

FOOD Insight™

IFIC Foundation
<http://ific.org>

May / June 2004

Strong Skeletons: Calcium and Beyond

Welcome back to the discussion on bone health! In the previous issue of *Food Insight*, the article, “Spring for Stronger Bones” addressed the role that physical activity plays in keeping bones healthy and strong. This issue continues the discussion as it pertains to nutrition. Many people know that adequate calcium intake is a crucial building block of strong bone tissue, but would it surprise anyone to know that the large majority of Americans (both men and women) consume insufficient calcium on a daily basis? In addition, nutrients other than calcium are also responsible for bone health.

May is National Osteoporosis Awareness and Prevention Month in the United States. Following up on that event, there is no better time to increase awareness of the risks associated with the development of osteoporosis so that you can prevent it from happening to you. Let’s take a closer look at what nutrients we need to keep our skeletons strong for all seasons.

More Bone Basics

Calcium and vitamin D are the two key nutrients involved in building and maintaining strong bones. Calcium receives the most media attention, but

vitamin D is equally important because Vitamin D and calcium work together.

Calcium

Calcium circulates in the blood and is important in a number of bodily reactions, such as blood clotting, heart beat consistency, and nerve transmission. To carry out these functions, our bodies prefer to use the calcium that we consume from our diets. If we do not consume enough calcium, it will be taken from storage in our bones. Even small reductions in blood calcium concentrations can trigger calcium loss from bone. One of the most effective ways to protect our bones is to get plenty of calcium in the foods and beverages that we consume daily.

Vitamin D

Vitamin D plays a supporting but essential role in bone building: it helps the body absorb and deposit calcium in bones and teeth. Without vitamin D we cannot use the calcium that we get from our foods and supplements. Our skin makes vitamin D, provided we receive adequate exposure to sunlight. However, experts now caution against relying just on sun exposure because the source of vitamin D is dependent on the variability of



nature as well as the variability of our bodies. The use of sunscreen also inhibits the skin’s ability to manufacture vitamin D.

Experts worldwide have focused anew on vitamin D in the 21st century, partly because there appears to be increases in the rates of vitamin D deficiency and vitamin D deficiency-related rickets. (Rickets is a vitamin D deficiency disease that affects the young during skeleton growth and is caused by failure to assimilate and use calcium and phosphorus usually because of inadequate levels of exposure to sunlight or inadequate vitamin D intake.)

“The groups most likely to be vitamin D deficient are the elderly and dark-skinned people,” explains Connie M. Weaver, Ph.D., professor and head of the Food and Nutrition Department at Purdue University. “The elderly cannot synthesize as much vitamin D and are frequently not spending time outdoors. Dark-skinned people also cannot synthesize the required amount of vitamin D in their skin,” adds Weaver. Similarly, individuals who live where the winters are long, or where cloudy days are the norm, may also need to rely on dietary sources of vitamin D.

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Acrylamide: Putting the Current Findings into Perspective

Acrylamide is a compound that is not added to foods but that forms naturally from a reaction of sugars with some specific amino acids found during certain types of heat processing and cooking. Acrylamide has been present at some level ever since we began cooking, but it was first identified in food in April 2002, when a group of Swedish scientists presented research that detected trace levels of the compound in some baked and fried foods. Prior to the Swedish study, food was not analyzed for acrylamide because it was not used as an ingredient, nor was it known to be a component of food.

In light of the finding from the Swedish study, the food industry, world health organizations and scientists throughout the world have increased their attention to acrylamide. Food regulatory agencies from several countries, including the US Food and Drug Administration (FDA) have initiated several studies regarding acrylamide in food. Although the initial studies found that acrylamide can be detected in baked and fried foods, further work including research from FDA found varying low levels of acrylamide (measured in parts per billion) in a broad variety of foods.

There is no evidence that the amount of acrylamide in food is harmful to humans. Significant questions remain regarding the true risk of acrylamide in foods.

International leaders in acrylamide research from academia, industry, and government also met recently to discuss recent findings and to identify areas in need of additional research. The Second Joint Institute for Food Safety and Applied Nutrition (JIFSAN) Acrylamide Workshop was held in Chicago, Illinois, in April 2004 (the first meeting having been held in October 2002). A few highlights of the 2004 meeting are summarized here.

Acrylamide forms from a reaction of carbonyls — specific carbon and oxygen components of reducing sugars like glucose or fructose — with certain amino acids, which are the building blocks of protein. Asparagine is the amino acid primarily involved in the formation of acrylamide and is commonly found in its free form (i.e., not linked with other amino acids in proteins) in many foods. The main mechanism of formation results from the Maillard browning reaction, which is responsible for the brown crust on bread and the toasty color and flavor of some breakfast cereals. Acrylamide thus forms in foods that are subjected to high temperature preparation processes such as baking, frying, and canning.

FDA's analysis of the foods in the U.S. diet found acrylamide in many samples at varying low levels and more detectable in potatoes, bread, and cereal products, but it can be found in other cooked and processed foods, prepared in restaurants or at home. Processing/cooking times and temperatures have been shown to affect the levels of acrylamide formed.

Although the amount of acrylamide consumed from home-prepared foods is unknown, research has identified home food preparation methods consumers can use to reduce the levels of acrylamide formed during cooking. Lauren Jackson, Ph.D., of the FDA Center for Food Safety and Applied Nutrition, National Center for Food Safety & Technology in Summit-Argo, Illinois, noted that most of the acrylamide formed during the toasting of

bread was found in the darker portions of the toast. When this portion of the toast was scraped off the bread, the "toast scrapings" had significantly larger amounts of acrylamide than the remainder of the toast.

Dr. Jackson also reported the effects of frying times and temperatures on acrylamide formation in French fries.

Consistent with the levels obtained on toasted bread, acrylamide levels and the degrees of browning increase with cooking (frying, toasting, etc.) times and temperatures. The degree of browning may be used as an indicator of the levels of acrylamide formed in some foods during cooking or processing. Additionally, to reduce acrylamide levels when frying fresh potatoes, storage of the potatoes in a cool (but not refrigerated), dry, dark room is important. This will prevent accumulation of sugars as well as sprout formation. She also noted that some washing treatments, including soaking and rinsing the sliced or cut potatoes in plain water, are effective in reducing acrylamide levels in the final cooked potato products.

In another evaluation of acrylamide in foods, in May 2004, the National Toxicology Program's Center for the Evaluation of Risks to Human Reproduction (NTP-CERHR) convened a panel of experts charged with the task of providing a scientifically sound evaluation of whether the current general population exposure to acrylamide poses a risk to human reproduction and development. For three days, the 14-member panel synthesized data from nearly

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Acrylamide: Putting Findings into Perspective

125 research papers into a cohesive report on acrylamide's reproductive and developmental effects on humans. The panel noted that although studies with animals suggest that acrylamide is harmful to reproductive and development processes in rats and mice, sufficient data are not available to reach the same conclusion regarding human exposure to the chemical.

"Considering the low level of estimated human exposure to acrylamide derived from a variety of sources, the Expert Panel expressed negligible concern for adverse reproductive and developmental effects for exposures in the general population," concludes a June 2004 report available on the NTP-CERHR Web site (http://cerhr.niehs.nih.gov/news/acrylamide/final_report.pdf).

"After reviewing all existing data quite extensively, we now know we need more research to find out if humans are at risk," Michael Shelby, director of the NTP-CERHR, concluded.

Food processors are also looking for ways to reduce the levels of acrylamide that are formed in their products while maintaining the same quality and safety of their products. There are many unanswered questions about acrylamide in foods, but the government, industry, and academia are committed to additional research to be certain that any risk to humans is minimized. Most scientists agree that all foods can be consumed as part of a healthful lifestyle. The optimum diet is most easily achievable if food choices are made on the basis of moderation, balance, variety, and enjoyment. In that spirit, the FDA and the World Health Organization do not recommend any dietary changes on the basis of what we now know about acrylamide. In fact, FDA continues to recommend that consumers eat a balanced diet, choosing a variety of foods that are low in trans fat, saturated fat, and rich in high-fiber grains, fruits, and vegetables.

Can I Reduce Acrylamide Levels in Food?

Until more is known about acrylamide in food, experts from FDA recommend that consumers focus not on acrylamide, but on eating a balanced diet, choosing a variety of foods that are low in trans fat and saturated fat, and rich in high-fiber grains, fruits, and vegetables. However, if you are still interested in reducing the trace levels of acrylamide that may be present in food, here are a few tips for home cooking:

- Avoid overcooking or using extremely high temperatures in cooking food. (NOTE: Undercooking some foods may result in foodborne illness.)
- Fry foods to a LIGHT, rather than dark, golden brown.
- Scrape the darker crumbs off toast and other baked items before consuming.
- Store potatoes at room temperature in a dry location, then soak and rinse cut or sliced potatoes, before frying or baking. It is important to drain the potato slices before frying to prevent pan fires.
- Enjoy a moderate amount of a wide variety of foods to stay healthy!

New Continuing Education Opportunity

All About Caffeine: Looking for Continuing Professional Education (CPE) Credits?

The International Food Information Council Foundation has developed an online American Dietetic Association-approved continuing professional education (CPE) program, "All About Caffeine," for registered dietitians and registered dietetic technicians. This self-study CPE program provides information on a subject that is of interest to many. You will learn about the sources of caffeine and

the amounts found in common beverages such as tea, coffee, and soft drinks. The program explores research related to caffeine and health, including reproduction, hydration, fibrocystic breast disease, osteoporosis, and heart disease.

To learn more about this CPE program, visit the IFIC Foundation Web site at:

<http://ific.org/adacpe>.

Eat for Strong Bones

Got Dairy? Dairy products are by far the most common food sources of calcium. Milk, cheese, yogurt, even pudding made with milk — are good sources of calcium, and products made from fluid milk also contain vitamin D. Milk, which has 300 milligrams (mg) of calcium per 8-fluid-ounce serving, and other dairy products are the primary sources of calcium that can be well-absorbed by the human body. In the United States fluid milk is also fortified with vitamin D, which makes dairy products doubly nutritious for bones.

Veggies Too! In addition to certain vegetables (such as broccoli, kale, and collard greens), tofu, almonds, and fish with bones (such as salmon and sardines) are sources of calcium. Be aware, however, that it can take large quantities of these foods to equal the amount of calcium you would get in eight fluid ounces (1 cup) of milk. For example, it takes about four cups of cooked broccoli to equal the amount of calcium you would get in a cup of milk. But, when it comes to obtaining sufficient calcium, every little bit helps.

Don't Do Dairy? Fortified milk alternatives are a good choice for some people who don't consume dairy products. Juices, breads, cereals, and snack foods are just some of the calcium-fortified foods you can find in a typical supermarket. In addition, increasing numbers of foods and beverages are fortified with vitamin D. Read the food labels to check whether the product you are buying is fortified with calcium and vitamin D because not all brands are enhanced. Incorporate some of these products into your diet, especially if you "don't do dairy."

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In the United States, fortified foods and dietary supplements provide most of the vitamin D in our diets, since the foods that are naturally high in vitamin D (e.g., sardines, herring, liver, and egg yolks) are not usually consumed in adequate amounts. Fortified milk and dairy products, breakfast cereals, and recently, calcium-fortified fruit juices are the foods most commonly enhanced with vitamin D.

Strong Bones at Every Age

Children and Teens: The easiest way to prevent osteoporosis later in life is to ensure adequate calcium and vitamin D intake throughout childhood, adolescence, and early adulthood.

In 2003 the American Academy of Pediatrics (AAP) began recommending that all infants and children receive 200 international units (IU) per day of vitamin D, starting in the second month of life, to help prevent deficiencies that might arise from exclusive breastfeeding. Although breastfeeding remains the preferred type of feeding for infants, the low vitamin D content of human breast milk in combination with low levels of sun exposure may predispose infants to vitamin D deficiencies. For infants who receive formula feedings of at least 17 ounces per day, supplements are not necessary, as all infant formulas sold in the United States contain adequate amounts of vitamin D.

According to data presented at the 2001 National Institutes of Health Consensus Development Panel on Osteoporosis Prevention, Diagnosis and Therapy, only 25 percent of boys aged 9 to 17 years were found to consume the recommended amount of calcium, and only 10 percent of girls

this age meet the recommendation. Older children can be given chewable multivitamins that contain 200 IU of vitamin D, and infants can be given liquid vitamin drops.

Calcium deficiency is a particular concern among growing teenagers because teens tend to stop consuming dairy products. Research also shows that many teens do not get enough vitamin D, and AAP suggests supplements for individuals in this group.

Encouraging children and teens to drink milk with their meals is one of the best ways to help ensure that they obtain adequate amounts of calcium and vitamin D. However, milk is not the only beverage option that can be used to ensure consumption of adequate amounts of calcium. For example, some brands of orange juice are fortified with calcium and vitamin D. Other calcium-rich foods like cheese, yogurt, and fortified snacks also add variety to the diet. Fortified and flavored milk beverages as well as powdered beverages prepared with milk are also good sources of dietary calcium.

Twenties, Thirties, and Forties: In the United States, 9 out of 10 women and nearly two-thirds of the men do not get sufficient calcium. Be sure to eat enough calcium and vitamin D-rich foods throughout your 20s because the ideal is to build up optimal bone mass by the time you are 30 years of age. After that, bone mass generally does not increase. However, there's still plenty of time left to make changes that will help maintain your bone mass, reduce bone loss, and reduce your risk of osteoporosis. Consider taking a multivitamin. Be

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sure to check that it contains some vitamin D and calcium. Calcium chews also provide a quick and tasty way to obtain calcium and vitamin D. Consult your healthcare provider with any questions or concerns.

Fifty Plus: If you have done a good job of taking care of your bones so far, then you've won half the battle already. If not, it's still not too late to make amends. Ask your healthcare provider about supplements. Your calcium and vitamin D requirements are somewhat higher after age 50, and your body does not absorb calcium as efficiently as it did when you were younger. Continue to eat a diet rich in both calcium and vitamin D, but don't be surprised if you need supplements to make up the difference.

Use the chart below to see whether you and your loved ones are getting adequate amounts of calcium and vitamin D on a daily basis.

For Calcium Dietary Reference Intakes:
<http://www.iom.edu/Object.File/Master/7/294/0.pdf>

For Vitamin D Dietary Reference Intakes:
<http://www.iom.edu/Object.File/Master/7/296/0.pdf>

FOR ADDITIONAL INFORMATION:

Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, National Bone Health Campaign
<http://www.cdc.gov/nccdphp/dnpa/bonehealth/index.htm>

National Osteoporosis Foundation
<http://www.nof.org>

*National Institutes of Health, Osteoporosis and Other Related Bone Diseases
National Resource Center*
<http://www.osteoporosis.nih.gov>

*Physical Activity, Nutrition, and Bone Health,
International Food Information Council Foundation*
<http://ific.org/publications/reviews/bonehealthir.cfm>

Are You Getting Enough Daily Calcium And Vitamin D?

Age or Group	Calcium (mg)*	Vitamin D (µg)*
7 – 12 mo	270	5
1 – 3 yr	500	5
4 – 8 yr	800	5
9 – 13 yr	1,300	5
14 – 18 yr	1,300	5
19 – 50 yr	1,000	5
50 – 70 yr	1,200	10
>70 yr	1,200	15
Pregnancy: ≤18 yr	1,300	5
19 – 50 yr	1,000	5
Lactation: ≤18 yr	1,300	5
19 – 50 yr	1,000	5

*Adequate intakes

Source: Dietary Reference Intakes for Calcium, Phosphorus, Magnesium, Vitamin D and Fluoride, 1997. Washington, DC: National Academies Press. Copyright 2001 by The National Academies.

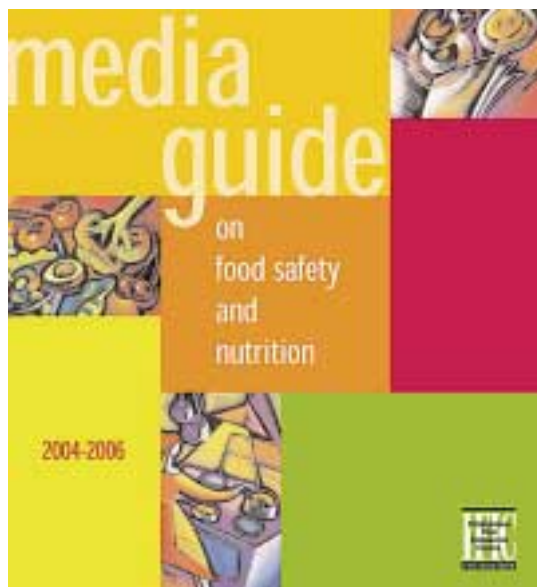
The Latest Media Guide from IFIC Foundation: Don't Leave Your Office Without It

A new and improved comprehensive resource for information on food safety and nutrition is on its way to journalists and health professionals. The *IFIC Foundation 2004-2006 Media Guide on Food Safety & Nutrition* is useful as a quick reference guide on nutrition, weight loss and obesity, dietary supplements, sugars and sweeteners, food allergies, food safety, agricultural issues and food production, food biotechnology, ingredients and additives, and international issues.

An integral part of the *Media Guide* is its listing of more than 250 scientific experts in virtually all food safety and nutrition issues. The experts are primarily affiliated with universities and the *Media Guide* provides their complete contact information. In addition, the experts are indexed by their area of expertise, to allow journalists to research food and nutrition issues more efficiently. All scientists are renowned in their fields and, more importantly, are media friendly: all have agreed to make themselves available for reporters' inquiries in between their research or teaching activities.

What Is It and Where Did It Come From?

The 2004-2006 edition of the *Media Guide* is the latest and most advanced in a series that has evolved mightily over the past decade. This sixth edition is compact, yet comprehensive, offering quick background information on all food safety and nutrition issues. Sidebars on the first page of each chapter offer URLs for Web pages on the IFIC Web site, ific.org, which has itself evolved into a



comprehensive collection of highly relevant articles, brochures, referenced scientific reviews, question and answer sections, and research summaries.

A Perfect Marriage: Print and Cyberspace

Americans increasingly research their health and health-related questions in cyberspace, as do journalists, health care professionals, educators, and others who write or communicate on food safety and nutrition — as lay people and professionals alike have become increasingly comfortable with relying on the Internet as an almost instantaneous source of information. Therefore, it has become ever more important to provide reliable, credible, and scientifically verifiable information to Web users. *The IFIC Foundation Media Guide* has risen to the challenge.

The *Media Guide* also contains short primers on topics like managing food allergies, diet and weight management, functional foods, foodborne illnesses, pesticides and the environment, and food biotechnology and

other new technologies. All of these primers are clearly written in easy-to-understand language. The *Media Guide* can be used to find quick food facts, food statistics, and additional resources. Research on consumers' attitudes toward biotechnology, functional foods, and other current issues is also referenced, with further information waiting at ific.org.

Food for an Information-Hungry World

Because of Americans' current hunger for information on food issues, from the low-carb diet craze and food labeling to food biotechnology, journalists and other food safety and nutrition communicators stand to benefit greatly from this handy reference on the science behind sugars, fats, fiber, and supplements. The *Media Guide* has been a reliable reference for journalists and others since 1995, and can help provide understanding and a foundation for judging and communicating information about complex food issues.

In a world where both print and Web-based resources co-exist, the *Media Guide* appears to have taken the best from both, making the job of researching the often difficult issues surrounding food surprisingly easy — where the perfect scientific answer to a scientific question is only a mouse click, an e-mail, or a phone call away.

The 2004-2006 IFIC Foundation Media Guide is provided at no charge to credentialed journalists and can be easily ordered through ific.org or by contacting the IFIC Foundation Media Relations Department at media@ific.org.

ADA Takes a Position on Sugars and Sweeteners

Given the current atmosphere of confusion about carbohydrates, refined carbohydrates, sugars, and sweeteners, the recently released American Dietetic Association (ADA) position paper on the use of nutritive and nonnutritive sweeteners could not have come at a better time.

The ADA report endorses the use of added sugars and sugar substitutes at reasonable levels, as determined by the advice of federal nutrition agencies. The U.S. Department of Agriculture (USDA's) *Food Guide Pyramid* and the USDA/U.S. Department of Health and Human Services 2002 Dietary Guidelines recommend that consumers "use sugars sparingly" and "choose a diet moderate in sugars," respectively. The Institute of Medicine's Dietary Reference Intakes offer a numerical value of 25 percent for the maximum intake of energy from added sugars.

"Consumers can safely enjoy a range of nutritive and nonnutritive sweeteners when consumed in a diet that is guided by current federal nutrition recommendations," the ADA position paper states. Nutritive sweeteners provide a source of energy (calories) whereas nonnutritive sweeteners have a sweet taste but do not provide added energy. Both types of sweeteners are found in a wide variety of foods and beverages, and, according to the ADA paper, have been found to be safe for consumers and offer palatability and choice in the diet.

Both types of sweeteners may also be consumed by children and pregnant women in the context of a nutrient-adequate diet. The daily intake levels differ for each of the nonnutritive sweeteners, five of which are approved by the U.S. Food and Drug Administration. The Acceptable Daily Intake is a conservative level and is the estimated amount per kilogram of body weight that a person can safely consume on average every day over a lifetime without risk. The position paper also mentions a link between heavy sweetener consumption and obesity in the population and recommends that those who want to lose weight opt for the use of nonnutritive sweeteners as a method of controlling energy intake.

To access the full position paper, visit http://www.eatright.org/public/other/index_adap0598.cfm.

New Resource from Kidnetic.com!

The International Food Information Council (IFIC) Foundation introduces the new Kidnetic.com Leader's Guide to Healthy Eating & Active Living for Kids & Families, a resource that allows health professionals, educators, and community youth organizations to conduct lessons and activities on healthy lifestyles with kids ages 9 to 12 years.



The *Leader's Guide* is based on content from Kidnetic.com

(<http://kidnetic.com>), an interactive, educational Web site designed to appeal to kids ages 9 to 12 and their parents and consists of a series of modules featuring lessons and activities that teach kids about fitness, food, fun, feelings, and family dynamics. The *Leader's Guide* can be downloaded from the Internet at no cost.

All content in the *Leader's Guide* has been reviewed for scientific accuracy and appropriateness by each of five organizations that form the ACTIVATE partnership with the IFIC Foundation. These organizations are: the American Academy of Family Physicians, American College of Sports Medicine, American Dietetic Association, International Life Sciences Institute Center for Health Promotion, and the National Recreation and Park Association. The ACTIVATE Partnership was formed to create tools designed to help prevent childhood obesity.

For more information and to download a copy of the *Leader's Guide* at no cost, visit <http://ific.org/kidnetic>.

What's New at IFIC.ORG?

Coming soon to a computer near you:

IFIC Foundation On-Line en Español. Check out <http://ific.org/sp> in July and don't forget to tell your friends and colleagues.

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.

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Current Topics in Food Safety & Nutrition



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