FOOD Insight™
Current Topics in Food Safety & Nutrition
IFIC Foundation
http://ific.org
July / August 2004

What Do We Know About Fructose And Obesity?

Scientists, public health professionals, and policy makers have been looking for the causes of the increased weight gain observed over the past two decades in the American population. Considerable attention has focused on the possible role of foods and beverages containing added sugars. (See the side bar for the meaning of the terms used to describe sugars.) Scientific studies, however, have failed to demonstrate a direct link between body weight and total or added sugars intake, and in many cases studies have actually shown an inverse relationship. Some scientists have recently speculated that increased intake of fructose — particularly as high fructose corn syrup (HFCS) in beverages — is a major factor leading to the rise in obesity. They have based these speculations on simple correlation analyses. (Correlation studies examine the relationship between two simultaneously occurring events, i.e., rise in rates of obesity and introduction of a new food. Such observations provide initial evidence of a possible connection but are useful only for hypothesis formation.) This article provides the basis to help put what we know about fructose, HFCS, and obesity into perspective. It also discusses the issue of the availability of fructose in the food supply, whether from HFCS or other sources, and what is known about how it is metabolized.

Fructose — What is It?

Fructose, as noted in the sidebar, is a single sugar unit, like glucose, and is sometimes referred to as "fruit sugar" since it is the sugar that occurs naturally in fruits, vegetables, and honey. Fructose and glucose are combined in equal amounts (50/50) in table sugar (sucrose). Similarly, fructose and glucose occur in almost equal amounts in HFCS. HFCS is primarily found in two formulations in the United States; "HFCS 55," which is 55 percent fructose and is used to sweeten beverages, and "HFCS 42," which is 42 percent fructose and used mostly in baked goods.

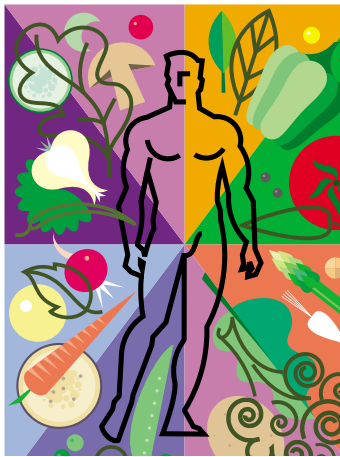
The interchangeable use of the words "fructose" and "HFCS" in some media and even scientific documents is potentially misleading to consumers, who may assume that the two are identical. They are, however, quite different in both their structure and uses in the food supply. Although research using fructose alone has led to assumptions about HFCS, as a sweetener, pure fructose is rarely consumed alone. It is generally consumed as a component of table sugar or of HFCS.

Fructose in the Food Supply

The primary factor driving the alleged connection between fructose and obesity is the increased availability of HFCS since its introduction in the 1970s. "Availability" refers to the total amount delivered into the food supply. This amount is greater than actual consumption, since waste and other losses are not accounted for. The proportion of HFCS as a percentage of all caloric sweeteners (added sugars and sweeteners) available in the U.S. food supply has increased from less than 0.5 percent in 1970 to 42 percent in 2001. Although the increased availability of HFCS appears dramatic it must be noted that as the availability of HFCS has increased, the availability of table sugar has decreased at nearly the same rate. Although the increased availability of HFCS parallels the increasing prevalence of obesity, that correlation alone does not prove causality. Further research in this area is warranted.

The combined amount of table sugar and HFCS available in the food supply remained essentially constant from

(continued on page 4)



INSIDE

Focus on Fiber: Why Roughage Still Warrants Our Attention

Past and present popular weight loss strategies tend to overemphasize single nutrients, such as fats and carbohydrates. Despite their attractiveness, these trendy "low-fat" and "low-carb" diets can be difficult to adhere to in the long term because some are quite restrictive. Furthermore, other important food components are overlooked.

One such component that merits greater attention is fiber. Because it contributes bulk to the diet, it promotes satiety and maintains it for a longer period of time than other nutrients — thereby potentially reducing the numbers of extra calories consumed. In addition, most Americans consume about 15 grams of fiber per day, which is about half the amount experts recommend. Hence, people could likely benefit from increased fiber intake. As a less-restrictive and sensible approach to weight management, diets rich in fiber may also have other health benefits, such as a reduced risk of colon cancer, diabetes, and heart disease.

Fiber and Colon Cancer

Fiber has long been thought to be protective against colon cancer because it helps "sweep" cancer-causing substances out of the intestines. Studies have demonstrated mixed results; however, data from the Nurse's Health Study in 1999 indicated that women who consumed increased fiber daily were no less likely to get colon cancer than those who ate little fiber. Another study, the Health Professionals Follow-up Study, showed similar results. In 2003, however, two studies suggested that diets rich in fiber were indeed protective, and that people who consumed them were 25 percent less likely to develop colon cancer. Furthermore, a 10-country European study involving more than half a million people has shown a significant protective effect of fiber intake. "Most between-country studies show a protective effect in the population consuming the highest amount of fiber, yet within the United States, no benefit for fiber consumption has been shown with regard to colon cancer incidence. There is no consensus as to whether or not dietary fiber protects against colon cancer," explains Joanne Lupton, Ph.D., Regents Professor of Nutrition at Texas A&M University. "Does this mean one should not make an effort to eat fiber? The answer to that is a decided 'no.' Scientific discovery is a meandering process; it will take time to find out the real story here."

Reducing the Risk of Diabetes and Heart Disease with Fiber

Research indicates that fiber may improve blood sugar (glucose) control, which is important in diabetes management. Normally, blood sugar levels rise rapidly after eating a meal. But this process slows down when meals include fiber-rich foods such as oats, barley, fruits, and vegetables. Hence, lesser dosages of insulin or blood sugar medications — as specified by a physician — may be needed.

Diabetes, high blood cholesterol, and blood clots are three important risk factors for coronary heart disease that may be modulated by fiber-rich diets. Data from the Nurse's Health Study showed that for every 10 grams of fiber a woman consumed daily, her risk of heart disease decreased by about 20 percent. Large-scale studies on men have shown that those who ate the most fiber-rich foods (35 grams/day) had one-third fewer heart attacks than those with the lowest fiber intake (15 grams/day). Men who ate more than 25 grams fiber/day had a 36 percent lower risk of developing heart disease than those who consumed less than 15 grams daily.

Impact of New Fiber Terms

The current protocols for labeling and defining fiber in the United States and many other countries are not yet standardized because of the emphasis on fiber as a measured food component rather than a nutrient with demonstrable health effects. However, experts are recognizing that as the science behind carbohydrates continues to evolve, new terms that define fiber, such as "nondigestible carbohydrates" (i.e., not digested or absorbed in the human small intestine) may be needed to encompass the emerging continuum of beneficial health effects and novel fiber sources. The National Academy of Sciences' Institute of Medicine (IOM) proposed the following terminology:

Dietary fiber consists of nondigestible carbohydrates and lignin (a non-carbohydrate substance bound to fiber) that are intrinsic and intact (i.e., naturally occurring) in plants. (Examples: gums, cellulose, fiber in oats, and wheat bran.)

Added fiber consists of isolated, nondigestible carbohydrates which have beneficial physiological effects in humans. They may be extracted or modified from plants (e.g., resistant starch from green bananas and cooked, cooled potatoes) or animal sources (e.g., chitin and chitosan, found in crab and lobster shells).

> Fiber benefits our immunity and overall health.

It is uncertain how these new terms will be used to help educate consumers and guide their food choices. Nevertheless, it is possible that the current system of labeling for dietary fiber — insoluble and soluble

(continued on page 3)

(continued from page 2)

Focus on Fiber

— could be replaced by two values described by the following terms: dietary fiber and added fiber. Dietary fiber would likely include plant foods in which the fiber is relatively intact and nutrients other than fiber (i.e., vitamins, minerals, and antioxidants) are present and may contribute to overall health benefits. Added fibers would delineate only those fibers that demonstrate positive health benefits. In the future, some food ingredients may be classified as "Added Fibers" on food labels, thus providing an opportunity to highlight information on anticipated health benefits.

Fiber Recommendations

The proposed new fiber terms are not expected to significantly influence recommended intake levels, although the IOM's Food and Nutrition Board has developed adequate intakes (AI) for total fiber consumption. Men aged 14 to 50 years should get 38 grams of total fiber per day, and women aged 19 to 50 years should get 25 grams per day. Men and women over the age of 50 are advised to consume 30 and 21 grams per day, respectively. At these recommended levels, total fiber may prevent constipation, lower blood sugar and cholesterol levels, and provide a source of nutrient rich, low-calorie foods that could contribute to satiety. To illustrate how these amounts translate into food servings, see Table 1.

Some Tips for Increasing Daily Fiber Intake

Choose high-fiber (5 grams or more per serving) breakfast cereals with bran or fiber in the name. Or add a few tablespoons of unprocessed wheat bran to your favorite cereal.

Switch to whole-grain breads (which contain at least 3 grams of dietary fiber per serving). These breads list whole wheat, whole-wheat flour, or another whole grain as the first ingredient on the label.

Eat more brown rice, barley, whole-wheat pasta, and bulgur.

Eat more beans, peas, and lentils. Add kidney beans to canned soup or a green salad. Or make nachos with refried black beans, baked tortilla chips, and salsa.

Eat fruit at every meal and snack on fresh/dried fruit, raw vegetables, low-fat popcorn, or whole-grain crackers.

Table 1. Fiber Content of Some Common Foods*

Food Item	Fiber Content (grams)
Apple, medium with skin	3.7
Broccoli, boiled, 1 cup	4.5
Brown rice, cooked, 1 cup	3.5
Carrots, raw, one medium	2.2
Kidney beans, red, boiled, 1 cup	13.1
Oat bran muffin, medium	5.2
Oatmeal, quick, regular or instant, cooked, 1 cup	4.0
Popcorn, air popped, 2 cups	2.4
Whole-wheat bread, 2 slices	3.8

*Other foods can also contribute fiber to the diet. Read food labels to find the amount of dietary fiber in each product, or search the U.S. Department of Agriculture (USDA) National Nutrient Database Web site: http://www.nal.usda.gov/fnic/foodcomp/search/

Prebiotics and Inulin

A prebiotic is something that feeds, or stimulates the growth of "good" bacteria in the gut and inhibits the growth of harmful bacteria. Information on prebiotics, such as inulin, may appear on food product labels in the near future. Inulin is a fiber-like compound found naturally in many foods e.g., chicory, onions, leeks, and garlic and it has received much attention lately because of its prebiotic effects. "All fiber acts as a prebiotic, in varying degrees," explains Dennis Gordon, Ph.D., professor emeritus, North Dakota State University. "By feeding our intestinal ecosystem, fiber benefits our immunity and overall health."

Who Says it's High Fiber?

The US Food and Drug Administration (FDA) has defined the following terms for food labeling:

High fiber	=	5 grams or more of fiber per serving
Good source of fiber	=	2.5 grams to 4.9 grams of fiber per serving

(continued from page 1)

Fructose

1970 to 1986 at about 128 grams per person per day, and gradually rose to 161 grams by 2000. Despite the increase in grams available in the food supply, the proportion of available calories in the total diet that comes from table sugar and HFCS combined has remained remarkably constant since 1970 at about 15 to 16 percent. Because sugar and the combination of all varieties of HFCS contain about 50 percent fructose, the relative proportion of fructose in the food supply also has remained constant, at about 8 percent of daily caloric intake. However, total calories available in the food supply increased from 3300 to 3900 per person per day between 1970 and 2000, based on USDA food supply data. (These numbers are based on calorie availability in the food supply, not calories consumed by individuals; hence the numbers here are an over-estimate of intake.) Increased portion sizes may also account for the rise in total calorie availability. Of these 600 additional calories available in the food supply, about 60 to 70 of those calories are from the fructose in sucrose and HFCS.

Fructose and Body Weight

Another hypothesis for correlating HFCS and obesity is the manner in which the body metabolizes fructose, which is commonly obtained from honey, fruit, and vegetables. Compared to glucose, dietary fructose is more easily absorbed and taken up by the liver. It is then further broken down into compounds that can be used as energy, converted to glucose, stored as glycogen, or utilized to synthesize triglycerides. How fructose is used depends on an individual's health condition, physical activity status, intake levels, consumption pattern (alone or with other foods), and intake of other macronutrients such as fiber, total carbohydrates, and fat. An individual's overall energy balance also plays a key role in determining whether fructose is utilized to synthesize triglycerides and store in adipose tissue or metabolized by the muscle system, central nervous system, or other organs for energy production. In a carefully controlled study with lean and obese women, the study subjects showed no significant differences in levels of body fat regardless whether the excess calories came from the consumption of more fructose, glucose, sucrose, or fat. This was true even when subjects were taking in more calories than they were using in activity. It should be noted that these studies were not performed with HFCS, but were performed only with table sugar, fructose, or glucose. Given this caveat, one can reasonably expect similar results with HFCS because HFCS, like table sugar, is composed of both fructose and glucose. But HFCS remains to be tested in such studies.

Fructose also differs from glucose in that it does not directly stimulate pancreatic insulin production or require insulin for its metabolism. Thus, compared with an equal amount of glucose, dietary fructose does not influence changes in blood glucose or insulin levels as efficiently as dietary glucose does. The relatively lesser effect that fructose has on stimulating blood glucose and insulin levels is proposed as a physiological hypothesis for why fructose ingestion may uniquely contribute to the rise in the rates of obesity. That is, a blunted rise in blood glucose and insulin levels is hypothesized to blunt leptin production, and blunted rises in insulin and leptin levels are hypothesized to interfere with the long-term regulation of food intake and body weight. Scant data from studies with humans exist to evaluate the fructose-insulin-leptin hypothesis, and no data are available to demonstrate whether dietary HFCS has favorable or unfavorable effects on insulin-leptin responses as compared with those of sucrose, glucose, and/or fructose. Relevant data for the hypothesis have come only from animal studies or studies using sucrose, fructose, and/or glucose and not using HFCS. Perhaps arguing against this hypothesis are diet proponents who believe it is precisely a blunted rise in blood glucose and insulin response that can aid in weight control. They recommend not eating foods that stimulate a rise in blood glucose levels.

Some researchers have concluded that calories ingested in liquid form do not contribute to satiety. This theory is cited to support the fructose-obesity connection. However, it is difficult to separate the possible effects because there are different physiological mechanisms for digesting food versus beverages, there are different roles that foods and beverages have in the diet, and there are other potential differences in cognitive cues.

Other studies have shown that the body compensates for calories from beverages depending on the degree of blood glucose rise and time between beverage consumption and test meal. The majority of studies have shown that sucrose solutions suppress food intake if the time between ingesting the solution and consuming the test meal is less than 60 minutes. Stemming from differences in the experimental designs of the various studies that have been performed, the overall data in this area are inconclusive. Because nearly identical amounts of glucose and fructose are found in sucrose and the HFCS used in beverages, similar results would be expected with the types of HFCS commonly used in soft drinks. This remains to be tested.

Earlier in 2004 the American Dietetic Association published a report, *Position of the American Dietetic Association: Use of nutritive and nonnutritive sweeteners*, that found, on the basis of current scientific evidence, that consumers can safely enjoy a range of caloric and noncaloric sweeteners. They noted that this statement is valid when such sweeteners are consumed as part of a diet that is guided by current nutrition recommendations, such as those in the *U.S. Dietary Guidelines for Americans* and the *Dietary Reference Intakes*, as well as individual health goals. This includes fructose from HFCS or from table sugar.

(continued on page 5)

(continued from page 4)

Fructose

Environmental Changes Since 1970

Obesity is a complex issue with many contributing factors ranging from genetics, social issues, food consumption, and physical activity. As indicated previously in this article, the HFCS in the food supply does not appear to be a major contributor to the increased energy intake of the U.S. population. Many societal as well as dietary changes have occurred since the 1970s that could be contributing to energy imbalance and development of obesity. Changes affecting caloric intake also include: more meals eaten away from home, larger portion sizes, and the relatively inexpensive and abundant food supply. There are also other changes working to reduce energy expenditure: increased reliance on the automobile, cuts in physical education, more "screen time" (television, computers, and video games), more hours working at sedentary jobs, more long distance commuting, and more labor saving devices. Finally, other changes may be contributing to both increased calorie intake and reduced energy expenditure: more sleep deprivation, more night work, certain prescription medicines, and emotional stress.

With so many changes, it may be overly simplistic to advocate a major causal role for any one food, food ingredient, or nutrient in the obesity epidemic. Although it is commonly agreed that overweight and obesity are due to excessive energy intake and lack of physical activity, individually, why and how people become obese is linked to multiple causes. A productive approach might be to evaluate each individual's total diet and lifestyle. Is energy intake and expenditure balanced? If not, what factors unique to that individual need to be addressed, taking into account job, lifestyle, and other considerations? The key is to help each person control their weight while continuing to conduct research that can lead to greater understanding of the factors contributing to the obesity epidemic.

Sources of Information

Almiron-Roit E, Flores SY, and Drewnowski A. No difference in satiety profiles between a liquid and a solid food consumed at different times before a test meal. Physiology and Behavior: in press.

American Dietetic Association. Position of the American Dietetic Association: use of nutritive and nonnutritive sweeteners. J Am Diet Assoc. 2004;104(2):255-75.

Anderson GH, Woodend D. Effect of glycemic carbohydrates on short-term satiety and food intake. Nutr Rev 2003;61(5):S17-S25.

DellaValle DM, Roe LS, Rolls B. Does the consumption of different beverages with a meal affect intake? FASEB J 2004;18(4):A1109.

ERS Availability Data taken and/or calculated from databases available at these links:

http://www.ers.usda.gov/data/foodconsumption/

http://147.208.9.134/

McDevitt RM, Poppitt SD, Murgatroyd PR, Prentice AM. Macronutrient disposal during controlled overfeeding with glucose, fructose, sucrose, or fat in lean and obese women. Am J Clin Nutr 2000;72:369-377.

Park YK, Yetley EA. Intakes and food sources of fructose in the United States. Am J Clin Nutr 1993; 58(suppl):737S-747S.

Saris WHM, Astrup A, Prentice AM, et al. Randomized controlled trial of changes in dietary carbohydrate/fat ratio and simple vs. complex carbohydrates on body weight and blood lipids: the CARMEN study. Int J Obesity 2000;24:1310-1318.

Teff KL, Elliott SS, Tschop M, et al. Dietary fructose reduces circulating insulin and leptin, attenuates postprandial suppression of ghrelin, and increases triglycerides in women. J Clin Endocrinol Metab 2004;89:2963-2972.

Coming to Terms with Sugars

The meaning of terms often used when talking about dietary sugars:

Caloric sweeteners…
Sweeteners, typically carbohydrates naturally present in or added to foods, caloric sweeteners have approximately 4 calories per gram

Sugars…
Monosaccharides (single sugar units like fructose and glucose) and disaccharides (two sugar units linked together, like sucrose); sometimes called simple sugars

Sucrose…
A disaccharide containing one fructose unit and one glucose unit bonded together (also known as table sugar); contains 50 percent fructose and 50 percent glucose

Glucose…
A monosaccharide; the main source of energy for the body

Fructose…
A monosaccharide; it has the same chemical formula as glucose but different molecular structure; sometimes called fruit sugar

Added sugars…
Sugars eaten separately, added to foods at the table (such as adding sugar to coffee, tea, or cereal; topping pancakes with syrup, etc.), or used as ingredients in prepared foods; examples include sugar, corn syrup, high fructose corn syrup, honey, and molasses

Table sugar…
Common name for the disaccharide sucrose; obtained from sugar beets and sugar cane

High fructose corn syrup…
A mixture of glucose and fructose produced from corn syrup; the most frequently used types are HFCS 42, common in baking applications, which is 42 percent fructose; and HFCS 55, common in beverage applications, which is 55 percent fructose

Pulse Check on Dietary Guidance in the United States

The *Dietary Guidelines for Americans* have historically used a public health approach to providing consumers with diet and health recommendations to the general public. Over the past two decades, this broad-based paradigm has remained remarkably consistent while accommodating periodic revisions of the *Dietary Guidelines* every 5 years. *The Food Guide Pyramid*, a graphical translation of recommended nutrient intakes specified by the *Dietary Guidelines* into types and proportions of food, has some flexibility built in for various energy levels, but it is often used in a "one-size-fits-all" manner. Furthermore, the *Food Guide Pyramid* has not been significantly revised since it was first published in 1992. Now there is an opportunity to shift from "population-based" guidance to "consumer-specific" guidance, making personalized, dietary guidance even more feasible.

Consumer Use of the *Food Guide Pyramid* in Today's Environment

Obesity has become an increasing public health problem and the driving force of nutrition trends today. Media coverage on all issues related to diet and health has escalated to the point that consumers are bombarded with so much conflicting and confusing nutrition information from various sources that they say that it is unclear "who to believe." In the first 2 years following the creation of the *Food Guide Pyramid*, media coverage primarily discussed it in a positive light as a new dietary guide replacing the "4 Food Groups." Today, stories in the media question the relevance of the Pyramid as a dietary tool in an environment of obesity and discuss consumer incomprehension of servings, vegetarian options, and refined carbohydrates versus whole grains. In addition, various groups have developed "alternative" pyramids and have disseminated them to consumers as *preferable* guides for healthful eating. This has only added to consumer confusion.

Given this increased attention to dietary guidance and the *Food Guide Pyramid*, the question becomes, "Are consumers getting enough *helpful* information to facilitate understanding and utilization of the *Pyramid's* guidance in their daily life?" A recent survey shows that 88 percent of consumers recognize the *Pyramid*, but that only 17 percent say they are following it. However, data from the Continuing Survey of Food Intakes by Individuals 1994-96 show that less than 1 percent of the population actually follow the *Pyramid's* recommendations.

In the environment of obesity, the *Food Guide Pyramid* has the potential to be a useful dietary tool in promoting weight management. However, multiple and mixed consumer messages may partially explain why the *Pyramid* is currently underutilized and why fad diets are so appealing. Extreme weight management strategies may be perceived as compatible in the short-term with consumers' lifestyles and promise "quick-and-easy" solutions within their repertoire of skills.

Pyramid Insights from Qualitative Research

Consumer research conducted by the International Food Information Council Foundation demonstrates a need for personalizing nutrition messages to make them more meaningful and useful to the consumer. The research showed that *Pyramid* messages resonate with consumers better when they are tailored to the specific needs and preferences of the individual. Consumers find it more understandable when *Pyramid* servings for the various food groups are illustrated in the context of foods they eat. For instance, "*A deli bagel is equivalent to about 4+ servings from the Bread, Cereal, Rice, & Pasta Group.*" Consumers also respond positively to messages that they can accommodate within their lifestyle. For example, if an individual is fond of full-fat milk, but is willing to make other trade-offs, statements like, "*Love the taste of whole milk? Balance it out with lower-fat foods such as reduced-fat cheese, low-fat sour cream, or fat-free dressing*" are received well.

By personalizing nutrition messages, consumers may become more interested and open to following dietary advice, rather than immediately tuning out the guidance being offered. In fact, consumers tell us that effective nutrition, food, and health messages have the following characteristics: positive; short and simple; specific and manageable; provide a payoff; individualized, and fun.

Implications for Dietary Guidance

In a highly polarized environment where consumer confusion is rampant, consumer research is an invaluable tool in knowing consumer needs and maximizing opportunities to individualize dietary guidance messages. Consumer research helps design messages that are useful, realistic, and practical for consumers to follow. Individualization allows flexibility for consumers to eat in a way that suits their taste and lifestyle while meeting nutritional criteria.

The current revision of the food guidance system provides many excellent and "creative" opportunities to make food guidance more relevant to the consumer. Government, media, academe, food industry, and consumers can work collaboratively toward developing unified messages concerning food and nutrition to maximize, rather than negate, the messages that consumers receive. This could be an important step in closing the communications loop and truly help consumers put dietary guidance into practice to achieve a healthful overall diet.

Parents and Caregivers Can Help Children Stay Healthy

Parents can lead the whole family in adopting more healthful eating and physical activity habits to help improve health and control weight. A new brochure from experts at the National Institute for Diabetes and Digestive and Kidney Diseases (NIDDK) and the International Food Information Council (IFIC) Foundation may help them do just that.

The IFIC Foundation partnered with NIDDK's Weight-control Information Network (WIN) to produce *Helping Your Overweight Child*, a four-page fact sheet filled with practical advice and useful ideas. Tips for improving eating habits include eating meals together as a family, eating fast food less often, trying not to use food as a reward, and avoiding controlling the amount of food that a child eats. Healthful snack ideas are listed, as are fun physical activities the whole family can enjoy together.

The release of this new fact sheet is timely. New data from the National Health and Nutrition Examination Survey (NHANES) show continuing increases in children's weights. Data from the most recent survey conducted from 1999 through 2002 show that 16 percent of youth ages 6 through 19 years are overweight [body mass index (BMI) at or above the 95th percentile]. About one in three (33 percent) children are at risk for overweight (BMI at or above 85th percentile).

Kids who are overweight are at risk for the same health problems, such as type 2 diabetes, as adults. And odds are that they will carry excess weight into adulthood, putting them at risk in later life for heart disease, high blood pressure, and some forms of cancer.

Helping Your Overweight Child is available in print from the Weight-Control Information Network (WIN), at 1-877-946-4627, or online at **www.niddk.nih.gov/health/nutrit/pubs/helpchld.htm**. WIN is a national information service of the NIDDK, of the National Institutes of Health (NIH), which is part of the U.S. Department of Health and Human Services (DHHS). The document is also available on the IFIC Foundation's web site at **http://ific.org**.

NAS Panel Determines Biotech Foods are Safe While Calling for More Research

On July 27, 2004, the National Academies of Science (NAS) National Research Council and Institute of Medicine issued a new report on food biotechnology, "Safety of Genetically Engineered Foods: Approaches to Assessing Unintended Health Effects." Sponsored by the U.S. Department of Agriculture, the U.S. Food and Drug Administration, and the U.S. Environmental Protection Agency, the Report concluded that attempts to assess food safety solely on the basis of the method of breeding are "scientifically unjustified."

The Committee that wrote the report distinguished that "genetic modification" describes a broad array of breeding techniques — from traditional cross-breeding to genetic engineering and the use of chemicals or radiation — used to improve plant and animal traits. "Genetic engineering" refers specifically to the use of molecular biology techniques to delete genes or to transfer genes for particular qualities from one species to another.

Adverse health effects from genetic engineering have not been documented. The report recommends that all foods produced through biotechnology be assessed for compositional changes that could influence safety. Greater scrutiny should be given to foods containing new compounds or unusual amounts of naturally occurring substances. Examples would include the detection and subsequent evaluation of an unknown substance for allergenicity or toxicity, or assessing the potential impact on diets and health from foods with increased or decreased nutrient levels. Even when differences in composition are noted, more research is needed to understand the potential biological significance of these changes.

In some cases, evaluation should continue after products are on the market, although post-market surveillance should not be used as a substitute for the safety assurance required before commercialization.

What's New at IFIC.ORG?

JUST LAUNCHED!

IFIC.ORG EN ESPANOL!

You can access ific.org in Spanish at **http://ific.org/sp** or through **http://ific.org** simply by clicking on español in the left navigation bar. Now much of the information available in English on **ific.org** is also available in Spanish. Take a look at **http://ific.org/sp** and let us know what you think. We'd love your feedback.

New IFIC Foundation Publications

Below are the newest releases from the IFIC Foundation. Single copies of most publications are available free-of-charge. For a comprehensive listing of publications or for bulk prices, please request the IFIC Foundation Publications List below.

❑ **Publications List (MI-4010)**
A complete list of publications available from the IFIC Foundation.

❑ **Food Guide Pyramid: Basic Maintenance for your Body (EB-2065)**
A brochure demonstrating how the USDA Food Guide Pyramid and Dietary Guidelines for Americans can be supported by nutrition messages and tips to help individuals achieve a healthful lifestyle. It covers principles of managing food choices and portions in "real life." Co-developed with the U.S. Department of Agriculture and the Food Marketing Institute.

❑ **Weight Loss: Finding A Weight Loss Program that Works for You (EB-2090)**
This helpful, easy-to-use brochure provides information and check lists for evaluating weight loss programs and services and helps consumers ask the right questions to choose a safe and effective weight loss method.

❑ **Prevent Childhood Choking: It's Up to You! (MI-4260)**
This colorful 2-sided poster in both English and Spanish is suitable for home or daycare use to help parents and caregivers take the necessary steps to prevent childhood choking on food or other objects. Developed in partnership with the National SAFE KIDS Campaign. Single copies free, multiple copies $1.50 each.

❑ **Caffeine and Women's Health (EB-2040)**
Revised and updated brochure providing current scientific facts about caffeine and women's health, including such topics as pregnancy and osteoporosis. This referenced document was developed in partnership with the Association of Women's Health, Obstetric and Neonatal Nurses.

❑ **IFIC Review: Understanding Food Allergy (IR-3070)**
This referenced white paper offers the latest scientific information on food allergy. It provides an overview on how to distinguish a food allergy from other sensitivities to food.

To Order:

Please complete and return this form to:

IFIC Foundation
1100 Connecticut Ave., N.W., Suite 430
Washington, DC 20036

Which of the following categories best describes you or your organization?
(*Please select only one*)

❑ A. IFIC Supporter
❑ B. Health Professional
❑ C. Professional Society Staff
❑ D. Home Economist
❑ E. Educator
❑ F. Extension Agent
❑ G. Researcher/Scientist
❑ H. Government
❑ I. Library / Info. Service
❑ J. News / Media
❑ K. Company / Industry
❑ L. Association / Industry
❑ M. Consumer Group
❑ N. Consumer
❑ O. Student
❑ P. Other

Name _____

Title / Business _____

Street _____

_____

City _____

State: _____ Zip: _____

Food Insight (ISSN 1065-1497) is published by the International Food Information Council (IFIC) Foundation. The International Food Information Council (IFIC) Foundation will effectively communicate science-based information on health, nutrition, and food safety for the public good. The IFIC Foundation is supported primarily by the broad-based food, beverage and agricultural industries.

Editor: Ann Bouchoux

Associate Editor: Nick Alexander

Contributors: Sylvia Rowe, Susan T. Borra, R.D., Dave Schmidt, Geraldine McCann, Dick Elder, Andy Benson, Nick Alexander, Cheryl Toner, M.S., R.D.; Joan Rothenberg, M.S., M.A.; Alison Esser, Stephanie Ferguson, Anthony O. Flood, Wendy Reinhardt, M.S., R.D.; Shelley Goldberg, M.P.H., R.D.; Jennifer Schlemen, Jillian Goode, Parker Lawton, Laura Hatch, Winifere Jenkins-Ford, John Kloor, Matt Tarka, Scott Bradford, Chris Kizzie, Sybrena Bullock, Catherine Brohiher, M.S., R.D., and Gretchen Dueñas

Copy Editor: Michael Hayes

Design: Lightthouse Concepts, LLC

1100 Connecticut Avenue, N.W., Suite 430
Washington, DC 20036
Email: foodinfo@ific.org
http://ific.org

Address Service Requested

Nonprofit Org.
U.S. Postage
PAID
Merrifield, VA
Permit No. 1112