and 11 Beta HSD1 expression correlate with visceral fat and insulin resistance in men: effect of weight loss. ....PAGE 26  
The ecology of eating: Smaller portion sizes in france than in the United States help explain the French paradox.....PAGE 27

Dietary fat plays a major role in obesity: no. ....	PAGE 29
Is dietary fat a major determinant of body fat? .....	PAGE 31
Divergent trends in obesity and fat intake patterns: the American paradox. ....	PAGE 31
Temporal trends in energy intake in the United States: an ecologic perspective. ....	PAGE 32
Dietary fat and obesity: an epidemiologic perspective. ....	PAGE 33
Changing eating and physical activity patterns of US children. ....	PAGE 34
Less fat or a different fat? .....	PAGE 35
The role of reduced fat diets and fat substitutes in the regulation of energy and fat intake and body weight. ....	PAGE 36
Dietary glycemic index and obesity. ....	PAGE 36
Types of fat intake and body mass index in a Mediterranean country. ....	PAGE 37
Changes in fat oxidation in response to a high-fat diet. ....	PAGE 37
High-fat and high-carbohydrate diets and energy balance. ....	PAGE 38
Overweight and obesity in the United States: prevalence and trends, 1960-1994. ....	PAGE 39
Do we eat less fat, or just report so? .....	PAGE 39
Fat, cholesterol, fiber and sodium intakes of US population: evaluation of diets reported in 1987-88 Nationwide Food Consumption Survey.....	PAGE 40
Trends in overweight among US adults from 1987 to 1993: a multistate telephone survey. ....	PAGE 41
Temporal trends in energy intake in the United States: an ecologic perspective. ....	PAGE 41
Overeating in America: association between restaurant food consumption and body fatness in healthy adult men and women ages 19 to 80.....	PAGE 42
Is dietary fat a major determinant of body fat? .....	PAGE 43
The continuing epidemics of obesity and diabetes in the United States. ....	PAGE 44
Dietary fat and obesity: an epidemiologic perspective. ....	PAGE 44
The sugar-fat relationship revisited: differences in consumption between men and women of varying BMI. ....	PAGE 45
Significant increase in young adults' snacking between 1977-1978 and 1994-1996 represents a cause for concern! .....	PAGE 46
Relationship between breakfast and obesity among school-aged children. ....	PAGE 47
Obesity, central fat patterning, and their metabolic correlates among the Inuit of the central Canadian Arctic. ....	PAGE 47
Epidemiological and nutritional transition in Mexico: rapid increase of non-communicable chronic diseases and obesity. ....	PAGE 48
Prevalence of overweight and weight gain in the United States. ....	PAGE 49
Trends in breakfast consumption of US adults between 1965 and 1991. ....	PAGE 49
Voluntary ethanol consumption and obesity in golden hamsters. ....	PAGE 50
The nutrition transition in Cuba in the nineties: an overview. ....	PAGE 50
Intakes and food sources of fructose in the United States. ....	PAGE 51

<http://www.psychosomaticmedicine.org/cgi/content/abstract/PSY.0b013e3181d9523cv1>

Published online before print April 5, 2010

Psychosom Med 2010, doi:10.1097/PSY.0b013e3181d9523c

© 2010 by American Psychosomatic Society

Original Article

Received September 27, 2009

Returned for revision January 4, 2010

## **Low Calorie Dieting Increases Cortisol**

A. Janet Tomiyama , PhD, Traci Mann , PhD, Danielle Vinas , BA, Jeffrey M. Hunger , BA, Jill DeJager , MPH, RD, Shelley E. Taylor , PhD

Address correspondence and reprint requests to: A. Janet Tomiyama, PhD, E-mail: [tomiyamaj@chc.ucsf.edu](mailto:tomiyamaj@chc.ucsf.edu) .

### ESSENCE OF ARTICLE

“Results: Restricting calories increased the total output of cortisol, and monitoring calories increased perceived stress. Conclusions: Dieting may be deleterious to psychological well-being and biological functioning, and changes in clinical recommendations may be in order..”

### ARTICLE

#### Abstract

**Objective:** To test the hypothesis that dieting, or the restriction of caloric intake, is ineffective because it increases chronic psychological stress and cortisol production—two factors that are known to cause weight gain; and to examine the respective roles of the two main behaviors that comprise dieting—monitoring one's caloric intake and restricting one's caloric intake—on psychological and biological stress indicators. **Methods:** In a 2 (monitoring vs. not) x 2 (restricting vs. not) fully crossed, controlled experiment, 121 female participants were assigned randomly to one of four dietary interventions for 3 weeks. The monitoring + restricting condition tracked their caloric intake and restricted their caloric intake (1200 kcal/day); the monitoring only condition tracked their caloric intake but ate normally; the restricting only condition was provided 1200 kcal/day of food but did not track their calories, and the control group ate normally and did not track their intake. Before and after the interventions, participants completed measures of perceived stress and 2 days of diurnal saliva sampling to test for cortisol. **Results:** Restricting calories increased the total output of cortisol, and monitoring calories increased perceived stress. **Conclusions:** Dieting may be deleterious to psychological well-being and biological functioning, and changes in clinical recommendations may be in order.

**Key Words:** dieting, stress, cortisol

---

<http://health.msn.com/weight-loss/articlepage.aspx?cp-documentid=100256851&GT1=31036>

## **Low-Cal Diets May Make You Gain Weight**

Restricting calories increases stress hormone, making it harder to keep weight off, researchers say

By Steven ReinbergHealthDay Reporter

THURSDAY, April 8 (HealthDay News) -- If losing weight feels like a never-ending battle, new research may explain why: Diets that restrict calories can actually make it harder to lose weight and keep it off .

Cutting calories increases production of cortisol , the stress hormone, which is linked to added belly fat, a new study finds.

"For the first time in humans, we are finding out that cutting your calories increases cortisol," said lead researcher A. Janet Tomiyama, a Robert Wood Johnson Foundation Health & Society Scholar at the University of California, San Francisco.

"We think this may be one reason dieters tend to have a hard time keeping weight off in the long-term," she said.

People who count calories feel stressed, she said, but it's the reduction in calories that increases cortisol, which, in turn, stresses the body and leads to weight retention.

"No matter how you cut calories, whether that's doing it on your own, or doing something like Nutrisystem or Jenny Craig, it doesn't matter, it's still going to increase your cortisol level," she said.

At any given time, 47 percent of U.S. adults are dieting, but up to 64 percent gain back more weight than they lost, according to background information in the report published online April 6 in Psychosomatic Medicine.

For the study, Tomiyama's team randomly assigned 121 women to one of four diets. One group tracked their calories, keeping them to 1,200 a day; another group ate normally but recorded the number of calories they consumed; a third group ate 1,200 calories a day, but did not have to record them, and the fourth group ate normally without any calorie-tracking.

At the start and end of the three-week trial, the researchers measured each woman's cortisol and stress levels. When calories were restricted, cortisol levels increased. In addition, calorie-counting also increased the women's perceived stress, the researchers found.

"The term 'dieting' brings to mind deprivation, starvation, being miserable and uncomfortable and ultimately failing in weight loss efforts," Samantha Heller, a dietitian, nutritionist and exercise physiologist who is familiar with the study, said.

Burning more calories than you consume is how your body loses weight, she said. "However, severe calorie restriction, diet fads, pills and potions, detox cleanses and other quacky approaches to weight loss only contribute to people's diet failures and, in fact, may increase the likelihood of regaining even more weight than what was lost -- if any," Heller added.

The best way to drop unwanted pounds is to adopt healthy lifestyle behaviors that include eating a variety of healthy foods, physical activity, patience and a game plan, she said.

"Many people want to lose weight and do not know how to begin. Creating a step-by-step plan is one piece of the puzzle a lot of people forgo," Heller said.

Starting a weight-loss program takes discipline, motivation and a desire to make behavioral changes and finding support can be very helpful, Heller added.

Another expert, Dr. David L. Katz, director of the Prevention Research Center at Yale University School of Medicine in New Haven, Conn., said while dieting isn't easy, certain strategies can help reduce stress and achieve a healthier lifestyle.

"Food itself, a reliable source of immediate gratification, may be used to relieve stress," Katz said. "When food intake is restricted, something else should replace it."

In general, dieting alone is not all that useful, Katz added. "Eating well and being active for life is the way to go," he said.

"By eating foods of higher overall nutritional quality, fullness can generally be achieved on fewer calories, eliminating the need for deprivation," Katz said. "In addition, physical activity can accelerate weight loss, promote health and alleviate stress in the bargain."

More information

For more information on healthful eating, visit the U.S. Department of Agriculture.

Find More on MSN Health & Fitness:

- The Pretty Skin Diet

---

<http://www.cnn.com/2003/HEALTH/diet.fitness/10/14/lowcarb.mystery.ap/>

### **Study surprise: Low-carb dieters eat more, lose weight**

Thursday, October 16, 2003 Posted: 11:12 AM EDT (1512 GMT)

A new study revives the diet debate between low-carb and low-fat fare.

FORT LAUDERDALE, Florida (AP) -- The dietary establishment has long argued it's impossible, but a new study offers intriguing evidence for the idea that people on low-carbohydrate diets can actually eat more than folks on standard lowfat plans and still lose weight.

Perhaps no idea is more controversial in the diet world than the contention -- long espoused by the late Dr. Robert Atkins -- that people on low-carbohydrate diets can consume more calories without paying a price on the scales.

Over the past year, several small studies have shown, to many experts' surprise, that the Atkins approach actually does work better, at least in the short run. Dieters lose more than those on a standard American Heart Association plan without driving up their cholesterol levels, as many feared would happen.

Skeptics contend, however, that these dieters simply must be eating less. Maybe the low-carb diets are more satisfying, so they do not get so hungry. Or perhaps the food choices are just so limited that low-carb dieters are too bored to eat a lot.

Now, a small but carefully controlled study offers a strong hint that maybe Atkins was right: People on low-carb, high-fat diets actually can eat more.

The study, directed by Penelope Greene of the Harvard School of Public Health and presented at a meeting here this week of the American Association for the Study of Obesity, found that people eating an extra 300 calories a day on a very low-carb regimen lost just as much during a 12-week study as those on a standard lowfat diet.

Over the course of the study, they consumed an extra 25,000 calories. That should have added up to about seven pounds. But for some reason, it did not.

"There does indeed seem to be something about a low-carb diet that says you can eat more calories and lose a similar amount of weight," Greene said.

A calorie just a calorie?

That strikes at one of the most revered beliefs in nutrition: A calorie is a calorie is a calorie. It does not matter whether they come from bacon or mashed potatoes; they all go on the waistline in just the same way.

Not even Greene says this settles the case, but some at the meeting found her report fascinating.

"A lot of our assumptions about a calorie is a calorie are being challenged," said Marlene Schwartz of Yale. "As scientists, we need to be open-minded."

Others, though, found the data hard to swallow.

"It doesn't make sense, does it?" said Barbara Rolls of Pennsylvania State University. "It violates the laws of thermodynamics. No one has ever found any miraculous metabolic effects."

In the study, 21 overweight volunteers were divided into three categories: Two groups were randomly assigned to either lowfat or low-carb diets with 1,500 calories for women and 1,800 for men; a third group was also low-carb but got an extra 300 calories a day.

The study was unique because all the food was prepared at an upscale Italian restaurant in Cambridge, Massachusetts, so researchers knew exactly what they ate. Most earlier studies simply sent people home with diet plans to follow as best they could.

Each afternoon, the volunteers picked up that evening's dinner, a bedtime snack and the next day's breakfast and lunch. Instead of lots of red meat and saturated fat, which many find disturbing about low-carb diets, these people ate mostly fish, chicken, salads, vegetables and unsaturated oils.

"This is not what people think of when they think about an Atkins diet," Greene said. Nevertheless, the Atkins organization agreed to pay for the research, though it had no input into the study's design, conduct or analysis.

Raising questions

Everyone's food looked similar but was cooked to different recipes. The low-carb meals were 5 percent carbohydrate, 15 percent protein and 65 percent fat. The rest got 55 percent carbohydrate, 15 percent protein and 30 percent fat.

In the end, everyone lost weight. Those on the lower-cal, low-carb regimen took off 23 pounds, while people who got the same calories on the lowfat approach lost 17 pounds. The big surprise, though, was that volunteers getting the extra 300 calories a day of low-carb food lost 20 pounds.

"It's very intriguing, but it raises more questions than it answers," said Gary Foster of the University of Pennsylvania. "There is lots of data to suggest this shouldn't be true."

Greene said she can only guess why the people getting the extra calories did so well. Maybe they burned up more calories digesting their food.

Dr. Samuel Klein of Washington University, the obesity organization's president, called the results "hard to believe" and said perhaps the people eating more calories also got more exercise or they were less apt to cheat because they were less hungry.

---

[www.ThePaleoDiet.com](http://www.ThePaleoDiet.com)

Loren Cordain, Ph.D.

January 18, 2010 - Volume 3 Issue 1

(Originally published February 1, 2007)

### **How Not to Become Part of the Obesity Epidemic:**

#### **Ignore the USDA's "My Pyramid"**

Editor's Note: This article first appeared in the Early to Rise online newsletter. It was written in lay fashion (without scientific references), that departs from the normal style of our newsletter, but you will see some of the latest scientific references in the Recent Science review following this article.

Unless you've been camping out in the Gobi desert for the past decade, you probably know that Americans are the fattest group of people on the planet. And we're getting even fatter. The U.S. governmental agency given the responsibility to carefully track these numbers is the Centers for Disease Control and Prevention's National Center for Health Statistics.

According to their statistics, 66 percent of all adults in the U.S. over age 20 are either overweight or obese. Of these, 32 percent are obese. Compare that to 30 years ago when only 47 percent of adults were overweight or obese and only 15 percent were obese. We are clearly in the midst of an obesity epidemic.

So, how did we get ourselves into this mess and is there any way out?

Two Glaring Omissions: Protein and the Glycemic Index

Perhaps the most blatant bit of failed nutritional advice for healthy eating to prevent weight gain and reduce chronic disease is that offered by the USDA Food Pyramid, now known as "My Pyramid." The original Food Pyramid was offered up to a trusting American public in 1992, and told us we should eat less than 30 percent of our total calories as fat. Because no recommendations were made for protein (then about 15 percent of total calories), that would leave carbohydrates to make up 55 percent or more of what the USDA considers an optimal diet.

But since the original Food Pyramid Guidelines were implemented, the numbers of overweight and obese Americans have risen from 55.9 percent of the population to the current value of 66.2 percent. And all while dutifully following the high carbohydrate, low protein governmental dietary recommendations. In fact, carbohydrate intake has actually increased, particularly high glycemic index carbohydrates in the form of refined grains and sugars.

In both the original Food Pyramid and the current "My Pyramid," absolutely zero mention is made of the glycemic index of foods, giving the message that dietary fat caused us to be fat and that replacement of fat with carbohydrate could prevent obesity and promote good health. Unfortunately, this message has now been shown in hundreds of peer review scientific journal articles to be too simplistic, incomplete, and even erroneous.

### The Glycemic Index

The glycemic index, originally developed in 1981, is a relative comparison of the blood sugar (glucose) raising potential of various foods or combination of foods based upon equal amounts of carbohydrate in the food. In 1997, the concept of glycemic load (a food's glycemic index ranking multiplied by the carbohydrate content per serving size) was introduced to assess a food's blood glucose raising potential based upon both the quality and quantity of dietary carbohydrate.

Refined grain and sugar products nearly always maintain much higher glycemic loads than unprocessed fruits and vegetables.

For people interested in losing weight, the importance of the glycemic index and load is that the blood sugar response is closely related to the insulin response. An exception to this general rule is dairy products, which exhibit low glycemic indices and loads, but paradoxically elicit high insulin responses similar to white bread. So when you eat a bowl of cheerios for breakfast, not only do the cheerios raise your blood sugar and insulin levels perilously, but the milk raises your blood insulin levels even further.

Hundreds of scientific studies completed over the past decade show that high glycemic index carbohydrates cause hormonal and blood chemistry changes that increase the appetite and promote weight gain. That's why you need to stick to low-glycemic foods if you want to lose weight.

You might think that the nutritionists who designed the revamped "My Pyramid" would be all over these exciting new developments. Not a chance. Highly glycemic foods are ubiquitous in the Western diet and now comprise 47.7 percent of the per capita energy intake in the U.S. Is it any wonder why 2/3 of us are now overweight or obese?

### Protein - Another Missing Link for Weight Loss

Governmental regulatory and advisory institutions are known to move slowly, but when it comes to dietary recommendations to prevent weight gain and obesity, they have not moved at all since 1992. Except for a superficial stab at including exercise as part of the new "My Pyramid," major dietary recommendations remain virtually unchanged between 1992 and 2005.

The current "My Pyramid" recommendations for the three macronutrients are as follows: fat: 20 – 35 percent of total energy intake, protein: 18 percent energy, and carbohydrate: 55 percent energy. Actual intake of these macronutrients is: fat: 32.8 percent energy, protein: 15.4 percent energy, and carbohydrate: 51.8 percent.

As was the case with the glycemic index, there is absolutely no mention of the benefit of higherprotein diets in promoting weight loss in the current "My Pyramid," despite hundreds of well controlled scientific experiments verifying this phenomenon. The decades-old perception is that to reduce body fat, you must reduce dietary fat, replacing the fat calories with carbohydrate calories.

The problem with this approach is that people experience constant hunger, and any weight loss is typically modest and hardly ever stays off for the long haul.

But contrary to this old belief system, you can reduce your body fat by limiting carbohydrate and increasing your consumption of protein.

Believe it or not, the first well-controlled scientific study that traded out dietary fat, not with carbohydrate, but with protein did not take place until 1999. Scientists at the University of Copenhagen put 65 overweight and obese men and women on one of two diets:

1. A reduced-calorie, high-protein, lowcarbohydrate diet, or
2. A reduced-calorie, high-carbohydrate, lowprotein diet

After six months on the lowcarb, high-protein diet, subjects lost almost 20 pounds, whereas subjects on the high-carb, low-protein diet lost only 11 pounds. And these results weren't a fluke – this type of experiment has been repeated and confirmed dozens of times in the past seven years.

A growing consensus in the scientific community is that high protein diets (where protein makes up 25 to 35 percent of total energy) are more effective at promoting weight loss than calorie reduced low carbohydrate diets because of their superiority in reducing hunger. Protein has a two to three times greater satiety value than either fat or carbohydrate, so people spontaneously eat less when they consume more protein. Of carbohydrates, fat, and protein, protein causes the greatest release of a gut hormone (PYY) that reduces hunger while simultaneously improving central nervous system sensitivity to leptin, another hormone that controls appetite and body weight regulation.

The scientific jury is in – high protein diets are the way to go. So, if you want to effectively lose weight, keep it off, and hold your hunger at bay, IGNORE the USDA's "My Pyramid" and stick to high-protein and low-glycemic foods. Your body will thank you for it.

## Recent Science

This time of year, many people make a New Year's resolution to "lose weight." A better resolution might be to eat the right food. When we eat the foods we evolved to eat, our bodies naturally maintain a more normal body composition, and there is not the constant struggle of calorie counting and dieting. Let's look at some recent studies examining this issue.

### Why Go High-Pro?

A recent review paper published in the *International Journal of Obesity*<sup>1</sup> cites numerous studies promoting higher protein diets as an effective body-weight management strategy. Several characteristics of protein and its metabolism contribute to this premise. Primarily, protein has a higher thermic effect than carbohydrates or fat, which means it requires more energy to metabolize than the other macronutrients. Following a meal, energy expenditure increases 0-3% for metabolism of fat, 5-10% for carbohydrate, and 20-30% for protein<sup>2</sup>. In addition, the greatest increase in diet-induced thermogenesis occurs from animal protein rather than from soy or other plant sources<sup>3</sup>.

Another study demonstrated a low-glycemic index, low-fat-high-protein diet resulted in a spontaneous 25% decrease in caloric intake compared to a high-carbohydrate-low fat diet. The metabolic profile was also "considerably improved" in the subjects of the study<sup>4</sup>.

So from these studies we're seeing that highprotein diets burn more calories while simultaneously reducing total caloric intake, by inducing satiety. We end up feeling full, eating less, and expending more energy in digestion and metabolism. Almost sounds like a weight-loss gimmick too good to be true!

1 Westerterp-Plantenga, MS., Luscombe-Marsh, N., Lejeune, MPM., Diepvens, K., Nieuwenhuizen, A., Engelen, MPKJ., Deutz, NEP., Azzout-Marniche, D., Tome, D., Westerterp, KR. Dietary protein, metabolism, and body-weight regulation: dose-response effects. *International Journal of Obesity* 2006; 30:S16-S23.

2 Tappy, L. Thermic effect of food and sympathetic nervous system activity in humans. *Reproduction Nutrition Development* 1996; 36:391-397.

3 Mikkelsen, PB., Toubro, S., Astrup, A. Effect of fat-reduced diets on 24 h energy expenditure: comparisons between animal protein, vegetable protein, and carbohydrate. *American Journal of Clinical Nutrition* 2000; 72:1135-1141.

4 Dumesnil, JG., Turgeon, J., Tremblay, A., Effect of a lowglycemic index-low-fat-high protein diet on the atherogenic metabolic risk profile of abdominally obese men. *British Journal of Nutrition* 2001; 86:57-568.

### Critical Role of Peptide YY in Protein-mediated Satiety and Weight Loss:

Conceptually, we know meals rich in protein enhance satiety and weight loss, as compared to those high in carbohydrate and/or fat, but a metabolic explanation for the effect has not been fully understood. In a two-part study, researchers discovered the hormone peptide YY (abbreviated PYY) acts 'anorectically', or induces satiety, postprandially in humans and mice. Researchers measured the release of PYY

following protein, carbohydrate, and fat-rich meals, and found that high-protein intake stimulated the greatest release of the hormone.

#### Different DHA Structures

Secondly, researchers discovered mice fed a high-protein diet over a long-term period experienced increased levels of circulating PYY, decreased food intake, and significantly lower weight gain and fatty tissue accumulation than mice on higher fat or carbohydrate diets. The researchers confirmed the influence of PYY by "generating" mice without the PYY gene, and observed that they were prone to over-eating and obesity, regardless of the type of diet they consumed (high protein, carbohydrate, or fat).

This paper suggests that our appetite control centers work more efficiently under lower carbohydrate and higher protein dietary conditions, similar to what our huntergatherer ancestors were adapted to, and in direct contrast to USDA food pyramid suggestions. This study verifies high protein diets make us feel full and more satisfied, thereby decreasing the total number of calories we consume, and begins to shed light on the physiological mechanisms acting to induce satiation and promote weight loss.

Batterham, R.L., Heffron, H., Saloni, K., Chivers, J.E., Chandarana, K., Herzog, H., Le Roux, C.W., Thomas, E.L., Bell, J.D., Withers, D.J. Critical role for peptide YY in protein-mediated satiation and body-weight regulation. *Cell Metabolism* 2006 Sept; 4:223-233.

#### High Protein Diet Wins Out:

A randomized trial comparing three diets, highfat, high-protein, and high-fiber/carbohydrate, demonstrated that diets high in protein confer a greater advantage in terms of weight loss, body composition, and blood lipid profile. Ninety-three overweight, insulin-resistant women were divided into each of three dietary regimes and interviewed at six and 12 months after commencement of the program. Participants in the high-protein group experienced clinically significant improvements in waist circumference, body fat mass, fasting insulin and triglyceride concentrations, and total body mass above either the high-fat or high-fiber/carbohydrate groups. More importantly, these benefits remained after 12 months, whereas participants in the other groups noticed improvement within the first 6 months, but had relapsed to some degree by the 12-month check-up. Despite the fact that participants in all three groups strayed considerably from the recommended macronutrient composition for their respective diet, members of the high-protein group experienced the most favorable outcome.

Ninety-three percent of women in the high-protein group returned for the follow-up at 12 months as compared to 75% for the high-fat and highcarbohydrate groups. Researchers believed this was significant; there seemed to be a preference for the higher-protein diet regime. Overall, participants in the high-fiber/carbohydrate group lost the least amount of weight and members of the highfat group regressed so rapidly, that there remained little advantage over the high-fiber/carbohydrate group after 12 months.

This study provides strong support for higher protein diets as an alternative to the conventional high-fiber/carbohydrate approach to weight loss and as a means of improving blood-lipid and insulin profiles.

McAuley, KA., Smith, KJ., Taylor, RW., McLay, RT., Williams, SM., Mann, JI. Long-term effects of popular dietary approaches on weight loss and features of insulin resistance. *International Journal of Obesity* 2006; 30:342-349.

DHA = Weight Loss?

A recent study published in the Journal of Nutrition has shown that Docosahexaenoic acid (DHA), the omega-3 fatty acid in fish oil, decreases body fat mass and fat accumulation in rodents. DHA achieves this in two ways: first, it acts during mitosis to inhibit differentiation of cells to preadipocytes (precursor fat cells), and secondly, by preventing the storage of fat in adipocytes, thereby increasing lipolysis (fat oxidation). Not only is the total number of pre-programmed fat cells decreased, but the ability of those cells to store large amounts of fat is also diminished.

This study continues along the current wave of omega-3 research and touches on previous studies showing decreased fat accumulation in fish-oil fed versus lard or corn-oil fed rodents<sup>1,2</sup>. These data have important implications for us as humans, but also for our industrial food animals (i.e. cornfed, feed-lot raised beef). The average ratio of omega-3:omega-6 fatty acids in our diet is out of balance, and much of that is due to the fat composition of the animals we eat, and the fact that we no longer eat marrow, brains, and other organs. So since it can be difficult to eat a perfectly "Paleo" diet in this modern world, current research supports DHA supplementation to bring us back into natural balance--in terms of both fatty acids and body composition.

Kim, HK., Della-Fera, MA., Lin, J., Baile, CA. Docosahexaenoic acid inhibits adipocyte differentiation and induces apoptosis in 3T3-L1 preadipocytes. Journal of Nutrition 2006 Sept; 136:2965-2969.

1 Hainault, I., Carlotti, M., Hajduch, E., Guichard, C., Lavau, M. Fish oil in a high lard diet prevents obesity, hyperlipidemia, and adipocyte insulin resistance in rats. Annals of the New York Academy of Sciences 1993; 683:98-101.

2 Parrish, CC., Pathy, DA., Angel, A. Dietary fish oil limits adipose tissue hypertrophy in rats. Metabolism 1990; 39:217-9.

---

<http://www.jacn.org/cgi/content/abstract/24/6/510>

Journal of the American College of Nutrition, Vol. 24, No. 6, 510-515 (2005)

Published by the American College of Nutrition

### **Short-Term Effect of Eggs on Satiety in Overweight and Obese Subjects**

Jillon S. Vander Wal, PhD, Jorene M. Marth, MA, RD, Pramod Khosla, PhD, K-L Catherine Jen, PhD and Nikhil V. Dhurandhar, PhD, FACN

Department of Psychology, Saint Louis University, St. Louis, Missouri (J.S.V.W.)

Department of Nutrition and Food Science, Wayne State University, Detroit (P.K., K.-L.C.J., N.V.D.)

Rochester Center for Obesity Research & Treatment, Rochester Hills (J.M.M., N.V.D.), Michigan

Address reprint requests to: Nikhil V. Dhurandhar, PhD, Associate Professor, Pennington Biomedical Research Center, 6400 Perkins Road, Baton Rouge, LA 70808. E-mail: Nikhil.Dhurandhar@pbrc.edu

## ESSENCE OF ARTICLE

“Conclusions: Compared to an isocaloric, equal weight bagel-based breakfast, the egg-breakfast induced greater satiety and significantly reduced short-term food intake. The potential role of a routine egg breakfast in producing a sustained caloric deficit and consequent weight loss, should be determined”

## ARTICLE

**Objective:** To test the hypotheses that among overweight and obese participants, a breakfast consisting of eggs, in comparison to an isocaloric equal-weight bagel-based breakfast, would induce greater satiety, reduce perceived cravings, and reduce subsequent short-term energy intake.

**Subjects:** Thirty women with BMI's of at least 25 kg/M<sup>2</sup> between the ages of 25 to 60 y were recruited to participate in a randomized crossover design study in an outpatient clinic setting.

**Design:** Following an overnight fast, subjects consumed either an egg or bagel-based breakfast followed by lunch 3.5 h later, in random order two weeks apart. Food intake was weighed at breakfast and lunch and recorded via dietary recall up to 36 h post breakfast. Satiety was assessed using the Fullness Questionnaire and the State-Trait Food Cravings Questionnaire, state version.

**Results:** During the pre-lunch period, participants had greater feelings of satiety after the egg breakfast, and consumed significantly less energy (kJ;  $2405.6 \pm 550.0$  vs  $3091.3 \pm 445.5$ , Egg vs Bagel breakfasts,  $p < 0.0001$ ), grams of protein ( $16.8 \pm 4.2$  vs  $22.3 \pm 3.4$ , Egg vs Bagel breakfasts,  $p < 0.0001$ ), carbohydrate  $83.1 \pm 20.2$  vs  $110.9 \pm 18.7$ , Egg vs Bagel breakfasts,  $p < 0.0001$ ), and fat  $19.4 \pm 5.1$  vs  $22.8 \pm 3.2$ , Egg vs Bagel breakfasts,  $p < 0.0001$ ) for lunch. Energy intake following the egg breakfast remained lower for the entire day ( $p < 0.05$ ) as well as for the next 36 hours ( $p < 0.001$ ).

**Conclusions:** Compared to an isocaloric, equal weight bagel-based breakfast, the egg-breakfast induced greater satiety and significantly reduced short-term food intake. The potential role of a routine egg breakfast in producing a sustained caloric deficit and consequent weight loss, should be determined.

**Key words:** obesity, eggs, satiety, weight loss, hunger, breakfast

---

[http://www.eurekalert.org/pub\\_releases/2010-04/epr-eef040210.php](http://www.eurekalert.org/pub_releases/2010-04/epr-eef040210.php)

Public release date: 6-Apr-2010

Contact: Egg Media Hotline

[info@incredible-egg.org](mailto:info@incredible-egg.org)

312-233-1211

**Egg Nutrition Center**

Eating eggs for breakfast helps reduce calorie consumption throughout the day by 18 percent

New research reports that eating protein in the morning helps manage hunger

Park Ridge, Ill. (April 6, 2010) – A new study demonstrates that eating protein-rich eggs for breakfast reduces hunger and decreases calorie consumption at lunch and throughout the day. The study, published in the February issue of *Nutrition Research*, found that men who consumed an egg-based breakfast ate significantly fewer calories when offered an unlimited lunch buffet compared to when they ate a carbohydrate-rich bagel breakfast of equal calories.(1) This study supports previous research which revealed that eating eggs for breakfast as part of a reduced-calorie diet helped overweight dieters lose 65 percent more weight and feel more energetic than dieters who ate a bagel breakfast of equal calories and volume.(2)

"There is a growing body of evidence that supports the importance of high-quality protein in the diet for overall health and in particular the importance of protein at the breakfast meal," said Maria Luz Fernandez, Ph.D., study author and professor in the department of nutritional sciences at the University of Connecticut. "We examined two typical American breakfasts, and the participants' self-reported appetite ratings reveal that a protein-rich breakfast helps keep hunger at bay."

#### A Closer Look at the Study

Twenty-one men participated in this study and each ate two different test breakfasts. On one test day the participants ate an egg-based, protein-rich breakfast including three scrambled eggs and one-and-a-half pieces of white toast. On another test day they ate a bagel-based, carbohydrate-rich breakfast including one plain bagel, one half tablespoon of low-fat cream cheese and six ounces of low-fat yogurt. The two breakfasts contained identical calories, but when the men ate the egg-based breakfast the researchers observed that:

- the men ate roughly 112 fewer calories at a buffet lunch three hours following the egg breakfast compared to the bagel breakfast
- they consumed approximately 400 fewer calories in the 24-hour period following the egg breakfast
- blood tests showed that ghrelin, the hormone that stimulates hunger when elevated, was significantly higher after the bagel breakfast

#### Protein Makes Breakfast Incredible

"Starting the day with a high-quality protein breakfast like eggs is a great tool to promote long-lasting fullness and reduced calorie consumption," said Helenbeth Reynolds, M.P.H., R.D., registered dietitian and nutrition consultant. "For only 70 calories, eggs are a compact, nutrient-rich source of high-quality protein, and nearly half of an egg's protein, along with many other nutrients, is found in the yolk, so I always encourage eating the whole egg."

#### Quick and Easy Egg Breakfasts

Reynolds suggests these tips to make a protein-rich breakfast incredibly quick and easy:

- For a speedy and satisfying balanced meal, beat an egg in a small bowl or coffee mug, place on high heat in the microwave for 60 seconds and add it to a toasted whole-grain English muffin. Top with low-fat cheese and a slice of tomato.
- Keep hard-cooked eggs ready and waiting in your refrigerator to grab as part of breakfast on the run.
- Bake a batch of egg and vegetable Muffin Frittatas ahead of time, and quickly re-warm in the microwave for a delicious and filling, protein-packed breakfast.

###

#### For More Information

- To learn more about high-quality protein and the nutritional benefits of eggs, visit the Egg Nutrition Center at [www.enc-online.org](http://www.enc-online.org).
- For more protein-rich egg recipes and preparation tips, visit the American Egg Board at [www.incredibleegg.org](http://www.incredibleegg.org).

1) Ratliff, J., Leite, J.O., de Ogburn, R., Puglisi, M.J., VanHeest, J., Fernandez, M.L. (2010) Consuming eggs for breakfast influences plasma glucose and ghrelin, while reducing energy intake during the next 24 hours in adult men. *Nutrition Research*, 30, 96-103.

2) Vander Wal, J.S., Gupta, A., Khosla, P., Dhurandhar. (2008). Egg breakfast enhances weight loss. *International Journal of Obesity*, 32, 1545-1551.

---

<http://linkinghub.elsevier.com/retrieve/pii/S0271531710000035>

[http://www.sciencedirect.com/science?\\_ob=ArticleURL&\\_udi=B6TB1-4YMWS25-2&\\_user=10&\\_coverDate=02%2F28%2F2010&\\_rdoc=1&\\_fmt=high&\\_orig=search&\\_sort=d&\\_docanchor=&view=c&\\_searchStrId=1290384277&\\_rerunOrigin=google&\\_acct=C000050221&\\_version=1&\\_urlVersion=0&\\_userid=10&md5=769fcc461e818c880cc68eac2cad3c24](http://www.sciencedirect.com/science?_ob=ArticleURL&_udi=B6TB1-4YMWS25-2&_user=10&_coverDate=02%2F28%2F2010&_rdoc=1&_fmt=high&_orig=search&_sort=d&_docanchor=&view=c&_searchStrId=1290384277&_rerunOrigin=google&_acct=C000050221&_version=1&_urlVersion=0&_userid=10&md5=769fcc461e818c880cc68eac2cad3c24)

Nutrition Research

Volume 30, Issue 2, February 2010, Pages 96-103

doi:10.1016/j.nutres.2010.01.002 | How to Cite or Link Using DOI

Copyright © 2010 Elsevier Inc. All rights reserved.

Permissions & Reprints

## **Consuming eggs for breakfast influences plasma glucose and ghrelin, while reducing energy intake during the next 24 hours in adult men**

Joseph Ratliffa, Jose O. Leitea, Ryan de Ogburna, Michael J. Puglisia, Jaci VanHeestb and Maria Luz Fernandez, ,

a Department of Nutritional Sciences University of Connecticut Storrs, CT 06269, USA

b Department of Kinesiology, University of Connecticut, CT 06269, USA

Received 5 November 2009;

revised 31 December 2009;

accepted 6 January 2010.

Available online 18 March 2010.

### ESSENCE OF ARTICLE

“These findings suggest that consumption of eggs for breakfast results in less variation of plasma glucose and insulin, a suppressed ghrelin response, and reduced energy intake.”

### ARTICLE

#### Abstract

We hypothesized that consuming eggs for breakfast would significantly lower postprandial satiety and energy intake throughout the day. Using a crossover design, 21 men, 20 to 70 years old, consumed 2 isoenergetic test breakfasts, in a random order separated by 1 week. The macronutrient composition of the test breakfasts were as follows: (EGG, % CHO/fat/protein = 22:55:23) and (BAGEL, % CHO/fat/protein = 72:12:16). Fasting blood samples were drawn at baseline before the test breakfast and at 30, 60, 120, and 180 minutes after breakfast. After 180 minutes, subjects were given a buffet lunch and asked to eat until satisfied. Subjects filled out Visual Analog Scales (VAS) during each blood draw and recorded food intake the days before and after the test breakfasts. Plasma glucose, insulin, and appetite hormones were analyzed at each time point. Subjects consumed fewer kilocalories after the EGG breakfast compared with the BAGEL breakfast ( $P < .01$ ). In addition, subjects consumed more kilocalories in the 24-hour period after the BAGEL compared with the EGG breakfast ( $P < .05$ ). Based on VAS, subjects were hungrier and less satisfied 3 hours after the BAGEL breakfast compared with the EGG breakfast ( $P < .01$ ). Participants had higher plasma glucose area under the curve ( $P < .05$ ) as well as an increased ghrelin and insulin area under the curve with BAGEL ( $P < .05$ ). These findings suggest that consumption of eggs for breakfast results in less variation of plasma glucose and insulin, a suppressed ghrelin response, and reduced energy intake.

Keywords: Eggs; Satiety hormones; Breakfast; Insulin; Ghrelin; Human

Abbreviations: ANOVA, analysis of variance; AUC, area under the curve; BAGEL, bagel-based high-carbohydrate breakfast; BMI, body mass index; EGG, egg-based low-carbohydrate breakfast; GLP-1,

glucagons-like peptide 1; MUFAs, monounsaturated fatty acids; PYY, peptide YY; PUFA, polyunsaturated fatty acids; SFA, saturated fatty acids; SI, satiety index; VAS, Visual Analog Scale

Corresponding author. Tel.: +1 860 486 5547; fax: +1 860 486 3674.

---

Nutrition Research

Volume 30, Issue 2, February 2010, Pages 96-103

<http://www.nature.com/ijo/journal/v32/n10/abs/ijo2008130a.html>

Original Article

International Journal of Obesity (2008) 32, 1545–1551; doi:10.1038/ijo.2008.130; published online 5 August 2008

### **Egg breakfast enhances weight loss**

JS Vander Wall<sup>1</sup>, A Gupta<sup>2</sup>, P Khosla<sup>3</sup> and N V Dhurandhar<sup>2</sup>

1. Department of Psychology, Saint Louis University, Saint Louis, MO, USA
2. Pennington Biomedical Research Center, Baton Rouge, LA, USA
3. Department of Nutrition and Food Science, Wayne State University, Detroit, MI, USA

Correspondence: Dr NV Dhurandhar, Pennington Biomedical Research Center, Louisiana State University System, Baton Rouge, LA 70808, USA. E-mail: [nikhil.dhurandhar@pbrc.edu](mailto:nikhil.dhurandhar@pbrc.edu)

Received 19 February 2008; Revised 19 June 2008; Accepted 8 July 2008; Published online 5 August 2008.

#### ESSENCE OF ARTICLE

“After 8 weeks, in comparison to the BD group, the ED group showed a 61% greater reduction in BMI ( $-0.95\pm 0.82$  vs  $-0.59\pm 0.85$ ,  $P<0.05$ ), a 65% greater weight loss ( $-2.63\pm 2.33$  vs  $-1.59\pm 2.38$  kg,  $P<0.05$ ), a 34% greater reduction in waist circumference ( $P<0.06$ ) and a 16% greater reduction in percent body fat ( $P$ =not significant). No significant differences between the E and B groups on the aforementioned variables were obtained. Further, total cholesterol, high-density lipoprotein cholesterol, low-density lipoprotein cholesterol and triglycerides, did not differ between the groups.”

#### ARTICLE

To test the hypotheses that an egg breakfast, in contrast to a bagel breakfast matched for energy density and total energy, would enhance weight loss in overweight and obese participants while on a reduced-calorie weight loss diet.

#### Subjects:

Men and women (n=152), age 25–60 years, body mass index (BMI) 25 and 50 kg m<sup>-2</sup>.

#### Design:

Otherwise healthy overweight or obese participants were assigned to Egg (E), Egg Diet (ED), Bagel (B) or Bagel Diet (BD) groups, based on the prescription of either an egg breakfast containing two eggs (340 kcal) or a breakfast containing bagels matched for energy density and total energy, for at least 5 days per week, respectively. The ED and BD groups were suggested a 1000 kcal energy-deficit low-fat diet, whereas the B and E groups were asked not to change their energy intake.

#### Results:

After 8 weeks, in comparison to the BD group, the ED group showed a 61% greater reduction in BMI ( $-0.95 \pm 0.82$  vs  $-0.59 \pm 0.85$ ,  $P < 0.05$ ), a 65% greater weight loss ( $-2.63 \pm 2.33$  vs  $-1.59 \pm 2.38$  kg,  $P < 0.05$ ), a 34% greater reduction in waist circumference ( $P < 0.06$ ) and a 16% greater reduction in percent body fat ( $P = \text{not significant}$ ). No significant differences between the E and B groups on the aforementioned variables were obtained. Further, total cholesterol, high-density lipoprotein cholesterol, low-density lipoprotein cholesterol and triglycerides, did not differ between the groups.

#### Conclusions:

The egg breakfast enhances weight loss, when combined with an energy-deficit diet, but does not induce weight loss in a free-living condition. The inclusion of eggs in a weight management program may offer a nutritious supplement to enhance weight loss.

#### Keywords:

satiety, hunger, proteins, bagels

#### MORE ARTICLES LIKE THIS

These links to content published by NPG are automatically generated

#### REVIEWS

Dietary treatment for obesity

Nature Clinical Practice Gastroenterology & Hepatology Review (01 Dec 2008)

See all 4 matches for Reviews

#### RESEARCH

Body Weight Loss and Weight Maintenance in Relation to Habitual Caffeine Intake and Green Tea Supplementation \*\*

Obesity Original Article

Short-Term Effects of a "Health-At-Every-Size" Approach on Eating Behaviors and Appetite Ratings \*

Obesity Original Article

Short-Term Effects of a "Health-At-Every-Size" Approach on Eating Behaviors and Appetite Ratings \*

Obesity Original Article

Glycemic index, cholecystokinin, satiety and disinhibition: is there an unappreciated paradox for overweight women?

International Journal of Obesity Original Article

See all 56 matches for Research

---

Pediatrics. 2003 Nov;112(5):e414.

### **Low glycemic index breakfasts and reduced food intake in preadolescent children.**

Warren JM, Henry CJ, Simonite V.

Nutrition and Food Science Group, School of Biological and Molecular Sciences, Oxford Brookes University, Gypsy Lane Campus, Headington, Oxford, United Kingdom.

#### ESSENCE OF ARTICLE

"CONCLUSIONS: These results suggest that low-GI foods eaten at breakfast have a significant impact on food intake at lunch. This is the first study to observe such an effect in a group of normal and overweight children and adds to the growing body of evidence that low-GI foods may have an important role in weight control and obesity management. The potentially confounding effect of differences in the macronutrient and dietary fiber content of the test breakfasts warrants additional study. In addition, the impact of GI on food intake and body weight regulation in the long term needs to be investigated."

#### ARTICLE

**OBJECTIVE:** Recent reports have suggested that a low glycemic index (GI) diet may have a role in the management of obesity through its ability to increase the satiety value of food and modulate appetite. To date, no long-term clinical trials have examined the effect of dietary GI on body weight regulation. The majority of evidence comes from single-day studies, most of which have been conducted in adults. The purpose of this study was to investigate the effect of 3 test breakfasts-low-GI, low-GI with 10% added sucrose, and high-GI-on ad libitum lunch intake, appetite, and satiety and to compare these with baseline values when habitual breakfast was consumed. **METHODS:** A 3-way crossover study using block randomization of breakfast type was conducted in a school that already ran a breakfast club. A total of 37

children aged 9 to 12 years (15 boys and 22 girls) completed the study. The proportion of nonoverweight to overweight/obese children was 70:30. Children were divided into 5 groups, and a rolling program was devised whereby, week by week, each group would randomly receive 1 of 3 test breakfasts for 3 consecutive days, with a minimum of 5 weeks between the test breakfasts. Participants acted as their own control. The 3 test breakfasts were devised to match the energy and nutritional content of an individual's habitual breakfast as far as possible. All test breakfasts were composed of fruit juice, cereal, and milk with/without bread and margarine; foods with an appropriate GI value were selected. After each test breakfast, children were instructed not to eat or drink anything until lunchtime, except water and a small serving of fruit supplying approximately 10 g of carbohydrate, which was provided. Breakfast palatability, satiation after breakfast, and satiety before lunch were measured using rating scales based on previously used tools. Lunch was a buffet-style meal, and children were allowed free access to a range of foods. Lunch was served in the school hall where the rest of the schoolchildren were eating. Food intake at lunch was unobtrusively observed and recorded. Leftovers and food swapping were recorded, and plate waste was estimated. Lunch intakes were analyzed using a multilevel regression model for repeated measures data. The likelihood ratio statistic was used to determine whether the type of breakfast eaten had a significant effect on lunch intake after allowing for sex and weight status. RESULTS: The type of breakfast eaten had a statistically significant effect on mean energy intake at lunchtime: lunch intake was lower after low-GI and low-GI with added sucrose breakfasts compared with lunch intake after high-GI and habitual breakfasts (which were high-GI). Overweight and sex did not have a significant effect on lunch intake. Pairwise comparisons among the 3 types of test breakfasts and between each test breakfast and habitual breakfast were made. Lunch intake after the high-GI breakfast was significantly higher than after the low-GI breakfast and low-GI breakfast with added sucrose. The details of the pairwise comparisons were as follows: high-GI versus low-GI = 145 +/- 54 kcal; high-GI versus low-GI plus sucrose = 119 +/- 53 kcal; low-GI plus sucrose versus low-GI = 27 +/- 54 kcal. Lunch intake after the low-GI breakfast and the low-GI breakfast with added sucrose was significantly lower than after the habitual breakfast. The details of the pairwise comparisons were as follows: low-GI versus habitual = -109 +/- 75 kcal; low-GI plus sucrose versus habitual = -83 +/- 75 kcal; high-GI versus habitual = 36 +/- 75 kcal. There were no significant differences between the test breakfasts in immediate satiation. The high-GI breakfasts were rated to be more palatable than the low-GI breakfasts. At lunchtime, hunger ratings were greater after the high-GI breakfast compared with the other 2 test breakfasts on 2 of the 3 experimental days. Prelunch satiety scales were inversely related to subsequent food intake. CONCLUSIONS: These results suggest that low-GI foods eaten at breakfast have a significant impact on food intake at lunch. This is the first study to observe such an effect in a group of normal and overweight children and adds to the growing body of evidence that low-GI foods may have an important role in weight control and obesity management. The potentially confounding effect of differences in the macronutrient and dietary fiber content of the test breakfasts warrants additional study. In addition, the impact of GI on food intake and body weight regulation in the long term needs to be investigated.

PMID: 14595085 [PubMed - indexed for MEDLINE]

---

4: Int J Obes. 1987;11 Suppl 1:87-93.

**The effect of high and low-fibre breakfasts on hunger, satiety and food intake in a subsequent meal.**

Burley VJ, Leeds AR, Blundell JE.

Twenty normal weight female volunteers divided into high and low restraint groups consumed breakfast meals of high and low-fibre content (12.0 g and 3.0 g fibre respectively) on two separate occasions. Visual analogue scales were used to record hunger, fullness, desire to eat, and a measure of prospective consumption for 2 1/2 hours after each meal. At this point, a tray of pre-weighed lunch foods was offered and subjects were requested to eat as much or as little as they desired. The two breakfast meals (of equal weight) were based on toast, breakfast cereal, milk, butter and orange marmalade. No significant difference in energy intake at lunch was found after the high and low fibre breakfasts, or between the restraint groups. There was no significant difference between ratings after the high and low-fibre meals except for fullness, which was greater after the high-fibre breakfast. The effect of fibre overall, was relatively weak compared to the differences between the two restraint groups, with the high restraint group consistently expressing significantly less hunger before, during and after the breakfasts compared to the low restraint group.

PMID: 3032830 [PubMed - indexed for MEDLINE]

---

<http://jn.nutrition.org/cgi/content/abstract/138/4/698?etoc>

<http://www.ncbi.nlm.nih.gov/pubmed/8862476>

7: Eur J Clin Nutr. 1996 Jul;50(7):409-17.

**Breakfasts high in protein, fat or carbohydrate: effect on within-day appetite and energy balance.**

Stubbs RJ, van Wyk MC, Johnstone AM, Harbron CG.

Rowett Research Institute, Bucksburn, Aberdeen, The Netherlands.

**OBJECTIVE:** To compare the effect of isoenergetically-dense, high-protein (HP), high-fat (HF) or high-carbohydrate (HC) breakfasts (at 08.30) on subjective hunger, fullness and appetite (measured hourly on a 100 mm visual analogue scale), macronutrient balance and ad libitum energy intake (EI), at a test meal (13.30) and throughout the rest of the day (until 23.00). **DESIGN:** Six men each spent 24 h in a whole-body indirect calorimeter on three separate occasions during which they received breakfasts designed to match 75% of BMR and that comprised, on average 3.1 MJ of protein (HP), carbohydrate (HC) or fat (HF), respectively, the remainder being split between the other two macronutrients. Every item of the ad libitum diet comprised 13% protein, 40% fat and 47% carbohydrate by energy, with an energy density of 550 kJ/100 g. **RESULTS:** Subjectively-rated pleasantness did not differ between the breakfasts, or any of the subsequent ad libitum meals. Subjective hunger was significantly greater during the hours between breakfast and lunch after the HF (26) treatment relative to the HP (18) or HC (18 mm) meals ( $P < 0.001$ ), although the HP treatment suppressed hunger to a greater extent than the other two treatments over 24 h. However, mean ad libitum lunch intakes were similar at 5.38, 5.30 and 5.18 MJ (NS) on the HP, HC and HF treatments, respectively. After-lunch intakes were also very similar at 6.14, 6.18 and 5.83 MJ (NS).

Mean 24-h energy expenditure amounted to 11.12, 11.14 and 10.93 MJ, respectively, producing energy balances of 5.71, 5.83 and 5.04 MJ (NS), respectively. The HP, HF and HC breakfasts led to enhanced P, F and C oxidation, respectively ( $P < 0.003$ ). CONCLUSIONS: Large HP, HC or HF breakfasts led to detectable changes in hunger that were not of sufficient magnitude to influence lunch-time intake 5 h later, or EI for the rest of the day. A single positive balance of each macronutrient can be buffered by oxidation and storage capacity, without leading to changes in meal-to-meal EI, when subjects feed ad libitum on unfamiliar diets of fixed composition.

Publication Types:

- Clinical Trial
- Controlled Clinical Trial

PMID: 8862476 [PubMed - indexed for MEDLINE]

<http://jn.nutrition.org/cgi/content/abstract/138/4/698?etoc>

---

<http://jn.nutrition.org/cgi/reprint/136/7/1849.pdf>

© 2008 American Society for Nutrition J. Nutr. 138:698-702, April 2008

### **Nutrient Physiology, Metabolism, and Nutrient-Nutrient Interactions**

Energy Expenditure, Satiety, and Plasma Ghrelin, Glucagon-Like Peptide 1, and Peptide Tyrosine-Tyrosine Concentrations following a Single High-Protein Lunch<sup>1,2</sup>

Astrid J. Smeets<sup>3,4,\*</sup>, Stijn Soenen<sup>3,4</sup>, Natalie D. Luscombe-Marsh<sup>3,4</sup>, Øydis Ueland<sup>5</sup> and Margriet S. Westerterp-Plantenga<sup>3,4</sup>

<sup>3</sup> Maastricht University, Department of Human Biology, Nutrition and Toxicology Research Institute Maastricht, 6200 MD, Maastricht, The Netherlands; <sup>4</sup> Top Institute Food and Nutrition, 6700 AN, Wageningen, The Netherlands; and <sup>5</sup> Matforsk AS, The Norwegian Food Research Institute, N-1430 Ås, Norway

\* To whom correspondence should be addressed. E-mail: [astrid.smeets@hb.unimaas.nl](mailto:astrid.smeets@hb.unimaas.nl) .

#### ESSENCE OF ARTICLE

“High-protein (HP) foods are more satiating and have a higher thermogenic effect than normal protein foods over the short-term as well as the long-term. We hypothesized that acute effects of higher protein intake on satiety may be related to acute metabolic and hormonal responses”

#### ARTICLE

High-protein (HP) foods are more satiating and have a higher thermogenic effect than normal protein foods over the short-term as well as the long-term. We hypothesized that acute effects of higher protein intake on satiety may be related to acute metabolic and hormonal responses. The study was a single-blind, randomized, crossover design. Subjects underwent 2 indirect calorimetry tests for measurement of energy expenditure (EE) and substrate oxidation. After a standard subject-specific breakfast, subjects received 1 of 2 randomly assigned treatments: an appropriate protein (AP) lunch (10% energy (E) protein, 60%E carbohydrate, 30%E fat), or a HP lunch (25%E protein, 45%E carbohydrate, 30%E fat). The increase in postlunch EE tended to be greater after the HP lunch ( $0.85 \pm 0.32$  kJ/min) than after the AP lunch ( $0.73 \pm 0.22$  kJ/min) ( $P = 0.07$ ). The respiratory quotient did not differ between the HP ( $0.84 \pm 0.04$ ) and the AP ( $0.86 \pm 0.04$ ) treatments. Satiety visual analogue scales (VAS) scores were significantly higher 30 and 120 min after the HP lunch than after the AP lunch. The area under the curve of the VAS score for satiety was higher after the HP lunch ( $263 \pm 61$  mm/h) than after the AP lunch (AP  $236 \pm 76$  mm/h) ( $P < 0.02$ ). Effects of the meals on satiety and diet-induced thermogenesis did not occur simultaneously with changes in plasma ghrelin, glucagon-like peptide 1, and peptide tyrosine-tyrosine concentrations. A single HP lunch, therefore, does not exert its acute effect on satiety through increased concentrations of satiety-related hormones. Other factors, which may explain the HP effect on satiety, may be metabolites or amino acids.

---

<http://www.ncbi.nlm.nih.gov/sites/entrez>

PMID: 14595085 [PubMed - indexed for MEDLINE]

1: Pediatrics. 2003 Nov;112(5):e414.

### **Low glycemic index breakfasts and reduced food intake in preadolescent children.**

Warren JM, Henry CJ, Simonite V.

Nutrition and Food Science Group, School of Biological and Molecular Sciences, Oxford Brookes University, Gypsy Lane Campus, Headington, Oxford, United Kingdom.

#### ESSENCE OF ARTICLE

“The type of breakfast eaten had a statistically significant effect on mean energy intake at lunchtime: lunch intake was lower after low-GI and low-GI with added sucrose breakfasts compared with lunch intake after high-GI and habitual breakfasts (which were high-GI).”

#### ARTICLE

**OBJECTIVE:** Recent reports have suggested that a low glycemic index (GI) diet may have a role in the management of obesity through its ability to increase the satiety value of food and modulate appetite. To date, no long-term clinical trials have examined the effect of dietary GI on body weight regulation. The majority of evidence comes from single-day studies, most of which have been conducted in adults. The purpose of this study was to investigate the effect of 3 test breakfasts-low-GI, low-GI with 10% added sucrose, and high-GI-on ad libitum lunch intake, appetite, and satiety and to compare these with baseline values when habitual breakfast was consumed. **METHODS:** A 3-way crossover study using block

randomization of breakfast type was conducted in a school that already ran a breakfast club. A total of 37 children aged 9 to 12 years (15 boys and 22 girls) completed the study. The proportion of nonoverweight to overweight/obese children was 70:30. Children were divided into 5 groups, and a rolling program was devised whereby, week by week, each group would randomly receive 1 of 3 test breakfasts for 3 consecutive days, with a minimum of 5 weeks between the test breakfasts. Participants acted as their own control. The 3 test breakfasts were devised to match the energy and nutritional content of an individual's habitual breakfast as far as possible. All test breakfasts were composed of fruit juice, cereal, and milk with/without bread and margarine; foods with an appropriate GI value were selected. After each test breakfast, children were instructed not to eat or drink anything until lunchtime, except water and a small serving of fruit supplying approximately 10 g of carbohydrate, which was provided. Breakfast palatability, satiation after breakfast, and satiety before lunch were measured using rating scales based on previously used tools. Lunch was a buffet-style meal, and children were allowed free access to a range of foods. Lunch was served in the school hall where the rest of the schoolchildren were eating. Food intake at lunch was unobtrusively observed and recorded. Leftovers and food swapping were recorded, and plate waste was estimated. Lunch intakes were analyzed using a multilevel regression model for repeated measures data. The likelihood ratio statistic was used to determine whether the type of breakfast eaten had a significant effect on lunch intake after allowing for sex and weight status. **RESULTS:** The type of breakfast eaten had a statistically significant effect on mean energy intake at lunchtime: lunch intake was lower after low-GI and low-GI with added sucrose breakfasts compared with lunch intake after high-GI and habitual breakfasts (which were high-GI). Overweight and sex did not have a significant effect on lunch intake. Pairwise comparisons among the 3 types of test breakfasts and between each test breakfast and habitual breakfast were made. Lunch intake after the high-GI breakfast was significantly higher than after the low-GI breakfast and low-GI breakfast with added sucrose. The details of the pairwise comparisons were as follows: high-GI versus low-GI = 145 +/- 54 kcal; high-GI versus low-GI plus sucrose = 119 +/- 53 kcal; low-GI plus sucrose versus low-GI = 27 +/- 54 kcal. Lunch intake after the low-GI breakfast and the low-GI breakfast with added sucrose was significantly lower than after the habitual breakfast. The details of the pairwise comparisons were as follows: low-GI versus habitual = -109 +/- 75 kcal; low-GI plus sucrose versus habitual = -83 +/- 75 kcal; high-GI versus habitual = 36 +/- 75 kcal. There were no significant differences between the test breakfasts in immediate satiation. The high-GI breakfasts were rated to be more palatable than the low-GI breakfasts. At lunchtime, hunger ratings were greater after the high-GI breakfast compared with the other 2 test breakfasts on 2 of the 3 experimental days. Prelunch satiety scales were inversely related to subsequent food intake. **CONCLUSIONS:** These results suggest that low-GI foods eaten at breakfast have a significant impact on food intake at lunch. This is the first study to observe such an effect in a group of normal and overweight children and adds to the growing body of evidence that low-GI foods may have an important role in weight control and obesity management. The potentially confounding effect of differences in the macronutrient and dietary fiber content of the test breakfasts warrants additional study. In addition, the impact of GI on food intake and body weight regulation in the long term needs to be investigated.

#### Publication Types:

- Clinical Trial
- Comparative Study

- Randomized Controlled Trial
- Research Support, Non-U.S. Gov't

PMID: 14595085 [PubMed - indexed for MEDLINE]

---

<http://www.bettykamen.com/hints/2047.htm>

### **Hint 2047: Egg breakfast fills you up longer.**

Starting the day with an egg breakfast instead of another food with the same calorie count is more likely to lead to weight loss in overweight people. The egg induces greater satiety.

In fact eggs have a 50 percent higher satiety index than regular breakfast cereals. This is believed to be due to the high protein content of the eggs. But other factors are involved, too, and it may be more than the macronutrient composition of the egg.

One study demonstrates that those who eat eggs for breakfast consume 164 calories less for lunch and 400 calories less over the next 36 hours.

[Eggs retain the greatest amount of nutrients if consumed while the yolks are still "runny." The less cooked, the better.]

Source: Journal of the American College of Nutrition 2006;24(6):510-515.

---

### **ADDITIONAL RESEARCH ARTICLES**

<http://www.ncbi.nlm.nih.gov/pubmed/10447983>

### **Menstrual Cycle and Voluntary Food Intake in Young Chinese Women**

*Appetite*, Volume 33, Issue 1, August 1999, Pages 109-118

E T LI, L B Y TSANG, S S H LUI

#### **Abstract**

The effect of menstrual cycle phase on energy and macronutrients intakes was assessed in 20 university students ( $21.2 \pm 1.3$  years) all of whom experienced ovulatory cycle as documented by a surge in urinary luteinizing hormone. Three-day food intake records, which consisted of one weekend day, were kept in both mid-follicular and mid-luteal phases. Mean daily energy intake was higher ( $p=0.02$ ) in the luteal

phase (6978±1847 kJ) than in the follicular phase (6095±1174 kJ). Intakes of carbohydrate and fat were also significantly elevated (by 15 and 21%, respectively) in the luteal phase. The menstrual phase effect on energy intake was attributed to the substantially higher intakes from Thursday through Sunday in the luteal phase. The proportion of energy from the three macronutrients was not affected by menstrual phase nor day of the week.

---

<http://www.ncbi.nlm.nih.gov/pubmed/9252985>

**Reduced sensitivity to glucocorticoid feedback and reduced glucocorticoid receptor mrna expression in the luteal phase of the menstrual cycle**

Neuropsychopharmacology, Volume 17, Issue 2, August 1997, Pages 100-109

Margaret Altemus, Laura Redwine, Yung-Mei Leong, Takeo Yoshikawa, Rachel Yehuda, Savilla Detera-Wadleigh, Dennis L. Murphy

Abstract

We examined the effects of the menstrual cycle on hypothalamic-pituitary adrenal axis regulation in healthy women with no history of psychiatric illness by measuring plasma cortisol responses to a low-dose (0.25 mg) of dexamethasone (N = 23) and by measuring glucocorticoid receptor (type II) mRNA expression in lymphocytes using Northern blotting (N = 19). Both measures were performed in the early follicular and mid-luteal phases of the menstrual cycle. Dexamethasone suppression of plasma cortisol was greater in the follicular phase of the menstrual cycle compared to the mid-luteal phase ( $p < .01$ ). In addition, type II glucocorticoid receptor mRNA expression in lymphocytes was 78% higher in the follicular phase compared to the mid-luteal phase ( $p = .02$ ). These results indicate that glucocorticoid feedback regulation of the hypothalamic-pituitary-adrenal axis is reduced in the midluteal phase of the menstrual cycle. Reduced feedback regulation of central stress response systems may play a role in generation of common premenstrual symptoms of irritability and dysphoria.

Psychoneuroendocrinology

Volume 33, Issue 6, July 2008, Pages 874-882

---

PMID: 19050176 [PubMed - as supplied by publisher]

1: Am J Physiol Endocrinol Metab. 2008 Dec 2. [Epub ahead of print] [Links](#)

**Enhanced cortisol production rates, free cortisol, and 11 Beta HSD1 expression correlate with visceral fat and insulin resistance in men: effect of weight loss.**

Purnell JQ, Kahn SE, Samuels MH, Brandon D, Loriaux DL, Brunzell JD.

Oregon Health & Science University.

## ESSENCE OF ARTICLE

“These data support a model in which increased HPA activity in men promotes selective visceral fat accumulation and insulin resistance and may promote weight regain after diet-induced weight loss, whereas 11 Beta HSD-1 gene expression in subcutaneous fat is a consequence rather than cause of adiposity. Key words: obesity, weight loss, cortisol production rates, insulin resistance, visceral fat.”

## ARTICLE

Controversy exists whether endogenous cortisol production is associated with visceral obesity and insulin resistance in humans. We therefore quantified cortisol production and clearance rates, abdominal fat depots, insulin sensitivity, and adipocyte gene expression in a cohort of 24 men. To test if found relationships are a consequence rather than a cause of obesity, 8 men from this larger group were studied before and after weight loss. Daily cortisol production rates (CPR), free hormone levels (FC), and metabolic clearance rates (MCR) were measured by stable isotope methodology and 24-hour sampling; intra-abdominal fat (IAF) and subcutaneous fat (SQF) by computed tomography; insulin sensitivity (SI) by frequently-sampled intravenous glucose tolerance test; and adipocyte 11 hydroxysteroid dehydrogenase-1 (11 Beta HSD-1) gene expression by quantitative RT PCR from subcutaneous biopsies. Increased CPR and FC levels correlated with increased IAF, but not SQF, and with decreased SI. Increased 11 Beta HSD-1 gene expression correlated with both IAF and SQF, and with decreased SI. With weight loss, CPR, FC, and MCR did not change compared to baseline; however, with greater loss in body fat than lean mass during weight loss, both CPR and FC increased proportionally to final fat mass and IAF; and 11 Beta HSD-1 decreased compared to baseline. These data support a model in which increased HPA activity in men promotes selective visceral fat accumulation and insulin resistance and may promote weight regain after diet-induced weight loss, whereas 11 Beta HSD-1 gene expression in subcutaneous fat is a consequence rather than cause of adiposity. Key words: obesity, weight loss, cortisol production rates, insulin resistance, visceral fat.

PMID: 19050176 [PubMed - as supplied by publisher]

---

<http://www.ingenta.com/isis/searching/ExpandTOC/ingenta.jsessionid=bcm86nonkt8.circus?issue=infobike://bpl/psci/2003/00000014/00000005&index=10>

### **The ecology of eating: Smaller portion sizes in France than in the United States help explain the French paradox**

Psychological Science, September 2003, vol. 14, no. 5, pp. 450-454(5)

Rozin P.[1]; Kabnick K.[1]; Pete E.[1]; Fischler C.[2]; Shields C.[2]

[1] University of Pennsylvania and [2] CNRS, Paris, France

COMMENT FROM BARBARA ZEITLIN KRAVETS CCN LNC: Many reviews of this article discuss what the lead author, Dr. Paul Rozin, feels about "The French paradox." He explains that there is only a French paradox if one believes that dietary fat is the major cause of obesity and cardiovascular disease. He stated that the importance of fat intake as a risk factor has been greatly exaggerated

ESSENCE OF ARTICLE IS WHOLE ARTICLE

Abstract:

Part of the "French paradox" can be explained by the fact that the French eat less than Americans. We document that French portion sizes are smaller in comparable restaurants, in the sizes of individual portions of foods (but not other items) in supermarkets, in portions specified in cookbooks, and in the prominence of "all you can eat" restaurants in dining guides. We also present data, from observations at McDonald's, that the French take longer to eat than Americans. Our results suggest that in the domain of eating, and more generally, more attention should be paid to ecological factors, even though their mechanism of operation is transparent, and hence less revealing of fundamental psychological processes. Ironically, although the French eat less than Americans, they seem to eat for a longer period of time, and hence have more food experience. The French can have their cake and eat it as well."

Document Type: Research article ISSN: 0956-7976

DOI (article): 10.1111/1467-9280.02452

SICI (online): 0956-7976(20030901)14:5L.450;1-

Publisher: Blackwell Publishing on behalf of the American Psychological Society

[http://65.54.246.250/cgi-bin/linkrd?\\_lang=EN&lah=ed66e4d60ff44ee81fa9013be412ef89&lat=1066334661&hm\\_\\_\\_action=http%3a%2f%2fwww%2enutraingredients%2ecom%2fnews%2fnews%2easp%3fid%3d7955](http://65.54.246.250/cgi-bin/linkrd?_lang=EN&lah=ed66e4d60ff44ee81fa9013be412ef89&lat=1066334661&hm___action=http%3a%2f%2fwww%2enutraingredients%2ecom%2fnews%2fnews%2easp%3fid%3d7955)

26/08/03 - The "French paradox" - the intriguing phenomenon that pitches France's rich cuisine against a slender population - can be explained in part by portions that are significantly smaller in French restaurants and supermarkets than in their American counterparts. So say researchers at the University of Pennsylvania and CNRS in Paris, who compared the size of restaurant meals, single-serve foods and cookbook portions on both sides of the Atlantic.

"The French paradox is only a paradox if one assumes that dietary fat is the major cause of obesity and cardiovascular disease," said Paul Rozin, professor of psychology at Penn and lead author of a paper in the September issue of the journal Psychological Science. "However, recent studies suggest that the importance of fat intake as a risk factor has been greatly exaggerated.

While the French eat more fat than Americans, they probably eat slightly fewer calories, which when compounded over years can amount to substantial differences in weight."

The French paradox has long stymied American dieters and scientists, puzzled by the ability of the French to remain trim while downing buttery croissants, creamy brie and decadent pastries. Just 7 per cent of French adults are obese, compared to 22 per cent of Americans, and the mortality rate from heart disease is significantly lower in France.

Rozin and his colleagues weighed portions at 11 comparable pairs of eateries in Paris and Philadelphia, including fast-food outlets, pizzerias, ice cream parlors and a variety of ethnic restaurants. They found the mean portion size across all Paris establishments was 277 grams, compared to a mean in Philadelphia of 346 grams - 25 per cent more than in Paris.

In just one of the 11 comparisons, between Hard Rock Cafes in both cities, were the Parisian portions larger. Three other international restaurant chains consistently served larger portions in the US, and Philadelphia's Chinese restaurants served meals that were on average 72 per cent heftier than those served by Chinese restaurants in Paris.

The researchers also examined references to portion size in Philadelphia and Paris editions of the 2000 Zagat restaurant guide. Serving sizes were not only mentioned roughly three times as frequently in reviews of Philadelphia restaurants, but, of these mentions, fully 88 per cent described large portions, compared to just 52 per cent in Paris.

"Many studies have shown that, if food is moderately palatable, people tend to consume what is put in front of them and generally consume more when offered more food," Rozin said. "Much discussion of the 'obesity epidemic' in the US has focused on personal willpower, but our study shows that the environment also plays an important role and that people may be satisfied even if served less than they would normally eat."

Extending their approach to single-serve foods sold in supermarkets, Rozin and colleagues found 14 of 17 items studied were larger in American stores. For example, a candy bar sold in Philadelphia was 41 per cent larger than the same product in Paris, a soft drink was 52 per cent larger, a hot dog was 63 per cent larger and a carton of yoghurt was 82 per cent larger.

Rozin's co-authors on the Psychological Science paper are Kimberly Kabnick and Erin Pete at Penn, who conducted the work as part of their senior Psychology Honors thesis, and Claude Fischler and Christy Shields at CNRS. Their work was sponsored by the National Institute on Drug Abuse.

---

: Obes Rev 2002 May;3(2):59-68

Comment in:

Obes Rev. 2002 May;3(2):57-8.

**Dietary fat plays a major role in obesity: no.**

Willett WC.

Departments of Epidemiology and Nutrition, Harvard School of Public Health, 665 Huntington Avenue, Boston, MA 02115, USA. WWillett@hsph.harvard.edu

## ESSENCE OF ARTICLE

”Moreover, within the United States (US), a substantial decline in the percentage of energy from fat during the last two decades has corresponded with a massive increase in obesity, and similar trends are occurring in other affluent countries. Diets high in fat do not account for the high prevalence of excess body fat in Western countries; reductions in the percentage of energy from fat will have no important benefits and could further exacerbate this problem. The emphasis on total fat reduction has been a serious distraction in efforts to control obesity and improve health in general.”

## ARTICLE

The percentage of dietary energy from fat has been suggested to be an important determinant of body fat, and this presumed effect has been invoked to justify the general promotion of low-fat diets. Dietary fat and the prevalence of obesity are lower in poor countries than in affluent countries. However, these contrasts are seriously confounded by differences in physical activity and food availability; within areas of similar economic development, per capita intake of fat and the prevalence of obesity have not been positively correlated. Randomized trials are the preferable method for evaluating the effect of dietary fat on adiposity because they avoid problems of confounding that are difficult to control in other studies. In short-term trials, a small reduction in body weight is typically seen in individuals randomized to diets with a lower percentage of calories from fat. In a meta-analysis of these trials, it was estimated that a decrease in 10% of energy from fat would reduce weight by 16 g d<sup>-1</sup>, which would correspond to a 9-kg weight loss by 18 months. However, compensatory mechanisms appear to operate because in trials lasting one year or longer, fat consumption within the range of 18-40% of energy has consistently had little, if any, effect on body fatness. Moreover, within the United States (US), a substantial decline in the percentage of energy from fat during the last two decades has corresponded with a massive increase in obesity, and similar trends are occurring in other affluent countries. Diets high in fat do not account for the high prevalence of excess body fat in Western countries; reductions in the percentage of energy from fat will have no important benefits and could further exacerbate this problem. The emphasis on total fat reduction has been a serious distraction in efforts to control obesity and improve health in general.

Publication Types:

Review

Review, Tutorial

PMID: 12120421 [PubMed - indexed for MEDLINE]

---

PMID: 9497170 [PubMed - indexed for MEDLINE]

Am J Clin Nutr 1998 Mar;67(3 Suppl):556S-562S

Erratum in:

Am J Clin Nutr 1999 Aug;70(2):304

Comment in:

Am J Clin Nutr. 1998 Nov;68(5):1144-7.

### **Is dietary fat a major determinant of body fat?**

Willett WC.

Department of Epidemiology, Harvard School of Public Health, Boston, MA 02115, USA.

#### ESSENCE OF ARTICLE

“Moreover, within the United States, a substantial decline in the percentage of energy from fat consumed during the past two decades has corresponded with a massive increase in obesity. Diets high in fat do not appear to be the primary cause of the high prevalence of excess body fat in our society, and reductions in fat will not be a solution. “

#### ARTICLE

The percentage of energy from dietary fat is widely believed to be an important determinant of body fat, and several mechanisms have been proposed to account for such a relation. Comparisons of both diets and the prevalence of obesity between affluent and poor countries have been used to support a causal association, but these contrasts are seriously confounded by differences in physical activity and food availability. Within areas of similar economic development, regional intake of fat and prevalence of obesity have not been positively correlated. Randomized trials are the preferable method to evaluate the effect of dietary fat on adiposity, and are feasible because the number of subjects needed is not large. In short-term trials, a modest reduction in body weight is typically seen in individuals randomly assigned to diets with a lower percentage of energy from fat. However, compensatory mechanisms appear to operate because in trials lasting  $>$  or  $=$  1 y, fat consumption within the range of 18-40% of energy appears to have little if any effect on body fatness. Moreover, within the United States, a substantial decline in the percentage of energy from fat consumed during the past two decades has corresponded with a massive increase in obesity. Diets high in fat do not appear to be the primary cause of the high prevalence of excess body fat in our society, and reductions in fat will not be a solution.

Publication Types:

Review

Review, Tutorial

PMID: 9497170 [PubMed - indexed for MEDLINE]

---

PMID: 9217594 [PubMed - indexed for MEDLINE]

Am J Med 1997 Mar;102(3):259-64

### **Divergent trends in obesity and fat intake patterns: the American paradox.**

Heini AF, Weinsier RL.

Clinic of Internal Medicine, Inselspital, University of Berne, Switzerland.

#### ESSENCE OF ARTICLE

“RESULTS: In the adult US population the prevalence of overweight rose from 25.4% from 1976 to 1980 to 33.3% from 1988 to 1991, a 31% increase. During the same period, average fat intake, adjusted for total calories, dropped from 41.0% to 36.6%, an 11% decrease. Average total daily calorie intake also tended to decrease, from 1,854 kcal to 1,785 kcal (-4%). Men and women had similar trends. Concurrently, there was a dramatic rise in the percentage of the US population consuming low-calorie products, from 19% of the population in 1978 to 76% in 1991.

#### ARTICLE

PURPOSE: To compare recent changes in diet and physical activity with trends in body weight and obesity prevalence, using large survey studies representative of the US population. MATERIALS AND METHODS: Secular-trends survey studies were made from databases of NHANES II and III, USDA Nationwide Food Consumption Survey, Behavioral Risk Factor Survey System, and Calorie Control Council Report providing data on obesity prevalence, body mass index, calorie and fat intake, exercise-related physical activity, and consumption of low-calorie food extracted from surveys for the adult US population and specific subgroups. RESULTS: In the adult US population the prevalence of overweight rose from 25.4% from 1976 to 1980 to 33.3% from 1988 to 1991, a 31% increase. During the same period, average fat intake, adjusted for total calories, dropped from 41.0% to 36.6%, an 11% decrease. Average total daily calorie intake also tended to decrease, from 1,854 kcal to 1,785 kcal (-4%). Men and women had similar trends. Concurrently, there was a dramatic rise in the percentage of the US population consuming low-calorie products, from 19% of the population in 1978 to 76% in 1991. From 1986 to 1991 the prevalence of sedentary lifestyle represented almost 60% of the US population, with no change over time. CONCLUSIONS: Reduced fat and calorie intake and frequent use of low-calorie food products have been associated with a paradoxical increase in the prevalence of obesity. These diverging trends suggest that there has been a dramatic decrease in total physical activity related energy expenditure. Efforts to increase the average American's total exercise- and nonexercise-related physical activities may be essential for the prevention of obesity.

PMID: 9217594 [PubMed - indexed for MEDLINE]

---

PMID: 10837288 [PubMed - indexed for MEDLINE]

13: Am J Clin Nutr 2000 Jun;71(6):1478-84

#### **Temporal trends in energy intake in the United States: an ecologic perspective.**

Harnack LJ, Jeffery RW, Boutelle KN.

Division of Epidemiology School of Public Health, University of Minnesota, Minneapolis, MN 55454-1015, USA.

## ESSENCE OF ARTICLE

“Americans appear, in some cases, to be selecting lower-fat foods over higher-fat alternatives. In addition, availability and sales of reduced-energy and reduced-fat products have increased.

CONCLUSION: Consistent with trends in overweight, most of the ecologic data reviewed suggest that energy intake has increased over the past several decades and is likely a major contributor to increases in average body weight. “

PMID: 10837288 [PubMed - indexed for MEDLINE]

## ARTICLE

BACKGROUND: The causes of recent increases in the prevalence of overweight in the United States are perplexing because national survey data do not show clear patterns of change in energy intake or expenditure. OBJECTIVE: Ecologic data regarding the quantities and types of foods and nutrients available in the United States between 1970 and 1998 were reviewed to provide an alternative perspective on trends in energy intake. DESIGN: Literature searches in agriculture, business, and medical library databases were conducted to identify data regarding the quantities and types of foods and nutrients available in the United States between 1970 and 1998. RESULTS: Per capita energy availability estimates from the US Department of Agriculture, US Food Supply Series, indicate that energy availability increased by 15% between 1970 and 1994. Data regarding trends in food purchasing and preparation suggest that Americans are eating more meals outside the home, relying more heavily on convenience foods, and consuming larger food portions. Americans appear, in some cases, to be selecting lower-fat foods over higher-fat alternatives. In addition, availability and sales of reduced-energy and reduced-fat products have increased. CONCLUSION: Consistent with trends in overweight, most of the ecologic data reviewed suggest that energy intake has increased over the past several decades and is likely a major contributor to increases in average body weight.

PMID: 10837288 [PubMed - indexed for MEDLINE]

---

PMID: 9497168 [PubMed - indexed for MEDLINE]

20: Am J Clin Nutr 1998 Mar;67(3 Suppl):546S-550S

### **Dietary fat and obesity: an epidemiologic perspective.**

Seidell JC.

Department of Chronic Diseases and Environmental Epidemiology, National Institute of Public Health and the Environment, Bilthoven, The Netherlands. j.seidell@rivm.nl

## ESSENCE OF ARTICLE

“At this stage there is no conclusive evidence from epidemiologic studies that under isoenergetic conditions dietary fat intake promotes the development of obesity more so than other macronutrients. “

## ARTICLE

The observation that dietary fat has an effect on weight gain and the development of obesity that is larger than would be expected on the basis of fat's energy value is mainly experimental. Several methodologic problems limit the interpretation of epidemiologic studies of the association between dietary fat intake and obesity. Among the issues relevant in this context are underreporting of energy and fat intakes, dieting behavior, inadequate control for variables such as energy expenditure, and limited between-subject variation in fat intake in developed countries. Different types of epidemiologic studies suffer from different types and magnitudes of bias and many conflicting results can be obtained. Ecologic and cross-sectional studies especially suffer from these biases. The more appropriate type of study (ie, prospective studies of fat intake and subsequent weight gain) was carried out in several countries but conflicting results were obtained. Overall, the observed associations seem to depend on the stage of cultural transition of the population studied (eg, modernization compared with postmodernization). Current epidemiologic methods are inadequate for performing valid studies of the relation between percentage of energy from dietary fat and obesity. Specifically designed prospective studies of unbiased estimates of energy balance are necessary. Appropriate control for confounders and emphasis on the possibility that genetic predisposition plays a role will also be necessary. At this stage there is no conclusive evidence from epidemiologic studies that under isoenergetic conditions dietary fat intake promotes the development of obesity more so than other macronutrients.

Publication Types:

Review

Review, Tutorial

PMID: 9497168 [PubMed - indexed for MEDLINE]

---

PMID: 10946798 [PubMed - indexed for MEDLINE]

28: Proc Nutr Soc 2000 May;59(2):295-301

### **Changing eating and physical activity patterns of US children.**

Johnson RK.

Department of Nutrition and Food Sciences, The University of Vermont, Burlington 05405, USA.  
rachel.johnson@uvm.edu

#### ESSENCE OF ARTICLE

“Total fat consumption expressed as a percentage of energy intake has decreased among US children. However, this decrease is largely the result of increased total energy intake in the form of carbohydrates and not necessarily due to decreased fat consumption.”

#### ARTICLE

The number of US children who are overweight has more than doubled over the last decade. This change has broadened the focus of dietary guidance for children to address nutrient overconsumption and

physical activity patterns. Total fat consumption expressed as a percentage of energy intake has decreased among US children. However, this decrease is largely the result of increased total energy intake in the form of carbohydrates and not necessarily due to decreased fat consumption. The majority of children aged 5-17 years are not meeting recommendations for Ca intakes. Much of this deficit is attributed to changing beverage consumption patterns, characterized by declining milk intakes and substantial increases in soft-drink consumption. On average, US children are not eating the recommended amounts of fruits and vegetables. US adolescents become less active as they get older, and one-quarter of all US children watch  $\geq$  4 h television each day, which is positively associated with increased BMI and skinfold thickness. There is an urgent need in the USA for effective prevention strategies aimed at helping children grow up with healthful eating and physical activity habits to achieve optimal health.

Publication Types:

Review

Review, Tutorial

PMID: 10946798 [PubMed - indexed for MEDLINE]

---

<http://www.ncbi.nlm.nih.gov/pubmed/9623182>

3: Ned Tijdschr Geneeskd 1998 Apr 18;142(16):886-9 Related Articles, Books, LinkOut

### **Less fat or a different fat?**

[Article in Dutch]

Katan MB, Grundy SM, Willett WC.

Landbouwniversiteit, afd. Humane Voeding en Epidemiologie, Wageningen.

Current dietary advice with a view to avoiding cardiovascular pathology is to replace fatty foodstuffs and those rich in saturated fat and cholesterol by food rich in complex carbohydrates. Although substitution of carbohydrates for fat lowers the blood level of low-density lipoprotein (LDL) cholesterol, it also lowers the level of high-density lipoprotein (HDL) cholesterol, thereby adversely influencing the risk profile for cardiovascular disease. Neither does a low fat diet appear to reduce obesity, another risk factor. A modern advice based on published research reads: obese persons should reduce their intake of saturated and trans-fatty acids by lowering the consumption of dairy fat, meat and hardened oils (bakery products and catering products fried in hardened fats), and in addition should consume less products with added sugars and refined starch. Carbohydrates should be provided by fruits, vegetables, leguminous plants and whole-wheat products. Persons of about the ideal weight should replace saturated and trans-fatty acids in their diet by unsaturated plant oils, and products with refined carbohydrates by fruits, vegetables and whole-wheat products.

Publication Types:

Review

Review, Tutorial

PMID: 9623182 [PubMed - indexed for MEDLINE]

---

11: Curr Opin Lipidol 1998 Feb;9(1):41-5 Related Articles, Books, LinkOut

**The role of reduced fat diets and fat substitutes in the regulation of energy and fat intake and body weight.**

Lawton CL, Blundell JE.

Biopsychology Group, School of Psychology, University of Leeds, UK.

The suggested link between a high intake of dietary fat and obesity has led to a proliferation on the market of reduced fat foods. The preceding year has seen the publication of more long-term studies investigating the effects of reduced fat and fat substituted foods on energy intake, fat intake and body weight. Effects on the proportion of the diet consumed as fat are encouraging (with most studies showing a decrease towards dietary recommendations), whilst effects on energy intake and body weight remain equivocal.

Publication Types:

Review

Review, Tutorial

PMID: 9502334 [PubMed - indexed for MEDLINE]

---

13: J Nutr 2000 Feb;130(2S Suppl):280S-283S Related Articles, Books, LinkOut

**Dietary glycemic index and obesity.**

Ludwig DS.

Division of Endocrinology, Children's Hospital, Boston, MA 02115, USA.

Obesity is among the most important medical problems in America today. Currently, approximately 1 in 4 children and 1 in 2 adults are overweight, prevalence rates that have increased by 50% since the 1960s. In an attempt to combat this problem, the Federal government and various official medical agencies have advocated decreasing intake of total fat and sugar, while increasing consumption of "complex carbohydrate." Despite a recent reduction in fat consumption to near the recommended 30% of total energy, rates of obesity have continued to rise, suggesting that other dietary factors may play a critical role in body weight regulation. One such factor may be glycemic index. This review examines the physiologic effects of glycemic index and argues for the need for controlled clinical trials of a low glycemic index diet in the treatment of obesity.

Publication Types:

Review

Review, Tutorial

PMID: 10721888 [PubMed - indexed for MEDLINE]

---

17: Public Health Nutr 2000 Sep;3(3):329-36 Related Articles, Books, LinkOut

**Types of fat intake and body mass index in a Mediterranean country.**

Gonzalez CA, Pera G, Quiros JR, Lasheras C, Tormo MJ, Rodriguez M, Navarro C, Martinez C, Dorronsoro M, Chirlaque MD, Beguiristain JM, Barricarte A, Amiano P, Agudo A.

Institut Catalan d'Oncologia, Barcelona, Spain. cagonzalez@iso.scs.es

**BACKGROUND:** Although the fatty acid fractions provide similar metabolizable energy, the type of dietary fat consumed could be relevant to the development of obesity. **OBJECTIVE:** To investigate the relationship between body mass index (BMI), obesity and the consumption of different types of fat and olive oil in a Mediterranean country with high prevalence of obesity, and high intake of monounsaturated fatty acids (MUFA) and olive oil. **SUBJECTS:** The study was carried out in Spain among 23 289 women and 14 374 men, aged 29-69 years, who were participants of a large European prospective cohort. **METHODS:** Information on usual food intake was collected by interviewers by means of a dietary history questionnaire. The association between obesity (BMI  $\geq$  30 kg m<sup>2</sup>), dietary fat, other dietary patterns and other non-dietary factors were tested using multilinear regression analysis. The ratio of reported energy intake to energy requirement was used as an estimation of dietary underreporting. **RESULTS:** The association between fatty acid fractions intake (saturated fatty acids (SFA) in women, and MUFA and polyunsaturated fatty acids (PUFA) in both sexes) and BMI was very weak, accounting for less than 1% of variance. All dietary and non-dietary variables accounted for 21% of variance in the measurement of BMI in women and only 6.7% of variance in men. Estimated underreporting of energy intake was 17.5% in obese women and 5.5% in obese men. **CONCLUSIONS:** The association between consumption of specific types of dietary fat, olive oil and obesity in Spain is not very important. However, because of the cross-sectional design and some level of underreporting of energy intake observed in overweight subjects and overreporting in underweight subjects, systematic bias cannot be completely discarded.

PMID: 10979153 [PubMed - indexed for MEDLINE]

---

19: Am J Clin Nutr 1997 Aug;66(2):276-82 Related Articles, Books, LinkOut

Comment in:

Am J Clin Nutr. 2000 Nov;72(5):1239-41.

**Changes in fat oxidation in response to a high-fat diet.**

Schrauwen P, van Marken Lichtenbelt WD, Saris WH, Westerterp KR.

Department of Human Biology, Maastricht University, Netherlands. P.Schrauwen@HB.Unimaas.NL

Intervention studies have shown that the adaptation of fat oxidation to fat intake, when the dietary fat content is changed, is not abrupt. This study was conducted to measure the time course of adaptation of oxidation rates to increases in the fat content of the diet while subjects were fed at energy balance. Twelve healthy, nonobese males and females [age: 26 +/- 2 y, body mass index (in kg/m<sup>2</sup>): 21.4 +/- 0.5; and habitual fat intake: 29 +/- 1% of energy] consumed a low-fat diet for 6 d (days 1-6) followed by a high-fat diet for 7 d (days 7-13). Days 5-9 and 13 were spent in a respiration chamber. After adjustment for energy intake to 24-h energy expenditure on day 5, subjects were in energy balance (range: -0.15 to 0.23 kJ/d) on days 6-9 and 13. Fat balance was zero on day 6 but became positive after subjects changed to the high-fat diet (1.06 +/- 0.15, 0.75 +/- 0.15, and 0.55 +/- 0.14 MJ/d for days 7, 8, and 9, respectively,  $P < 0.05$ ), reaching a new balance on day 13, 7 d afterward. In conclusion, when in energy balance, lean subjects are capable of adjusting fat oxidation to fat intake within 7 d of when dietary fat content is increased.

PMID: 9250105 [PubMed - indexed for MEDLINE]

---

25: Diabetes Care 1996 Oct;19(10):1142-52 Related Articles, Books, LinkOut

### **High-fat and high-carbohydrate diets and energy balance.**

Shah M, Garg A.

Center for Human Nutrition, University of Texas Southwestern Medical Center at Dallas, USA.

The current American Diabetes Association guidelines for nutrition recommend a moderate increase in monounsaturated fats and a reduced intake of carbohydrate in patients with diabetes in whom high-carbohydrate diets deteriorate glycemic control and lipoprotein levels. High-fat diets, however, are believed to promote obesity, and some investigators may have reservations recommending such diets. This review thus investigates the role of diet composition in promoting obesity or achieving weight loss and its implications in patients with diabetes. Epidemiological studies show some evidence that fat intake is more importantly related to body weight than carbohydrate intake, but conclusions are weak because confounding variables, such as physical activity, smoking, and energy intake, were generally not controlled for. Metabolic studies under isoenergetic conditions report no change in energy balance when fat intake is increased, but report a negative fat balance with substantial increase carbohydrate intake. During overfeeding, excess fat intake is stored as fat, whereas excess carbohydrate is mostly oxidized in the short term but can lead to substantial gain in fat stores because of reduced fat oxidation and considerable de novo lipogenesis in the long term. Spontaneous energy intake, however, is higher on an unrestricted high-fat diet compared with a high-carbohydrate diet, but the long-term effects are not known. Weight-loss intervention studies show that a hypocaloric high-carbohydrate diet is not associated with more weight loss than a high-fat hypocaloric diet. In conclusion, a high-monounsaturated fat diet to control glycemic control and lipoprotein levels in patients with diabetes should not affect weight loss or maintenance, provided that energy intake is carefully controlled.

Publication Types:

Review

Review, Academic

PMID: 8886565 [PubMed - indexed for MEDLINE]

---

6: Int J Obes Relat Metab Disord 1998 Jan;22(1):39-47 Related Articles, Books, LinkOut

**Overweight and obesity in the United States: prevalence and trends, 1960-1994.**

Flegal KM, Carroll MD, Kuczmarski RJ, Johnson CL.

National Center for Health Statistics, Centers for Disease Control and Prevention, Hyattsville MD 20782, USA.

**OBJECTIVE:** To describe the prevalence of, and trends in, overweight and obesity in the US population using standardized international definitions. **DESIGN:** Successive cross-sectional nationally representative surveys, including the National Health Examination Survey (NHES I; 1960-62) and the National Health and Nutrition Examination Surveys (NHANES I: 1971-1974; NHANES II: 1976-1980; NHANES III: 1988-94). Body mass index (BMI:kg/m<sup>2</sup>) was calculated from measured weight and height. Overweight and obesity were defined as follows: Overweight (BMI > or = 25.0); pre-obese (BMI 25.0-29.9), class I obesity (BMI 30.0-34.9), class II obesity (BMI 35.0-39.9), and class III obesity (BMI > or = 40.0). **RESULTS:** For men and women aged 20-74 y, the age-adjusted prevalence of BMI 25.0-29.9 showed little or no increase over time (NHES I: 30.5%, NHANES I: 32.0%, NHANES II: 31.5% and NHANES III: 32.0%) but the prevalence of obesity (BMI > or = 30.0) showed a large increase between NHANES II and NHANES III (NHES I: 12.8%; NHANES I, 14.1%; NHANES II, 14.5% and NHANES III, 22.5%). Trends were generally similar for all age, gender and race-ethnic groups. The crude prevalence of overweight and obesity (BMI >> 25.0) for age > or = 20 y was 59.4% for men, 50.7% for women and 54.9% overall. The prevalence of class III obesity (BMI > or = 40.0) exceeded 10% for non-Hispanic black women aged 40-59 y. **CONCLUSIONS:** Between 1976-80 and 1988-94, the prevalence of obesity (BMI > or = 30.0) increased markedly in the US. These findings are in agreement with trends seen elsewhere in the world. Use of standardized definitions facilitates international comparisons.

PMID: 9481598 [PubMed - indexed for MEDLINE]

---

8: Int J Obes Relat Metab Disord 2000 Apr;24(4):435-42 Related Articles, Books, LinkOut

**Do we eat less fat, or just report so?**

Heitmann BL, Lissner L, Osler M.

Department of Medicine CF, Glostrup University Hospital, Denmark. BeHe@Glostruphosp.KbhAmt.dk

**OBJECTIVE:** To examine secular trends in diet reporting error. **METHODS:** Dietary information was obtained from 228 Danish men and women in 1987-88, and from 122 men and women in 1993-94. **RESULTS:** Bias in dietary reporting of energy and protein intake was assessed by comparing reported intake with intake data, estimated from 24 h nitrogen output, validated by administering P-aminobenzoic acid, and estimated 24 h energy expenditure. Total energy was under-reported more than energy from protein at both surveys, suggesting that energy from other nutrients, like fat and/or carbohydrate, must have been under-reported too. There was a greater under-reporting for energy than for protein in 1993-94 (29%) than in 1987-88 (15%). Obesity was positively associated with under-reporting, both in 1987-88 and in 1993-94. **CONCLUSION:** The higher macro-nutrient specific error in 1993-94 compared to 1987-88 may reflect a trend to increasingly omitting fat and/or carbohydrate-rich foods in dietary reporting. This may be a consequence of increased awareness of diet intake, which, in turn, may be related to intensified public health campaigns to reduce intake of fat and/or simple carbohydrate. These results may have consequences for our understanding of the apparent decline in dietary fat and associated health benefits.

PMID: 10805500 [PubMed - indexed for MEDLINE]

---

11: Eur J Clin Nutr 1995 Dec;49(12):915-20 Related Articles, Books, LinkOut

### **Fat, cholesterol, fiber and sodium intakes of US population: evaluation of diets reported in 1987-88 Nationwide Food Consumption Survey.**

Ganji V, Betts N.

Department of Health Science and Human Ecology, California State University, San Bernardino 92407, USA.

**OBJECTIVE:** Food intake data from Nationwide Food Consumption Survey (NFCS) was used to evaluate intakes of fat, type of fat, cholesterol, dietary fiber and sodium of Americans classified by age. **SURVEY DESIGN & SETTING:** Data from the recent USDA's 1987-88 NFCS were used. NFCS was designed to be a self-weighting, multistage, stratified, area probability sample representative of individuals in the 48 conterminous states. 1987-88 NFCS response rate was 35%. Three-day food intake data were used to assess the nutrient intakes. **SUBJECTS:** Dietary intakes of 9027 individuals (4180 men and 4847 women) were evaluated. Survey sample was divided into 11-14, 15-18, 19-24, 25-50 and > 51 years age groups. **RESULTS:** On average, Americans consumed more calories from total fat (36.5-38.1% of energy) and saturated fat (13.0-14.1% of energy) than recommended. Mean intakes for polyunsaturated fat (6.1-7.6% of energy) and monounsaturated fat met the recommendations (13.6-14.3% of energy). Total, saturated and monounsaturated fat intakes were significantly lower in the > 51 years age group compared to younger age groups. Mean cholesterol intakes were higher in the 19-24 and 25-50 year age groups than recommended. Fiber intakes were similar across the age groups (12.3-13.4 mg/d). Sodium intakes were higher in the younger population compared to the older population. **CONCLUSIONS:** Although dietary patterns of Americans in relation to total fat and saturated fat intakes have changed toward a healthier diet, these changes did not meet recommendations. The US population continues to consume lower intakes of fiber and higher intakes of sodium.

PMID: 8925793 [PubMed - indexed for MEDLINE]

---

12: Am J Public Health 1996 Dec;86(12):1729-35 Related Articles, Books, LinkOut

**Trends in overweight among US adults from 1987 to 1993: a multistate telephone survey.**

Galuska DA, Serdula M, Pamuk E, Siegel PZ, Byers T.

Division of Nutrition and Physical Activity, Centers for Disease Control and Prevention, Atlanta, GA 30341-3724, USA.

**OBJECTIVES:** Using data from the Behavioral Risk Factor Surveillance System, this study describes trends in the prevalence of overweight between 1987 and 1993. **METHODS:** Data were examined from 33 states participating in an ongoing telephone survey of health behaviors of adults (n = 387,704). Self-reported weights and heights were used to calculate sex-specific prevalence estimates of overweight for each year from 1987 to 1993. Time trends were evaluated with the use of linear regression. **RESULTS:** Between 1987 and 1993, the age-adjusted prevalence of overweight increased by 0.9% per year for both sexes (from 21.9% to 26.7% among men and from 20.6% to 25.4% among women). The increasing linear trend was observed in all subgroups of the population but was most notable for Black men (1.5% per year) and men living in the Northeast (1.4% per year). Secular changes in smoking and leisure-time physical activity did not entirely account for the increase in overweight. **CONCLUSIONS:** The prevalence of overweight among American adults increased by 5% between 1987 and 1993. Efforts are needed to explore the causes of this adverse trend and to find effective strategies to prevent obesity.

PMID: 9003129 [PubMed - indexed for MEDLINE]

---

PMID: 10837288 [PubMed - indexed for MEDLINE]

13: Am J Clin Nutr 2000 Jun;71(6):1478-84

**Temporal trends in energy intake in the United States: an ecologic perspective.**

Harnack LJ, Jeffery RW, Boutelle KN.

Division of Epidemiology School of Public Health, University of Minnesota, Minneapolis, MN 55454-1015, USA.

**ESSENCE OF ARTICLE**

“Americans appear, in some cases, to be selecting lower-fat foods over higher-fat alternatives. In addition, availability and sales of reduced-energy and reduced-fat products have increased. **CONCLUSION:** Consistent with trends in overweight, most of the ecologic data reviewed suggest that energy intake has increased over the past several decades and is likely a major contributor to increases in average body weight. “

PMID: 10837288 [PubMed - indexed for MEDLINE]

## ARTICLE

**BACKGROUND:** The causes of recent increases in the prevalence of overweight in the United States are perplexing because national survey data do not show clear patterns of change in energy intake or expenditure. **OBJECTIVE:** Ecologic data regarding the quantities and types of foods and nutrients available in the United States between 1970 and 1998 were reviewed to provide an alternative perspective on trends in energy intake. **DESIGN:** Literature searches in agriculture, business, and medical library databases were conducted to identify data regarding the quantities and types of foods and nutrients available in the United States between 1970 and 1998. **RESULTS:** Per capita energy availability estimates from the US Department of Agriculture, US Food Supply Series, indicate that energy availability increased by 15% between 1970 and 1994. Data regarding trends in food purchasing and preparation suggest that Americans are eating more meals outside the home, relying more heavily on convenience foods, and consuming larger food portions. Americans appear, in some cases, to be selecting lower-fat foods over higher-fat alternatives. In addition, availability and sales of reduced-energy and reduced-fat products have increased. **CONCLUSION:** Consistent with trends in overweight, most of the ecologic data reviewed suggest that energy intake has increased over the past several decades and is likely a major contributor to increases in average body weight.

PMID: 10837288 [PubMed - indexed for MEDLINE]

---

14: Obes Res 1999 Nov;7(6):564-71 Related Articles, Books, LinkOut

### **Overeating in America: association between restaurant food consumption and body fatness in healthy adult men and women ages 19 to 80.**

McCrary MA, Fuss PJ, Hays NP, Vinken AG, Greenberg AS, Roberts SB.

Energy Metabolism Laboratory, Jean Mayer USDA Human Nutrition Research Center on Aging at Tufts University, Boston, MA 02111-1524, USA.

**PURPOSE:** To examine the association between the frequency of consuming restaurant food and body fatness in adults. **RESEARCH METHODS AND PROCEDURES:** Usual free-living dietary intake and the frequency of consuming food from seven different restaurant types (fried chicken, burger, pizza, Chinese, Mexican, fried fish, and "other") were assessed by food frequency questionnaire in 73 healthy men and women [ages 19 to 80, body mass index (BMI) 18 to 33]. In addition, body fatness (percent weight) was determined by hydrostatic weighing, and physical activity and other lifestyle parameters were assessed by questionnaire. The relationship between the frequency of consuming restaurant food and body fatness was determined after controlling for age, sex, and other confounders by using multiple regression techniques. **RESULTS:** Restaurant food consumption averaged 7.5+/-8.5 (Standard Deviation) times/month. After controlling for age and sex, the frequency of consuming restaurant food was positively associated with body fatness (partial  $r = 0.36$ ,  $p = 0.003$ ). The strength of this association did not change after controlling for education level, smoking status, and alcohol intake, but after additionally controlling for physical activity, the partial  $r$  increased to 0.42 ( $p = 0.004$ ). Total daily intakes of energy, fat, and fiber were significantly associated with restaurant food consumption frequency ( $r = 0.59$ , 0.28, and -0.45,

respectively,  $p = 0.02$  to  $0.0001$ ). **DISCUSSION:** The frequency of consuming restaurant food was positively associated with increased body fatness in adults. The increasing proportion of household food income spent on food prepared away from home in the United States may therefore help explain the rising national prevalence of obesity.

PMID: 10574515 [PubMed - indexed for MEDLINE]

---

15: Am J Clin Nutr 1998 Mar;67(3 Suppl):556S-562S Related Articles, Books, LinkOut

Erratum in:

Am J Clin Nutr 1999 Aug;70(2):304

Comment in:

Am J Clin Nutr. 1998 Nov;68(5):1144-7.

### **Is dietary fat a major determinant of body fat?**

Willett WC.

Department of Epidemiology, Harvard School of Public Health, Boston, MA 02115, USA.

#### ESSENCE OF ARTICLE

” Moreover, within the United States, a substantial decline in the percentage of energy from fat consumed during the past two decades has corresponded with a massive increase in obesity. Diets high in fat do not appear to be the primary cause of the high prevalence of excess body fat in our society, and reductions in fat will not be a solution.”

#### ARTICLE

The percentage of energy from dietary fat is widely believed to be an important determinant of body fat, and several mechanisms have been proposed to account for such a relation. Comparisons of both diets and the prevalence of obesity between affluent and poor countries have been used to support a causal association, but these contrasts are seriously confounded by differences in physical activity and food availability. Within areas of similar economic development, regional intake of fat and prevalence of obesity have not been positively correlated. Randomized trials are the preferable method to evaluate the effect of dietary fat on adiposity, and are feasible because the number of subjects needed is not large. In short-term trials, a modest reduction in body weight is typically seen in individuals randomly assigned to diets with a lower percentage of energy from fat. However, compensatory mechanisms appear to operate because in trials lasting  $> \text{or} = 1$  y, fat consumption within the range of 18-40% of energy appears to have little if any effect on body fatness. Moreover, within the United States, a substantial decline in the percentage of energy from fat consumed during the past two decades has corresponded with a massive increase in obesity. Diets high in fat do not appear to be the primary cause of the high prevalence of excess body fat in our society, and reductions in fat will not be a solution.

Publication Types:

Review

Review, Tutorial

PMID: 9497170 [PubMed - indexed for MEDLINE]

---

16: JAMA 2001 Sep 12;286(10):1195-200 Related Articles, Books, LinkOut

**The continuing epidemics of obesity and diabetes in the United States.**

Mokdad AH, Bowman BA, Ford ES, Vinicor F, Marks JS, Koplan JP.

Data Management Division, National Immunization Program, Centers for Disease Control and Prevention, MS E62, 1600 Clifton Rd, NE, Atlanta, GA 30333, USA. ahm1@cdc.gov

CONTEXT: Recent reports show that obesity and diabetes have increased in the United States in the past decade. OBJECTIVE: To estimate the prevalence of obesity, diabetes, and use of weight control strategies among US adults in 2000. DESIGN, SETTING, AND PARTICIPANTS: The Behavioral Risk Factor Surveillance System, a random-digit telephone survey conducted in all states in 2000, with 184 450 adults aged 18 years or older. MAIN OUTCOME MEASURES: Body mass index (BMI), calculated from self-reported weight and height; self-reported diabetes; prevalence of weight loss or maintenance attempts; and weight control strategies used. RESULTS: In 2000, the prevalence of obesity (BMI  $\geq 30$  kg/m<sup>2</sup>) was 19.8%, the prevalence of diabetes was 7.3%, and the prevalence of both combined was 2.9%. Mississippi had the highest rates of obesity (24.3%) and of diabetes (8.8%); Colorado had the lowest rate of obesity (13.8%); and Alaska had the lowest rate of diabetes (4.4%). Twenty-seven percent of US adults did not engage in any physical activity, and another 28.2% were not regularly active. Only 24.4% of US adults consumed fruits and vegetables 5 or more times daily. Among obese participants who had had a routine checkup during the past year, 42.8% had been advised by a health care professional to lose weight. Among participants trying to lose or maintain weight, 17.5% were following recommendations to eat fewer calories and increase physical activity to more than 150 min/wk. CONCLUSIONS: The prevalence of obesity and diabetes continues to increase among US adults. Interventions are needed to improve physical activity and diet in communities nationwide.

PMID: 11559264 [PubMed - indexed for MEDLINE]

---

PMID: 9497168 [PubMed - indexed for MEDLINE]

20: Am J Clin Nutr 1998 Mar;67(3 Suppl):546S-550S Related Articles, Books, LinkOut

**Dietary fat and obesity: an epidemiologic perspective.**

Seidell JC.

Department of Chronic Diseases and Environmental Epidemiology, National Institute of Public Health and the Environment, Bilthoven, The Netherlands. j.seidell@rivm.nl

## ESSENCE OF ARTICLE

“At this stage there is no conclusive evidence from epidemiologic studies that under isoenergetic conditions dietary fat intake promotes the development of obesity more so than other macronutrients. “

## ARTICLE

The observation that dietary fat has an effect on weight gain and the development of obesity that is larger than would be expected on the basis of fat's energy value is mainly experimental. Several methodologic problems limit the interpretation of epidemiologic studies of the association between dietary fat intake and obesity. Among the issues relevant in this context are underreporting of energy and fat intakes, dieting behavior, inadequate control for variables such as energy expenditure, and limited between-subject variation in fat intake in developed countries. Different types of epidemiologic studies suffer from different types and magnitudes of bias and many conflicting results can be obtained. Ecologic and cross-sectional studies especially suffer from these biases. The more appropriate type of study (ie, prospective studies of fat intake and subsequent weight gain) was carried out in several countries but conflicting results were obtained. Overall, the observed associations seem to depend on the stage of cultural transition of the population studied (eg, modernization compared with postmodernization). Current epidemiologic methods are inadequate for performing valid studies of the relation between percentage of energy from dietary fat and obesity. Specifically designed prospective studies of unbiased estimates of energy balance are necessary. Appropriate control for confounders and emphasis on the possibility that genetic predisposition plays a role will also be necessary. At this stage there is no conclusive evidence from epidemiologic studies that under isoenergetic conditions dietary fat intake promotes the development of obesity more so than other macronutrients.

Publication Types:

Review

Review, Tutorial

PMID: 9497168 [PubMed - indexed for MEDLINE]

---

21: Int J Obes Relat Metab Disord 1998 Nov;22(11):1053-61 Related Articles, Books, LinkOut

### **The sugar-fat relationship revisited: differences in consumption between men and women of varying BMI.**

Macdiarmid JJ, Vail A, Cade JE, Blundell JE.

School of Psychology, University of Leeds, UK.

**OBJECTIVE:** To assess the relationship of dietary fat and sugar consumption in men and women with different body mass indices (BMI). To determine the actual food sources for sugar intake, comparing differences between men and women across BMI groups. The effect of excluding individuals with low

energy intakes (that is, invalid data) on these relationships was also incorporated in the analysis.

**SUBJECTS:** Subjects for this analysis were those individuals who participated in the 1986-1987 Dietary and Nutrition Survey of British Adults (DNSBA). **METHOD:** In the DNSBA, dietary intake was assessed using seven-day weighed food records, providing estimates of dietary fat and sugar intake. From the DNSBA database food records, sources of sugar intake were classified into five sugar containing food groups (high fat sweet products, fruits, dairy products, sugar products (excluding soft drinks) and sugar products (including soft drinks)). BMI was calculated from the measurement of height and body weight. **RESULT:** A positive relationship between BMI and dietary fat intake was found for men, both when fat was expressed as a percentage of energy and in absolute terms (g/d). This relationship was only replicated for women when intake was expressed in absolute terms. A negative relationship was found between sugar intake (as a percentage of energy) and BMI in men, but not women. Expressing sugar consumption in absolute terms did not produce a statistically significant relationship with BMI for either men or women. In women the only sugar source associated with BMI was high fat sweet products (for example, cakes, biscuits, chocolate), where higher intakes were related to higher BMIs. The reverse relationship was found for men. In men, BMI was also negatively related to the intake of sugar products (for example, table sugar, preserves, sugar confectionery), both when soft drinks were included and excluded. The inclusion of low energy reporters (LER) in the analysis altered the relationships between nutrients and BMI, particularly among women. The association between overall fat intake (g/d) and BMI was weakened, while the negative relationship with sugar intake was strengthened. In the case of women, the inclusion of LER completely reversed the relationship between consumption of high fat sweet foods (cakes, biscuits, chocolate) and BMI (due to the reduced reporting of these products by obese women). Fewer alterations in the relationships between BMI and the sources of sugar consumed were observed in men than in women when LER were included in the analysis. **CONCLUSION:** The relationships between dietary fat, sugar and BMI are different in men and women, and are dependent on the inclusion of LER, particularly in women. The results suggest that among women the consumption of high fat sweet products may be a factor in understanding obesity. Furthermore, the observation of high consumption of these foods among obese women is consistent with measured preferences for these high fat sweet foods. The altered representation of the data created by LER appears to distort the relationship between sugar, fat and the degree of obesity in men and women.

PMID: 9822942 [PubMed - indexed for MEDLINE]

---

25: Prev Med 2001 Apr;32(4):303-10 Related Articles, Books, LinkOut

**Significant increase in young adults' snacking between 1977-1978 and 1994-1996 represents a cause for concern!**

Zizza C, Siega-Riz AM, Popkin BM.

Department of Nutrition, University of North Carolina at Chapel Hill, Chapel Hill, North Carolina 27516-3997, USA.

**BACKGROUND:** Studies on children and adolescents suggest a large increase in the role of snacking; however, little is know about changes in the snacking behavior of young adults. **METHODS:** USDA's nationally representative surveys from 1977-1978 to 1994-1996 are used to study snacking trends among

8,493 persons 19-29 years old. RESULTS: Snacking prevalence increased from 77 to 84% between 1977-1978 and 1994-1996. The nutritional contribution of snacks to total daily energy intake went from 20 to 23%, primarily because energy consumed per snacking occasion increased by 26% and the number of snacks per day increased 14%. The mean daily caloric density (calorie per gram of food) of snacks increased from 1.05 to 1.32 calories. The energy contribution of high-fat desserts to the total calories from snacking decreased (22 to 14%), however, this food group remained the most important source of energy. The energy contribution of high-fat salty snacks doubled. Sweetened and alcoholic beverages remained important energy contributors. CONCLUSION: This large increase in total energy and energy density of snacks among young adults in the United States may be contributing to our obesity epidemic. Copyright 2001 American Health Foundation and Academic Press.

PMID: 11304090 [PubMed - indexed for MEDLINE]

---

31: Rev Clin Esp 2000 Aug;200(8):420-3 Related Articles, Books, LinkOut

**Relationship between breakfast and obesity among school-aged children.**

[Article in Spanish]

Rocandio AM, Ansotegui L, Arroyo M.

Facultad de Farmacia, Universidad del Pais Vasco, Vitoria-Gasteiz.

Breakfast models among children are an issue of public health concern given the association between breakfast and school performance and its potential relationship with obesity. Food intake, energy, and nutrients in the breakfast of 32 school aged children (11-years olds) and its relationship with body mass index (BMI, kg/m<sup>2</sup>) were examined. The analysis was made by means of anthropometric measurements and a record of weekly food intake using the accurate weighed amount method. The percentage of studied children with overweight/obesity reached 46.9 (weight for height > 90 percentile). The proportional calorie intake in breakfast was lower than that recommended (16.6%). The association observed between caloric percentage of breakfast regarding daily energy and BMI was not significant. Nevertheless, significant correlations were found between fruit group (Pearson  $r = 0.6286$ ) and protein foods (Pearson  $r = -0.7653$ ) with BMI. The amount of total lipids (34.4%) and saturated lipids (19.4% in breakfast exceed the recommendations. Further studies are necessary to confirm these data and serve as basis for the design of nutritional education programs.

PMID: 11076178 [PubMed - indexed for MEDLINE]

---

33: Hum Biol 1996 Apr;68(2):245-63 Related Articles, Books, LinkOut

**Obesity, central fat patterning, and their metabolic correlates among the inuit of the central Canadian Arctic.**

Young TK.

Department of Community Health Sciences, University of Manitoba, Canada.

I report on the occurrence and metabolic correlates of obesity among the Inuit (Eskimos) of the central Canadian Arctic using data from the Keewatin Health Assessment Study conducted during 1990 and 1991 in eight Inuit communities in the Northwest Territories (n = 434, adults aged 18 years and older). Data from the 1990 Manitoba Heart Health Survey among 2200 predominantly white residents of the province of Manitoba were used for comparison. Judging by body mass index and two skinfold thicknesses, obesity among the Inuit is as prevalent as it is in the general North American population. This is a new development over the past two or three decades, the result of rapidly changing physical activity, diet, and lifestyle. Obesity is more prevalent among women, among whom there is also a higher degree of central fat patterning based on the waist-to-hip ratio. When different categories of obesity are compared, blood pressure and one or more of the lipids show an increasing trend but glucose or insulin level shows no significant change. This observation distinguishes the Inuit from other populations. Even where a relationship exists, as with triglyceride and HDL cholesterol levels, the magnitude of the response is lower among the Inuit. The differential effect of obesity on glucose, blood pressure, and lipid levels in the Inuit compared with non-Inuit suggests a type of selective insulin resistance, the underlying mechanism of obesity and several chronic diseases. Inuit metabolism reflects their almost exclusive diet of fat and proteins traditionally. From the public health perspective it is important to monitor and ameliorate the impact of changing diet and physical activity on the prevalence of obesity and associated health effects.

Publication Types:

Multicenter Study

PMID: 8838915 [PubMed - indexed for MEDLINE]

---

35: Public Health Nutr 2002 Feb;5(1A):113-22 Related Articles, Books, LinkOut

### **Epidemiological and nutritional transition in Mexico: rapid increase of non-communicable chronic diseases and obesity.**

Rivera JA, Barquera S, Campirano F, Campos I, Safdie M, Tovar V.

Centro de Investigacion en Nutricion y Salud, Instituto Nacional de Salud Publica, Cuernavaca, Morelos, Mexico.

**OBJECTIVE:** The objective of this paper is to characterise the epidemiological and nutritional transition and their determinants in Mexico. **DESIGN:** Age-adjusted standardised mortality rates (SMRs) due to acute myocardial infarction (AMI), diabetes mellitus and hypertension were calculated for 1980-1998. Changes in the prevalences of overweight and obesity in women and children and of dietary intake from 1988 to 1999 were also used in the analysis. Quantities of food groups purchased by adult equivalent (AE) and food expenditures away from home between 1984 and 1989 were used to assess trends. All information was analysed at the national and regional levels, and by urban and rural areas. **RESULTS:** SMR for diabetes, AMI and hypertension increased dramatically parallel to obesity at the national and regional levels. Fat intake in women and the purchase of refined carbohydrates, including soda, also increased. **DISCUSSION:** The results suggest that obesity is playing a role in the increased SMRs of diabetes, AMI and hypertension in Mexico. Total energy dietary intake and food purchase data could not explain the rise in the prevalence of obesity. The increases in fat intake and the purchase of refined

carbohydrates may be risk factors for increased mortality. Information on physical activity was not available. CONCLUSION: SMRs due to diabetes, hypertension and AMI have increased dramatically in parallel with the prevalence of obesity; therefore actions should be taken for the prevention of obesity. Reliable information about food consumption and physical activity is required to assess their specific roles in the aetiology of obesity.

PMID: 12027273 [PubMed - in process]

---

37: Am J Clin Nutr 1992 Feb;55(2 Suppl):495S-502S Related Articles, Books, LinkOut

### **Prevalence of overweight and weight gain in the United States.**

Kuczmarski RJ.

Division of Health Examination Statistics, National Center for Health Statistics, Centers for Disease Control, Hyattsville, MD 20782.

Data from the Second National Health and Nutrition Examination Survey (NHANES II) indicated that in the period 1976-1980 approximately 34 million US adults (25.7%) were overweight, with more women (19 million) than men (15 million) affected. Selected demographic factors, eg, low educational attainment and low family income were associated with the prevalence of overweight and with the incidence of weight gain. Analyses of the NHANES I Epidemiologic Follow-up Survey indicated that in a 10-y period, women had a greater mean weight gain. The overall incidence of a major weight gain (ie, an increase of five or more body mass index units) was twice as great among females (5.3%) than males (2.3%). Data on overweight and weight gain in the United States by selected demographic characteristics are summarized.

Publication Types:

Review

Review, Tutorial

PMID: 1733118 [PubMed - indexed for MEDLINE]

---

42: J Am Diet Assoc 1996 May;96(5):464-70 Related Articles, Books, LinkOut

### **Trends in breakfast consumption of US adults between 1965 and 1991.**

Haines PS, Guilkey DK, Popkin BM.

Department of Nutrition, School of Public Health, University of North Carolina at Chapel Hill 27599, USA.

OBJECTIVE: To examine breakfast consumption patterns and trends between 1965 and 1991 for adults in the United States. DESIGN: Trends analysis pooling three cross-sectional surveys. SETTING: Nationally representative samples obtained from the Nationwide Food Consumption Survey (NFCS) of 1965, the NFCS of 1977-1978, and the 1989-1991 Continuing Survey of Food Intakes by Individuals.

SUBJECTS: Adults aged 18 years and older: 6,274 in 1965, 18,033 in 1977-1978, and 10,812 in 1989-1991. All results reflect use of sampling weights, so results reflect nationally representative samples in each time period. MAIN OUTCOME MEASURES: Breakfast consumption, defined as the consumption of food and/or beverage between the hours of 5 AM and 9 AM, was the focus of the trends analysis.

Population prevalence rates are reported for the entire population and population subgroups.

STATISTICAL ANALYSIS PERFORMED: Probit analysis was used to identify factors associated with changes in breakfast consumption over time. RESULTS: Breakfast consumption declined in the 26-year period between 1965 and 1991 from 86% to 75% for US adults. Breakfast consumption increased with age, and the age differential increased over time. Urban-rural and South-non-South differences in breakfast consumption narrowed over time, whereas black-nonblack and college-noncollege differences increased slightly or remained constant. The nutritional quality of food consumed at breakfast has improved since 1965. CONCLUSIONS: Although part of the decline in breakfast consumption can be explained by personal and demographic determinants, other unknown factors contributed to the trends. Elucidation of such factors is necessary to predict differences in breakfast as a health-related behavior.

PMID: 8621871 [PubMed - indexed for MEDLINE]

---

43: *Physiol Behav* 1986 Jan;36(1):41-5 Related Articles, Books, LinkOut

### **Voluntary ethanol consumption and obesity in golden hamsters.**

DiBattista D.

Adult male golden hamsters with continuous access to Purina chow, water and either 15, 30 or 45% ethanol (v/v) for 14 weeks derived an average of 34, 37 and 22%, respectively, of their total calories from ethanol. Animals in the 15 and 45% ethanol groups derived up to 12.0 and 9.9 kcal/day, respectively, from ethanol, but the Purina chow intakes of these animals were such that their total caloric consumption and their body weights did not significantly exceed those of a control group having access only to Purina chow and water. In contrast, the 30% ethanol group derived up to 16.4 kcal/day from ethanol, and consistently consumed 25% more total calories than the control group, despite eating significantly less Purina chow. Furthermore, hamsters in the 30% ethanol group were 27% heavier and had significantly larger epididymal and retroperitoneal fat pads than controls. Similarities are noted between ethanol-induced obesity in hamsters and the dietary obesity which has been observed in rats having continuous access to Purina chow and a 32% sucrose solution.

PMID: 3513215 [PubMed - indexed for MEDLINE]

---

44: *Public Health Nutr* 2002 Feb;5(1A):129-33 Related Articles, Books, LinkOut

### **The nutrition transition in Cuba in the nineties: an overview.**

Rodriguez-Ojea A, Jimenez S, Berdasco A, Esquivel M.

Department of Nutrition, Faculty of Medical Science Calixto Garcia, Institute of Nutrition and Food Hygiene, Havana, Cuba. arojea@infomed.sld.cu

**OBJECTIVE:** To describe and analyse the changes in diet, physical activity and body composition of the Cuban population during the 1990s and the health implications of these changes. **DESIGN AND SETTING:** Data on national food balance and physical activity are from government agencies and the Ministry of Public Health; nation-wide and local representative surveys were used to analyse body composition and leisure activities. Data on morbidity and mortality are from the Ministry of Public Health. **RESULTS:** The collapse of the European socialist countries and the Soviet Union, as well as the reinforced United States' blockade, provoked a sudden shortage of fuel, raw materials, imported foods and essential supplies. Per capita energy availability decreased, physical activity increased, and the prevalence of obesity decreased. Nutrition deficiencies were observed in the early 1990s, while the trend of morbidity from non-communicable disease continued to increase. The nutrition transition characteristics following the economic recovery in 1995-1996 resembled those of the 1980s because of the increased food availability, decreased physical activity and increased obesity prevalence. **CONCLUSIONS:** Programmes to deal with the complex situation generated a response in a remarkably short time. Undesirable changes in diet composition and the reduction of physical activity constitute a challenge in the current post-critical stage that must be prevented.

PMID: 12027275 [PubMed - in process]

---

45: Am J Clin Nutr 1993 Nov;58(5 Suppl):737S-747S Related Articles, Books, LinkOut

### **Intakes and food sources of fructose in the United States.**

Park YK, Yetley EA.

Office of Special Nutritionals, Food and Drug Administration, Washington, DC 20204.

Examination of the per capita disappearance data for sweeteners and other sources of fructose showed that during the past two decades there was a considerable increase in the availability of free fructose in the food supply. However, the availability of the total amount of fructose, which includes both free and bound fructose, has remained relatively constant. Estimates of the average daily intake of fructose, based on the 1977-78 USDA Nationwide Food Consumption Survey, ranged from 15 g for infants to 54 g for males aged 15-18 y with a mean of 37 g for the total population. These values represent 7-9% of the energy intake (8% for the total population). For most sex/age groups nonalcoholic beverages (eg, soft drinks and fruit-flavored drinks) and grain products (eg, sweet bakery products) were the major sources of fructose; fruits and fruit products were the major sources of naturally occurring fructose; nonalcoholic beverages were the major sources of added fructose.

Publication Types:

Review

Review, Tutorial

PMID: 8213605 [PubMed - indexed for MEDLINE]