

# Tufts

## Nutrition



Why sugary drinks are more dangerous than we thought

### MARKET MAKER

Last summer, the Boston Public Market, the first all-local, year-round, indoor market of its kind in the country, opened its doors. It is a great experiment in supporting small farmers and fishermen while providing healthy food to city residents, and Mackenzie Sehlke, N13, is helping it all come to life.

As part of the small staff of the nonprofit behind the market, she helped recruit the vendors, who offer everything from pasture-raised poultry to unpasteurized juice, from vinegar to chocolate. And yes, touring their farms and kitchens and sampling their wares has been a highlight of the job.

But beyond that, Sehlke—the only nutritionist on staff—has had a hand in overseeing the market's many programs, managing its USDA grants, and promoting it as a place for recipients of food stamps (officially known as the Supplemental Nutrition Assistance Program) to pick up groceries; more than 1,500 of the market's products are SNAP-eligible.

Although the market has many goals for health promotion and education, helping local small businesses grow is its main mission. She says it has been fun seeing the vendors come up with new ways to draw in customers. At the Jasper Hills Farm stall, she says, a customer can buy a piece of cloth-bound cheddar, a cheese board to take to a party, or just a grilled cheese sandwich for lunch. "It's an amazing way of getting small producers to optimize their margins," she says.

She also enjoys watching the vendors inspire each other. The George Howell coffee stall started offering mocha made from nearby Taza's chocolate, and Beantown Pastrami began serving Chestnut Farms eggs on their sandwiches in the morning.

"Those are cool, interesting, new things that didn't exist before they all kind of hung out together," she says. Local helping local can be a tasty thing.



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# TRUSTED SCIENCE, REAL IMPACT



**WHEREVER I TRAVEL**, I hear one question time and again: What in the world should I be eating? We are living through a remarkable time in nutrition. We have more and better science and greater public attention to food and sustainability, coupled, however, with more widespread and intense public confusion. The public is swarmed by a dizzying array of new topics and issues—gluten-free, low-fat, low-carb, paleo, grass-fed, farmed vs. wild, natural, cage-free, organic, GMO, high fructose corn syrup. It's hard for consumers to figure out which of these are important for them.

The disconnect between the remarkable progress in the quality and rigor of nutrition science and the explosion of public attention and bewilderment is both ironic and revealing. As the science has advanced over the past 30 years, the messages and priorities have as well. An expanding world of media pundits, talking heads, book authors, bloggers, social media posters, personal health coaches, mobile app developers, for-profit wellness companies and food marketers is creating an unfiltered firehose of often conflicting and contradictory messages. Where is a person to turn?

In the midst of this cacophony, Tufts Nutrition—the Friedman School and the HNRCA—represents a strong voice of trusted, rigorous and objective scientific discovery and information. Our breadth, multidisciplinary approach and focus on public impact remain our hallmarks. The Friedman School, born nearly 40 years ago, was founded on the foresight of Tufts President Jean Mayer that nutrition was not merely about biochemistry, but also about social science, behavioral science, economics, food systems, sustainability and policy. This vision continues to guide all that we do today.

As you read this magazine, know that you are benefiting from the work of more than 80 faculty, 50 HNRCA scientists, 350 graduate and certificate students and numerous staff who are dedicated to generating reliable, relevant answers to the most important scientific questions of our time.

Crucially, Tufts Nutrition is dedicated to translating these findings into real-world change. Just a few examples include our Nutrition Innovation Lab, targeting global hunger; ChildObesity180, working to reverse the obesity epidemic in kids; the New Entry Sustainable Farming Project, training new farmers and building a stronger food system; and the Feinstein International Center, defining evidence-based policies to help people caught in humanitarian crises.

Achieving enduring, positive, evidence-based public impact is at the heart of our work. Enjoy this magazine and thank you for being part of the Tufts Nutrition family.

**DARIUSH MOZAFFARIAN, M.D., Dr.P.H., dean of the Gerald J. and Dorothy R. Friedman School of Nutrition Science and Policy**

## Tufts Nutrition

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# SHARING THE KNOWLEDGE



**AT THE HNRCA** we embrace the Dalai Lama's sentiment: "Share your knowledge. It is a way to achieve immortality." Our goals are a little less lofty than immortality, but helping people live longer and enjoy healthy and active aging is at the heart of our mission. To achieve those goals it is important that we find ways to share the practical applications of our research with people who want to create their own blueprint for a healthy and active life.

One of our innovative approaches to outreach and education is through our Talk & Taste programs offered in partnership with the Boston Center for Adult Education (BCAE) and the Massachusetts Horticultural Society. In these total sensory sessions, HNRCA scientists provide the science behind what a BCAE chef prepares for the participants, while a horticulturist offers fascinating historical context and tips on how to cultivate the plants. If you're in the Boston area, mark your calendar for our next Talk & Taste event on March 29. You will learn about what mushrooms can do for your immune system and how they might even help you fend off food poisoning.

To highlight the importance of physical activity to healthy aging, we organized our first Go4Life event in September. We worked with the City of Boston and the U.S. Administration on Aging to offer older adults a half-day program featuring short, informative talks on physical activity, nutrition and brain health as well as a chance to take part in an outdoor tai chi demonstration in the heart of the city (see page 27).

We also use social media to extend our outreach globally. I hope you're already following us on Twitter (@JMHNRCA), Facebook and YouTube as well as our website ([hnrca.tufts.edu](http://hnrca.tufts.edu)).

Of course, this magazine and its website ([go.tufts.edu/nutrition](http://go.tufts.edu/nutrition)), which provides free access to archived stories going back to 2002, is another powerful tool for learning how scientific discovery can help people make healthy choices. I hope you find the information we offer in these pages useful to your professional pursuits as well as your personal lives.

The measure of success for the HNRCA is how we take the exceptional research done in our labs and move it beyond the important academic journals and scientific community and into the lives of people who will benefit from it.

A handwritten signature in dark ink that reads "Simin Meydani".

**SIMIN NIKBIN MEYDANI, D.V.M., Ph.D.**

Director, Jean Mayer USDA Human Nutrition Research Center On Aging

## LAURELS

**ANDREW GREENBERG**, the Atkins Professor at the School of Medicine, an associate professor at the Friedman School, and director of the Obesity and Metabolism Laboratory at the HNRCA, received the 2015 Research Achievement Award from the Take Off Pounds Sensibly Foundation.

**JENNIFER HASHLEY, G05**, has been named one of 10 Eisenhower Fellows for her work as director of the New Entry Sustainable Farming Project at the Friedman School. The fellows will travel abroad to meet with experts in their respective fields to exchange ideas and information.

**EILEEN KENNEDY**, professor of nutrition and former dean of the Friedman School, was appointed to the High Level Panel of Experts on Food Security and Nutrition, a science-policy group that provides independent analysis and advice to the Committee on World Food Security, which is part of the U.N. Food and Agriculture Organization.

**ALICE H. LICHTENSTEIN**, the Gershoff Professor of Nutrition at the Friedman School, is the new executive editor of the *Tufts Health & Nutrition Letter*. She also presented the Robert Levy Memorial Lecture at the 2015 scientific sessions of the American Heart Association in November. Her topic was "Trans Fatty Acids: Falling Down the Rabbit Hole."

**JOEL MASON**, an associate professor at the School of Medicine and at the Friedman School and director of the Vitamins and Carcinogenesis Laboratory at the HNRCA, was among those named to *Newsweek* magazine's 2015 Top Cancer Doctors list. A specialist in gastroenterology, he is regarded as one of the nation's foremost authorities on nutrition's impact on cancer.



# A La Carte



## What Telomeres Tell Us

These DNA defenders are signals of longer life **BY JULIE FLAHERTY**

**E**VER NOTICE WHAT happens when the little plastic bit on the end of your shoelace comes off? The lace starts to fray and unravel, and soon it's no good. It turns out your chromosomes have a similar protective cap known as telomeres. They're stretches of extraneous DNA on the end of chromosomes that keep the more important genetic information intact when cells divide. Each time a cell replicates, however, a bit of the telomere gets lopped off. Eventually, the telomere gets so short that the cell can stop dividing or die. Stress, illness and aging can speed up cell division, hastening the wear and tear on telomeres.

You can tell a lot about a person from the state of his telomeres. In older people, those with healthier diets tend to have longer telomeres, while those with short telomeres are more likely to die from heart disease or infectious illness.

Scientists don't know if telomere shortening is simply a sign of aging, or actually contributes to it. But there does seem to be a

connection between telomere length and certain vitamins and minerals. Studies have shown that women who eat diets rich in vitamin A and beta-carotene, for example, tend to have longer telomeres.

Ligi Paul Pottenplackel, a scientist in the Vitamin Metabolism Laboratory at the Jean Mayer USDA Human Nutrition Research Center on Aging at Tufts, has been studying the connection between telomeres and folate, a B vitamin that is known to be important for keeping DNA intact. In a 2009 study, she found that people with adequate folate in their blood had long telomeres. Does that

mean longer is better? More recently, she and her colleagues looked at telomere length and folate in about 1,000 men and women. Contrary to what the researchers expected, they found that the people with the highest levels of folate had shorter telomeres than those who were lower in folate. Why? It's possible that people who get a lot of folic acid from multivitamins and fortified foods may be consuming more than they need.

The shorter telomeres, they write in the *European Journal of Nutrition*, could reflect DNA damage "resulting from folic acid intake beyond what is optimal for cellular functions."

One thing that does seem to keep telomeres from eroding is physical activity. Researchers including Luisa Soares-Miranda at the University of Porto in Portugal and Dariush Mozaffarian, the dean of the Friedman School, investigated the connection in the journal *Medicine & Science in Sports & Exercise*. Using data from the Cardiovascular Health Study, they looked at 582 adults who were an average age of 73 at the start of the study. Over five years, the participants reported on their physical activity; the researchers also kept tabs on their physical fitness and telomere length.

At the start of the study, the participants who were more physically fit and who reported doing more walking had longer telomeres. Over time, everyone's telomeres got shorter, but the participants who started exercising more saw a benefit: The more physical activity they added, the less their telomeres shrank. The authors conclude that even later in life, adding physical activity can improve your health outlook.

Tufts researchers will be looking more closely at telomeres to see what they can show us about healthy aging. In the meantime, may your diet be healthy, and your telomeres lengthy.

# OVERWEIGHT AND HEALTHY

We know that excess weight, and especially obesity, can lead to heart disease and diabetes. But not all obese people have the same risk factors for disease. In fact, some extremely overweight people are actually "metabolically healthy," meaning that they exhibit few symptoms of metabolic syndrome, such as high blood pressure, high blood sugar and high cholesterol.

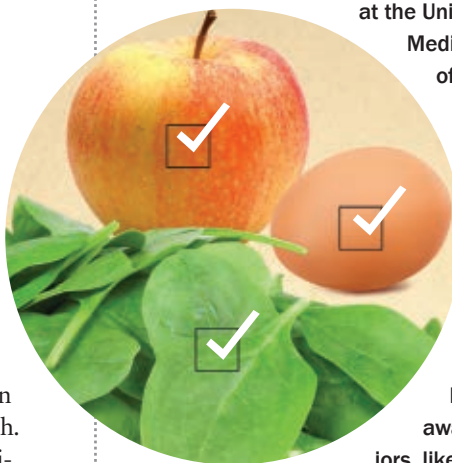
A recent study published in *Preventive Medicine* sought to determine whether there is something special about the dietary patterns and nutrient intakes of metabolically healthy obese people. The study, a collaboration among researchers at the University of Massachusetts, Brown Medical School, Tufts University School of Medicine and the Jean Mayer USDA Human Nutrition Research Center on Aging at Tufts used dietary and health data from the National Health and Nutrition Examination Survey to examine the diets of more than 1,200 obese adolescents and adults.

The researchers gave every individual's diet a score on the Healthy Eating Index (HEI), which awards points for healthy food behaviors, like eating more vegetables, fruits and whole grains. Points are also given for low intakes of solid fats, alcohol and added sugars. Each diet can receive a score of up to 100; the higher the score, the healthier the diet.

They found that compared to their metabolically unhealthy peers, the metabolically healthy adolescents and adult women under age 45 had higher HEI scores, indicating relatively healthy diets. However, HEI scores were not linked to metabolic health in adult men or in women age 45 and older. The study also found that overall, the obese people in the study had pretty low dietary quality; in fact, the group with the highest HEI score, the metabolically healthy adults ages 45 to 85, averaged only a lackluster 56 out of a possible 100 points.

The findings could be useful for future interventions to reduce disease risk in obese people, especially if started early in life.

-KATHERINE PETT



# EXERCISING FOR BRAIN HEALTH

Study finds that physical activity doesn't necessarily improve cognitive function as we age

**IN A STUDY** published in the *Journal of the American Medical Association*, researchers including Kieran Reid, a scientist in the Nutrition, Exercise and Sarcopenia Laboratory at the Jean Mayer USDA Human Nutrition Research Center on Aging at Tufts, looked to see whether exercise could stave off dementia in seniors.

They used data from the Lifestyle Interventions and Independence for Elders study, a trial of 1,635 sedentary seniors originally designed to test whether exercise could prevent or delay mobility problems, such as walking or getting out of a chair. Seniors were randomly assigned to one of two groups: a physical-activity group—which did 50 minutes of walking, strength training and balance and flexibility exercises several times a week—or those who participated in a class on healthy aging.

In the latest study, scientists analyzed seniors' cognitive scores before and after the intervention, looking at such skills as working memory, recall and reasoning.

After two years, the researchers found no overall difference in cognitive

function between the two groups: Both had the same proportion of seniors who developed mild cognitive impairment and dementia. However, for adults over age 80 and for those who had lower mobility at the beginning of the study, executive function was better in the physical-activity group compared to the health-education group.

It is possible that both the physical-activity and health-education programs had an equally positive effect, rather than none at all, the researchers said. And the finding on executive function is notable, because the ability to organize thoughts and plan tasks is important for staying independent as we age.

—KATHERINE PETT

## Together We Lose

Sometimes, it's the parents who take after their kids. That was the case when the obesity intervention program Shape Up Somerville sought to help the children in that city improve their diets and rev up their physical activity.

Friedman School researchers helped kids gain less weight than their peers in other cities. But the parents also had a modest decrease in their Body Mass Index, compared to the control parents. About a third of parents started walking more during the intervention, and more than half chose healthier dishes when eating out. Isn't it nice when families share more than just cold germs?







## PROS AND CONS OF LIFE NEAR THE BIG CITY

As developing countries start to urbanize, cities become sources of jobs, health care and food for people who migrate from the countryside. But what does it mean for the people who stay on the farm?

Amelia Darrouzet-Nardi, N15, now an assistant professor of global health studies at Allegheny College, and William Masters, a Friedman School professor, looked at the history of urbanization in 46 countries and compared it to health data on women and children in rural farm communities. They found that children in agricultural regions close to longer-established cities were less likely to be underweight or too short for their age, regardless of the family's income. At the same time, their mothers were more likely to be overweight than moms on farms with less access to markets and urban services. The findings suggest that farm families can benefit nutritionally from proximity to cities, but urban access comes with its own dangers.

The study was published in the journal *Food Security*.

## Obesity and Colorectal Cancer

Certain gut bacteria could affect the chances of developing the disease

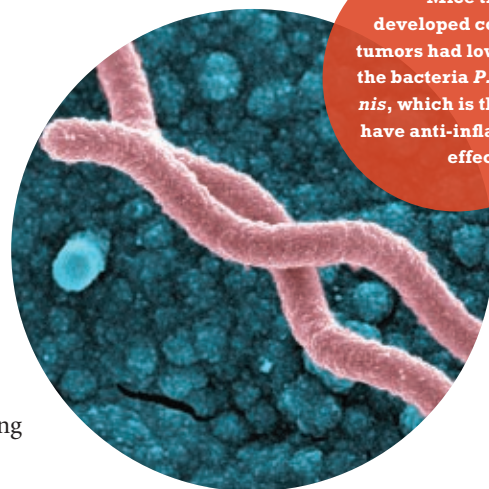
**PEOPLE WHO ARE** extremely overweight have a higher risk for developing colorectal cancer, though why that is so remains unknown. There is growing evidence that people who have adenomas, the precursors to colorectal cancer, have different gut bacteria—or microbiota—than those who do not. Several studies have shown that mice are more likely to get colorectal cancer when given gut microbiota from humans or other mice with colorectal tumors, suggesting that microbiota are responsible, in part, for the cancer.

Researchers in the cancer cluster at the Jean Mayer USDA Human Nutrition Research Center on Aging at Tufts sought to understand whether, when it comes to cancer risk and gut bacteria, it matters if the obesity is caused by

genetics or by poor diet. Their study was done in two strains of mice genetically prone to developing colorectal cancer: mice bred to be of normal weight and a group with genes that cause extreme obesity.

Scientists fed half of the normal-weight mice a low-fat, low-calorie diet and half an obesity-inducing high-fat, high-calorie diet. All the genetically obese mice were fed a low-fat diet so researchers could assess the effects of obesity per se. After the experiment, they compared the gut microbiota of the groups of mice.

The findings, published in *PLOS ONE*, found that obesity caused by genetics and obesity resulting from greater calories both increased cancer risk, meaning that obesity itself is a



Mice that developed colorectal tumors had low levels of the bacteria *P. distasonis*, which is thought to have anti-inflammatory effects.

risk factor for cancer, at least in mice. Additionally, mice that developed colorectal tumors had low levels of the bacteria *P. distasonis*, which is thought to have anti-inflammatory effects. Much more research is needed to see whether *P. distasonis* reduces inflammation in the colon, and thereby the risk for colon cancer. **-KATHERINE PETT**

# Dig In



Lauren Abda, N12, describes herself as “food enthused and tech curious.”

N12, a matchmaker of sorts for Boston food and tech entrepreneurs. Her company, Branchfood, runs these monthly Community Tables, as well as workshops and panel discussions focused on what’s innovative on the local food scene, and leases coworking space to budding food companies from its hip location in a downtown Boston skyscraper.

A couple years ago, Abda noticed restaurants, urban farms and local/sustainable food start-ups were flourishing around the city. “But there wasn’t a resource for people to access all these interesting things happening in the Boston ecosystem,” she says. Now people have a way to learn about a new way to deliver CSA shares, find restaurant software that makes sourcing organic produce easier or even meet an angel investor looking for the next big thing in veganism.

Branchfood’s largest event to date was last November’s “Hack Urban Food,” which invited techies to come up with ideas to benefit restaurants, urban farms and institutional food services. About 150 people took part in the two-day event, which yielded such grow-worthy ideas as an app that would text customers when fresh produce is delivered to a store.

## START ME UP

Branchfood founder helps entrepreneurs find their way

BY JULIE FLAHERTY

**THE INFORMAL MEETING** starts with introductions around the room. Among the 20 or so attendees is Darnell Adams, who hopes to eliminate a food desert in Boston’s Dorchester neighborhood by opening a community-owned co-op supermarket. In the corner is Jaime Silverstein, a crop developer for Freight Farms, which builds urban hydroponic farms inside shipping containers. Cullen Schwarz invites everyone to test his app DoneGood, which rates restaurants and other businesses on their social

responsibility, including environmental friendliness and worker fairness.

The cofounder of Enerchi Bites says she is open to ideas about recyclable packaging for her chia-rich energy bar nuggets. This leads to a discussion about that time Stonyfield Farms tried encasing frozen yogurt balls in edible, fruit-based film skins, to eliminate packaging altogether. A noble idea, but a little weird, most in the room agree.

All ears turn to the two Brown University grads who want to create

a health drink based on gac, a superfruit grown in Vietnam. They expect to start with a powdered form, as the fresh fruit is not allowed into the United States. Someone across the table offers the name of an entrepreneur who did something similar with jackfruit: “You might want to chat with her about how she built supply.”

These regular meet-ups, where people who work in all areas of food can get together to network and share best practices, are hosted by Lauren Abda,

People have noticed what Abda was been up to: The *Metro* named her one of three female entrepreneurs to look out for, and Zagat included her in its “30 under 30” in Boston.

Abda became interested in the private sector while a student in the Food Policy and Applied Nutrition Program. She was inspired by her classes with James Tillotson, professor of food policy and international business, and sought out business classes at MIT. In 2010, she started Tufts Food Works, a club for students interested in entrepreneurship and the food industry. With the help of Professor William Masters, she created a directed study (for herself and other students) that included guest lectures by business professors and site visits to local food ventures.

Explaining the breadth of the food system has been a big part of her mentorship to budding food companies. She recently coproduced the Boston Food Network database, which organizes all the people in Boston’s food scene, from farmers to distributors to companies that “rescue” food waste to keep it out of the landfill.

“There are a lot of food entrepreneurs who don’t understand the different parts of the food system, and the many players that

need to be on board for these start-ups to really be successful,” she says. With the right connections, she hopes, these small companies with big ideas will make a difference in how we eat.

## DO YOUR KNEES NEED D?

Vitamin may protect your joints from arthritis

BY JACQUELINE MITCHELL

**PEOPLE WHO ARE** lacking in vitamin D could be doubling their risk for progressive osteoarthritis, the cartilage-eroding joint disease that leads to achy knees and mobility problems.

Fang Fang Zhang, an assistant professor of epidemiology at the Friedman School, and her colleagues tracked 418 people who already had some evidence of knee osteoarthritis, which affects as many as 50 percent of adults at some point, according to the Arthritis Foundation. They discovered a relationship between low blood levels of vitamin D and osteoarthritis that worsened over time.

The observational study, published in the *Journal of Nutrition*, included patients who had complained of

knee pain, or whose X-rays showed early signs of the disease. Zhang and her colleagues examined subsequent X-rays taken over the course of four years to determine whether the osteoarthritis got worse. The researchers also monitored the patients’ blood levels of vitamin D.

The researchers saw “almost double the risk of progression in people with low vitamin D levels compared with those with adequate vitamin D status,” says Zhang.

Zhang saw the doubling of risk only in people who were clinically deficient in vitamin D, so she emphasizes her findings don’t mean that everyone should start taking supplements. “When we see a positive association like this, people

tend to get all excited,” she says. “But only people with vitamin D deficiency would benefit—not everyone.”

Zhang’s observational study follows a clinical trial conducted by Tim McAlindon, a professor of medicine at Tufts, and Bess Dawson-Hughes, M75, a senior scientist at the Jean Mayer USDA Human Nutrition Research Center on Aging at Tufts. That two-year study of 146 people sought to determine whether vitamin D supplementation could halt or actually reverse the progression of osteoarthritis of the knee. The researchers found no evidence to support that; their findings were published in the *Journal of the American Medical Association* in 2013.





But that doesn't mean the two studies contradict each other.

McAlindon says that a limitation of his clinical trial "is that for ethical reasons, we could not enroll people who are medically deficient in D, so none of the participants was really deficient. Therefore, we couldn't rule out the possibility that people who are extremely deficient in D might experience some benefit from vitamin D."

## FOOD INSIDE OUT

Who measures all those nutrients in what we eat, anyway?

BY HELENE RAGOVIN

**NEXT TIME YOU'RE** in the supermarket checking out the Nutrition Facts panel on a product or entering what you ate for lunch into a fitness app, you can thank researchers at the Jean Mayer USDA Human Nutrition Research Center on Aging at Tufts. They are among the scientists all over the country who figure out what, exactly, is in our food.

"If you go into Whole Foods right now and find the bagged kale, they have the vitamin K content advertised right on the bag—and that came from here," says Sarah Booth, Ph.D., senior scientist and director of the center's

Vitamin K Laboratory. In fact, any nutritional data that includes vitamin K owes that information to Booth's lab, the only one in the country that analyzes vitamin K content for the U.S. Department of Agriculture.

The work is part of the National Food and Nutrient Analysis Program, which systematically samples food from across the country for its nutritional composition. The results are entered into the USDA food composition database, a virtual treasure trove of nutritional information. (Visit the database at [ndb.nal.usda.gov](http://ndb.nal.usda.gov).)

While this information is undoubtedly of interest to health-minded consumers, it also serves much broader purposes. "The activities we do have far-reaching impact, for clinical use and public policy, in addition to research activities," says Booth. It is the statistical

foundation for all national and local dietary assessments—for instance, it's the bedrock of the mammoth National Health and Nutrition Examination Survey (NHANES), which collects data about what the Americans are eating. Dietitians use the database in clinical settings to develop diets for their patients; policymakers use it to estimate the nutritional content of school lunches or to help formulate the national nutritional standards. It's also a vital tool for nutrition researchers, particularly those doing epidemiological work that examines the dietary patterns of large populations.

Jeffrey Blumberg, Ph.D., a senior scientist in the Antioxidants Research Laboratory, is another HNRCA researcher who contributes data to the USDA. In his work, which focuses on phytochemicals—chemical compounds found in

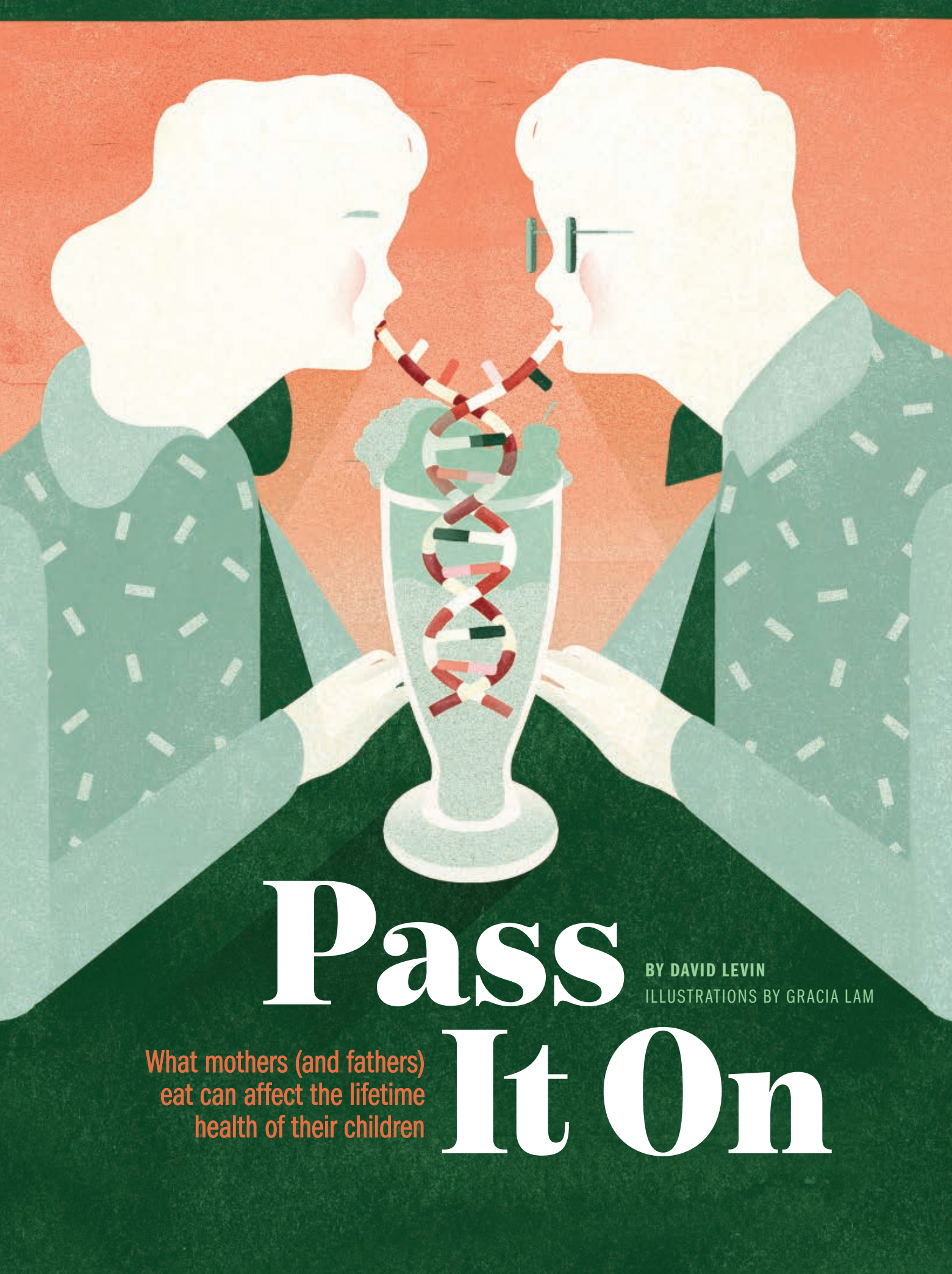
plants—he often conducts nutrient analyses, especially when he's doing a dietary intervention study.

"I need to know exactly what I'm feeding someone—exactly what's in that fruit or vegetable or whole grain," he says. The nutritional composition of plant foods varies based on growing conditions, and for intervention studies, in which Blumberg investigates the effects of specific amounts of nutrients on specific biological markers, a database average is not precise enough.

But the averages are valuable for epidemiologists. So after Blumberg obtains this data, he will often share it with the USDA. It is only in the last 15 to 20 years that the USDA has included nutrient categories like the carotenoids and flavonoids that Blumberg studies.

So how exactly do scientists ferret out the individual nutrients? Each food works somewhat differently, Booth says, but basically, the foods are broken down through a series of physical processes and chemical interactions. In the case of a thick, leafy bunch of emerald-colored kale in Booth's lab, for example, the chain starts with a simple mortar and pestle, and ends, many steps later, with a pencil-thin, pale green line of vitamin K captured in a test tube. Then it's ready to be measured by the scientists—and, later, touted by the marketers on the front of a bag.





# Pass It On

What mothers (and fathers)  
eat can affect the lifetime  
health of their children

BY DAVID LEVIN  
ILLUSTRATIONS BY GRACIA LAM



**I**N THE WINTER OF 1944, THE WESTERN NETHERLANDS Faced a famine of epic proportions. A Nazi blockade had stopped all food or fuel from entering the region, forcing residents to eat whatever they could scrounge up—sometimes even grass or tulip bulbs. Many consumed as little as 600 calories a day, and by the time the famine eased that spring, more than 20,000 people had starved to death. It was a historic disaster that later provided a bittersweet opportunity for researchers. Because the famine had struck an otherwise well-fed community, it offered a unique chance to study how temporary malnutrition might affect long-term health—not only for those who had survived the disaster, but also their offspring.

While combing through Dutch medical records in the 1990s, epidemiologists in Britain and the Netherlands began to notice that thousands of children born to mothers who were pregnant during the famine tended to have low birth weights. That in itself wasn't surprising, however. What shocked the researchers was that these birth weights often corresponded with high rates of heart disease, obesity and diabetes late in life—ailments that popped up decades after exposure to famine in the womb.

"That was really the first time that researchers realized parental nutrition could have an impact years down the line," says Simin Nikbin Meydani, director of the Jean Mayer USDA Human Nutrition Research Center on Aging (HNRC) at Tufts. That finding, called the "Barker Hypothesis" (after David Barker, the British epidemiologist who championed the notion), was not without controversy, in part because the children who survived pregnancy during the famine may have been somehow different from those who did not. But it did open up a new area for scientific exploration—one that Meydani and other HNRC researchers are able to focus on through better-controlled experiments. "We're starting to gain a much better understanding that what happens to you early in life, and what happens to

your parents, has a significant impact in terms of how you grow up and respond to different diseases," she says. "It's a really exciting concept."

The thought that our offspring could be affected by our own nutritional circumstances is a humbling one. Think about it: The health of your children as they reach old age might be tied to the diet you or your partner ate before your kids were born. So how, exactly, is that even possible?

## CHEMICAL BOOKMARKS

According to researcher Jimmy Crott, that's an ongoing question. Crott is a scientist at the HNRC and an assistant professor at the Friedman School, where he studies the link between nutrition and cancer. He says the answer may not necessarily lie in a parent's genes—rather, it's in the way those genes are turned on and off.

In every DNA molecule lies a sort of master plan for the entire body. Think of it as a cookbook of sorts—it holds tens of thousands of recipes that let it create any sort of tissue, enzyme, hormone or other substance in the human body. Yet somehow, our cells are able to browse all this information in an orderly way and extract only the bits needed to do their jobs. Cells in the pancreas, for example, turn to recipes for making insulin, whereas cells in the gall bladder home in on

ones for creating bile. There's no single mechanism that allows cells to do this, Crott notes. Rather, it's a combination of processes, including one researchers collectively call the epigenome.

"The epigenome is essentially a set of modifications to DNA that don't change the genetic code, but instead sit on top of it," says Crott. In the process, it acts as a set of chemical bookmarks that flag certain sections of DNA, directing a cell's attention to specific genes. The epigenome can also mask parts of DNA, making those genes unavailable. By selecting which genes are readable at any given time, it effectively controls how a cell can use its genetic code. The catch, Crott says, is that external factors, such as environmental pollution, aging and diet, may affect how accurately those bookmarks are placed, and how well they're maintained.

Although the epigenome uses a number of methods to turn genes on and off, one major process is DNA methylation. This happens when a molecule called a methyl group binds onto a section of DNA, rendering certain genes unreadable. With a normal, healthy diet, Crott says, this methylation usually works just fine. Take away key nutritional components like folates (one of the B vitamins), however, and it can start misbehaving.

"Folate and related B vitamins are very important for shuttling methyl groups around in the cell," Crott says. Without them, it becomes more difficult to bookmark or mask particular genes, which throws a wrench into the cell's epigenetic works. "An abundance or lack of folate certainly isn't the only thing that affects methylation," Crott says, "but if you don't have the right raw materials, certain parts of the machine can be compromised."

If the methylation process is damaged, it can leave cells with a major information management problem. Bookmarks that normally let the cell



focus on specific genetic recipes can suddenly go missing, or show up where they're not expected, causing the wrong genes to be read at the wrong time. That can result in a host of health problems, ranging from obesity to heart disease—even certain kinds of cancer.

In 2011, Crott and his research team tested this idea in pregnant mice. Some were given foods packed with folate and related B-vitamins, while others were fed smaller amounts of those nutrients. As it turned out, mice that ate a folate-rich diet during pregnancy had offspring with lower rates of intestinal cancer than their peers, whose mothers had been fed a regular diet. When Crott's team analyzed the DNA of those "lower-folate" mice, it made a startling observation: A gene called *Sfrp1*, which can help suppress tumors, was less active than normal, leaving those mice susceptible to disease.

Logically, this makes sense. As a fetus develops, it gets its nutrients directly from the mother, so any major imbalances she experiences in her own diet can alter its growth. Surprisingly, however, it's becoming more and more clear that what a father eats can play a major role as well.

Unlike egg cells, which form only once in life (as a female fetus develops), sperm cells are created constantly, and so might be particularly sensitive to their current environment. If a father's nutrition suffers, even on a short-term basis, it could cause epigenetic changes in his sperm, some of which may affect the health of his future children.

"Everyone pretty much accepts that what a mother does during pregnancy influences her unborn child. But paternal influence is really a new concept," says Meydani. "It means you can't blame only the mothers anymore—fathers have to take some responsibility for how children will turn out as well."



**“Everyone pretty much accepts that what a mother does during pregnancy influences her unborn child. But paternal influence is really a new concept.”** —Simin Meydani

#### NATURE AND NURTURE

These new findings raise some existential questions. Are we doomed to feel the effects of our parents' environment as we age? If they experienced nutritional extremes, like famine or obesity (which has also been found to change the epigenome), will we inevitably face disease later in life?

Not necessarily, Meydani says. The fact that the epigenome is so easily affected by our nutrition can swing both ways, and it may actually be possible to counteract some of the risk you inherited from your parent's nutrition by making certain lifestyle changes. That's particularly the case for conditions like obesity, says Susan Roberts, director of the HNRCA's Energy Metabolism Laboratory. "About 50 percent of body-fatness variability is inherited. The other 50 percent is attributable to lifestyle, and much of that lifestyle is learned," she says.

For the most part, she says, what adults cook for dinner is what's on the table for children, so kids learn to eat and enjoy the foods their parents eat. If

that food isn't healthy, there's a greater chance that children who are already predisposed to gaining weight will become obese.

To break this cycle, Roberts is working on finding ways to combat obesity at an early age and educating parents and families to encourage healthier eating. "I think the biggest thing is really habit formation," she says. "Ninety percent of the things we do, we sort of do by rote, and food choices are no different."

Rethinking disease prevention in this way may be the key to healthy aging, says Meydani. What we do now, after all, doesn't just affect us; it can affect the next generation, too. "We shouldn't only be thinking about disease prevention during adult life. That might not be enough," she says. "It needs to start very early in childhood and be a continuous process. In fact, your parents have to start early in order to give you the best chance of reducing your risk of disease."

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# FEAST *for the*

BY MARTELLE ESPOSITO, N11,  
MPH11, AND JOEY ZELEDÓN



THERE'S NO REASON THAT THE DESIGN TECHNIQUES USED BY FOOD companies to make junk food irresistible can't be used to make fruit and vegetable snacks appealing, too. Food design, after all, is about more than food—it's also about creating an experience. Anyone, from food companies to moms and dads, can use these strategies to create fruit and vegetable snacks that kids—and adults—will enjoy.

**FOCUS ON RITUAL.** As children in the 1990s, many of our favorite (if not necessarily healthy) snacks involved ritual. There was something wonderful about spreading “cheese” on crackers with a stick to make your own sandwiches. There was something satisfying about cutting out the perforated shapes in

“fruit” leather before eating them.

The same strategy can be applied to fruit and vegetable snacks. For example, place carrot sticks into a classic french-fry carton lined with wax paper. The subtle crinkling of the package as each carrot is removed and then dipped in a dollop of hummus

adds a touch of delight because the consumer is engaging with the food.

**SHOW, DON'T TELL.** Have you ever received a bouquet of fruit cut into flower shapes? The vibrantly colored fruit is transformed into an appealing display without losing the beauty and identity of the fruit itself. Similarly, Japanese parents make use of the colors and textures found in vegetables, fruit, rice, fish and other whole foods to create bento boxes for their children's lunches. The food is not processed beyond recognition, but celebrated in a beautiful scene.



# EYES

Simple design tricks  
make healthy snacks as  
appealing as junk food

PHOTOGRAPHS BY RUSSELL BLANCHARD  
AND JOEY ZELEDÓN

The classic lollipop showcases the colors and shape of the candy through a transparent wrapper and a simple, functional stick that doubles as a pedestal. Presenting fruits and vegetables in a similar way celebrates their natural beauty and elevates them to a treat status.

**CREATE PURPOSEFUL PACKAGING.** If you were to see chocolates scattered on a table, they would look like a bunch of brown blobs. However, when they are placed in individual, textured, shiny wrappers in a beautiful box, they are elevated to a special treat. The experience of opening the carefully crafted package

creates anticipation that enhances the delight of eating the chocolates.

The same technique can be applied to a fruit cocktail. An assortment of berries placed in the compartments of a chocolate box feels more like a delicacy. It also makes for a slower eating experience, as each piece is savored.

**AVOID MONOTONY.** If a snack contains a variety of contrasting but complementary ingredients, we are likely to eat more of it. In the case of junk foods, this is a bad thing, but combining different healthy foods into one snack presents an opportunity. Additionally,

including a small, calorie-indulgent food in the combination may capture a consumer's attention, such as a bit of milk chocolate with fruit. Consider, also, the timing of the indulgent ingredient. Designing it to be eaten at the tail end of the snacking experience can encourage the consumer to eat the fruits or vegetables first.

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# RUDE AWAKENING

Cutting back on sleep  
can pack on the pounds.  
The question is, why?

BY MICHAEL BLANDING ILLUSTRATION BY JULIETTE BORDA

YOU PROBABLY KNOW THIS RITUAL: THE KIDS ARE in bed, the television is on, and you reach for the chips or the ice cream. Before long, it's 1 a.m., and you are dreading your alarm clock in the morning as you guiltily pick up the empty bag or pint container from the floor. Substitute your own late-night binge, but the result is the same: You've stayed up late and overeaten again.

When it comes to studying the causes of weight gain and obesity, nutrition researchers rightly focus on the interaction between diet and exercise. They're just starting to understand the influence of an activity that humans engage in for a third of their lives—sleep.

A growing body of research over the past few years has found that lack of sleep is closely associated with weight gain. "At this point, the relationship between sleep and obesity has been well-established," says Hassan Dashti, M.D., who was lead author of a paper in the January 2015 issue of the *American Journal of Clinical Nutrition* that

examined that relationship and of a review article on sleep and diet published in the journal *Advances in Nutrition* in November. The question is, why?

"It could be related to increased intake or lack of physical activity," says Dashti, who received his Ph.D. from Tufts in 2015 and is a dietetic intern at Brigham and Women's Hospital. "And if we find that it is related to intake, then we need to find out what types of food people are eating more of and whether they are engaging in specific dietary behaviors." Other researchers have looked at hormonal, psychological and sociocultural factors, and Dashti himself has concentrated on genetic factors that may mediate the relationship.

All of this research points to the inescapable conclusion that while getting more sleep may not be a magic bullet for losing weight, it's an integral and oft-overlooked part of the puzzle in helping us to maintain a healthy weight. "People who go to bed late or sleep less tend to eat more, especially after 8 p.m., contributing to an increase in weight,"



says Friedman School professor José Ordovás, director of the Nutrition and Genomics Laboratory at the Jean Mayer USDA Human Nutrition Research Center on Aging at Tufts and Dashti's doctoral thesis adviser.

In the January paper, Dashti, Ordovás and other researchers analyzed nine studies that tracked health and lifestyle factors over time and involved nearly 15,000 people of European descent. After adjusting for age, sex and location, they found a small but significant association between the length of time people slept and their body mass index (BMI). Each extra hour of sleep translated to a slight decrease in BMI. Men, however, benefitted from the extra sleep twice as much as women.

When Dashti and his colleagues looked more closely at different age and gender groups, they found compelling evidence that all those late-night snacks may be taking their toll. "Individuals who sleep less tend to eat more foods higher in saturated fat," says Dashti. "And we find additional associations with women—those who sleep less also tend to eat more foods higher in carbs and lower in polyunsaturated fats, the healthier fats."

Those results are consistent with previous analyses of sleep and diet. Michael Grandner, a psychologist and director of the Sleep and Health Research Program at the University of Arizona School of Medicine, looked at data from the National Health and Nutrition Examination Study (NHANES) in 2013, and found that short sleepers of five to six hours a night consume an average of 50 extra calories compared to normal sleepers of seven to eight hours—an increase of 2.3 percent.

What is more important, short sleepers had less variety in their diets, ate more unhealthy foods and drank more alcohol.

The results seem consistent even over the very long term. For a 2011 study published in the *New England Journal*

*of Medicine*, Dariush Mozaffarian, the dean of the Friedman School, looked at weight gain over 20 years in more than 120,000 men and women in three separate studies. He found that those who slept six hours or less per night had greater weight gain than those who slept seven to eight hours. "These long-term observations support the results of short-term experiments that reduced sleep changes our hunger and cravings for specific foods, especially less healthy, more highly processed junk and snack foods," he says.

Indeed, some small-scale lab studies, for which people were restricted to less than six hours of sleep for one or more nights, have supported the association between lack of sleep and higher food intake. Analyzing five of these studies, Columbia University obesity researcher Marie-Pierre St. Onge found that in four of them, calorie intake increased substantially as sleep declined—an average of 300 to 550 calories a day—mostly from late-night snacking.

### FUELING AN ALL-NIGHTER?

In part, those increases can be explained as compensation for the increased physical activity of being awake longer—but not completely. "If you are awake, you are more likely to burn more calories. But the energy intake is so much greater than what it should be," says Kristen Knutson, a biomedical anthropologist at the University of Chicago. "People are overeating way more than they need to make up for the extra energy expenditure of being awake."

Other laboratory interventions have pointed toward metabolic reasons for overeating. Several early studies found a decrease in the amount of leptin (known as the "satiety hormone" for its role in inhibiting hunger) and an increase in ghrelin (known as the "hunger hormone" for its propensity to stir appetite) in subjects when the amount of time they were allowed to

sleep was limited. More recent studies have had difficulty replicating those findings; however, some researchers believe that complex chemical changes may be driving the propensity to overeat when we don't sleep, at least in part.

Knutson points to more recent studies that have found an increase in cortisol, the "stress hormone," in short sleepers. That increase is particularly prevalent in the evening—the same time studies have shown short sleepers overeat. "You could imagine from an evolutionary perspective, if lack of sleep is interpreted as a stressor, it may be stimulating a flight-or-fight response, for which you would need more energy," says Knutson. "People may be choosing food that is more energy-dense as a result."

### TIRED BRAIN, POOR CHOICES

Other research has pointed less toward a biologically driven explanation for increased eating by short sleepers in favor of one that is more psychologically triggered. Jean-Philippe Chaput of the Children's Hospital of Eastern Ontario Research Institute, who wrote an editorial in the *American Journal of Clinical Nutrition* about Dashti's paper, has found that weight gain is highest among short sleepers with personality traits that make them less inhibited about eating, implying they are not eating just out of need.

"After eating good meals, you don't feel hungry, but there is always room for dessert," says Chaput. "When you sleep less, you have more time to eat. It may be that people are eating out of pleasure to the brain rather than any kind of hormonal explanation." The drive to eat for pleasure may be compounded by poor cognitive ability because of sleep loss, UC Berkeley sleep psychologist Matt Walker found in a 2013 study.

Hooking research subjects up to an fMRI (functional magnetic resonance imaging) machine, Walker's lab found that after a sleepless night, participants





## **“PEOPLE ARE OVEREATING WAY MORE THAN THEY NEED TO MAKE UP FOR THE EXTRA ENERGY EXPENDITURE OF BEING AWAKE.”**

showed impaired functioning in the brain’s frontal lobe, which controls decision-making, while activity increased in the amygdala, associated with the brain’s reward system. When presented with a range of food options, these participants were more likely to choose burgers, pizza and doughnuts over fruits and vegetables.

“We’ve known for a long time that sleep loss impairs brain function,” says Grandner. “When you are well-rested, you are very good at sorting information. But when people are sleep-deprived, the stuff you are supposed to ignore gets more distracting.”

Dashti’s own recent research has suggested that short sleep doesn’t affect everyone equally—in fact, genetic variations may explain the propensity to put on extra calories. In his recent paper in the *American Journal of Clinical Nutrition*, Dashti looked at variants in the so-called CLOCK gene (the acronym stands for Circadian Locomotor Output Cycles Kaput)—an important regulator of our sleep-wake cycle.

“It’s one of the core genes that make up your biological clock,” says Dashti. “If that gene is not functioning properly, your biological clock may not be working.” Dashti found, however, that among some people with variants of the CLOCK gene, sleeping longer led to eating more healthy fats and proteins, decreasing the genetic risk of becoming obese.

The research augments studies by Ordovás and others that have shown how patterns of genetic variants can lead to increased consumption in other ways, including a genetic propensity to eat larger portions or to eat more when bored. Adding sleep into the mix,

Dashti’s research suggests one way to combat genetic patterns.

In another paper, published in the journal *Diabetes Care*, Dashti found that getting sufficient sleep could decrease the risk of diabetes among those with other gene variants related to the biological clock. “If you have this genetic predisposition to elevated blood sugar, then following normal and recommended sleep duration of seven to nine hours a night may help reduce this genetic predisposition,” he says.

These gene variants are not rare—by some estimates they affect 40 to 50 percent of the population. Changing sleep patterns may be one way to help control cardiometabolic diseases like diabetes and high blood pressure. “We are really focused on finding ways for people with specific genetic profiles to follow specific lifestyles to reduce their genetic predisposition to cardiometabolic diseases,” says Dashti.

### **THE MISSING PIECE**

Of course, sleep is just one piece of the puzzle in the prevalence of such diseases, but it may be a way to make widespread changes in public health. It is well-established that people from disadvantaged socioeconomic backgrounds suffer disproportionately from such diseases—and also that they sleep less, due in part to working multiple jobs or shift work and other time pressures. “People aren’t sleeping five hours a night because they hate sleep; rather they feel like they don’t have time for sleep,” says Grandner. “The question is, could sleep be driving the wedge even further by maintaining some of these health problems? Is sleep just tagging

along for the ride, or is it making things worse?”

Addressing sleep problems may help improve health overall and spur other healthy changes. “It is much easier to intervene on sleep than on smoking or alcohol or diet or exercise,” points out Grandner. “We could potentially do some real good here.”

Sleeping more may not help people lose weight, per se, but studies have shown that it can help improve the effectiveness of existing diets. “When everyone is put on the same weight-loss diet, the short sleepers tend to lose less,” says Dashti. “A lot of health coaches emphasize the importance of diet and exercise, but they neglect sleep. It’s the missing third component.”

While much progress has already been made in teasing out the connection between weight gain and sleep, the research is still in the beginning stages. “It’s a very exciting moment in research, but we need to be careful not to oversell the results,” warns Ordovás.

Even so, asking questions about sleep should be part of any nutritionist’s strategy for helping patients eat better and improve their overall health, say these researchers. Neglecting the importance of the sleep we get is a missed opportunity for clinicians to affect real change. “We need to change the mind-set of people who think sleep is for slackers and people who aren’t hard-working, and realize it is part of a healthy lifestyle, along with good diet and good exercise,” says Knutson. “Sleep should be considered part of a healthy trinity.”

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# Tufts Nutrition TOP 10

## Overlooked veggies that are surprisingly good for you

Here, in no particular order, are some vegetables that deserve a second glance for their nutritional benefits, according to Jeffrey Blumberg, a Friedman School professor and scientist in the Antioxidants Research Laboratory at the Jean Mayer USDA Human Nutrition Research Center on Aging at Tufts, and Helen Rasmussen, a Friedman School instructor and senior research dietitian at the center.



### ARTICHOKE

The artichoke packs a nutritional punch, though identifying the edible part is somewhat tricky for the uninformed. The tender artichoke heart is at the bottom of the vegetable. Once steamed, the cactuslike leaves can be eaten by biting down on the leaf and scraping the tender flesh into your mouth. The edible parts of the artichoke contain fiber, folate, lutein, zeaxanthin, potassium and vitamins K and C. It is very low in calories (64 in one medium artichoke).

### PURPLE POTATO

These tubers, which have purple skins as well as flesh, are popular in South America. You'll most often find the younger, golf-ball-sized ones in supermarkets, even though the mature

root can grow to the size and shape of a white potato. The nutritional profile of purple potatoes is similar to that of russet potatoes, with both being good sources of potassium and fiber. (Keep the skins on!) Purple potatoes also contain the flavonoid anthocyanins, which is associated with healthy blood pressure and reduced risk of some forms of cancer.

### FENNEL

Fennel is a flowering plant related to the carrot family. One half of a bulb is a mere 36 calories, and hits the jackpot in vitamins A, C and K; carotenoids (beta carotene, lutein and zeaxanthin); and potassium. It

is also a good source of fiber. While fennel is commonly used in Italian and French cooking, it is often misunderstood and neglected in the U.S. Is it a vegetable, an herb or a spice? The hollow stalks of fennel are considered an herb, having an appearance similar to dill. They're usually chopped and sautéed, and then added to salads, soups or vegetables with butter or olive oil. But the part of fennel most commonly used in cooking is the cultivated bulb, called the Florence fennel. Its inflated leaf base has a mild anise flavor with a sweeter taste. Sliced Florence fennel can be grilled, roasted or baked.

### JERUSALEM ARTICHOKE

Contrary to its name, the roots of this root vegetable started in North America, where explorer Samuel de Champlain came across it and described its flavor as similar to that of an artichoke. The Jerusalem part of its moniker may have come from *girasole*, the Italian word for sunflower, as this plant is the tuber of a sunflower. Also known as sunchoke, this low-calorie food (55 calories for a half cup) has piqued the interest of health professionals,







because it contains inulin. A starchy compound, inulin is classified as a prebiotic, because it supports the growth of beneficial bacteria in the bowel. Sunchokes are slightly sweet and are often served in stir-fried dishes or chopped raw in salads.

### **CELERIAC**

To the uninformed cook, the first reaction to celeriac, also known as celery root, may be, “Is this a joke?” The appearance of this uncontrolled, massive ball of roots and flesh can make one wonder how it ever became part of any edible table fare. This delicious, earthy, celery-flavored vegetable can be used raw in salads or cooked and mashed along with potatoes. A half-cup serving yields only 21 calories and has plenty of vitamin K and potassium.



### **OKRA**

A member of the hollyhock family, this vegetable is technically a fruit. Its ability to grow in drought-resistant climates makes it an attractive food in countries all over the world. It grows wild in Africa, Asia and Australia, and it's a popular thickening ingredient in gumbo stew. Turned off by the gooey liquid emitted during cooking? Cook the okra separately over a hot fire and then add it to the dish. This low-calorie food (12 calories for five pods) adds flavor to any meal, as well as lutein, vitamin K and potassium.



### **PARSNIP**

The parsnip is a root vegetable with a culinary history dating back to the ancient Greeks and Romans, who cultivated it. The parsnip can be eaten raw, but is usually cooked—it becomes sweeter that way. In either case, parsnips are a good source of fiber and vitamin C and contain more potassium than many other vegetables.

### **COLLARD GREENS**

Collards are a cruciferous vegetable, from the same family as broccoli and cabbage. These slightly bitter leaves are a staple in Southern cooking, along with kale, mustard greens and turnip greens. They are an excellent source of vitamins C and K as well as dietary fiber. Collards also contain sulforaphane, which may help prevent some forms of cancer, and very large amounts of the carotenoid lutein, which concentrates in the brain and retina. It's helpful to cut collards into small pieces so they cook more quickly, helping avoid the unpleasant sulfur smell associated with overcooking them.

### **KOHLRABI**

This root vegetable tastes similar to a broccoli stem or cabbage heart, but milder and sweeter. It can be consumed raw in salads and slaws or cooked. Kohlrabi is often found in German

dishes as well as Kashmiri cuisine. It is an extraordinarily rich source of vitamin C, with one serving providing the full recommended daily value.



### **ROMANESCO BROCCOLI**

Also known as Romanesque cauliflower, this is an edible flower bud in the cruciferous family and an ingredient in Italian cuisine, though harder to find in America. It has the crunchiness of cauliflower but a delicate, nutty flavor. Its chartreuse color and unusual fractal shape make it an unusual addition to common dishes. Romanesco is a good source of vitamins C and K, fiber and carotenoids.





# SIPPING TOWARD DISASTER

Soda and other sugary drinks are  
even worse for us than we thought.  
Can we kick the habit?

PHOTOGRAPHS BY CHRISTOPHER HARTING

BY JULIE FLAHERTY

**I**N PUBLIC HEALTH CIRCLES, it's often called the "low-hanging fruit." If people could just kick the sugar-sweetened beverage habit, it would make a huge dent in the number of empty calories they consume. Sugary drinks often have no nutrients other than sugar, so it's a simple cut-it-out message that even kids can understand—no fussing with fiber grams or glycemic index rankings, no shopping for fruits and vegetables.

Public health officials have been banging the drum against sugar-sweetened beverages for years, and over the last decade, people seem to have started listening. Sales of soda, by far the biggest conduit of liquid sugar in the American diet, are declining. Sugared soda sales have dropped by more than a quarter since the late 1990s. A recent Gallup poll found 61 percent of Americans are actively trying to avoid soda, a big change from the 41 percent in 2002.

It is a public health success story, but in many ways the battle has just begun. According to a 2013 analysis in the *American Journal of Clinical Nutrition*, Americans still get about 150



calories per day from sodas, fruit beverages and sports and energy drinks—about a can’s worth for everyone in the country. Other countries average even more. And certain pockets of the population drink far more than others.

We are still discovering just how high the stakes are. Friedman School researchers recently calculated that sugary drinks account for 184,000 deaths worldwide each year, by way of diabetes, heart disease and obesity-related cancers. But even if you are not obese, or even overweight, scientists are finding that sugary drinks can still do damage. All of which has made preventing people from developing the habit in the first place a priority for Tufts researchers.

## NOTORIOUS S.S.B.

Nutritionists are usually reluctant to demonize a particular food, yet they are unabashedly ganging up on sugar-sweetened beverages. Which leads to the question: If sweet drinks are indeed “liquid candy,” what makes them worse than peanut butter cups or gummy bears?

To start, there’s volume. “We’re not talking about a food people treat as a sometimes food,” says Christina Economos, N96, the New Balance Chair in Childhood Nutrition at the Friedman School. “We’re talking about a liquid source of calories that people

have embedded into their diet so that it’s daily or multiple times a day.”

According to a 2010 study by the National Cancer Institute, children ages 14 to 18 got four times more calories from soda and fruit, sports and energy drinks than they did from candy. It was the largest single source of calories in their diet.

Whether the sweetener is high-fructose corn syrup or old-fashioned cane sugar, a can of soda sends a rush of sugar to the blood. Repeated blood sugar spikes can lead to inflammation and insulin resistance. Studies have also shown that liquids may not satisfy hunger the way that solid foods do, making it easier to go overboard on daily calories. “Sugar-sweetened beverages may be the perfect storm of harmful effects: a large dose of refined carbs, very rapid digestion and decreased ability to compensate for the extra calories,” says Dariush Mozaffarian, dean of the Friedman School.

Observers liken this opposition to sugared beverages to the fight against big tobacco. And as with that battle, researchers first had to prove that the substance in question can make you sick. For a while, it was mostly a highly plausible theory. But over the last decade, says Gitanjali Singh, a research assistant professor at the Friedman School, many observational studies have shown a link between

drinking sugary beverages and weight gain, which in turn is a major risk factor for diabetes and cardiovascular disease. Then, in 2012, the *New England Journal of Medicine* published the results of a trio of controlled trials showing that cutting sugary drinks out of the diet helps people lose weight or at least gain less. “The evidence is all there,” Singh says. “I wouldn’t say that it is controversial anymore.”

Researchers are uncovering other ways in which drinking sugar can harm your health. According to a recent study published in the *Journal of Hepatology*, a daily sugar-sweetened beverage habit may increase the risk of nonalcoholic fatty liver disease. Being overweight or obese is the biggest risk factor for this illness, which affects up to one in five adults and can silently lead to cirrhosis and liver failure. The study, led by Jiantao Ma, N14, then a doctoral student at the Friedman School, looked at 2,634 white, middle-aged men and women, and found those who drank more than one sugary drink a day were 56 percent more likely to have the disease than those who drank none. The association held when they controlled for age, sex and Body Mass Index (BMI).

“That means [that] irrespective of BMI, people who drink more sugary beverages have a higher chance of having fatty liver disease,” says senior

**SUGAR TALLIES:** The photo below shows the sugar content for some typical bottled drinks, ranging in size from 11.5 to 20 fluid ounces. The sugar content for 8-ounce servings would be **A.** Lemon-lime soda: 6 tsp. **B.** Lemon tea: 4 tsp. **C.** Sparkling citrus beverage with natural pulp: 6 tsp. **D.** Sports drink: 3 tsp. **E.** Cola: 6 tsp. **F.** All-natural lemonade: 7 tsp. **G.** Sparkling grapefruit drink with fruit juice: 5 tsp. **H.** Citrus soft drink: 7 tsp. **I.** Root beer: 7 tsp. **J.** Fruit-flavored punch, sweetened with sugar and sucralose: 3 tsp.





author Nicola McKeown, a scientist in the Nutritional Epidemiology Laboratory at the Jean Mayer USDA Human Nutrition Research Center on Aging at Tufts and an associate professor at the Friedman School.

Sweet drinks may also influence the fat you accumulate in other parts of your body. Another study by McKeown and Ma, published in 2014 in the *Journal of Nutrition*, looked at visceral fat, the kind that packs in around organs; scientists think it is metabolically more dangerous than subcutaneous fat, the kind just under the skin. In a study of 2,596 middle-aged adults, they found that people who drank at least one sugar-sweetened beverage a day had 10 percent more visceral fat than people who drank none.

There are signs that drinking sugar can mess with your health even without the interim step of weight gain. For a study published in the journal *Obesity* in 2014, McKeown looked at people's cholesterol, triglycerides, insulin resistance, blood pressure and other biomarkers of heart disease risk and compared them to their sugar-sweetened beverage consumption. Adults who consumed one sugary drink daily were almost twice as likely to have metabolic red flags as those who drank none. And that wasn't just for people who are obese or overweight; the association held in normal weight individuals, too.

On the surface, a daily can of soda may not seem to affect a growing kid who burns lots of calories on the track team. "How important is it to decrease my child's soda or fruit drink intake if they seem to be pretty healthy? It's hard for parents to know," says Maria Van Rompay, N06, N10, a research associate and instructor at the Friedman School.

Van Rompay found clues when she studied a diverse group of Boston-area school children for a study published in the *Journal of Nutrition*. The children who reported drinking the most sugar-sweetened beverages showed the

highest levels of blood triglycerides, a risk factor for heart disease.

Over the course of a year, those children who reported they had cut back on their intake—by at least one can of soda per week—had the highest increase in their HDL levels, known as the "good" cholesterol. And this effect held true for children regardless of their weight.

## SUGAR-SOAKED POPULATIONS

Sugar-sweetened beverage drinkers tend to be poorer and have less education than nondrinkers. They are also more likely to be minorities. And while the national numbers point to an overall decrease in the amount of sugary drinks we down—which is encouraging—consumption of sugary drinks among many black and Mexican-American children is still high.

"They are consuming significantly more calories from sugar-sweetened beverages and juice than their white counterparts. So there is still a lot more work to do," says Economos. She expects a repeat of what happened when tobacco companies started losing their more affluent customers. "Some of the marketing and advertising will be shifted into lower-income communities, and the availability of those beverages will remain high and perhaps even increase in those settings."

That makes developing interventions that speak to those communities a priority, says Van Rompay. "Certain groups already have a lot of health risk factors; if they are ones who are continually consuming sugar-sweetened beverages, then additional focus needs to be placed on helping get the message out," she says.

Sweet beverage sales may be declining in the United States, but the problem is a global one, with some countries experiencing more dire health consequences. An analysis by Friedman School researchers published in the June 2015 issue of the journal *Circulation* estimated that worldwide, sugar-sweetened beverages are responsible for

# DRINKS WITH BENEFITS

Public health advocates are happy to see soda sales in decline. At the same time, they want to keep people from turning to sugary fruit drinks, lemonades, iced teas, sports drinks and energy drinks as substitutes. They are keeping a close eye on energy drink sales, which have been climbing rapidly and are expected to reach \$10.8 billion in 2015, according to market researcher Mintel.

"Although they are a small percentage of calorie contribution [to the average diet], they are on the rise," says Tufts' Christina Economos.

What to drink instead? Milk contains natural sugars, but it also has many nutrients that are lacking in the average diet. You will get vitamins and minerals from 100 percent fruit juice, as well as plenty of natural sugar, which is why the Robert Wood Johnson Foundation recommends limiting 100 percent fruit juice to 4 to 8 ounces per day, depending on age.

Many nutrition experts would like to see people switching to seltzer or plain old water.

"When you think about what to substitute for those liquid calories, water is an obvious choice, but there is a lot of evidence showing that other beverages, such as coffee and tea, are beneficial," adds Nicola McKeown. Just go easy on the sugar packets.

-J.F.

133,000 deaths from diabetes, 45,000 deaths from cardiovascular disease and 6,450 deaths from cancer. More than three-fourths of the deaths occurred in low- and middle-income countries.

“The remarkably high rates of disease related to sugar-sweetened beverages in Latin America and the Caribbean were striking,” says Mozaffarian, the senior author of the study. The reasons could be cultural, socioeconomic or both. Homemade sugar drinks, called “frescas,” are popular in those countries, as are store-bought sodas.

Of the 20 most populous countries they looked at, Mexico had the highest death rate attributable to sugar-sweetened beverages, at 405 deaths per million. The United States was second, with 125 deaths per million.

The effect was most prominent among young people. “In the U.S., for example, about 10 percent of all obesity- and diabetes-related deaths under age 45 were attributed to sugar-sweetened beverage consumption,” Mozaffarian says. “That’s a remarkably high proportion.”

The mortality study drew on the results of another analysis done by the same group, published in *PLOS ONE*, which found that worldwide, younger people drink much more sugar than older people. This brings up the question of what will happen when those young people get older. It could be that they will grow out of their penchant for sweet drinks, the way many tastes mature. Or, “it could also be that the environment has changed over the past 40 to 60 years and that this is the norm now,” says Singh, the lead author of the global studies. If young people keep drinking sugar as they age, it will only exacerbate the cost of obesity-associated health care and create economic losses from disability.

Singh says it is hard to predict whether soda consumption will decline worldwide as it has in the United States. It is possible that things could get worse before they get better. “If

you look at lower- and middle-income countries, the food environments are changing very quickly. They have high levels of processed foods, and suddenly a lot more people can afford them. Those countries are very much a target of advertising and marketing.”

All the more reason that public health efforts have to be refined so that they reach specific countries and even certain age groups within countries, Singh says. “We can’t have a one-size-fits-all approach—we have to have direct and targeted policies.”

## WHILE THEY’RE YOUNG

Demonstrating the deadly effects of sugary drinks is important, says Economos. “But the question is then, what do you do about it?”

As director and vice chair of ChildObesity180 at Tufts University, a research-based think tank working to turn around the obesity epidemic, Economos knows that people can change what they drink, especially if you get to them while they are young.

She saw the signs that this could work while leading the Shape Up Somerville project, where schools, restaurants, city officials and others teamed up to get children in that city to eat better and exercise more. When the researchers analyzed the data, they found the kids spent less time in front of screens and more time being active, but the most significant change they made to their diets was reducing their sugar-sweetened beverage intake by about a can a week.

Since then, ChildObesity180 has made reducing sugary drinks a cornerstone of several of its projects. Its Healthy Kids Out of School initiative has been working with volunteer-led programs, including the Boy Scouts, 4-H, Pop Warner and the YMCA, to spread nutrition education to the hundreds of thousands of children those groups work with. Of all the nutrition messages they could push, they started

with “Choose water instead of sugar-sweetened beverages.”

ChildObesity180 also worked with the Silver Diner, a family restaurant chain in Virginia and Maryland, to make changes to its children’s menu. Among them: serving milk or 100 percent fruit juice with all entrees. Soda wasn’t mentioned on the kids menu at all, though people could still order it. Before the change, more than a third of children ordered soda; two years later, less than a quarter of them did.

“That’s pretty exciting, because if you implement a default option like that, and you’ve got millions of kids eating out, that’s a big reduction in sugar-sweetened beverages,” Economos says.

Sugary drinks aren’t solely to blame for the obesity epidemic. Will focusing on this one piece make that big a difference? After all, drinking sugar-sweetened beverages is associated with other unhealthy habits, including lack of exercise and poorer diet overall.

Economos has long advocated for a multifaceted approach to improving nutrition, and would hate for the no-soda message to reach kids in a vacuum. “We need to do a better job at comprehensive health education in the early years so they understand the larger context,” she says.

That said, the message to stop drinking sugar is the kind of thing people can latch onto. “The rule of thumb with social marketing is ‘keep it simple,’ ” she says. It could be just one of several clear-cut nutrition messages that seep into the public consciousness.

And that, to many health advocates, is why the sugary-drink habit is a low-hanging fruit, one that is ripe for plucking. “It won’t be a magic bullet that’s going to solve all diet-related problems,” Mozaffarian says. “Yet this is a simple and straightforward first step.”

**JULIE FLAHERTY**, the editor of this magazine, can be reached at [julie.flaherty@tufts.edu](mailto:julie.flaherty@tufts.edu).



# From All Corners

UNIVERSITY, SCHOOL & ALUMNI NEWS

## MEDITATION IN MOTION

Research study volunteers and other friends of the Jean Mayer USDA Human Nutrition Research Center on Aging at Tufts were treated to an outdoor tai chi class as part of the center's first Go4Life event last fall. For many, it was their first foray into this gentle exercise that focuses on breathing. The event, which included a morning of presentations by HNRCA scientists, celebrated Go4Life Month, sponsored by the National Institute on Aging and the White House Conference on Aging to promote physical activity in older adults.



Guinea-Bissau, on Africa's Atlantic coast, is the 11th poorest nation in the world. "Just like us, they know that education is critical for their children's future," says researcher Nina Schlossman.



# Researchers Build a School

A nutrition study leads to an unexpected mission: fortifying young minds **BY JULIE FLAHERTY**

**P**ROFESSOR SUSAN B. Roberts and Adjunct Assistant Professor Nina P. Schlossman, J75, N86, went to the village of Dandu in Guinea-Bissau to do research on nutritional foods for mothers, infants and children. What they found was a very special relationship that goes beyond scientist and subject.

Dandu's 800 or so residents live in mud brick houses and farm the land for food, selling cashews for basic needs like clothing and soap. There are no stores, cars or electricity, apart from a single solar light in the village health center. "In Dandu 'possessions' are meager," says Roberts. "One time we went, we happened to have some empty gallon

water containers in the back of our truck. The villagers excitedly asked if they could keep them as they would be very helpful in their clinic." The clinic was barren of any medical supplies; the only equipment was a lone, worn table.

The Dandu residents could be considered to have many needs, but what they told Roberts and Schlossman they wanted most was a school. Children had

to walk many miles to get to the nearest one in another village, which meant many did not go at all.

The village elders, in particular, felt strongly about the need for a school. “They would like to see more opportunities for the next generation,” Schlossman says. “The link with the next generation is most important for them.”

At first, Roberts, the director of the Energy Metabolism Laboratory at the Jean Mayer USDA Human Nutrition Research Center on Aging at Tufts, and Schlossman, who runs the consultancy Global Food & Nutrition Inc., were overwhelmed by the request. But while spending time with the villagers for the nutrition research studies, “I realized what fine people they were—honest, thoughtful, committed to helping each other,” Roberts says. “As a result, we decided we wanted to help them more.”

Soon several people signed on as cofounders, including their Tufts colleagues Sai Das, Andrew Greenberg and Payal Batra. Many others donated.

The local partner for the nutrition research studies, International Partnership for Human Development (IPHD), was able to match their donations and oversee the construction of the Dandu school. The donations

paid for the building materials, desks, benches, books and even a new well. The villagers did the construction, and the Ministry of Education provided a teacher and two teaching assistants.

The new school quickly enrolled 170 children when it opened in January 2015.

“Seeing the kids in the school, in their classrooms, learning the alphabet and grammar was great. It was really inspiring,” Schlossman says. “My fantasy is to help the villagers with something else they really want, which is adult literacy and vocational training once the primary school gets established.”

Enrollment is now up to 270—so many that even with students attending in shifts, the villagers had to build two temporary classrooms out of palm leaves on the side of the school to accommodate them. That is why Roberts and Schlossman now want to raise another \$24,000 to build two additional permanent classrooms and a latrine.

Roberts calls it “a small amount of money when you think of the benefit we are providing here—not just for the children themselves, but also for their families and the Guinea-Bissau nation.”



To make a donation, go to [tuftsgiving.org](http://tuftsgiving.org), select “Friedman Nutrition” as the school and write in “Dandu school–HNRCA” as the area.

## REFUGEE CHAMPION



**SASHA CHANOFF, N04, F04,** was honored at the White House last year as a World Refugee Day

**Champion of Change.** Chanoff, a graduate of the Master of Arts in Humanitarian Assistance program at the Friedman and Fletcher schools, is the founder and chief executive of RefugePoint, a Cambridge-based organization that provides long-term help to the world’s most vulnerable refugees. Since founding the nonprofit in 2005, Chanoff has worked in more than 20 locations across Africa with people fleeing persecution in war-torn areas.

In November, he told WBUR’s “Radio Boston” that concerns about refugee resettlement programs allowing dangerous people into the United States are based on fear and not an understanding of the vetting process. Of the nearly 20 million refugees in the world, he said, less than 1 percent will have access to a resettlement program.

“We know that we have to take extraordinary cautions to select the right people for these programs,” Chanoff said. It may take years of corroborating interviews and fact collecting. “We get to know them.” When humanitarian groups recommend a refugee be resettled, he said, it is often “as a life-saving measure.”

## Come Join Us!

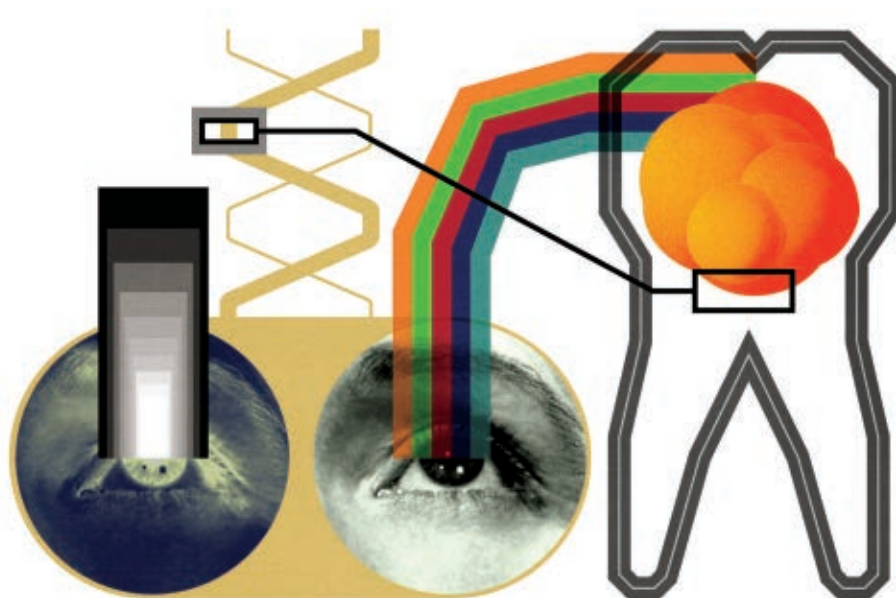
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## Visionary Work

Cells from dental pulp could be used to treat sight-stealing macular degeneration

**MORE THAN 15** million Americans suffer from age-related macular degeneration (AMD), a disease that can rob patients of their sight. It starts slowly. Over the course of months or years, lumps of cellular debris and new blood vessels can form in the retina, damaging tissue and causing progressive blindness—and in many cases, the effects of the disease are irreversible.

Researchers at Tufts are trying to improve those odds. They are exploring new ways to replace damaged retinal tissue using cells from an unlikely source: a patient's own dental pulp.

"[Dental] pulp cells and retinal cells share a common progenitor in the body," says stem cell biologist Behzad Gerami-Naini, an assistant professor at the School of Dental Medicine, who is leading the research. "As an embryo develops, certain stem

cells differentiate into retinal tissue, fat cells, bone cells or tooth pulp—so all those cell types are actually related on some level." Because the cells share the same origin, Gerami-Naini says it may be possible to "reprogram" them in the lab, gently coaxing them into becoming retinal cells.

The key to this cellular transformation, he adds, lies in manipulating a set of genetic instructions that tell stem cells which genes should be turned on or off at any given time. These instructions, called the epigenome, effectively act like a series of molecular bookmarks, flagging snippets of DNA that contain the recipe to make a nerve cell, retina, tooth pulp or other specialized tissue. By rearranging those bookmarks, he says, it's possible to alter which "recipe" a cell uses to determine its final form.

### CELL REBOOT

Gerami-Naini is no stranger to working with stem cells in this way. His team has already shown that it's possible to "reboot" human skin cells, sending them back into an embryonic-like form, called an induced pluripotent stem cell (iPS), which has the potential to become any type of cell in the human body. Using iPS cells as a starting point, the team has been able to grow healthy retinal cells that theoretically could be implanted into the eye to repair damage from macular degeneration.

There's a catch, however: The iPS process, which Japanese researchers pioneered in 2006, normally uses a lab-made virus to inject new genes into a cell's DNA that erase existing genetic bookmarks. The use of such viruses can create stumbling blocks to approval from the U.S. Food and Drug Administration, because they have the potential to cause unpredictable changes to a cell's genetic code.

"There are still many safety concerns," says Benjamin Chan, D10, DG13, a clinical instructor of orthodontics at Tufts who is a collaborator on the research. "In order to perform clinical trials, you have to first show there won't be any [unintended] viral effects [to the genome]."

Dental pulp stem cells, however, may help avoid those complications. Instead of relying on viruses, the Tufts team believes it may be possible to manipulate the pulp cells' DNA—effectively forcing them to change their form—by using existing chemicals and growth media.

Creating virus-free cells is just one part of the challenge, however. "Treating macular degeneration isn't as simple as just injecting new retinal cells into the eye," says team collaborator Sheldon Rowan, a scientist in the Nutrition and Vision Laboratory at the Jean Mayer USDA Human Nutrition Research Center on Aging at Tufts.



“The retina is a complex structure. Each cell has a specific orientation that needs to be maintained to keep the tissue healthy in the long run.”

To create tissue that could be used for implantation, Rowan says the research team first needs to grow its cells on a microscopic scaffold that mimics the underlying membrane of the retina. They’re working with David Kaplan, director of Tufts’ Bioengineering and Biotechnology Center, to build a series of tiny silk structures that recreate the weblike structure of the retina membrane. The researchers plan to grow their cells on these scaffolds to see whether they can generate a healthy piece of three-dimensional retinal tissue.

Gerami-Naini is quick to note that the research is still in the early stages, but if the team is successful, that could be good news for patients diagnosed with age-related macular degeneration.

—DAVID LEVIN

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**NUTRITION LEADERS.** The school celebrated nearly 35 years of history last September when it brought together all the men and women who have served as its leaders for the event “The Friedman School: Past, Present and Future.” From left are Stan Gershoff, dean, 1981-1993; Eileen Kennedy, dean, 2004-2011; Irv Rosenberg, dean, 1995-2004; Robin Kanarek, dean ad interim, 2011-2014; and Dariush Mozaffarian, dean, 2014-present, who was named the Jean Mayer Chair in Nutrition.

# The Right Balance

Gift boosts research on nutrition, aging, inflammation and disease

**WHEN ILLNESS STRIKES**, your immune system goes on the offensive, sending out chemicals that increase inflammation in your body to drive out harmful invaders, such as viruses or bacteria.

The system works well when it remains in balance, and the right amount of inflammation helps us recover from an infection or injury. But too much inflammation, and the body will attack itself and damage cells and tissues.

No one knows why, but as we age, our bodies seem to lose the ability to control inflammation, making

us more vulnerable to age-related diseases, such as cancer, diabetes and heart disease. Finding a way to rein in inflammation is a main focus of the scientists at the Jean Mayer USDA Human Nutrition Research Center on Aging (HNRCA) at Tufts. Joan Cohn, J65, and her husband, Peter Cohn, a physician, have made a generous gift to advance the study of inflammation and chronic disease in the aging process, and the role nutrition can play in keeping inflammation in balance within the body. Joan Cohn is a member of the board of advisors to the

Friedman School, the HNRCA's sister institution and key partner at Tufts.

"This gift will advance the research and provide opportunities for graduate students, scientists and faculty," says Simin Nikbin Meydani, director of the HNRCA and a professor of nutrition and immunology at the Friedman School and the Sackler School's Graduate Program in Immunology at Tufts. She says she is grateful that the Cohns have provided additional funding for a public seminar on these issues this year.

"This support will allow us to look at the way food and particular nutrients facilitate, for example, good cognitive function as we age and also deter cancer," says Dennis Steindler, director of the HNRCA's Neuroscience and Aging Lab. He studies how nutrition can improve the function of stem cells within the brain to help prevent such diseases as brain cancer and Alzheimer's.

Other HNRCA researchers are looking at both whole foods and particular compounds within foods to determine their effects on inflammation. For example, certain compounds in blueberries may help improve mental fitness in older adults. Meydani and her colleagues have conducted research on the effect of EGCG, a compound in green tea, on autoimmune diseases. Other studies will focus on how diet interacts with genes to improve the inflammatory response as we age or helps prevent inflammation that occurs as a result of treatments like chemotherapy.

"This gift is very timely, and I think that the Cohns are very forward looking in providing support for this area of research and education," Meydani says. "We have uncovered just the tip of the iceberg in terms of understanding the role of inflammation and nutrition in preventing chronic diseases. The potential is huge for making advances in this area." —BRENDA CONAWAY



Joan and  
Peter Cohn



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If you would like to donate to the Friedman School or Human Nutrition Research Center on Aging, visit [nutrition.tufts.edu/givenow2](https://nutrition.tufts.edu/givenow2).



YOUR ALUMNI ASSOCIATION

# IT STARTS WITH A PLAN



**IT IS AN** exciting time to be an active member of the Friedman School Alumni Association. In September, the school launched its first strategic planning process in more than a decade, providing an opportunity to think about our long-term goals and strategies.

As valuable members of the Friedman community, alumni are playing a crucial role in every step of this process, from serving alongside faculty, staff and students on investigative working groups to providing input via surveys and interviews. Thank you to the many alumni who have volunteered their time to support strategic planning so far; your input is shaping the Friedman School's future.

Concurrent with the school's strategic planning process, the Alumni Association Executive Council is taking a closer look at our own mission and vision. We held a retreat in November to think critically about the Alumni Association's strategic direction and consider what we aim to accomplish in the next three to five years. Much of the discussion focused on thinking "outside the box" to make sure we aren't bound by our past experiences or perceived barriers. It is our aim to evolve alongside our alumni population, offering you new ways to provide value to the Friedman community and stay engaged with the school.

If you have any thoughts about where you think the Alumni Association should focus its efforts, please feel free to contact me at [andrewsh@herbalife.com](mailto:andrewsh@herbalife.com). I welcome your input and look forward to sharing your suggestions at a follow-up meeting this spring. Otherwise, I look forward to seeing you during reunion weekend, April 8–10, 2016.

ANDREW SHAO, N00, President, Friedman School Alumni Association

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# Class Notes

## N83

**SUSAN HOLMAN** has received the 2016 University of Louisville and Louisville Presbyterian Theological Seminary Grawemeyer Award in Religion. She was recognized for her book, *Beholden: Religion, Global Health and Human Rights*, which explores how health-care efforts based on a human-rights approach can overlook the important role religions play in communities, and how faith-based initiatives are often more focused on the benefactor than on the recipient of care. She highlights how a combined approach, incorporating religious views and traditions with dialogue about economic and social rights, can be useful in combating global health problems. Holman is a senior writer at the Global Health Education and Learning Incubator at Harvard University.

## N85

**MIRIAM NELSON**, N87, A12P, A14P, the associate dean of Tisch College and a Friedman School professor, has been appointed director of the Sustainability Institute and deputy chief sustainability officer at the University of New Hampshire. In a message to the Tufts community, Dean Dariush Mozaffarian wrote: "Here at Tufts, Mim leaves behind an indelible legacy that stretches back 30 years to her days as a graduate student. Through her roles as a Friedman School faculty member, as a scientist at the HNRCA, as founding director of the John Hancock Research Center on Physical Activity and Obesity Prevention, as cofounder of ChildObesity180, as a

national adviser on public policy and as a teacher and dedicated mentor to students and faculty, Mim has been vital to our university and to improving the health of millions."

## N00

**REENA BORWANKAR** was a presenter at the International Conference on Family Planning in Nusa Dua, Indonesia, in January. She contributed to three sessions to build advocacy and share research results related to improving linkages among family planning, nutrition and food security. Borwankar is a technical adviser with the Food and Nutrition Technical Assistance III Project, which is managed by the nonprofit FHI360.

## N05

**KELLY HORTON** is now the North America policy director for Mars Inc. She reports that she is enthusiastic about the opportunity to use her nutrition policy expertise in this new capacity.

## N06

**KERRI HAWKINS** moderated an Alumni Association career panel titled "Launch Pad Careers: Rising from Entry-Level Roles to Senior Management." The other panelists were **MICHAEL DEANGELIS**, N00, MPH00; **JENNIFER KARL**, N06; **SKYE SCHULTE**, N02, MPH02; AND **KATYA TSAIOUN**, N99.

## N07

**JANEL OVRUT FUNK** and her husband, Aaron, welcomed identical twin

girls into their family on October 27, 2015. She writes: "Lydia Julianne and Josephine Samantha joined big brother Zachary, and everyone is doing well!"

## N10

After a yearlong stint as the Uganda country coordinator with the Whitaker Peace and Development Initiative, **ORACH GODFREY OTOBI**, N10, F10, has decided to venture into elective politics. He garnered 62 percent of votes under the National Resistance Movement primaries, making him the flag bearer for Chairman of the Amuru District Local Government for the 2016 general elections.

## N12

**KATIE BISHOP**, MPH12, is now the state and community obesity policy manager with the American Heart Association, consulting with state and community advocates on a variety of nutrition and physical-activity policy issues, including sugary drinks, early care and education, out-of-school time and healthy food on public property.

**CHRISTINE GARY** has moved from one Washington, D.C. public relations firm to another. Formerly with Powell Tate, she now brings her experience in communication campaigns for food, nutrition and health-care clients to Porter Novelli. She welcomes student inquiries about how a Friedman education can launch a PR and public affairs career.

## N13

**MAUREEN KELLY** has relocated to Washington, D.C., where she is working on a project with RTI International; she is the monitoring and evaluation data manager for the USAID-funded ENVISION project to control and eliminate seven neglected tropical diseases, including snail fever (schistosomiasis) and river blindness (onchocerciasis).

**LINGXIA SUN** has relocated to Baltimore, Maryland, where she is a pediatric clinical dietitian at Johns Hopkins Children's Center, providing medical nutrition therapy for children in the pediatric intensive care unit. She also received the A.S.P.E.N. Pediatric New Practitioner Award and was recently invited to attend the 2015 A.S.P.E.N. Leadership Retreat as a future leader.

## N15

**ALYSSA CHARNEY** relocated to Washington, D.C., where she is working as a policy specialist at the National Sustainable Agriculture Coalition, which advocates for federal policy reform to advance the sustainability of agriculture, food systems, natural resources and rural communities.

**CHRISTINE SULLIVAN** has joined Coastline Elder Services Inc., and the 4C Collaborative of New Bedford, Massachusetts, as the Tufts grant coordinator. This three-year grant funds an effort to identify low-income seniors most at risk for malnutrition and readmission to the hospital, increase nutrition education and reduce barriers to getting quality food.

# Zap Those Veggies

**JEANNE P. GOLDBERG, G59, N86**, a professor at the Friedman School and director of the Nutrition Communication Program, serves as our expert.

**Q** When I microwave frozen vegetables, am I destroying any of the nutrients in them?

**A** Heat, whether from a conventional source or a microwave oven, destroys some nutrients, but actually makes it easier for the body to use some of them.

The factors that affect loss of nutrients during cooking are how long the vegetable is cooked, at what temperature and how much water is used. In addition, some vitamins are more easily destroyed than others. Because water-soluble vitamins are

leached into the water, microwave cooking—which takes less time and smaller amounts of water—actually conserves some vitamins.

The bottom line is to eat plenty of vegetables, and to follow the directions for cooking them that are provided on the package. Manufacturers have tested these carefully to provide the best-tasting product.



Send your questions for future installments of “Ask Tufts Nutrition” to Julie Flaherty, Tufts University Office of Publications, 80 George St., Medford, MA 02155, or email [julie.flaherty@tufts.edu](mailto:julie.flaherty@tufts.edu).





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**11 Parental influence**



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**20 Know this veggie?**



## ABOUT LAST NIGHT...

A growing body of research over the past few years has found that lack of sleep is closely associated with weight gain. To find out why, scientists are looking at hormonal, psychological, sociocultural and genetic factors. Could indulging in a little more shut-eye be another tactic in the fight against obesity?

FOR MORE ON THE STORY, TURN TO PAGE 16.