

# food **Insight**

Current Topics in  
Food Safety and Nutrition

MAY/JUNE 2002  
IFIC FOUNDATION

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## DIETARY REFERENCE INTAKES: THE STORY CONTINUES

In 1997, the Food and Nutrition Board of the National Academy of Sciences did something dramatic: it changed the way nutritionists and nutrition scientists evaluate the diets of healthy people by creating the Dietary Reference Intakes (DRIs). Remember the Recommended Dietary Allowances (RDAs)? From the time they were established in 1941, the RDAs were used to evaluate and plan menus that would meet the nutrient requirements of various groups as well as other applications such as interpreting food consumption records of populations, establishing standards for food assistance programs, and establishing guidelines for nutrition labeling, to name a few. Their primary goal was to prevent diseases caused by nutrient deficiencies. In technical terms, the RDAs were not intended to be used to evaluate the diets of individuals, but they were often used that way.

In the early 1990s, after much consideration, the Food and Nutrition Board undertook the task of revising the RDAs and a new family of nutrient reference values—the Dietary Reference Intakes (DRIs)—were born. There are four types of DRI reference values: the Estimated Average Requirement (EAR), the Recommended Dietary Allowance (RDA), the Adequate Intake (AI), and the Tolerable Upper Intake Level (UL). (See accompanying box for definitions of these values). The primary goal of having new dietary reference values not only was to prevent nutrient deficiencies, but also was to reduce the risk of chronic diseases such as osteoporosis, cancer, and cardiovascular disease.

### DRIs: For Professionals Only?

Chances are good that if consumers were asked whether they have ever heard of a dietary reference intake or DRI, they would answer with blank stares. In fact, focus group research with registered dietitians has indicated that health professionals also have many questions about how to use the DRIs.

For the most part, DRI values have been used by scientists and nutritionists who work in research or academic settings. Nutritionists who work primarily with consumers have not yet had to develop a detailed understanding of the DRIs. Nutritionists who develop menus that must meet certain nutritional requirements (child nutri-



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# METABOLIC SYNDROME:

## LIFESTYLE STRIKES AGAIN

Just in case Americans need one more reason to keep weight gain in check and increase their levels of physical activity, there is now more evidence that our lifestyle habits are increasing our risk of experiencing serious illness and premature death. According to a recently published study conducted by the Centers for Disease Control and Prevention, at least 47 million Americans—or about one in five people—have a condition called metabolic syndrome.

Metabolic syndrome is diagnosed when a person has three or more of the following conditions: abdominal obesity, high triglyceride levels, low high-density lipoprotein (HDL) cholesterol levels, high blood pressure, and high fasting glucose levels (see the table below). People who have metabolic syndrome, which is also known as syndrome X or insulin resistance syndrome, are at increased risk for developing type 2 diabetes and cardiovascular disease and are at greater risk of dying from cardiovascular disease and other causes.

### Insulin Resistance: The Key Factor to Metabolic Syndrome

Gerald Reaven, M.D., a professor of medicine at Stanford University, was the first scientist to identify that people with high insulin levels have an increased risk of heart disease. In a book that he coauthored, *Syndrome X: Overcoming the Silent Killer That Can Give You a Heart Attack* (Simon & Shuster, 2000), he estimates that approximately 60 million to 75 million people are insulin resistant. Of these, about 5 to 10 percent will develop type 2 diabetes. The remaining 90 to 95 percent are at risk for developing

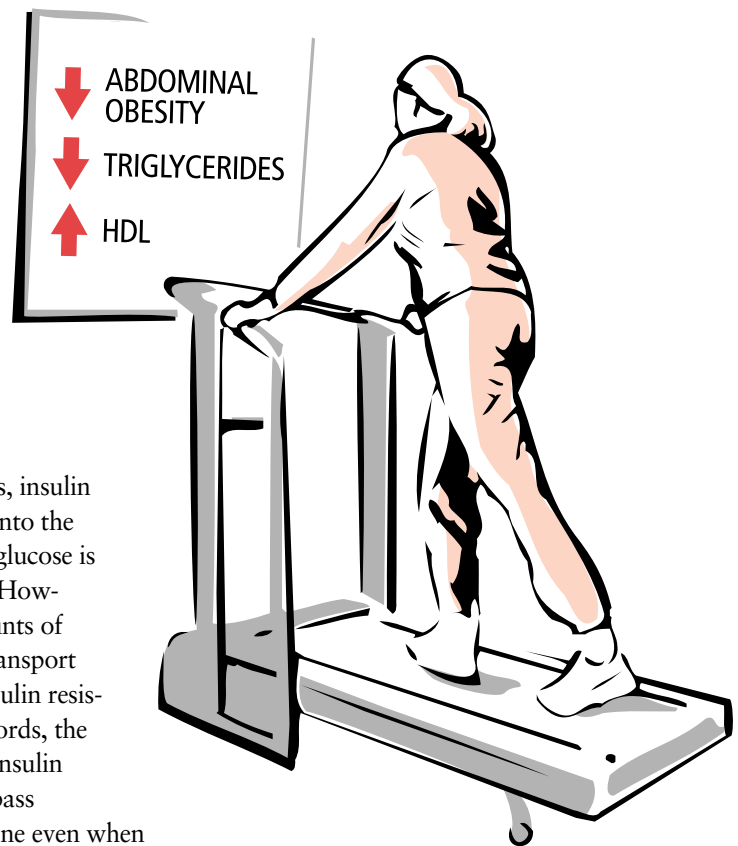
metabolic syndrome.

Under normal conditions, insulin allows glucose to move into the cells of the body, where glucose is used to produce energy. However, when normal amounts of insulin are not able to transport glucose into the cells, insulin resistance occurs. In other words, the cells resist the action of insulin and the glucose cannot pass through the cell membrane even when normal amounts of insulin are present. When this happens the pancreas must produce more insulin to maintain normal blood glucose levels. People with metabolic syndrome have higher levels of glucose in their blood, although it is still within the normal range, and they are not diabetic.

The cause of insulin resistance in individuals is unknown. It is estimated that about half of the cases of insulin resistance results from genetic variation, which affects insulin's effectiveness. The ability of insulin to permit glucose utilization may be up to 10 times more efficient in people who are insulin sensitive than in those who are insulin resistant. Insulin resistance is also affected by factors that we can control: body weight (in particular, abdominal fat) and fitness level.

### Insulin Resistance and Obesity

Obesity greatly increases the likelihood of insulin resistance; however, it is possible to be insulin resistant without being obese or to be obese without being insulin resistant. Keith Ayoob, a registered dietitian and spokesperson for the American Dietetic Association, explains the role of diet in



insulin resistance: “Although diet is one factor in obesity, it is not the ‘cause’ of insulin resistance or diabetes. People tend to become more insulin resistant as they become overweight.”

### Treatment and Prevention of Metabolic Syndrome: Tackling Obesity

Dietary approaches to treating and preventing metabolic syndrome vary, but nearly all experts agree that clinical parameters are greatly improved by reducing body weight by as little as 10 percent and increasing one's level of physical activity.

Ayoob believes that small changes can lead to big improvements: “It's not about achieving a perfect lifestyle but instead working toward a better one. A 10 percent weight loss can significantly improve health risks.”

To begin to affect weight control, Ayoob suggests that we focus on the successes highlighted by the National Weight Control Registry, which looked at how a variety of people achieved and then main-

tained a 30-pound weight loss over time. “The National Weight Loss Registry found that people lost weight in different ways: through high-carbohydrate diets, low-carbohydrate diets, fad diets, groups, etc. But to maintain the loss they generally ate diets that were high in fiber, low in fat, and rich in fruits and vegetables. They also made a solid commitment to an active lifestyle (45 to 60 minutes of physical activity each day), and maintained a positive attitude.”

Ayoob points out that obesity stems from excess calories, which can come from a variety of sources. “We eat more food prepared away from home now than ever before. Eating out makes it easier to eat more calories with less portion control. It has also been documented that when we are served more, we tend to eat more. Health professionals need to help people understand moderation and define it for them.”

It takes time to make permanent dietary changes, Ayoob stresses. “You have to gradually balance your diet. It’s not an overnight fix. It has to be a priority to eat fruits, vegetables, and whole grains before eating foods from the top of the Food Guide Pyramid. People are very afraid of giving up all their fun when it comes to food...but people tend to have too many ‘once in a while’ foods. We can’t make every high calorie food just go away: the answer is smaller portions, less often along with more exercise.”

### Metabolic Syndrome: The Fitness Connection

Glenn Gaesser, Ph.D., is a professor of kinesiology at the University of Virginia and the author of *Big Fat Lies*, a book that emphasizes that fitness at any body weight improves health. Gaesser has worked closely with obese clients, encouraging them to change their fitness and eating patterns. According to Gaesser, “Changing either weight or exercise patterns can have profound effects. Exercise is essential because muscle is the biggest tissue in the body—30 to 40 percent of body mass is muscle. It’s the major site of glucose

disposal. Inactive muscle is not as sensitive to insulin.”

Many experts recommend that people work toward being moderately physically active for at least 30 minutes per day, most days of the week. Gaesser believes that these recommendations are helpful, but he also encourages people to be more physically active by incorporating short bursts of activity into their routines: “People can ‘work out’ ten minutes at a time by using hand weights while at their desks or while on the phone, or by taking a 2 to 5 minute walk. It may not seem like much but these activities can increase fitness levels.”

### Long Term Solutions

Many health professionals believe that society as a whole must undergo a profound change to truly address the problems created by lifestyle factors such as obesity and lack of activity. Ayoob agrees wholeheartedly. “Obesity and metabolic syndrome are not just about food and not about being more active: it’s about a lifestyle. The focus should embody this concept, not just individual foods.”

Ayoob also believes that health professionals must move beyond just telling people what to eat and how to exercise. “We need to readjust our priorities as a society: I believe we can do this, but it will take a concerted effort not just by government, not just by schools, but also by families. Parents need to get on board as role models for how to eat healthfully and be active. When parents don’t model the behaviors, kids are not likely to do them either. When kids see their parents taking care of themselves, they tend to follow along.”

Family meals are crucial to family health because they demonstrate eating habits and build communication. Ayoob explains, “Want to know what your kids are doing?? Schedule dinner...Parents need to get kids in the kitchen to help with family meal preparation. Kids will remember those family meals but not the computer games they played.”

## CLINICAL PARAMETERS OF METABOLIC SYNDROME\*

\*Note: Metabolic syndrome is defined as having three or more of these risk factors listed in the table.

Risk Factor	Defining Level
Abdominal obesity	Waist circumference Men: > 102cm or 40in Women: > 88cm or 35in
High triglyceride levels	≥ 150 mg/dl
Low high density lipoprotein	Men: ≤ 40mg/dl Women: ≤ 50mg/dl
High blood pressure	≥ 130/≥ 85mmHg
High fasting glucose levels	≥ 110mg/dl

Ayoob isn’t suggesting that families need to cook meals every night. “When you bring in take-out foods, make a salad or steam a vegetable to have along with it. Kids can get involved with that, too. Turn your kids loose in the produce section of the grocery store. Have them pick the vegetables and fruits for the week.”

Like other chronic diseases, metabolic syndrome is a complex, lifestyle-induced illness. Its solutions are not difficult to understand: eat less, exercise more. But as Keith Ayoob suggests, these solutions must become part of everyday life and woven into our societal fabric to be effective. Perhaps we’re ready to listen now.

### For Further Information:

- *Third Report of the National Cholesterol Education Program Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults (ATP III)*, [www.nhlbi.nih.gov/guidelines/cholesterol/index.htm](http://www.nhlbi.nih.gov/guidelines/cholesterol/index.htm)
- *Prevalence of Metabolic Syndrome*, <http://www.cdc.gov/nccdphp/dnpa/obesity/trend/metabolic.htm>
- National Weight Control Registry, <http://www.uchsc.edu/nutrition/nwcr.htm>
- *Syndrome X: Overcoming the Silent Killer That Can Give You a Heart Attack*, by Gerald Reaven, MD, Terry Kristen Strom, M.B.A., and Barry Fox, Ph.D. Simon & Shuster (New York, 2000).

## Dietary Reference Intakes: The Story Continues

Continued from page 1

tion programs, elderly feeding programs, prison menus, military feeding programs) have had to become more familiar with the DRIs.

A lack of understanding of DRIs among nutrition professionals is not surprising to Jeanne Goldberg, Ph.D., a professor at the Tufts University School of Nutrition and expert in communicating nutrition science to the public. “The reports are much more comprehensive than ever before. Some of the confusion that people have may be because the reports have been released in stages. Also, the DRI reports are far more complicated documents to interpret to the public and to patients...remembering all the parameters such as the difference between an AI, EAR and an RDA is challenging. The DRIs are primarily for nutrition scientists, not for consumers,” explains Goldberg.

Nancy Clark, M.S., R.D., who advises both casual exercisers and elite athletes in the Boston area about nutrition, readily

admits that the DRIs are not something she has had to focus on in her work. Clark’s clients, who tend to be fairly savvy about nutrition, are also not really tuned into the DRIs. She states, “The DRIs, like many nutrition issues, have to be translated for consumers. People eat food, not nutrients. I’m encouraging people to eat fruits and vegetables rather than tell them to be sure to get enough vitamin C.”

“Communicating the DRIs to the nutrition community will take time,” says Allison Yates, Ph.D., R.D., and director of the Food and Nutrition Board (FNB), which is responsible for coordinating the committees that have developed the DRI reports. Over the past 7 years Yates and her coworkers have been steadily working to help the nutrition community understand the significance of the new values and how to use them appropriately. The FNB has overseen the creation of several research articles published in scientific journals and other documents to help practitioners better understand the DRIs. In 2000, the Food and Nutrition Board published *Dietary Reference Intakes: Applications in Dietary Assessment*. A companion report, *Dietary Reference Intakes: Applications in Dietary Planning* is expected to be released in Summer 2002. In addition, work is now underway on a guide that will summarize all of the DRI reports into one condensed, 300-page book. Yates expects the condensed version of the DRI reports to be available in August of 2002. The DRIs will be presented on foldout pages that can be easily referred to for reference.

### The DRIs: A Learning Process

Even with all the guidance and articles that the Food and Nutrition Board has published, Yates is still concerned about how the DRI values are being used: “Some people are still using two-thirds of the new RDA value to assess the nutrient intake of groups, and this is not correct.” In the past, some practitioners who planned meals for groups would use two-thirds of the RDA value as an intake goal to prevent excess nutrient intake.

One of the major differences between the recent DRI reports and the previous RDAs is the creation of tolerable upper intake levels or ULs. The 1989 edition of the RDAs discussed “excessive intakes and toxicity,” ULs are different, however, and there have been misinterpretations of their meaning. According to Yates, with intakes “above the UL there is potential for increased risk, but there is an uncertainty factor which functions as a margin for safety compared to levels which have been shown to result in adverse effects. Consistently consuming a nutrient at the upper level should not cause adverse effects. Intake levels at the UL can be interpreted as a ‘warning flag,’ not as reason for alarm,” explains Yates. Yates also stresses, “It’s important to know how the UL was derived because there are not many studies that have been done on adverse effects of nutrient intake. For example, in the case of arsenic, we know it’s toxic, but there is no UL because we don’t have enough data on chronic intake of lower doses to set a UL. When a UL cannot be determined, it is important to be careful about consuming levels above the RDA or AI.”

Although many nutritionists have applauded the development of ULs, they do present communication challenges. Jeanne Goldberg stressed this challenge when she stated, “One of the real strengths of the DRI process was that they (DRIs) do address upper safe limits. But it is tough because they need to be communicated in broad strokes: they are not toxic levels.”

### For More Information or Additional Reading...

- [www.iom.edu](http://www.iom.edu): Under Institute of Medicine Programs, go to the Food and Nutrition Board to check the status of DRI reports.
- <http://ific.org>: “Nutrient Requirements Get a Makeover: The Evolution of the Recommended Dietary Allowances.” Food Insight, September/October 1998.

## DEFINITIONS OF DIETARY REFERENCE INTAKES

**Recommended Dietary Allowance (RDA):** the average daily dietary intake that is sufficient to meet the nutrient requirement of nearly all (97 to 98 percent) healthy individuals in a particular group according to stage of life and gender.

**Adequate Intake (AI):** a recommended intake value based on observed or experimentally determined approximations or estimates of nutrient intake by a group (or groups) of healthy people, that are assumed to be adequate; AI is used when an RDA cannot be determined.

**Tolerable Upper Intake Level (UL):** the highest daily nutrient intake that is likely to pose no risk of adverse health effects for almost all individuals in the general population. As the intake increases above the UL, the potential risk of adverse effects increases.

**Estimated Average Requirement (EAR):** a daily nutrient intake value that is estimated to meet the requirements of half of the healthy individuals in a group according to life stage and gender—used to assess dietary adequacy and as the basis for the RDA.

# THE CONSUMER VIEW ON FUNCTIONAL FOODS: YESTERDAY AND TODAY

More than 2000 years ago, Hippocrates said, “Let food be thy medicine.” This concept underlies the definition of “functional foods” used by the International Food Information Council (IFIC): any food or food component that may provide a health benefit beyond basic nutrition.

IFIC is keeping a finger on the pulse of consumer attitudes toward functional foods with its most recent quantitative survey, conducted in March 2002. Cogent Research of Cambridge, Massachusetts, conducted telephone surveys with 1,004 randomly selected U.S. adults. Those surveys provided data that build on the quantitative data collected in 1998 and 2000.

Continuing the trend since 1998, almost all consumers (94 percent) agree that certain foods have health benefits that go beyond basic nutrition and may

reduce the risk of disease or other health concerns. Consumers express little

familiarity with terms commonly used to describe this concept, including “functional foods” (62 percent like it, whereas 27 percent dislike it). Even less well liked is “nutraceuticals” (only 34 percent like it; 49 percent dislike it). Still, 85 percent of Americans are either “very interested” or “somewhat interested” in learning more about functional foods. This level of interest has been consistently strong since 1998.

As in 1998 and 2000, a majority of consumers believe they have a “great amount” of control over their own health (68 percent). They overwhelmingly believe that food and nutrition play “a great role” in maintaining or improving overall health (71 percent), and the proportion is even greater than the proportion of individuals who believe that exercise (63 percent) or family health history (41 percent) is a key determinant of health. Although more than half (54 percent) of the respondents are reducing the amounts of certain foods or food components in their diets, 35 percent (compared to 36 percent in 2000 and 28 percent in 1998) are adding foods or beverages for their health benefits, particularly vegetables, fruits, and water.

The top 10 foods that consumers identify as having a health benefit beyond basic nutrition include broccoli (9 percent), fish or fish oil (9 percent), green leafy vegetables (9 percent), oranges or orange juice (9 percent), carrots (8 percent), garlic (7 percent), fiber (6 percent), milk (6 percent), oats/oat bran/oatmeal (6 percent), and tomatoes (6 percent). The foods in the top five have remained constant since 1998 and are consistently associated with America’s top health concerns: cardiovascular disease and its factors, including heart disease/heart attack, high blood pressure,

stroke, and high cholesterol, which remain the top collective concern of Americans (41 percent). Cancer continues to concern almost a third (30 percent) of consumers. Other health concerns that consumers mention include weight (17 percent), diabetes (17 percent), and nutrition/diet (12 percent). Overall, 44 percent of consumers associate foods or food components with a reduced risk of cancer, often naming fruits and vegetables. A slightly larger number of consumers (53 percent) associate foods with heart health, including fish or fish oil, garlic, and fiber.

Almost two-thirds (63 percent) of Americans say they are eating at least one food to receive a functional health benefit. Although these results are not significantly different from those from the survey conducted in 2000 (59 percent), they do represent a significant increase from the results obtained in the survey conducted in 1998 (53 percent).

When asked about specific associations between food and health, awareness of the connection between calcium and osteoporosis remains high, as was the case in 2000 (79 percent). Fewer Americans are aware of the association between antioxidants and cancer (54 percent), and fewer still know about the heart health benefits of soy protein (35 percent). Those who had heard of these associations were asked how much they had heard: 64 percent had heard “a lot” about the calcium—osteoporosis relationship, whereas only 34 percent had heard “a lot” about antioxidants—cancer and 23 percent had heard “a lot” about soy protein—heart disease relationship. Therefore, in addition to fewer consumers actually hearing about the last two relationships, those consumers are also hearing only “a little” about them.

The relatively recent determinations of

*Continued on page 8*



# NewsBites

*U.S. Agriculture*, was released on June 10, 2002, and is available on-line at <http://www.ncfap.org>.

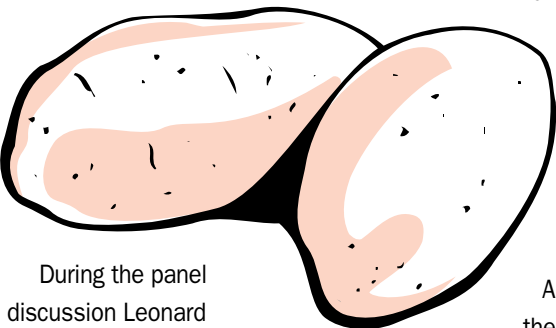
## CONSUMER FEDERATION OF AMERICA CONFERENCE HIGHLIGHTS THE NEXT GENERATION OF FOODS FROM BIOTECHNOLOGY

The Consumer Federation of America held its National Food Policy conference on April 22 and 23 in Washington, D.C. The topics discussed included bioterrorism and food, food allergies, nutrition labels, irradiation, and functional foods. In addition, one of the sessions focused on the next generation of biotech crops and foods.

applications of chemicals as well as less

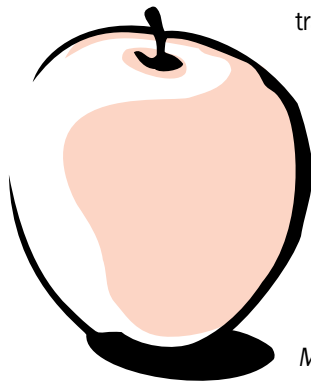
topsoil erosion. Soybeans, broccoli, peanuts, and eggplant are being developed to fight insects on their own. Research is also being conducted on raspberries, barley, grapes, apples, grapefruit, sunflowers, peaches, and tomatoes

enhanced to be protected from diseases that can kill an entire season's crop.



During the panel discussion Leonard Gianessi, program director and senior research associate of the National Center for Food and Agricultural Policy (NCFAP), highlighted research his organization collected on biotech food crops that he believes will be in farmers' hands in the coming years.

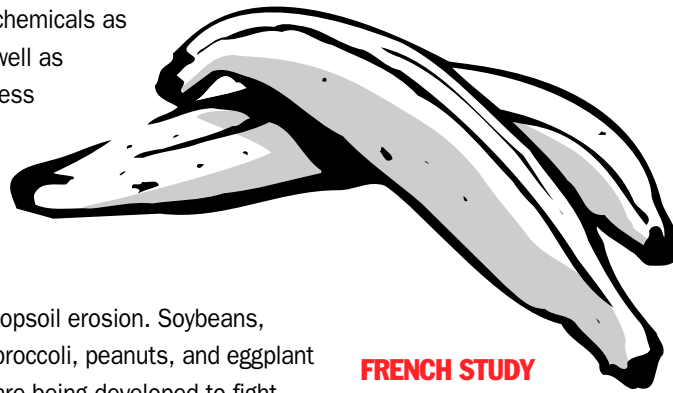
These crops include alfalfa and wheat enhanced to tolerate the application of broad-spectrum herbicides that can result in fewer



Although all these crops and foods may not be available tomorrow, they are anticipated in the near future. Researchers around the country are growing many of these crops in field trials which signals that they have begun the

Food and Drug Administration review

process. Note: The NCFAP report, *Plant Biotechnology: Current and Potential Impact for Improving Pest Management in*



## FRENCH STUDY CONFIRMS SAFETY OF ASPARTAME

Recently, after an extensive evaluation of the scientific literature on the sweetener aspartame, a committee of independent scientific experts selected by the French Food Safety Agency (AFSSA) reaffirmed the safety of aspartame.

In October 2000, the French Consumer Affairs Ministry asked AFSSA to form an expert committee to study any possible link between exposure to aspartame and the occurrence of brain tumors. This evaluation was conducted in response to concerns regarding aspartame that appeared in the media and on the Internet, in which it was alleged that aspartame was associated with adverse neurological health effects in humans.

In May 2002, the expert committee produced a report reviewing the toxicity of aspartame on the central nervous system in laboratory animals and humans. The report examined the available toxicological and epidemiological data concerning the effects of this sweetener on the nervous system and on the quantities of this sweetener consumed by the general population and by particular populations such as diabetic children and teenagers.

On the basis of a comprehensive analysis of the current scientific data, the expert committee concluded that there is no relationship between aspartame consumption and brain tumors in humans or animals. Furthermore, the metabolites of aspartame—phenylalanine, aspartic acid and methanol—are provided in much greater

amounts from everyday foods and by normal cell metabolism than from the consumption of aspartame. There is inadequate scientific evidence to

establish that these metabolites are the cause of the harmful neurological effects. An examination of peer reviewed, published works has shown no relationship between aspartame and epilepsy or changes in brain activity. In addition, aspartame intake in humans, even in users such



as diabetic children, does not exceed the acceptable daily intake.

This review once again confirms the safety of aspartame as a sweetener in foods. The text of the report is available in French at <http://www.afssa.fr/ftp/actu/aaat2000sa0249.pdf>.

### PIZZA: THE EDIBLE CLASSROOM

Combine eight common ingredients, the desire to serve up food science in a new and tasty way, and a large serving of creativity and you have The Pizza Explorer, an interactive CD-ROM produced by the Institute of Food Tech-

nologists (IFT) with Purdue University.

Developed with the goal of teaching interested students the basics of food science and food chemistry, The Pizza Explorer is an entertaining approach to education. The program allows middle school and high school students to learn about food chemistry, food processing, and nutrition through topics that include the history of pizza, the nutritional makeup of its ingredients, and food processing, with games and quizzes added to spice up the mix.

As The Pizza Explorer developer Bruce Watkins, Ph.D.,

professor of food science at Purdue University, points out, "How else can you disguise a food chemistry CD-ROM? All kids in this country eat pizza and relate to pizza as a food." Use of this creative combination of a universally loved food and the computer allows educators to serve up a very appealing teaching tool.

The Pizza Explorer is available online at the National Health Museum's Web site, [www.accessexcellence.org](http://www.accessexcellence.org). The CD-ROM, which contains voice-over narration and additional information, is available free to science teachers; call IFT at 312-782-8424.

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## 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 and *Food Insight* reprints available from the IFIC Foundation.

### Fish & Your Health (EB-2095)

This brochure takes a look at the benefits of fish and seafood in a healthful diet. Provides information on the impact of omega-3's and seafood consumption for the general consumer, children and issues on guidance for pregnant women. Favorably reviewed by the American Academy of Family Physicians Foundation.

### 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.

### Children's Nutrition and Physical Activity Teaching Set (MI-4200)

A teaching set designed to help kids ages 9-15 understand the importance of combining nutrition and physical activity. The set features at 22"x34" two-sided color poster highlighting the Physical

Activity Pyramid alongside the Food Guide Pyramid.

Set includes the "Ten Tips to Healthy Eating and Physical Activity for You" brochure, reproducible slick, and poster. Please send \_\_\_ copies at \$3.50 and \$1.50 shipping and handling.

### IFIC Review: Low-Calorie Sweeteners and Health (IR-3025)

This referenced white paper presents an overview of the currently approved sweeteners in the United States and those being considered by the FDA. The role of low calorie sweeteners in a healthful diet and in weight loss management is also discussed.

### Listeriosis and Pregnancy: What is Your Risk? Tear-Pad (MI-4245)

This 25-sheet tear-pad provides healthcare professionals, physicians, nurses, nurse midwives, dietitians, nutritionists and others easy-to-read background information on listeriosis for women who are pregnant. Developed in partnership with the U.S. Department of Agriculture, U.S. Department of Health and Human Services and the Association of Women's Health, Obstetric and Neonatal Nurses. Single tear-pad free.

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## The Consumer View on Functional Foods: Yesterday and Today

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relationships between soy protein and heart disease and between antioxidants and cancer may help to explain why belief in the efficacies of these relationships is lower than that for the efficacy of the calcium-osteoporosis relationship. Compared to the results for 2000, fewer consumers (59 percent) believe in the efficacy of the soy protein/heart disease relationship. Slightly more believe in the efficacy of the antioxidant—cancer relationship (66 percent).

It's a different story for calcium-osteoporosis relationship, with 91 percent of consumers believing in the efficacy of the relationship. The differences in the levels of belief in the effectiveness of these relationships lie first in the length of exposure to the information—the health benefits of calcium have been

discussed in detail for many years. Also, a wide range of communicators—from health professionals to journalists to government officials—have extolled the health benefits of calcium against osteoporosis. In addition, Americans are less familiar with food sources of soy protein and antioxidants, and some consumers who did not like the taste of early soy products are unaware of new ones. Additionally, lower levels of belief in the efficacy of an association may be related to hearing relatively less about the association.

For functional foods to deliver their potential public health benefits, consumers need a clear understanding of and a strong level of confidence in the scientific criteria that are used to document health effects and claims. When communicating about functional foods, it is important to translate quality science into understandable and usable messages that meet consumer needs.

The following are specific communication strategies: (1) Cite the need for credible, scientific criteria as the basis for messages about functional foods and the development of new food products. (2) Accentuate the “good news” about food. (3) Place new research findings into context with the overall body of scientific evidence. (4) Discuss the benefits of particular components within the context of familiar foods and overall eating patterns. (5) Do not overstate potential benefits, and ensure that any claims made on- or off-label are based on reasonable and responsible information.

The best advice for helping consumers to reap the health benefits of foods is to eat moderate portions of foods from the various groups in the Food Guide Pyramid, as well as increase the variety of foods consumed from each of these groups. After all, “variety is the spice of life!”

**Food Insight** (ISSN 1065-1497) is published by the International Food Information Council (IFIC) Foundation, the educational arm of IFIC. IFIC's mission is to communicate science-based information on food safety and nutrition to health and nutrition professionals, educators, journalists, government officials and others providing information to consumers. IFIC is supported primarily by the broad-based food, beverage and agricultural industries.

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