

Tufts

NUTRITION

MAGAZINE OF THE GERALD J. AND DOROTHY R.
FRIEDMAN SCHOOL OF NUTRITION SCIENCE AND POLICY
AND THE JEAN MAYER USDA HUMAN NUTRITION
RESEARCH CENTER ON AGING
SUMMER 2013 VOL. 14 NO. 2

THE Microbiome

Meet the trillions
of tiny allies that
call your body home

PLUS: MULTIVITAMIN Q & A • WALKABLE TOWNS • IS GLUTEN-FREE FOR ME?

Q: Is It Safe to Exercise While Undergoing Cancer Treatment?

For this installment of “Ask Tufts Nutrition,” Debra Berlanstein, associate director of the Hirsh Health Sciences Library, serves as our expert.

A: Exercise can improve the quality of life for cancer survivors as well as for patients still undergoing treatment, based on two extensive reviews I was involved in as a research librarian.

The results showed that exercise programs, including walking, bicycling, resistance training and yoga, can be beneficial, although more research is needed to determine which kinds of exercise are best.

We conducted two reviews. The first examined 56 trials with a total of 4,826 participants undergoing cancer treatment. The second evaluated information from 40 trials involving 3,694 people who had completed treatment. Both reviews compared the quality of life of patients who exercised with that of patients who did not exercise; overall, both showed exercise to be beneficial.

In the first case, for patients undergoing treatment, the researchers learned that exercise may improve a

person’s physical abilities and how they function in society. Exercise also reduced fatigue. The more intense the exercise, we found, the greater the benefits.

The second review, which looked at people who had finished treatment, found that exercise may reduce worry about cancer and positively affect the way people view their body. It may also help someone cope with emotional problems and reduce anxiety, fatigue and pain.

In both cases, however, findings need to be viewed with caution, because the reviews looked at many kinds of exercise programs around the world that varied by the type of exercise, length of the program and intensity. Also, the studies we reviewed used a number of ways to measure quality of life.

This type of work is something more librarians are becoming involved in, and I hope research faculty will continue to take advantage of our expertise. The cancer and exercise study, for example, took several years and entailed developing a complicated search strategy and keeping detailed records of searches and results. Systematic reviews are complex but rewarding and are capable of producing useful results that answer specific clinical questions.

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.

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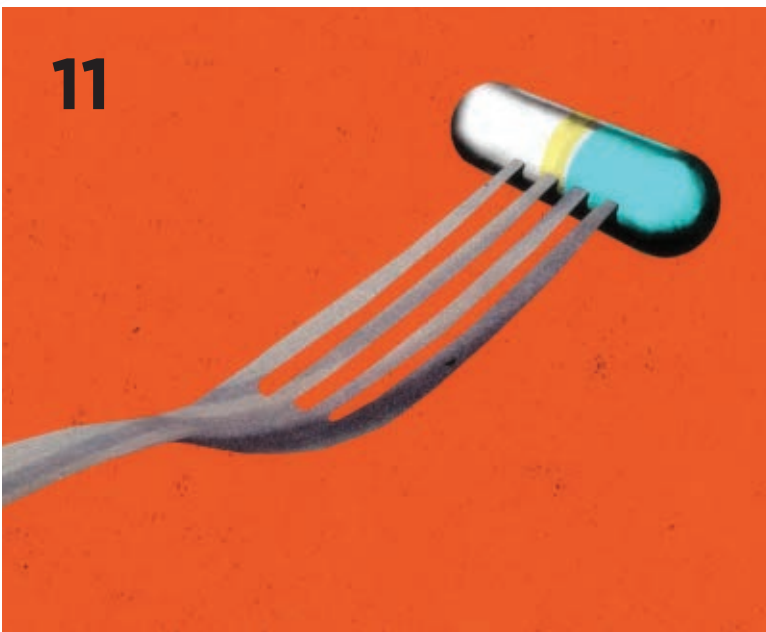
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A Decade of Progress



THIS SUMMER, THE FRIEDMAN SCHOOL WILL MARK A SIGNIFICANT transition. For the past decade, the John Hancock Research Center on Physical Activity, Nutrition and Obesity Prevention has been an important and integral part of the school. In that short time, the center has catalyzed change to make good nutrition and physical activity available to people across the nation.

Scientists at the center, under the leadership of Drs. Miriam Nelson, Christina Economos, Jeanne Goldberg, Jennifer Sacheck and Sara Folta, have conducted innovative, groundbreaking studies highlighting the impact of physical activity and obesity prevention on improving the health of such diverse populations as children, college students, midlife and older Americans and immigrants. The public and private partnerships developed through the center's research have been catalysts for positive change among communities as close as Somerville, Mass., and as far away as Kenai, Alaska. Shape Up Somerville was so successful that it became a model for First Lady Michelle Obama's Let's Move! campaign.

In addition to their innovative research, center members have made significant contributions to public policy by serving on national boards, including the Institute of Medicine, the U.S. Department of Health and Human Services, the Department of Agriculture and the President's Council on Physical Fitness, Sports and Nutrition.

Training future leaders in the field of obesity prevention has also been a priority of the Hancock Center, which has sponsored 11 doctoral fellows and more than 200 master's degree students.

July 1, 2013, marked the conclusion of our 10-year term agreement with John Hancock Financial Services Inc. After that, as established in the agreement, the John Hancock name will no longer be used in connection with work on obesity prevention at the Friedman School. However, the legacy of the John Hancock Research Center will be recognized in the research, training and impact on society that will continue, stronger than ever.

In addition to its term gift to establish the center, John Hancock Financial Services Inc. has sponsored the Tufts Marathon Challenge, providing the opportunity for more than 1,400 Tufts students, staff, faculty and friends to participate in the Boston Marathon. This program has raised more than \$4.5 million for the Friedman School and Tufts Athletics (see related story, page 28). The Tufts Marathon Team will continue for at least the next two years.

We sincerely thank John Hancock Financial Services Inc. for its generosity over the past decade. That support has helped the Friedman School enhance the health of our nation.

ROBIN KANAREK, PH.D.

INTERIM DEAN, FRIEDMAN SCHOOL OF NUTRITION SCIENCE AND POLICY

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Climate Change



IT IS A PRECARIOUS TIME FOR SCIENTIFIC RESEARCH AND higher education. With recent funding cuts, the National Institutes of Health, the world's largest financial supporter of biomedical research, and the USDA, which created and supports the HNRCA, were gravely affected. The reductions in funding have had a direct impact on anyone who is engaged in research at an academic institution, and the financial climate for scientific research has been altered in a way we have not seen in recent years.

It's time to broaden our research landscape. At Tufts University, there has been a concerted effort to bring together faculty and scientists from different research areas, schools and centers to form multidisciplinary partnerships in the pursuit of knowledge and discovery. This has created many synergies that allow researchers from traditionally divergent areas to work together, paving the way for broader, more impactful results while using resources more efficiently.

Scientists from all over the world recently met in Boston to share their ideas and discuss their research at the annual conference known as Experimental Biology. I am happy to say that the Friedman School and the HNRCA were well-represented by faculty, scientists and graduate students. A full gamut of attendees, from young scientists to world-renowned researchers, presented a wide array of quality research.

It was evident to me that despite current funding woes, the drive for scientific advancement is alive and well. The conference was just one reminder of how important it is to create an environment that will support the next generation of scientists, scholars and teachers and to ensure that funding opportunities are preserved for them.

The research we do at the HNRCA focuses on healthy and active aging. With ever-increasing health-care costs and an ever-growing number of older adults, research around healthy aging through nutrition and physical activity is becoming even more relevant.

As I look at the research coming out of the Friedman School and the HNRCA, the durable and positive effects on national and global health are evident. I hope you enjoy learning about some of our recent breakthroughs in this issue of the magazine.

SIMIN NIKBIN MEYDANI, D.V.M., PH.D.
DIRECTOR, JEAN MAYER USDA HUMAN NUTRITION RESEARCH CENTER ON AGING

Laurels

The American Journal of Preventive Medicine named Healthy Kids Out of School, an initiative of **CHILDOBESITY180**, as a winner of its Childhood Obesity Challenge, an online competition for innovative ideas to combat the childhood obesity epidemic.

Associate Professor **CHRISTINA ECONOMOS, Ph.D.**, received the Science Board Honor Award from the President's Council on Fitness, Sports and Nutrition.

ALICE H. LICHTENSTEIN, D.Sc., the Gershoff Professor of Nutrition Science and Policy and director of the HNRCA Cardiovascular Nutrition Laboratory, was named vice chair of the 2015 Dietary Guidelines Advisory Committee, which also counts Professor **MIRIAM NELSON, Ph.D.**, as a committee member.

Professor **MOHSEN MEYDANI, D.V.M., Ph.D.**, director of the Vascular Biology Laboratory at HNRCA, is the 2013 recipient of the McCormick Science Institute Research Award of the American Society for Nutrition.

Professor **MIRIAM NELSON, Ph.D.**, received the 2013 Citation Award from the American College of Sports Medicine.

Professors **JACOB SELHUB, Ph.D.**, director of the HNRCA Vitamin Metabolism Laboratory, and **ALLEN TAYLOR, Ph.D.**, director of the HNRCA Nutrition and Vision Research Laboratory, were selected as fellows of the American Society for Nutrition, in acknowledgment of their distinguished careers in nutrition.

Letter

HEADS UP!

Your excellent article "Climate and Calamity" by Taylor McNeil (Winter 2013) could be the clarion call for better disaster preparedness that *An Inconvenient Truth* was for global warming.

SAURABH SHAH, F96
NEW YORK, N.Y.



Power Loss

Fat molecule may factor in muscle decline as we age

AS PEOPLE GET OLDER, FAT TISSUE INEVITABLY TAKES UP RESIDENCE in their muscles, but some of that fat may be particularly damaging. A small study conducted at the Jean Mayer USDA Human Nutrition Research Center on Aging (HNRCA) suggests that buildup of a fat molecule known as ceramide might play a leading role in muscle deterioration in older adults.

The study enrolled 10 men in their mid-70s and nine men in their early 20s. None was overweight, and none had exercised in six months. The researchers, including first author Donato Rivas, Ph.D., an HNRCA scientist, took muscle biopsies before and after the participants performed a single round

of leg exercises to examine how the workout affected muscle growth. Their analysis showed that two types of ceramide molecules were higher in the older men.

“We suspect that the increased storage of ceramide we saw in the older men, exacerbated by the presence of saturated fat, has a part in weakening the anabolic signaling that responds to resistance exercises and helps with the assembly of new muscle,” says Roger Fielding, Ph.D., N93, senior author and director of the HNRCA Nutrition, Exercise Physiology and Sarcopenia Laboratory.

Learning more about ceramide activity through larger, long-term interventional trials may identify a role in dietary or therapeutic drug interventions for sarcopenia, an age-related condition of muscle loss and function.

“The deterioration of muscle is compounded by a loss of muscle strength, which really begins to decline around age 50 and appears to be a factor in the visible decrease in mobility people exhibit around age 80,” adds Fielding, who is also a professor at the Friedman School. Previous research done at Tufts and other institutions suggests that even with limited exercise, older adults can maintain and build some new muscle. “Until there is enough research to develop specific exercise and dietary interventions, staying as physically active as deemed safe by your health-care provider can only benefit aging muscle.”

The results of the study were published in the *Journal of Applied Physiology*.

OVERHEARD

“Millions are getting the message that sugary drinks aren’t good for us By the time the ban gets enacted, the intended results may have already been realized in New York City and beyond.”

—ASSISTANT PROFESSOR HUGH JOSEPH, N84, N94, IN A LETTER TO *THE NEW YORK TIMES*, POINTING OUT THE UPSIDE OF WORLDWIDE MEDIA COVERAGE OF A COURT RULING HALTING A BAN ON OVERSIZED DRINKS IN THE CITY

Quieting a Gene in Mice Helps Them Resist Rich Food

If candy and potato chips didn't beckon from every street corner, wouldn't we all be thin? Thankfully, science is looking at ways to resist. Researchers have found that silencing a particular gene in mice keeps them from getting fat, even when presented with an abundance of calorie-dense food.

Along with colleagues, Andrew Greenberg, M.D., the Atkins Professor in Nutrition and Metabolism at Tufts School of Medicine and director of the Obesity and Metabolism Laboratory at the HNRCA, bred a strain of mice born without the gene that codes for perilipin-2, a protein that regulates the storage of fat within cells. They offered those mice, along with a genetically conventional group, the equivalent of a Western diet—sugary, high-fat food—and let them eat their fill.

After 12 weeks, the mice lacking perilipin-2 had gained significantly less weight than the control group, which, as expected, continued to eat hungrily. The perilipin-2-free mice ate less in comparison, and even moved around more.

They also had all the health advantages that go along with being lean: smaller fat cells, less inflammation, lower triglyceride levels and better insulin sensitivity.

In addition to eating less and moving more, the genetically altered mice appeared to have more brown fat cells, which, unlike typical white fat cells, actually have the ability to burn calories.

Because humans also carry the perilipin genes, the findings eventually could lead to ways to fight obesity and diabetes. "This is an exciting observation because it provides an opportunity to identify new pathways that modulate food intake, physical activity and potentially, metabolism of fat," says Greenberg, an associate professor at the Friedman School.

The study was published in the *Journal of Lipid Research*.



BIG CALORIES FROM SMALL RESTAURANTS

Apologies, Cheesecake Factory. It turns out you and the other big chain restaurants aren't the only ones who have been helping America pack on the pounds.

HNRCA researchers found independent and small-chain restaurants ply us with slightly more calories on average than their equivalents at national chains, and far more than we need.

The researchers analyzed 157 meals from 33 Mexican, American, Chinese, Italian, Japanese, Thai, Indian, Greek and Vietnamese restaurants in the Boston area. Not only did the meals, which averaged 1,327 calories, provide two-thirds of a person's typical daily calorie requirements, but a subset they looked at were 6 percent more caloric than the national chain meals.

Lorien Urban, Ph.D., N09, N11, a postdoctoral scholar in the HNRCA Energy Metabolism Laboratory and the first author, points out that independent eateries, which make up half of U.S. restaurants, are not subject to new federal regulations that mandate that they post calorie content information.

"Our findings suggest that routine reporting of meal calorie content by all restaurants, not just large chains, would encourage individuals to make informed choices about their diet and would discourage restaurants from offering unhealthy portions," she says.

Eating by the Clock

Late-lunchers tend to lose less weight, study finds

WHATEVER YOUR DIET CONSISTS OF, THE TIME OF DAY you eat it may play a significant role in how much you weigh, a recent study suggests. The study, conducted by researchers from the HNRCA, Brigham and Women's Hospital and the University of Murcia in Spain, followed 420 individuals who enrolled in a 20-week weight-loss program in Spain.

Subjects were divided into two groups: early eaters (who ate a Mediterranean-style lunch before 3 p.m.) and late eaters (who ate the same lunch after 3 p.m.). Results, which appeared in the January 13 issue of the *International Journal of Obesity*, showed that early eaters lost an average of 22 pounds in 20 weeks, while late eaters lost 17 pounds.

Researchers suspect that glucose generated by the meals might be processed differently by the body depending on the time of day. Another factor in the weight-loss difference might be that late eaters tended to eat less breakfast, or skip the meal altogether, which goes against most dieting advice.



DNA + Diet = Heart Health

Scientists at the HNRCA have discovered a new gene mechanism that appears to protect some people against cardiovascular disease, especially if they eat more polyunsaturated fat. The findings, published in the *American Journal of Human Genetics*, contribute to efforts to develop diets that complement genetic makeup.

The authors, including first author Kris Richardson, Ph.D., a postdoctoral associate in the HNRCA Nutritional Genomics Laboratory, analyzed data from more than 27,000 men and women enrolled in 10 epidemiological studies. They observed a type of microRNA that slows down production of the enzyme LPL, which helps metabolize triglycerides in the blood.

The researchers did not see this microRNA activity in the carriers of the gene variant, said senior author José Ordovás, Ph.D., director of the genomics laboratory and a professor at the Friedman School. "Without that interference, people with the variant would presumably have more LPL available to break down excess triglycerides and prevent them from being deposited in the arteries, which could eventually lead to atherosclerosis and other cardiovascular diseases," he said.

The authors noted lower triglyceride levels and higher concentrations of HDL, the "good" cholesterol, in those who had the gene variant. Carriers tended to have even lower triglyceride levels if their diets contained more polyunsaturated fatty acids, which are considered a healthier fat.

MILD B-12 DEFICIENCY MAY SPEED DEMENTIA

BEING EVEN MILDLY DEFICIENT in vitamin B-12 may put older adults at a greater risk for accelerated cognitive decline, an observational study from HNRCA researchers suggests.

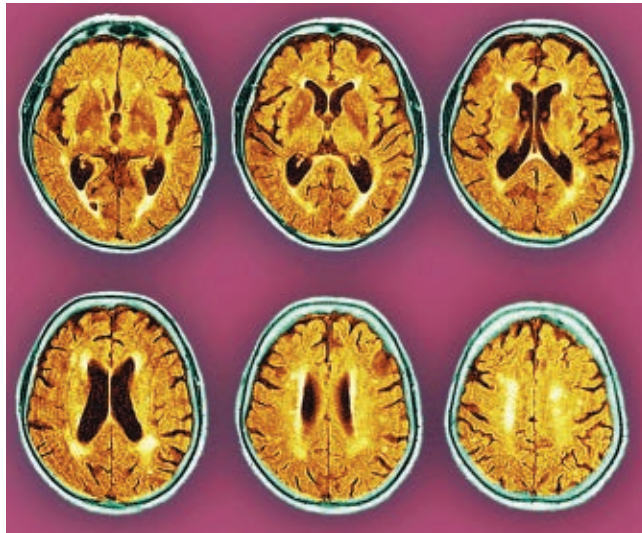
Martha Savaria Morris, Ph.D., an epidemiologist in the Nutrition Epidemiology Program at the HNRCA, and colleagues examined data from 549 men and women enrolled in a cohort of the Framingham Heart Study. The subjects, who had an average age of 75 at the start, were divided into five groups based on their vitamin B-12 blood levels.

Being in the two lowest groups was associated with significantly accelerated cognitive decline, based on scores from dementia screening tests given over eight years.

“Men and women in the second lowest group did not fare any better in terms of cognitive decline than those with the worst vitamin B-12 blood levels,” Morris said. It is well known that severe B-12 deficiency speeds up dementia, but the finding suggests that even more seniors may be affected.

The study appeared in the *Journal of the American Geriatrics Society*.

“While we emphasize our study does not



Magnetic resonance imaging (MRI) scans of the brain of a 76-year-old patient with dementia. The brain has shrunk and the ventricles, the fluid filled spaces (dark brown) at the center of the brain, have become enlarged.

show causation, our associations raise the concern that some cognitive decline may be the result of inadequate vitamin B-12 in older adults, for whom maintaining normal blood levels can be a challenge,” said Professor Paul Jacques, D.Sc., the study’s senior author and director of the HNRCA Nutrition Epidemiology Program.

Animal proteins, such as lean meats, poultry and eggs, are good sources of vitamin B-12. Because older adults may have

a hard time absorbing vitamin B-12 from food, the USDA’s 2010 Dietary Guidelines for Americans recommend that people over age 50 incorporate foods fortified with B-12 or supplements in their diets.

The subjects in this study were mostly Caucasian women who had earned at least a high school diploma. The authors said future research might include more diverse populations and explore whether vitamin B-12 status affects particular cognitive skills.

CALORIES INCREASE RISK OF BREAST CANCER

Women who consume a lot of calories are 60 to 70 percent more likely to be diagnosed with breast cancer than those with low-calorie diets, according to a new study.

Fang Fang Zhang, Ph.D., an assistant professor at the Friedman School, and colleagues looked at 1,775 women diagnosed with breast cancer and 2,529 of their sisters enrolled in the Breast Cancer Family Registry. They asked the participants how much they ate and exercised, and also measured their Body Mass Index. The women who ate the most, more than 2,341 calories per day, had a 60 to 70 percent greater risk of breast cancer than those who ate less than 1,359 calories per day.

The calorie/cancer association appeared to be stronger among women who got less than 15 minutes a day of strenuous physical activity. Yet the risk was still elevated among the high-calorie eaters, even if they burned off the calories with exercise or kept a normal body weight. The association held only for premenopausal women or those with hormone receptor-positive cancers.

The study appeared in the journal *Breast Cancer Research and Treatment*.

CALORIES

Exercising six days a week—yes, you heard her—is the flywheel of weight loss, says alumna, associate professor and competitive rower Jennifer Sacheck in a new book



NE LOOK AT JENNIFER SACHECK, 5 FEET, 10 INCHES TALL, 140 pounds, no extra body fat, and you can easily convince yourself she must have it easy. Great genes and good fortune, you say; that's how she stays so fit.

Then the alarm goes off, the 4:30 one that awakens Sacheck, N01, nearly every morning before she drives 17 miles from her home in Concord, Mass., to a boathouse in Cambridge, hauls her single scull onto the Charles River and starts to row while even the sun is trying to find enough energy to wake up.

"People might look at me and say, oh Jen, you don't have a problem with weight," says Sacheck. "But I work so hard every day to make sure I get my physical activity in." And soon after she hits the water, Sacheck starts thinking about what she is going to make for a healthy dinner.

OUT



BY LINDA HALL PHOTOGRAPHY BY KATHLEEN DOOHER

Discipline and effort are what keep her fit. But here's what Sacheck, an associate professor at the Friedman School's John Hancock Research Center on Physical Activity, Nutrition and Obesity Prevention, also wants you to know: While there are no short cuts, it is possible and even pleasurable to eat and exercise your way out of a toxic lifestyle, pre-dawn wake-up calls optional.

That's the message in a new book—*Thinner This Year*—Sacheck has co-written. With so many diet books on the market, Sacheck says what distinguishes *Thinner This Year* is that it focuses on balanced nutrition (how to eat rather than how to diet), insists that exercise must be an essential part of weight management and overall health, and steers clear of “myths and scams, nonsense and deception.”

“A lot of diet books sell one aspect or concept really heavily—don't eat carbs, don't eat wheat,” she says. Her book emphasizes

the need to eat across food groups every day. “It's so unwise to skip a food group. Each has its own benefits.”

Sacheck describes the book as a guide to healthy living, regardless of whether someone needs to lose weight. She cautions that while some people are clearly too heavy for their body type, others are “skinny fat”—their weight isn't the problem, but their eating is not nutritious, a lack of exercise leaves them unfit, and their stored fat is inviting dysfunction and disease.

Sacheck wrote the book with Chris Crowley, a former Wall Street litigator turned wellness evangelist who has written two other books about health. Crowley shares his experiences trying to lose weight and live healthier, embracing irreverence and humor. Sacheck writes the science. “He beats the drum and sounds the trumpet; I provide you with the scientific road map,” she says.

“Most people truly do not understand what’s going on inside their bodies,” Sacheck says, whether it is how essential nutrients make the difference between function and dysfunction, what happens inside your muscles when they are moving or sedentary, how stored fat sends toxic signals that trigger disease, or that both nutrition and exercise must be included if you are to stay trim and healthy.

She says she initially was attracted to the *Thinner This Year* project because of the straightforward advice in Crowley’s first two books: “Exercise six days a week until the day you die—and then, as Chris says, you can take that day off. And don’t eat crap.”

To that end, the book recommends a minimum of 45 minutes of exercise six days a week. Sacheck recognizes that most people might consider that a daunting commitment. But the time can be divided (take a 20-minute brisk walk at lunchtime) or woven into errands (park a distance from the store entrance). The book also offers ideas for strength-training exercises that don’t require a gym.

“Exercise is the flywheel of weight loss, weight management and almost everything that’s good in life,” she writes. Exercise shrinks stored fat, reducing triggers of inflammation and disease, and grows lean muscle, boosting metabolism and burning calories.

ROW TO SUCCESS

Exercise—particularly rowing, which is her passion—brings Sacheck joy and stress release. The sport that Sacheck discovered when she moved to Florida during her sophomore year of high school has guided much of her life since, personally and professionally.

She has been a nationally recognized rower since those high school days. In her senior year, her crew team won a national title, and Sacheck was offered a full athletic scholarship to Syracuse, where she became crew team captain and an Academic All-American. She flirted with the Olympics, even was invited to training camps, but opted to accept a coaching job at UMass Amherst that included a tuition-free graduate school education.

It was there, while pursuing a master’s in exercise physiology, that she discovered the other half of her professional calling. She was coaching Division I women’s crew, and her student athletes had a pressing question: How can we lose some weight?

The young women were in shape, but they wanted to shed some pounds to become stronger competitors and to make sure they could remain in the lightweight rowing class, for which the weight limit is 130 pounds. Sacheck’s initial advice was, “Well, you can run more.” She knew a lot about fitness, after all, but when the students asked her what they should be eating, Sacheck realized she needed—and wanted—to learn as much as she could about nutrition.

“Low-fat diets were big back then,” Sacheck says, but she quickly learned to counsel her athletes to avoid choosing low-fat “dead food”—processed products with little nutritional value—and shift to nutrient-dense vegetables, protein and carbohydrates for the fuel they needed to prevent muscle stress and fatigue. A favorite recommendation was beans—nutritionally efficient and economically attractive. (“They were in college, after all,” she says.) Her team members lost weight and won their division championship.

Sacheck’s interest in healthy eating led her to the Friedman School. After earning her Ph.D. in nutrition, she completed a four-year

postdoctoral fellowship at Harvard Medical School, studying the mechanisms underlying muscle wasting from disease and disuse. In 2005 she returned to Tufts as a faculty member; she is also a scientist at the Jean Mayer USDA Human Nutrition Research Center on Aging and on the faculty of the Tisch College of Citizenship and Public Service. At the moment, she is leading a National Institutes of Health-funded clinical trial—dubbed “The Daily D Study”—to determine whether the current recommendation of 600 IU per day of vitamin D adequately raises levels in children who are deficient, particularly those who are overweight or obese. The study also aims to determine whether vitamin D levels have a significant impact on markers that measure risk for cardiovascular disease.

FOOD FOR LIFE

Sacheck’s life these days focuses on nutrition, but she didn’t think about such things growing up.

She spent most of her childhood in the Midwest with a diet that included a lot of meat, potatoes and vegetables such as corn, green beans and iceberg lettuce; she even had dessert on most days. The saving grace was that the food was always homemade, she says. “We were not eating processed packaged foods with hidden fats, added sugars and added caloric value.”

Sacheck says that foods rich in nutrients, protein and fiber burn up to 30 percent of their calories just through the processes of digesting and metabolizing, and they have built-in appetite suppressors, none of which is true of white flour and sugar. In fact, junk foods—highly processed foods with lots of sugar and fat—rewire the brain and create addictive urges, she says.

Sacheck, who has two children ages 4 and 6, now follows what her book recommends: a daily balance of 50 percent vegetables and fruit, 20 percent whole grains, 20 percent lean protein, and 10 percent low-fat dairy and healthy fats.

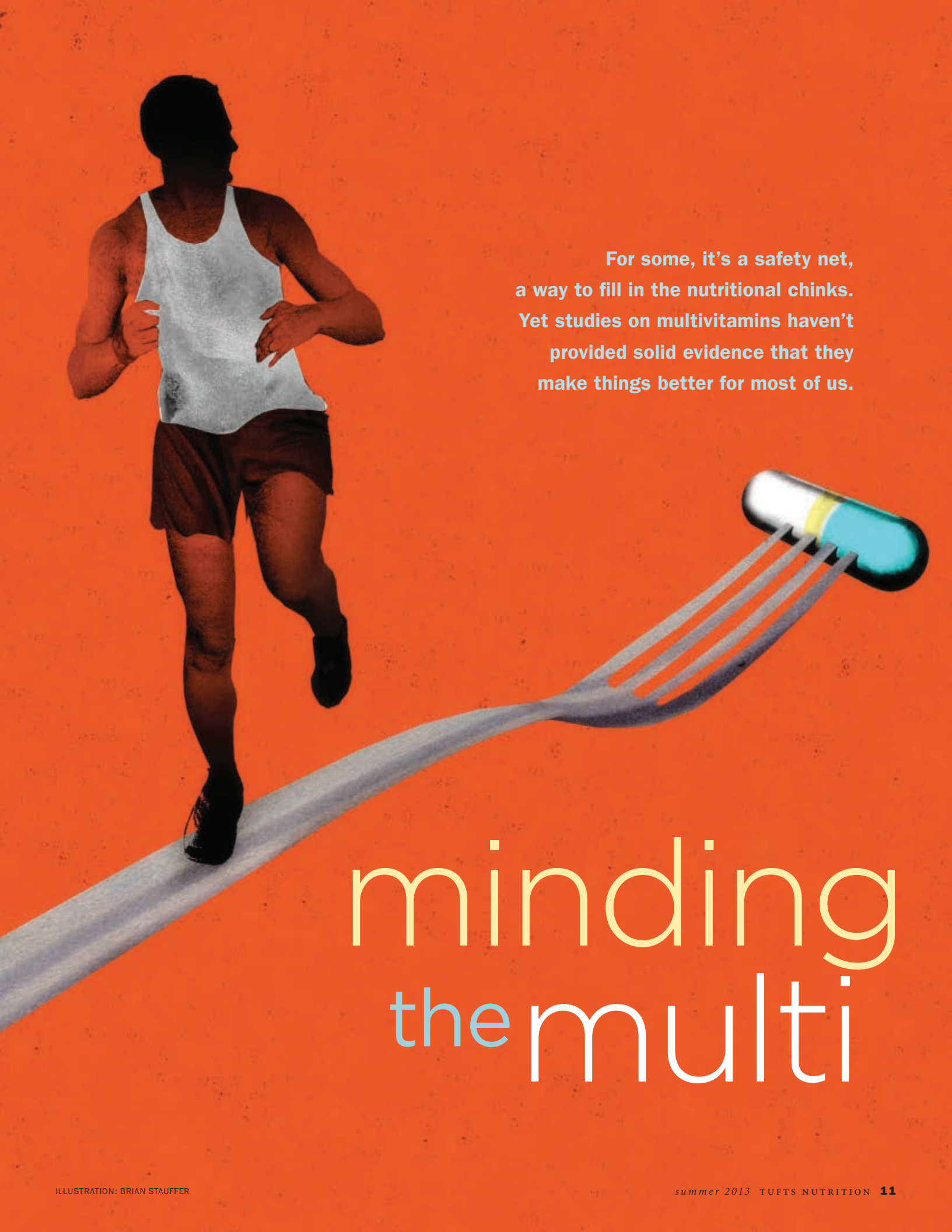
She does have a firm rule: Do not drink your calories. Drinking “doesn’t register with your brain like chewing your calories,” she says. “Drink a smoothie or a sports drink, and you can drink 200 to 500 calories in a heartbeat, but the brain doesn’t recognize you’ve eaten food, and you’re soon hungry.”

Sacheck exercises for health and training, as she continues to compete at high levels. Seventeen times she has competed in the Head of the Charles Regatta, Boston’s annual two-day rowing event that attracts 9,000 competitors from around the world. Her two proudest finishes as a master’s single came in 2005 (when she was pregnant) and 2006 (four months after giving birth), both times finishing in second place, missing first by just seconds. Annually, she competes in a grueling road race—7.6 uphill miles to the top of Mount Washington, the highest peak in the Northeast.

While Sacheck excels, she’s never considered herself perfect. She says she put on an extra 15 pounds in college when she and her now-husband often met for pizza and beer. And even today she has a “go-to processed, packaged, terrible food” when she is feeling stressed. “Do you know how many Cheez-Its I ate writing this book?” she asks.

But each new day she sets the alarm and gets back on track. **TN**

Linda Hall is a freelance writer in Hopkinton, Mass.

An illustration of a muscular man in a white tank top and dark shorts running on a large, silver fork. The fork is angled diagonally across the frame. At the tip of the fork, a blue and white capsule is balanced. The background is a solid orange color.

For some, it's a safety net,
a way to fill in the nutritional chinks.
Yet studies on multivitamins haven't
provided solid evidence that they
make things better for most of us.

minding the multi

We asked four Tufts nutritionists to sit down for a roundtable discussion about the science of multivitamins and to answer a simple question: Should healthy adults take them?

THE PARTICIPANTS **Jeffrey Blumberg**, Ph.D., Friedman School professor and director of the Antioxidants Research Laboratory at the Jean Mayer USDA Human Nutrition Research Center on Aging (HNRCA) | **Johanna Dwyer**, D.Sc., Tufts Medical School professor, director of the Frances Stern Nutrition Center and a senior nutrition scientist for the Office of Dietary Supplements at the National Institutes of Health | **Alice H. Lichtenstein**, D.Sc., Gershoff Professor of Nutrition Science and Policy at the Friedman School, professor at Tufts Medical School and director of the Cardiovascular Nutrition Laboratory at the HNRCA | **Joel Mason**, M.D., professor at the Friedman School and Tufts Medical School and director of the Vitamins and Carcinogenesis Laboratory at the HNRCA

TN I am a fairly healthy adult, and I think I eat a slightly better-than-average diet. My doctor says I should take a multivitamin—she recommends it for all women my age. Should I take one?

Blumberg: I feel there is no harm in taking a multivitamin, and doing so will help fill in the gaps. More than half the American population isn't consuming the amounts of fruits, vegetables and whole grains that we recommend to help them meet their needs for vitamins and minerals.

Lichtenstein: Your physician's recommendation is not consistent with current clinical guidelines. There was a very extensive systematic review sponsored by the federal government that was done by the Johns Hopkins Evidence-Based Practice Center that showed no benefit to the general population from a multivitamin. It may be useful in certain select groups, but we know that in the U.S., those individuals who need a multivitamin most—those who are nutrient-insufficient—are less likely to use supplements anyway. We're not even sure whether falling a little bit below the Recommended Dietary Allowances (RDAs) is causing a problem, because there don't seem to be clinical manifestations in general.

One of the problems is that when you put an emphasis on something like whether people should take a multivitamin, you shift the focus off what is really important: that they are eating too many calories, too much saturated fat and trans fat, too much sodium,

not enough fiber, and they are not exercising enough. There is no quick fix. You can't just pop a pill and make everything better.

Blumberg: I agree. If you want to take a multivitamin because you love to eat at fast-food restaurants 10 times a week, and you hate fruit and vegetables and you think you can compensate for that, my answer is no, you can't. Multivitamins are supplements, not substitutes for a healthy diet.

And I agree that the people who need a multivitamin most are the ones who aren't taking them. Who is taking a multivitamin? The more affluent, the more highly educated, the people who are actually eating better diets, who exercise, don't smoke. The people who *really* need to be listening to their doctor's advice to take a multivitamin are not.

But I don't agree with the converse: that people who need them the least don't need them at all, because they are not meeting their RDAs either. Maybe some of the RDAs are not perfect, but they are a goal that reflects the current consensus, and we know that most people aren't meeting it.

Dwyer: Speaking for myself, I don't think that a multivitamin is going to cause any particular good, nor do I think it is going to cause any particular harm. It's a personal choice. It's like whether people should be avoiding every animal food or everything that has added sugar. A lot of these blanket statements about absolutely consuming or not consuming foods or multivitamins are oversimplified, inconsequential, yuppie-related food faddism.

TN So what you are saying is, it's up to me; it probably won't hurt, but at the same time why are we arguing about this when there are bigger problems?

Dwyer: Exactly.

TN When I asked a few people why they take multivitamins, they said things like, "I'm a little anemic, so I need the iron," or "That's how I get my vitamin D." It seems to be one-stop shopping for a variety of concerns.

Mason: I think this mindless approach that many Americans (and for that matter many American physicians) take—that it might help, and it can't hurt—is not necessarily the most cogent one. Now, it might be that as a young woman, you *aren't* getting enough vitamin D and calcium. The multivitamin might not be the right approach, because most multivitamins have a trivial amount of calcium. If you really think carefully about what you as an individual need, most often you are going to end up with a more intelligent strategy.

Lichtenstein: If your physician finds that you need more calcium, I would ask, have you tried low-fat Greek yogurt? Do you think there is a way of increasing your dairy intake? There are so many food-based ways of getting your nutrients.

Dwyer: Years ago I was studying vegetarians, and some of them told me they took a vitamin supplement because they weren't

unproven, but

40%

of American adults say they take a multivitamin, making it the most commonly used dietary supplement.

SOURCES: THE CENTERS FOR DISEASE CONTROL AND PREVENTION;

getting enough calcium and iron. If you looked at the vitamins they were taking, they were indeed vitamins, but the calcium and iron they needed were *minerals*.

Indiscriminate vitamin use is sort of like the use of holy water in the Middle Ages: People thought if you sprinkled it on things, it would ward off all evil. People who take supplements would probably be offended by that, but sometimes if you look at their reasons, they are not more sophisticated than beliefs in the Middle Ages.

TN Let's talk about the risks. What about the 2011 Iowa Women's Health Study, the observational study that found there was an increased risk of death in women who took multivitamins?

Dwyer: To say that multivitamins are causing mortality—I really believe that is a big stretch, and I don't think that particular paper is in line with the rest of the literature. Most of the studies that say things like that are not controlling for the confounders, such as smoking, obesity, preexisting illness, etcetera. Sadly, you can't control for all of the confounders in an observational study.

TN Is that why we don't know definitely whether multivitamins are good or bad, because they are just really hard to study?

Dwyer: It's extremely *expensive* to study them well in large randomized clinical trials that last for many years, especially with hard end points such as mortality or heart

attacks. There have been several very good, randomized studies that did not show any adverse effects from multivitamins.

Blumberg: There are now several meta-analyses of multivitamins and mortality, and they show no benefit, no harm.

The Physicians Health Study II recently tested a complete multivitamin in 15,000 men and reported a modest reduction in total incidences of cancer. I don't wish to overstate the benefit found here, but it was a large, long-term and well-controlled study. Not surprisingly, many have pointed out the complexities and limitations associated with this and similar studies. Yet if investing millions of dollars in a randomized clinical trial like this—the “gold-standard” for medicine—is still insufficient to provide convincing evidence of benefit, then we need to find new and practical approaches.

Lichtenstein: In talking about potential harm, the other thing we have to remember is that a tremendous amount of the foods we consume are fortified. If you are consuming a bowl of breakfast cereal that has 100 percent of the RDA, if you are getting orange juice that has calcium and vitamin D added to it, or a powdered beverage mix that has vitamin C, you already may be getting the equivalent of a multivitamin pill.

I think we are just beginning to learn the effects of overconsumption of nutrients. We really don't know *that* accurately what people are consuming. We don't have

a standardized system in the United States for monitoring it. The whole reason a new category—the tolerable upper intake levels (ULs)—was introduced was to address this. I think we need to be a little cautious.

Blumberg: I don't see anything in the Center for Disease Control's Morbidity and Mortality weekly report that there is an epidemic of people showing up in emergency rooms with vitamin toxicities. When we look at the RDAs versus the ULs for most nutrients, we are talking about five to 10 times higher than that. So there is a pretty big range for most nutrients before you run into harm. Vitamin A [which has been associated with bone loss] is an exception.

Lichtenstein: I agree. I'm not saying that there is harm. I guess the question I would ask somebody is: Are you already getting the equivalent of a multivitamin supplement in your diet because of your breakfast cereal, because you're drinking multiples of these vitamin waters, because of fortified OJ?

Mason: This kind of goes back to one of the buzzwords these days: personalized medicine. I think trying to make recommendations for an entire population versus recommendations for a particular individual puts us at loggerheads.

Blumberg: One meaningful step toward personalized nutrition is if your doctor would just give you a little dietary assessment.

Lichtenstein [applauding]: Yay!

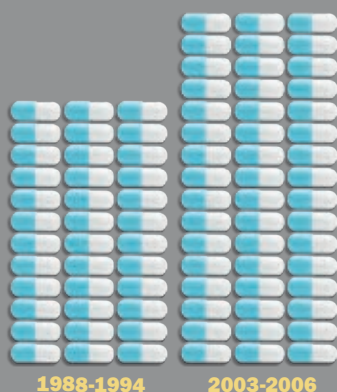
Mason: I bet you could design a five-item questionnaire that would effectively and validly define those people who could potentially benefit from a multivitamin versus those who wouldn't. While you're waiting in the doctor's waiting room, instead of reading a six-month-old issue of *Cosmopolitan*, you could just as soon answer the five questions, and the physician assistant would say, “You know what? You fall into a category that would benefit from a multivitamin.”

Lichtenstein: Or the PA would say, “We need to probe more.” **TN**

still popular

Supplement users are more likely to report very good or excellent health, have health insurance, use alcohol moderately, eschew cigarettes and exercise more frequently than nonusers.

When asked why they take supplements, 45 percent of people said they were looking to improve their overall health. Only 23 percent said it was on a doctor's recommendation.



Between 1988–1994 and 2003–2006, multivitamin use by Americans grew by about a third, from 30 percent to 40 percent.

**IF
YOU
BUILD
IT,
THEY
WILL
WALK**





BY JULIE FLAHERTY PHOTOGRAPHY BY BRAD DECECCO

AS THE SEDAN CRUISES AROUND A MASSACHUSETTS town, Mark Fenton juts his arm out of the passenger window like a zealous tourist, snapping seemingly random photos of crosswalks, traffic signs, rollerbladers, trash cans, jay walkers. The car comes to a stop, and Fenton sprints off, jogging down a bike trail to see what it connects to, what businesses are nearby, what drinking fountains and mile markers he can see. When he returns to the trailhead, his eyes, above his outsized handlebar mustache, twinkle with enthusiasm.

"This has the opportunity to be a little retail cluster," he says to his hosts, who include the directors of the town's public health, public works and family services departments. It's not enough to have a nice paved trail for biking, he would argue. It has to connect to places that are useful or desirable—shops, restaurants, playgrounds, a post office, a corner store. "That's where I want the brew pub," he says as he scouts the nearby buildings.

Fenton, a public health planning and transportation consultant, has worked with hundreds of communities across the country to make their streets more welcoming to foot and bike traffic. His goal is to change the built environment to get people moving more often on their own power.

"If you are trying to encourage people to be more physically active every day, how their community is designed has much to do with it," he says. "If you have sidewalks, you are more likely to walk. If there is a nearby corner store or a park, you might let your child walk to destinations. If there are bike paths and bicycle lanes, you are more likely to ride a bicycle."

Even something as simple as trees on the sidewalk can get people moving, he says. "For my 74-year-old mom in the summer, that shade may be the difference between her choosing to walk or not on a very hot day in August. So it's functional."

Fenton, an adjunct associate professor at the Friedman School, is teaching a new course starting in spring 2014 that will demonstrate how to do what he does: convince city councils to set building policies that promote physical activity. He will also offer the course as part of an online graduate certificate program called Developing Healthy Communities, which is aimed at midcareer public health professionals who need to understand the language that town planners, economists and politicians speak.

Research has shown that if stores, post offices, libraries and playgrounds are closer to homes, people are more

likely to stroll or bike to them, rather than jump in the car. Sidewalks, crosswalks, bike trails and bike lanes all correlate to more physical activity for the average resident. "Place matters," Fenton says. A clean shopping area with wide sidewalks, water fountains, bike racks and benches not only gets people walking, it increases retail sales.

That last part—the economic bottom line—is usually what persuades a planning board to adopt Fenton's suggestions.

"What sells? Simply telling people you should build this neighborhood this way because it's good for the health of the community is not nearly as compelling as a recently published report by the EPA that connects smart growth with economic benefits," he says. "That's what they want to hear: Do I earn more dollars per square foot on a walkable street?"

Many of the things that make a community more walkable also make it more attractive to businesses and home buyers. Studies have shown that walkable communities saw house values hold steadier during the recession, which most likely kept tax revenues healthier, Fenton says.

"People make light of the Boulder, Colorados" that have invested a lot in these kinds of improvements, Fenton says. "Those are the places in which the Googles of the world want to locate their offices."

Often, towns make decisions that save short-term dollars but have long-term health consequences. Fenton has seen countless examples of school boards that decide to build new

Mark Fenton wants your town to be healthy, and he'll move mountains (or at least sidewalks and bike lanes) to do it.

schools on the edge of town, where the land is cheapest.

"They think they saved lots of money, forgetting that for the lifetime of the school, they are going to be paying to transport the kids by bus and by car," he says. "And by the way, there is going to be a public health cost, because any number of children who might have bicycled to that school when it was in a neighborhood cannot do so anymore."

The town he is touring has a similar problem, with so many parents dropping off their children by car that traffic around the schools is unbearable. Fenton suggests creating off-site drop-off spots, with safe walking routes to the schools. It not only relieves traffic; it ensures kids get some exercise getting to and from the building each day.

As the tour continues, Fenton takes note of the things he likes,

such as a subdivision where a cut-through has been created to meet up with a walking trail and a new retail building that has rental properties on the second floor, above the businesses. Such “mixed-use” areas are some of his favorites.

Then the car turns into another subdivision with beautiful lawns and a long street to the main road. A young couple walks by, pulling two children in a red wagon. They are walking in the street, because there are no sidewalks out of the subdivision.

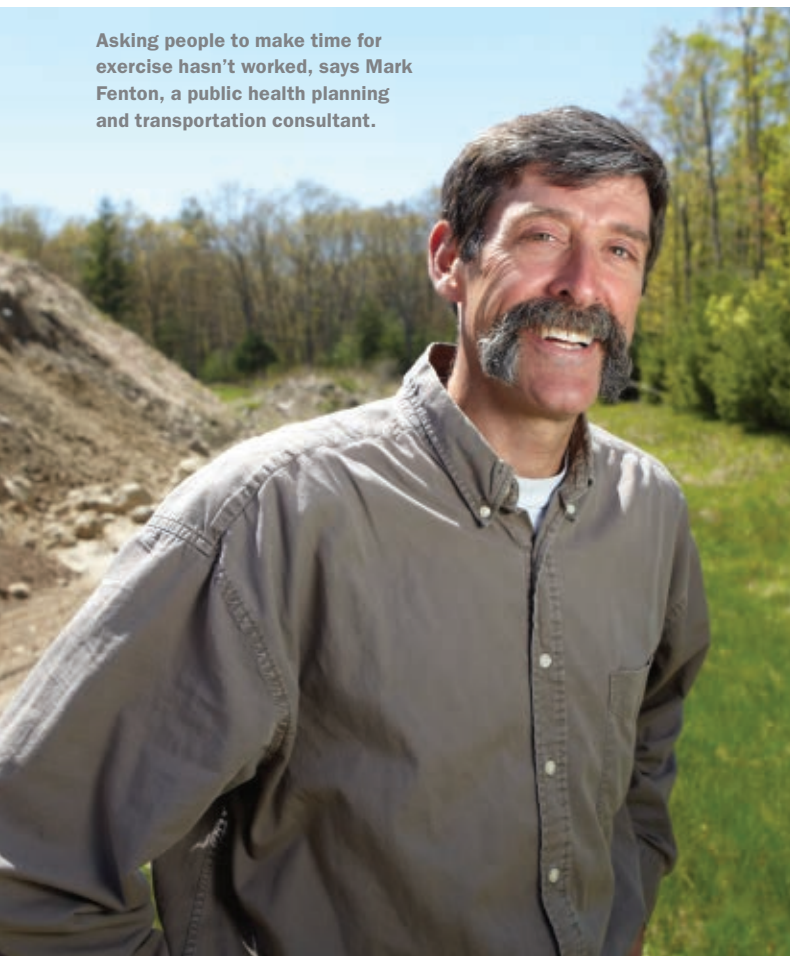
“You are looking at modern American suburbia,” Fenton says. For decades, particularly in the ’50s and ’60s, neighborhoods were designed around the needs of the driver, not the pedestrian. Whether it is returning a library book or picking up a gallon of milk, “every trip has to be by car,” he says.

Fenton has a lean runner’s build and a demeanor that crackles with kinetic energy. He talks almost as fast as he walks, which is *fast*. He tried out twice for the Olympics in the 50-kilometer race-walk event. Some know him from a PBS series he hosted, *America’s Walking*, or as the editor-at-large of *Walking Magazine*. When it comes to walking, you could argue that no one knows more about putting one foot in front of the other.

He originally studied to be an engineer and got into the field of biomechanics. He worked at the Olympic Training Center in Colorado Springs and then at Reebok’s human performance lab, where he designed sneakers that would reduce the likelihood of injury for athletes.

“It was all great, but I realized the much deeper question is not how do we get elite athletes to be better at what they do, but how do we get the vast majority of Americans to do anything at all,” he says.

Asking people to make time for exercise hasn’t worked, says Mark Fenton, a public health planning and transportation consultant.



A NOBLE FAILURE

He, like so many other public health advocates, helped launch dozens of community walking initiatives. You know the kind: He whipped up enthusiasm in a town, encouraged everyone to wear pedometers and keep walking diaries, and handed out countless water bottles and T-shirts with cute logos.

But the disheartening fact is “that approach has not worked,” he says. Despite all the community outreach, leisure time physical activity in the United States hasn’t increased significantly in 20 years, according to the Centers for Disease Control and Prevention. He points to one exercise study reported in the *Journal of the American Medical Association* in which people were given exercise instruction, including exercise bikes to use in their homes. They found there was a burst of exercise soon after the program started, but 18 months later, people were actually getting less exercise than before the intervention.

“Just telling people to get exercise does not move the ball permanently,” Fenton says. “We were still telling them to carve exercise time out of their day. After a while, life just gets in the way.”


The solution, he is convinced, is to make moving once again part of the routine. “What we really need to do is create a world where it is easier for people to be physically active as part of daily life, because not everyone is going to go to a gym or take a class.”

The data on the health benefits of sidewalks, crosswalks, bike trails and all the rest is out there. What is harder to come by is research on how best to get the changes approved and implemented. Politicians are not necessarily thinking about the correlation between isolated housing subdivisions and childhood obesity rates. Public health officers often speak a completely different language from transportation planners and developers. Fenton tries to bridge the gap.

He recently was a guest lecturer for a Friedman School class on community and public health nutrition. The instructor, Assistant Professor Virginia Chomitz, Ph.D., N85, N92, asked her students to pretend they were standing before a town meeting to argue for, say, a new bike trail. After hearing the excellent presentations, Fenton told them it isn’t enough to rattle off statistics on projected physical activity increases. If they want to get their proposals passed, they have to be ready to respond to the local mother’s concern that lights on the trail will keep her children awake at night. (Offer to limit the hours the lights are on.) They have to counter the DPW official’s argument that he doesn’t have funds or manpower to maintain a trail. (Show they can organize a volunteer brigade of trail keepers.)

“You’ve got to think about what the emotional reaction is going to be and how to respond to that,” he says, urging them to remember that from the town’s perspective, “Not changing is easier than changing.”

Fenton estimates he was on the road 135 days last year, consulting with communities large and small. He would be happy to see more people fighting the fight. “We need to raise the next generation of professionals who are going to do this,” he says. **TN**

A close-up photograph of a person's foot, wearing a blue and white checkered sock, stepping down on a piece of light-colored dough. The dough is resting on a wooden surface, and the foot is positioned as if about to crush or flatten it. The background is a blurred blue and white checkered pattern.

It's hip to beat up on wheat protein, but it may not be as toxic as you think

Gluten Free-for-All

BY HELENE RAGOVIN

IF PROUST WERE WRITING TODAY, HIS INSPIRATION would most likely be a gluten-free madeleine.

Where once most of us never gave a second thought to the biochemical composition of our grains, the past decade has seen a torrent of interest in gluten-free fare. Last year, almost one-third of consumers surveyed by industry analysts reported they were looking to cut down or eliminate gluten from their diets. From hamburger buns to cake mix to Passover matzo, gluten-free has become a supermarket mainstay.

The reasons that gluten—a protein mixture found in wheat and a handful of other grains—has become today's most scorned nutrient range from medical awareness by consumers to savvy marketing by food manufacturers. It's true that more people are being diagnosed with illnesses that are aggravated by eating

gluten. But the current demand for gluten-free food has outpaced the number of people with documented health conditions. Many look at gluten-free diets as a vehicle for weight loss, a way to avoid processed foods or simply a path to better health.

Yet the decision to adopt a gluten-free diet should not be made lightly, says Tricia Thompson, N91, a registered dietitian who specializes in gluten-free diets and has written widely on the subject for both professional and general audiences. Avoiding gluten is not, she stresses, a panacea for weight-loss. Nor is gluten harmful for those who do not have a medical reason to avoid it.

"There are a lot of people who think that if they see something with a gluten-free label, it's healthier," she says. "And that's simply not true."

The condition most closely associated with gluten avoidance is celiac disease, an autoimmune disorder. Celiac disease sufferers cannot digest the proteins present in wheat, barley and rye. The result is damage to the nutrient-absorbing hairs in the small intestine and, often, gastric distress. About 1.8 million Americans have celiac disease, although 1.4 million of them remain undiagnosed, according to a 2012 analysis by the Mayo Clinic. Another condition, known as non-celiac gluten sensitivity, also causes intestinal and other symptoms in the presence of gluten, although its particulars are far less understood, and the number of those affected harder to calculate.

Health professionals wonder whether some people who blame gluten for their ills—influenced by celebrity endorsements, social media and other pop-culture buzz—may simply be experiencing the “nocebo” effect, when an inert or harmless substance evokes an unpleasant reaction.

“Sense should prevail over sensibility to prevent a gluten preoccupation from evolving into the conviction that gluten is toxic for most of the population,” wrote the authors of a recent article in the *Annals of Internal Medicine*. “We must prevent a possible health problem from becoming a social health problem.”

The authors, scientists Antonio Di Sabatino and Gino Roberto Corazza, list three reasons not to self-prescribe a gluten-free diet. First, it makes it harder later on to determine whether you have celiac disease. Second, if you do have celiac disease but don’t follow a gluten-free regime properly (more on that later), you can harm your body. And third, it’s just plain expensive if you don’t need to do it. A 2008 study from a Canadian medical school, for example, found the price of gluten-free foods a whopping 242 percent higher than their gluten-full counterparts.

Thompson agrees. “So many people go on the diet, and they may feel better, but they have no idea: Do they have celiac disease? Do they have non-celiac gluten sensitivity? Do they just feel better because they’re eating less or more of certain types of foods?”

Testing should always be the first step. And in order to be tested, you need to have been eating gluten. Without the presence of gluten

in the diet, it becomes impossible to detect the antibodies that point to celiac disease—or rule it out. “If you are considering going on a gluten-free diet, you must be tested for celiac disease first, because you need to know if you have this very serious autoimmune disease,” Thompson emphasizes.

Even if diet adjustments eliminate the symptoms, celiac disease still presents many underlying issues that need to be monitored. “There are things that go along with it. You will need to be checked for anemia, bone disease, other autoimmune diseases.

Women can have difficulty with fertility and carrying a child to term,” Thompson says. Because the disease has a strong genetic link, it’s also important for children or other relatives to be tested.

Being on a true gluten-free diet, the kind a person with gluten-aggravated illness should follow, is quite hard. Thompson doubts that people who have not been diagnosed know all the details. “They’re not worrying about cross-contamination. They may be drinking beer. They may be eating the cheese off the top of a pizza and not having the crust.”



Tricia Thompson, N91, a registered dietitian, has focused her career on gluten-free diets.

The first step in detecting celiac disease is a blood test, which may be followed by a biopsy. This straightforward approach is a godsend for those with the disease; people with celiac disease used to suffer for years before hitting upon the right diagnosis, if at all. In fact, Thompson's decision to specialize in the subject stemmed from her own struggles. Growing up in Alaska in the 1970s, she was "the child who always had a stomachache." In that time and place, her doctors lacked the technology needed to make a proper diagnosis of celiac disease. She discovered the idea of gluten-free eating by combing through the stacks at a university library and years of painful trial and error. Avoiding gluten finally brought her relief from her symptoms. To get tested for celiac disease today, she would have to start eating gluten again, and make herself sick, which she is understandably reluctant to do. "I was never properly tested, which is what happened to a lot of people," she says. She's emphatic that that situation no longer need exist today.

A COOKIE BY ANY OTHER NAME

When Thompson started eating gluten-free in the early 1980s, the number of available products was limited. "Very few manufacturers were making gluten-free products, and the food was terrible," she recalls. With the plethora of gluten-free products now on the shelves—the market for gluten-free goods has topped \$4.2 billion—it's become much easier to mimic a conventional diet. But that has created another problem, as many processed gluten-free products are not healthful in other ways: They are low in fiber and whole grains, lacking in vitamins and minerals or high in fat and sugar (See "Label Alert," at right). Today's packaged gluten-free brownie, it seems, is much the same as yesterday's fat-free cookie, both cloaked under their "health halos."

"Some of it is nutritious, and some of it is still junk," Thompson says.

A gluten-free diet is not only being marketed as a healthier way of eating, it's also widely touted as a way to slim down. "Is the gluten-free diet a weight-loss plan? Absolutely not," declares Thompson. "If someone is using a gluten-free diet to remove processed foods from their eating

LABEL ALERT: GLUTEN-FREE PITFALLS

Eating a healthy, gluten-free diet is possible, but there are hidden nutritional pitfalls, particularly if you depend on commercial products, says Tricia Thompson, N91, author of *The Complete Idiot's Guide to Gluten-Free Eating* (with Eve Adamson) and the *American Dietetic Association Easy Gluten-Free: Expert Nutrition Advice with More than 100 Recipes* (with Marlisa Brown).

"A lot of people think that if it has gluten-free on the label, it's somehow healthier. People tend to think having a gluten-free cookie or brownie is healthier than having a wheat-based cookie or brownie, and that's simply not true. Junk food is still junk food," says Thompson. Some things to look out for in processed gluten-free food:

Lack of whole grains: Gluten-free foods are often made with refined flours and starch, such as white rice, milled corn or tapioca starch. "If you look at the ingredients, the first one might be maize starch or cornstarch," says Thompson. "That drives me crazy. There is no reason in this day and age to make gluten-free foods and have cornstarch be the first ingredient." She advises looking for products made with whole grains, which can include buckwheat, teff, amaranth, millet, quinoa, whole corn, brown rice, wild rice or gluten-free oats.

Lack of fortification: Unlike refined wheat-based bread, pasta or breakfast cereals, many refined gluten-free foods tend not to be enriched or fortified with B vitamins and iron. For those whose previous diets had relied on enriched or fortified wheat products, this could result in a drop in nutritional status. Look for gluten-free, enriched products.

High in fats, sugars and gums: Many gluten-free manufacturers add fat and sugar to improve the taste of their products, and xanthan and guar gums in an attempt to imitate the mouthfeel and texture of gluten foods. People eating gluten-free need to become accustomed to a different "norm," Thompson says. "Certainly, you can find manufacturers of gluten-free foods that are not using these ingredients, and I'd like to see more of them," she says. One way to avoid baked goods made with gums is to make your own from scratch.

—HELENE RAGOVIN

plan, then it may result in weight loss—as long as they're not substituting the gluten-free cookie for the gluten-containing cookie," she says. "If they're using it as an excuse to remove pasta and bread and carbohydrates from their diet, they may in fact lose weight—because then it's become like the Atkins [low-carbohydrate] diet. But that doesn't mean it's the gluten" that was the problem in the first place.

Thompson believes most people, regardless of their gluten tolerance, would benefit from fewer boxed or industrially prepared foods. "I'd like to see the return to real

foods—fruits, vegetables, whole grains, baking from scratch. Then we wouldn't be getting some of these ingredients that we can't pronounce," Thompson says. "You can remove processed foods from your diet without going gluten-free." In other words, scratch the frosted strawberry gluten-free toaster pastries, made with potassium sorbate, titanium dioxide and three types of gums—and have some strawberries. **TN**

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The Microbiome

EVERYONE'S GOT A PERSONAL COLLECTION OF MICROBIOTA. You could think of yours as your unique internal pet—at up to 3 percent of your body mass, it's as hefty as a teacup Yorkie or a large guinea pig—requiring care and feeding. In turn, your microbiota provide essential services: extracting energy from food, absorbing and generating vitamins and amino acids, and forming barriers against infective invaders. If researchers are correct, your microbiota might also fight diabetes, obesity and cancer; stimulate your immune system; break down toxins; and boost your overall health.

So exactly what are microbiota? They are the more than 10,000 species of bacteria, fungi and viruses that inhabit your gut, nose, mouth, throat, skin and urogenital tract. Professor Simin Nikbin Meydani, D.V.M., Ph.D., director of the Jean Mayer USDA Human Nutrition Research Center on Aging (HNRCA) at Tufts, likens the collective organisms to a major internal organ that is more metabolically active than even the liver.

She says nutritionists' excitement about the emerging picture of our microbiota is based partly on the discovery that the organisms are not the innocent bystanders scientists once imagined, and on the equally startling realization that gut bacteria could have an impact on the entire body—potentially determining, for instance, whether an individual is obese or lean, or predestined to health or disease.

The U.S. government's \$173 million Human Microbiome Project (the microbiome being the collective genes of the microbiota, which outnumber

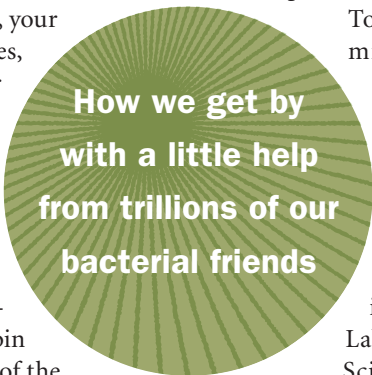
your own human genes 150 to 1) is designed to propel knowledge to a new level. Just last year, 200 scientists reported the results of five years of collecting samples from more than a dozen body sites on more than 200 study participants. They found hundreds of never-before-described fungal species as well as other indications that they had just scratched the surface of the scope of the microbiome's structure.

To add to the challenge, everyone's microbiome appears to be unique: It is readily modified by diet, its multiple microorganisms seem to have overlapping roles, and “nobody understands what happens when all this gets modulated,” says Associate Professor Martin Obin, Ph.D., a researcher in the Obesity and Metabolism Laboratory at the HNRCA.

Scientists around the world, including many at the HNRCA, are accelerating their research on exactly what these microscopic allies do for us, and how to get them to do it better. At the HNRCA, current research ranges from studying the immunity-boosting and cancer-fighting effects of the plant components that bacteria digest for us to exploring a little-understood form of vitamin K generated by microflora in the colon.

GUT INSTINCTS

Several hundred species of bacteria, along with some fungi and protozoa, inhabit our digestive tract, the largest reservoir of microorganisms in the human body. If what HNRCA scientists and others suspect about intestinal microbes pans out,



How we get by
with a little help
from trillions of our
bacterial friends

BY DEBORAH HALBER ILLUSTRATION BY PAUL WEARING





the knowledge could revolutionize the way we think about gut bacteria in relation to weight loss, immunity, disease and the creation of essential nutrients.

The “good” bacteria in our intestines have a symbiotic relationship with our bodies. They survive on food that passes through, glean energy from the parts that we cannot digest ourselves. They occupy real estate along the intestinal wall where pathogens might otherwise set up shop; they produce substances that drive off or kill invading pathogens and behave as low-level antigens, inducing intestinal lymphatic tissues to churn out natural antibodies that prevent “bad” bacteria from invading.

The intestines send out substances that may favor certain bacteria. The microbiota, in turn, alter the intestinal lining, influencing its tendency to store or burn fat. Understanding that relationship holds out a tantalizing possibility: Tweaking the microbiota might lead to new ways to address the obesity epidemic.

Professor Andrew S. Greenberg, M.D., director of the HNRCA Obesity and Metabolism Laboratory and the Atkins Professor in Nutrition and Metabolism at the School of Medicine, studies the complex interplay among microbiota, diet and hormones that govern food absorption and metabolism. He hopes to illuminate this “symphony” of interactions that can tip the balance toward burning fat, for instance, or storing it. “We are actually on that hunt right now, and we have data to support that these pathways may alter the storage of fat,” he says.

Previously, researchers hadn’t thought about the role of the intestines in regulating these metabolic processes. “The intestines were the forgotten organ in terms of obesity,” he says. “Who would think that the intestines regulate food intake?” But studies have shown that microbiota direct the intestines toward certain pathways that enable fat, glucose or cholesterol to be absorbed. Gastric bypass surgery seems to promote weight loss not only by reducing food intake but also by encouraging the microbiota to process fat in a certain way.

Scientists may be able to alter that pathway in a way that affects gut bacteria, says Greenberg, whose work in this arena in mice is being extended to humans. To regulate fat absorption, it would be necessary to tweak how gut bacteria interact with the intestine itself—a feat that Greenberg sees not only as possible, but likely in the near future.

IMMUNITY BOOSTERS

Beyond weight control, the interplay between what we eat and our microbes seems to affect our immune system. Professor Mohsen Meydani, D.V.M., Ph.D., director of the Vascular Biology Laboratory at the HNRCA, along with Simin Meydani, who is also director of the Nutritional Immunology Laboratory, are seeking to quantify how consuming whole versus refined grains changes the population of “good” bacteria that keep the digestive tract running smoothly, protect against pathogens and, in turn, boost the immune system.

Very few studies have investigated whole grains’ effect on gut immunity, but eating fiber-rich grains seems to be beneficial, producing reduced levels of the inflammation that is tied to heart disease, cancer and mortality. No one has shown exactly how whole grains do that, but it could be by interacting with the immune cells that reside in the gastrointestinal tract. The cells can generate signals that could be transferred to cells and tissues way beyond the gut, boosting the body’s capacity to deal with toxins, allergens and harmful microorganisms, Simin Meydani notes. Or they could produce short-chain fatty acids associated with anti-inflammatory effects and enhanced immune response. They might also increase the acidity of the gut, creating an unfavorable environment for unwanted microorganisms.

In an ongoing study of 80 subjects led by Simin and Mohsen Meydani, half will consume a whole-grain, high-fiber diet, and half will consume refined grain. After six weeks, DNA sequencing, done in collaboration with researchers at Tufts Medical School, will allow scientists to analyze the change in ratio of certain bacteria and their effects on the immune system.

CHURNING OUT VITAMINS

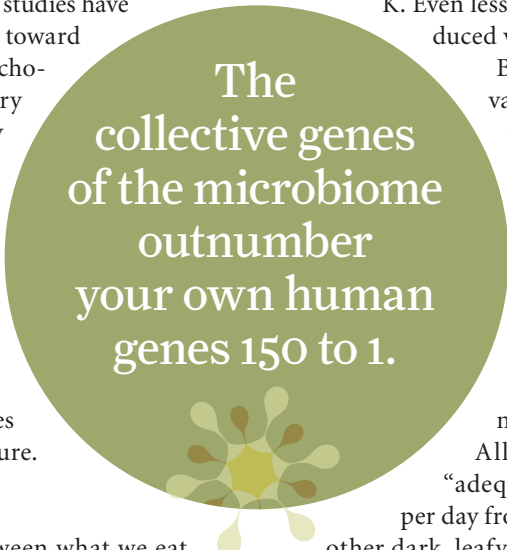
Your microbiota also work as vitamin-production plants. Bacteria in the gut synthesize vitamins, and those that they don’t use are excreted to benefit their host. In humans, gut bacteria secrete vitamin B12 and a less familiar micronutrient called vitamin K.

Professor Sarah L. Booth, Ph.D., associate director of the HNRCA, says that other than its accepted role in blood clotting, little is understood about the physiological functions of vitamin K. Even less is understood about forms of bacteria-produced vitamin K called menaquinones.

Booth and her colleagues suspect the huge variation in gut bacteria might help explain the wide variation in vitamin K levels found in the general population. “We’ve been so focused on one form of vitamin K, we have neglected the form produced in the gut,” she says.

As the director of the only U.S. laboratory dedicated to studying vitamin K nutrition, Booth is hopeful that advances in DNA sequencing will help launch new research. Vitamin K is one of the few vitamins for which the Recommended Daily Allowance is unknown—we know only that “adequate intake” equals 90 to 100 micrograms per day from such dietary sources as spinach, kale and other dark, leafy greens. How much of an individual’s vitamin K is generated within the gut and how much comes from diet? “We haven’t had the tools to study this,” Booth says. “Work on gut microbiomes in relation to nutrients has always mentioned vitamin K, and yet we know so little about the role of gut production and whether it has an impact on health.”

Booth and her research colleagues are looking at whether increasing whole grains and dietary fiber modifies bacterial production and, in turn, vitamin K production in the gut.



The
collective genes
of the microbiome
outnumber
your own human
genes 150 to 1.

Get Cultured

Probiotic—defined by the Food and Agriculture Organization of the United Nations as a live microorganism that confers a health benefit—has become a buzzword signaling a boost for your personal microbiome, much like designer fertilizer for your prize rosebushes.

Similarly, prebiotics—indigestible food ingredients such as fiber—are digested by “good guy” bacteria in the lower intestine, says Martin Obin, an expert on obesity and metabolism at the HNRCA. “The byproducts then go into the bloodstream and do good things,” helping to digest food, prevent infections and bolster the immune system.

Growing appreciation for gut microbiota has spawned U.S. and European industries centered on “friendly” bacteria. Besides tubs of yogurt, probiotics are popping up in soy beverages, salsa, dill relish, ketchup, and even a microcapsule coating on bread. Probiotics in capsules or gummy bears promise billions of live cultures per dose to ensure digestive health and “general well-being.” Probiotics’ unproven claims range from preventing colds and curing yeast infections to altering brain activity and reducing cholesterol.

Between 2003 and 2008, the number of probiotic foods and beverages produced worldwide more than doubled, according to Datamonitor, a food industry watchdog. In 2011, consumers spent \$28 billion on probiotic foods and supplements, according to the research firm EuroMonitor International.

Yet the science lags behind sales. Few of the additives or supplements have been tested as rigorously as conventional drugs. (In 2010, both a Nestlé subsidiary and Dannon agreed to drop probiotic claims for separate products, and last year, Europe completely banned the terms “prebiotic” and “probiotic” in food industry marketing.)

So far, with a few exceptions, such as preventing or treating certain kinds of diarrhea in children, clear-cut evidence of probiotic effectiveness is lacking. But promising research continues. Studies in mice, for example, indicate certain strains of probiotics could offer protection from metabolic syndrome, a catch term for the obesity, insulin resistance, high triglycerides, high cholesterol and other symptoms that an alarming number of middle-aged people develop.

Obin found that in mice fed a high-fat diet, probiotic strains of the bacteria *Lactobacillus* and *Bifidobacterium* prevented weight gain and improved insulin sensitivity. Obin is hopeful they could do the same in humans.

—DEBORAH HALBER

Nutrition and Cancer Biology Laboratory, and Ligi Paul Pottenplackel, Ph.D., of the Vitamin Metabolism Laboratory, are looking at the effects of a high-fat diet and genetically induced obesity on the microbiota and the rate of liver and intestinal cancer.

Assistant Professor Oliver Chen, Ph.D., a scientist at the Antioxidant Laboratory at the HNRCA, is part of a team looking at polyphenols—phytochemicals commonly found in vegetables, legumes, chocolate, cranberries and green tea. All other things being equal, people who eat a lot of foods containing polyphenols have shown a reduced risk of chronic disease. Given polyphenols’ low absorption rate in the upper gastrointestinal tract, their benefits may play out amid the microflora in the colon.

Chen is looking at what is left over from the polyphenols once the gut microflora break them down and examining the extent to which these products affect immunity, especially in colon cells. The polyphenols may even change the bacteria themselves. “We hope to see if polyphenols can play a prebiotic role to modify the microbiota to a more favorable profile,” he says.

Collectively, Crott says, “these studies will further our understanding of the complex interaction between diet, the gut microbiome and cancer.”

Laurence Parnell, Ph.D., a computational biologist in the Nutrition and Genomics Laboratory at the HNRCA, uses cutting-edge techniques to look at the nutritional benefits of a healthy microbiome. “We’re less interested in the specific bacterial species and more concerned with the metabolic potential of the population as a whole,” Parnell said. For instance, his lab analyzes the breakdown products of food in the gut, blood and urine to see what was eaten

and whether it was processed in ways that make nutrients available to cells in the body. “For us, this gets at the function of the microbiome and the biological response that can be so important to the onset and progression of obesity, aging and such disorders as cardiovascular disease, type 2 diabetes and stroke,” he says.

Researchers at the HNRCA are excited about the cross-fertilization of disciplines: Nutritionists are now collaborating with Parnell and other computational biologists as well as with geneticists, microbiologists, gastroenterologists, mathematicians and computer scientists to determine what defines a healthy human microbiome. The resulting understanding of the microbiome’s connections to human health may lead to a new wave of disease prevention and treatment in which very small, historically unheralded entities have big effects. **TN**

Deborah Halber, G96, is a freelance writer in Lexington, Mass.

CANCER CLUES

Not all bacteria, of course, provide benefits. Certain microbes amplify inflammation in the lining of the stomach or intestines and have been implicated in gastrointestinal cancer. Other gut bacteria may be associated with the development of colorectal tumors. But little is known about how diet and bacteria—both good and bad—interact to influence cancer risk. Ongoing studies by the HNRCA’s Cancer Cluster are looking at just that.

A study led by Jimmy Crott, Ph.D., a researcher in the HNRCA’s Vitamins and Carcinogenesis Laboratory, is comparing the gut microbiota of human subjects who have intestinal tumors to the microbiota of those who do not. The study also looks at how dietary patterns and the intake of specific nutrients correlates to the species of microbes they host.

In rodent studies, Xiang-Dong Wang, M.D., Ph.D., director of the

Food WITHOUT FAVOR

**For agencies trying to help the sick and hungry in Afghanistan,
alleviating the suffering means
not taking sides in the war** **BY TAYLOR MCNEIL**

As foreign troops continue to pull out of Afghanistan, international aid agencies must brace for more conflict. At the same time, they will find it even harder to address urgent humanitarian needs unless they are perceived as more neutral to the Taliban and other armed opposition groups, according to a report by Tufts researchers.

"Among aid workers and Afghans, there is a deep sense of concern about the situation and how it's going to evolve," says Antonio Donini, a senior researcher at Tufts' Feinstein International Center and co-author of the report "Afghanistan: Humanitarianism in Uncertain Times."

Embroiled in war and civil strife for more than 30 years, Afghanistan is now one of the poorest countries in the world, ranking at or near the bottom of measures for health, food security and education, the report notes. Humanitarian agencies have made some small gains in the past decade, but those are now in jeopardy as the U.S. and other NATO forces withdraw troops and curtail relief funding.

Adding to the urgency of the situation is the agreement in January between Barack Obama and Afghan President Hamid Karzai to accelerate the withdrawal of U.S. and other NATO troops from Afghanistan: They're now scheduled to leave in 2014. Donini notes that during 1989–90, when the Soviets pulled out of Afghanistan after a protracted war, most analysts felt that if only the Afghans were left alone, they would

sort out their problems. Instead, the country descended into a free-for-all, with warlords and the Taliban vying for control.

"In many ways, we have a similar situation today," he says. "With the withdrawal of foreign troops, the central government will control the main cities and some of the main roads, but a lot of the country will revert to either warlord control or Taliban control."

Donini and report co-author Norah Niland, a former U.N. official now based in Switzerland, traveled to Afghanistan in June 2012 to meet with government, aid agency and other nongovernmental organization (NGO) officials. Another co-author, Prisca Benelli, a Ph.D. student at the Fletcher School, worked on data collection and analysis to document the state of health care and education in Afghanistan.

Those data are not reassuring. The health statistics alone make for depressing reading. By one standard measure, almost one in three Afghan children is malnourished, especially in the southern part of the country, which has been most affected by the conflict. The under-5 mortality rate—how many children die before reaching their fifth birthday—is the worst for all of Asia and rivals that of other strife-ridden countries, including Somalia and

the Democratic Republic of Congo.

Afghanistan also has the second highest maternal mortality rates in the world—it's the only country where men live longer than women, says Donini. Access to medical care is likewise extremely poor, because of continuing conflict and insecurity, which affect the functioning and resupply of rural health-care facilities.

Donini says he spoke to many aid agency workers and Afghans who were not optimistic about the country's future, fearing that the conflict would intensify as foreign troops pull out. That being the case, Donini and his colleagues recommend the NGOs and the U.N. plan for the worst: a deteriorating political situation and a continuing



ITISM



Opposite, a girl in Jawzjan Province receives Australian food aid. Above, a boy sits atop an abandoned Soviet tank on a hill in Kabul Province. Raw sewage flows in unpaved streets in Kabul.



Nearly one in three Afghan children is malnourished, especially in the southern part of the country, which has been most affected by the conflict.

humanitarian crisis. Only by acknowledging this outcome can they be prepared to help the Afghans, bringing more resources to the country, especially to rural areas that are now off-limits to many aid agencies.

Part of the problem is that most aid organizations have been allied so strongly with the central government and the coalition forces that it is difficult for them to work safely in most parts of the country. "It's going to take time to restore the credibility of an aid system that is quite biased," says Donini. All the Western donors except Switzerland are involved as parties to the conflict, and it's unlikely that this would be ignored by the Taliban.

"But I think there is an opportunity for

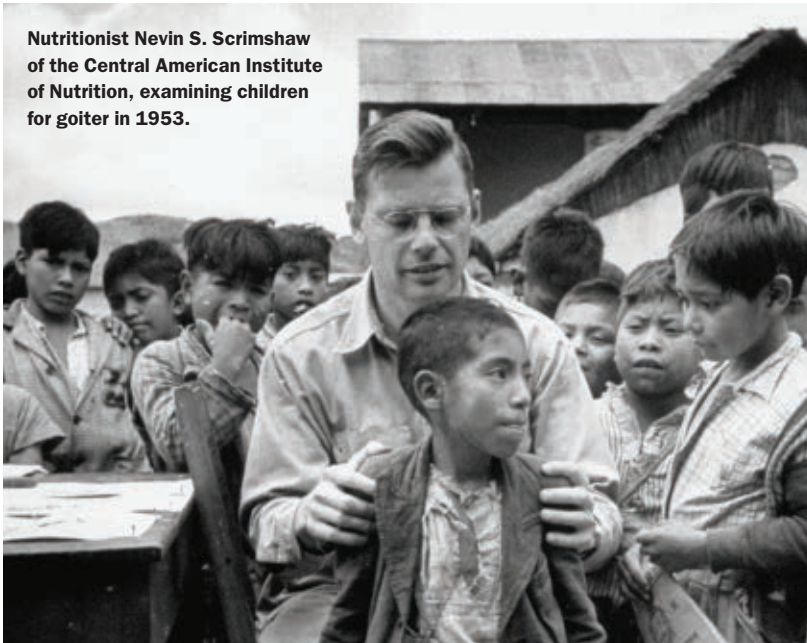
the aid system to mend its ways in terms of becoming more impartial and independent, if not neutral," Donini says. He notes that the International Committee of the Red Cross understood long before many agencies that the victory over the Taliban in late 2001 and early 2002 wasn't holding, and so took a more neutral stance toward the Islamic fundamental political movement. Now the Red Cross is one of the few agencies that can work outside of the main cities, which are controlled by the central government.

Because most other aid organizations are still so clearly allied with the central government and coalition forces, they have been unable to maintain strong contacts with the communities that they had been serving. Instead, they manage their relief programs remotely from Kabul, the capital. "I think this lack of proximity between the aid agencies and the communities where they want to work is the main area where progress has to be made," Donini says.

"It's absolutely urgent to find ways of working in areas that are contested, and the best way of doing this is trying to maintain an independence from the warring parties, to advocate on the basis of humanitarian principles to convince whoever is on the ground of what the intentions and the opportunities are," he says. **TN**

Taylor McNeil, the senior news editor in Tufts' Office of Publications, can be reached at taylor.mcneil@tufts.edu.

Nutritionist Nevin S. Scrimshaw of the Central American Institute of Nutrition, examining children for goiter in 1953.



Nutrition's Shining Star

Nevin Scrimshaw's pioneering work saved countless lives

AS HIS FRIEND AND COLLEAGUE IRWIN ROSENBERG HAS PUT IT, NEVIN Scrimshaw was “probably unchallenged as the most important nutrition scientist and nutrition leader in the world.” And so it was that Rosenberg, the Jean Mayer University Professor in Nutrition at Tufts, and a crowd of other nutrition luminaries gathered on the Boston campus on April 20 to honor a man who had fostered and inspired their careers.

Scrimshaw, a visiting professor at the Friedman School, which houses a foundation he created, died in February of congestive heart failure at age 95. He spent seven decades fighting malnutrition in Asia, Central America and Africa. Not only did he fight, but he often won.

He helped find ways to prevent kwashiorkor, a deadly form of severe malnutrition afflicting young children. He developed a method for adding iodine to the crude moist salt in developing countries that led to dramatic reductions in goiter in women and children. To help malnourished children in Guatemala, he developed a protein-rich mixture of cotton-seed flour and maize called Incaparina. He created a similarly nutritious food for children in India.

“It is amazing how many of Nevin’s innovations and foundations have withstood the test of time, and in most cases have grown in importance,” said Lindsay

Allen, director of the USDA Western Human Nutrition Research Center. She noted that Incaparina is probably more widely consumed today than it was 30 years ago.

Scrimshaw was also the first scientist to describe the interplay between malnutrition and infection, an important connection that would change how physicians treated diarrhea and respiratory disease in developing countries.

Scrimshaw grew up near Milwaukee, and initially studied biology. He enrolled at Ohio Wesleyan at 16, and by age 23 had earned an M.A. in biology and a Ph.D. in physiology from Harvard University. He received a medical degree from the University of Rochester in 1945, and added a master’s of public health from Harvard in 1959.

In 1961, he founded the Massachusetts Institute of Technology’s department of nutrition and food science, where he trained a generation of nutrition leaders. Long after he retired from that post, “he was always organizing panels, moderating them, creating very lively sessions, bringing everyone together,” said Ellen Messer, a nutritional anthropologist and visiting associate professor at the Friedman School. “Nevin’s contacts became everyone’s contacts.”

In 1982, Scrimshaw created the International Nutrition Foundation, which now bears his name, to provide fellowships to scientists from developing countries and fund research on critical nutrition issues. He also founded the world hunger program of the United Nations University.

He received countless honors, including the World Food Prize in 1991.

“My father was an example of the defiance of illness and aging,” his daughter, Susan Scrimshaw, president of the Sage Colleges, said at the tribute. “He coped with heart disease and cancer with a stubbornness that sometimes frustrated his children.”

In addition to his daughter, Scrimshaw leaves his wife, Mary; four sons, eight grandchildren, four step-grandchildren and a great-grandchild.

A TALE OF KALE

Produce, with all the intimate details

The “know-your-farmer” movement has acquainted many consumers with the origins of the foods they buy. Could “know your biochemist” be the next step? Talk and Taste, a new series at the Jean Mayer USDA Human Nutrition Research Center on Aging (HNRCA), aims to get you even more familiar with your favorite fruits and vegetables, right down to the molecular level.

About 70 people gathered this spring

to learn all about kale—from what soils are ideal for seedlings, to its biochemical properties, to how best to cook it to bring out its nutrients and flavor. Sarah Booth, director of the HNRCA’s Vitamin K Laboratory, explained the nutritional benefits of kale, which is heavy in vitamin K, and the role it plays in blood coagulation. Betty Sanders, master gardener from the Massachusetts Horticultural Society, talked about best

practices for growing kale in New England. Chef Rolando Robledo of Clover FoodLab provided a cooking demonstration and tasting of his white bean, butternut and kale soup.

The series, which has also delved into pumpkin and strawberries, is a partnership between the HNRCA and the Massachusetts Horticultural Society. For more information, visit hnrca.tufts.edu/events/talk-and-taste.



Before the Well Runs Dry

WITH THE WORLD POPULATION EXPECTED TO HIT 9 billion by 2050, some predict food production will need to almost double to feed them. Now consider that agriculture accounts for 70 to 80 percent of global water use. The question quickly becomes: Will there be enough water to go around?

The consensus at a symposium sponsored by the Tufts interdisciplinary graduate program Water: Systems, Science and Society, aptly titled “Feeding Ourselves Thirsty,” was a strong...maybe.

On the bright side, Timothy Wise, G05, director of the research and policy program at the Global Development and Environment Institute at Tufts, said that studies demonstrate ways in which we could increase crop yields by 50 percent, with just a 13-percent increase in water use. But that is assuming that farmers employ smart water-use techniques, which is far from the case worldwide.

In Mexico, for example, water use is twice what it should be because of outdated irrigation systems.

Brazil and Australia have already put money toward more efficient use of the natural resource. Indeed, agriculture in south-

eastern Australia survived an eight-year drought, which had robbed it of 70 percent of its available water, by instituting such efficiencies.

Danielle Nierenberg, N01, cofounder of the policy institute FoodTank, argued that promoting such inexpensive, local and culturally appropriate solutions as rainwater harvesting and solar-powered irrigation—steps she has seen African farmers already taking—could have a much bigger effect than a costly search for a magic-bullet technology.

“There are countless examples of hope and success and innovation going on” around the globe, she said.

Roberto Lenton, Ph.D., the founding executive director of the Robert B. Daugherty Water for Food Institute at the University of Nebraska, said he is inspired by farmers in western India, who use their cell phones to activate electronic irrigation pumps, and pastoralists in Kenya, who upload info on groundwater conditions to the Internet to form a real-time map of water availability.

Good water practices can also come from unexpected corners. Satellite images have revealed that Taliban-controlled regions of Afghanistan employ drip irrigation, which saves on water and fertilizer, on their poppy farms.



Water tank with solar panels



Don Megerle greeting the team at the finish line.

What Keeps Them Running

Training his team for Boston 2014, Tufts' marathon coach won't change a thing by Phil Primack, A70

THE “DON HUGS” WILL RETURN TO the Boston Marathon next year. So will the peanut butter and jelly sandwiches, strawberries and, especially, the steady encouragement with which Coach Don Megerle fuels his runners’ bodies and souls. In that way, the 2014 marathon will be the same as all the other Hopkinton-to-Boston treks for which the coach has trained and coaxed members of the Tufts Marathon Team since becoming director of the university’s marathon effort in 2004.

Though deeply shaken by the blasts of April, Megerle refuses to join in the everything-is-going-to-change chorus that tends to follow acts of terror. The team’s formal training for the next marathon began in mid-June, same as always.

The coach sticks to the promise he made to his first marathon team, a decade ago. “I told the team that every Wednesday at 7 a.m., every Sunday at 8 a.m., at every interval training session, wind, rain or snow, I

will be there with them,” says Megerle, who began working with runners after 33 years of leading the Tufts men’s swim team to success. “Same thing this year.”

His marathon family formed in 2003 as the Tufts President’s Marathon Challenge, attracting about three dozen participants. Since then, he has trained nearly 2,000 students, faculty, staff and alumni marathoners. Those runners and their supporters have raised more than \$4.5 million to support nutrition, medical and fitness programs at Tufts, including research on childhood obesity at the Friedman School.

One runner, Alonso Nichols, the university’s assistant director of photography, calls it “Megerle magic.” It’s not that the coach has invented some special training breakthrough. What distinguishes Megerle is his “almost Zen approach to running,” Nichols says. “I don’t think Don Megerle ever logged my miles per minute, but that man knew exactly my condition, when I kept a good

pace, when I was pushing too hard. You’ll see him with lots of things—like strawberries and bananas to nourish his runners—but not with a stopwatch or a clipboard.”

Since 2004, more than 95 percent of Megerle’s marathoners have made it across the Boylston Street finish line. As far as the coach is concerned, that includes all of last April’s Tufts runners, even those who were turned away after the bombs went off. Of about 135 official and unofficial Tufts runners, 45 had crossed the finish line before the explosions, and most of the rest were within a few miles or less. Megerle had already greeted the finishers with hugs and smiles. He was waiting for the rest of the team when smoke filled the air. He began looking for people he could help when he saw one of his own runners near the Boston Public Library, dazed and confused. Wounded people were being wheeled by on stretchers. “I kept shielding her face,” says Megerle. “She can’t see this awful stuff. I got a medical guy to call her mother and said, ‘You’ve got to get her out of here.’”

For the next six hours, until well after dark, Megerle kept walking the finish-line area, looking for his runners, all of whom turned out to be safe. The next day, as it always does, the marathon team gathered for a reception hosted by the Tufts president. For his part, Megerle knew this was an opportunity to begin the process of getting the team to look ahead, not just back. “I tried to be pretty stoic for the runners, even if I wasn’t really feeling that way,” he says. “I wanted them to stay tight, to stay together, to know it’s going to be fine.”

Talk to any Tufts Marathon Team member, and you’ll hear a story of some personal touch by Megerle. Going with them to physical therapy sessions. Remembering their favorite foods. Offering advice and support on matters that sometimes had nothing to do with training. “The runners know that my life will become their life,” he says. “There is nothing I won’t do for these kids.” The bond is as strong as it is mutual.

Phil Primack is a freelance editor and writer in Medford, Mass. A version of this story appears in the Summer 2013 issue of Tufts Magazine.

THE NEW FLETCHER DEAN

Former NATO commander James Stavridis is known as an inspirational leader and strategic thinker

JAMES STAVRIDIS, F83, F84, THE RETIRED admiral who most recently served as NATO's top military commander and oversaw the U.S. European Command, has been appointed dean of the Fletcher School at Tufts, the nation's oldest graduate school of international affairs. Stavridis will succeed Stephen W. Bosworth, who is retiring this summer after having led the school since 2001.

The New York Times has called Stavridis a "Renaissance admiral," largely because this career Navy man has defined the 21st-century U.S. military as not built solely on might, but also on what is known as "smart power," the creation of durable partnerships with friends and allies to achieve mutual goals of security, prosperity and peace.

"We are excellent at launching Tomahawk missiles; we need to get better at launching ideas," said Stavridis, who is

known as an inspirational leader and strategic thinker with a deep understanding of international affairs.

Stavridis, who earned a master of arts in law and diplomacy and a Ph.D. from the Fletcher School, will start his new job later this summer.

He was the first naval officer to serve as American and NATO commander in Europe, where he was responsible for 120,000 coalition troops serving on three continents and at sea. The European Command encompasses 51 nations, stretching east from Spain and Portugal to the Middle East and into the Caucasus, the traditional boundary between Europe and Asia.

Stavridis had to navigate a diversity of geography, culture and economics in the region while negotiating such sensitive issues as the U.S. mission in Afghanistan, cybersecurity, the protection of millions of

Turkish citizens who live near the border with Syria from ballistic missile attacks, and piracy off the Horn of Africa.

"Admiral Stavridis has the rare combination of intellectual curiosity, social intelligence, humility, leadership skills and respect from others that has made him one of the great military and political leaders of his generation, and that will make him a spectacular Fletcher dean and a key member of the university leadership team," said Tufts Provost and Senior Vice President David Harris in announcing the appointment.

Harris also noted Stavridis' expertise in diplomacy, security studies, international organizations and politics—all areas that are key to the Fletcher School's mission.



James Stavridis, F83, F84



Tufts Alumni

A Vision for Tufts

During a time of expanding horizons for the university, Tufts Alumni is pleased to invite you to meet with Tufts President Anthony P. Monaco to hear about where the institution aspires to be in the next 10 years.

During the first two years of the president's tenure, Tufts Alumni hosted 23 receptions to introduce him to alumni, parents and friends around the world. In 2013–14, President Monaco will be visiting a number of Asian cities as well as cities in Colorado, Delaware, New Hampshire, Oregon, Texas and Washington.

All members of the Tufts community are invited to attend any of these special events. As the president's itinerary is developed, you can find event dates and locations at tuftsalumni.org/president.

Future Investment

Frances Stern alums make a collective commitment to financial aid by **Kristen Laine**

I AM A FRANCES STERN GRADUATE,” SAYS HELENE FUCHS, G75, USING THE common shorthand for Tufts’ nutrition and dietetic science program founded by the pioneering social worker, educator and dietitian Frances Stern. “The graduate degree increased my knowledge. The internship really launched me as a professional.” But without financial aid, Fuchs says, “I never would have been able to go.”

Now Fuchs and other friends of the Frances Stern program are ensuring that its work continues through generous gifts to financial aid. For Fuchs, who runs a health-care management company, part of the inspiration is the young people she encounters in the management course she teaches for Frances Stern students. Those students are pursuing the combined master’s in nutrition and dietetic internship, a joint program with Tufts Medical Center’s Frances Stern Nutrition Center and the Friedman School. The hospital-based nutrition center offers inpatient and outpatient nutrition services.

“Every time I work with students,” Fuchs says, “I’m reminded of how passionate they are about making a difference.” And yet she’s also aware that, like her, many students couldn’t be in the program without financial help.

To make that happen, Fuchs is leading a small group of alums, including Carole Palmer, G69, and Pat Kearney, G78, to increase student financial aid. Palmer, who holds appointments at the Friedman School and the School of Medicine,

in addition to her primary appointment at Tufts School of Dental Medicine, recalls the psychological boost that receiving a scholarship gave her as a Frances Stern student: “You realize that people are noticing your work, that they think you’re worthy of support.”

Members of the group have each committed to making a gift of \$2,500 annually for three years. They are challenging other graduates to match their combined contribution to the Frances Stern financial aid fund. “This is a way to expand the amount of my donation,” Fuchs says. “By combining gifts and encouraging others to match them, we can increase what the program receives.”

Other friends of the program are generously supporting financial aid, including Judy Usen, N02P, a member of the Friedman Friends Council, who initiated her multi-year financial aid commitment in 2010. A dietitian who worked in a hospital for many years, Usen got involved with the program while her daughter, Dara Borto, N02, was a student. Now Borto is a staff member certified in nutrition support at the Frances Stern Center, and Usen is an active volunteer.

“Having a mother and daughter share a profession is a special bond,” Usen says. “Though I am not a program graduate, I am very impressed with it through what I have learned from Dara and by volunteering.” Usen identified a great need for student financial aid; her gift also recognizes her profession and the outstanding work of the center.

The efforts of these donors reflect their passion for the center’s ongoing work in research and clinical care—and for creating opportunities for the next generation of students. “I’m investing in the sustainability of the work that the Frances Stern program does,” says Fuchs. “I’m not giving back. I’m giving forward.”

Kristen Laine is a freelance writer in Seattle.



Frances Stern students, such as Erika Hval, N13, have the opportunity to learn how to promote healthy living thanks to donors’ investment in financial aid.



Tawanda Muzhingi, N08

Knowledge Fortified

Tawanda Muzhingi dedicates his career to improving children's health in southern Africa by Kristin Livingston

SUPPOSE YOUR CHILD STOPPED GROWING? What if he eventually lost his sight, or died, and a way to prevent that had been in your backyard the whole time—only you had no idea what it could do for a child's health? For some families in southern Africa, this scenario is real.

"Knowledge saves lives," says Tawanda Muzhingi, N08, a research assistant at the Jean Mayer USDA Human Nutrition Research Center on Aging and a Ph.D. candidate in the Friedman School's biochemical and molecular nutrition program. A native of Zimbabwe, Muzhingi has spent

the past six years developing sustainable solutions for vitamin A deficiency in southern Africa, work that will help prevent childhood illness and death.

Most families in the region cannot afford to regularly eat such vitamin A-rich foods as meat, eggs or dairy products; many often go a year at a time without getting the essential vitamin. Cheaper sources of vitamin A, such as kale, aren't stocked on supermarket shelves, although they are grown in these African communities. But without basic nutritional knowledge, families may not prepare kale in a way that maximizes its nutrients or feed the leafy green to their children on a regular basis.

The father of two, Muzhingi wants to develop sustainable farming programs in southern Africa while distributing life-saving nutritional information. To that end, he spent last summer doing a research internship in Mexico, studying new breeds of maize that contain lots of beta-carotene, which can be converted into vitamin A. "Also I'm looking at vitamin E in maize, because some studies have shown that if you put vitamin E and beta-carotene together, the body can convert the beta-carotene into vitamin A efficiently," he says.

The internship, supported by the Dr. James S. Sadowski Memorial Internship Fund, has been pivotal in his efforts to find solutions for vitamin A deficiency. Muzhingi says he is very grateful for the assistance, but most of all he is thankful to be receiving an education that he hopes will one day benefit the health of many back home in Africa.

GENEROUS GRADUATES

The Friedman School's Class of 2013 raised a record amount—\$1,619—to give back to Tufts. Celebrating from left are Micah Risk, Franciel Dawes, Vicky Santoso, Interim Dean Robin Kanarek, Jackie Parr and Lorena Macias Navarro. Seventy-five percent of the gift will go toward financial aid; the rest will support Friedman School community-building events. For the past four years, each graduating class has presented the school with a monetary gift. More than 70 percent of the class contributed this year.



Commencement 2013

Vitamin A visionary tells graduates to be open to all possibilities

ROBIN KANAREK, INTERIM DEAN OF THE FRIEDMAN SCHOOL, pointed out at the school's 32nd commencement that the very first nutrition school convocation was held on the Medford/Somerville campus in Alumnae Lounge, which could easily accommodate the 10 graduates, the faculty and all their family and friends. This year, nearby Cohen Auditorium was filled to capacity with hundreds cheering on the 105 new graduates.

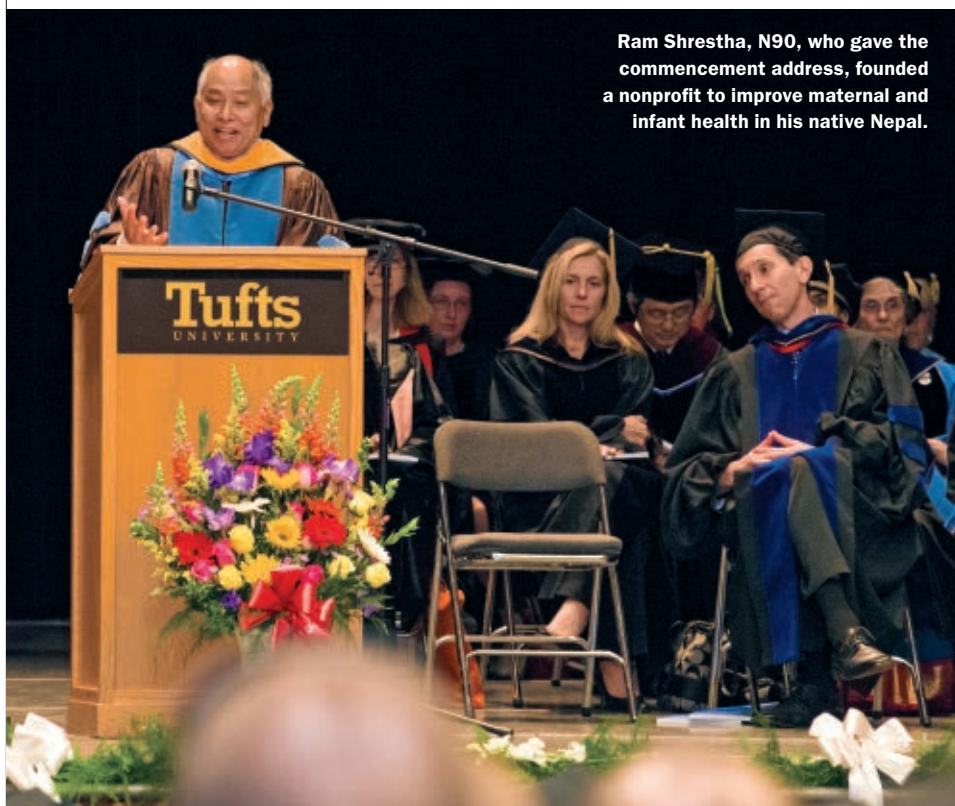
The school's commencement speaker, Ram Shrestha, N90, was awarded an honorary doctor of science degree at the all-university commencement ceremony earlier in the day. Shrestha served for more than two decades as executive director of the Nepali Technical Assistance Group, a nonprofit he founded in 1995 to improve maternal and infant health in his native Nepal. He devised innovative ways to motivate an army of female community health volunteers to distribute vitamin A supplements across the country. By 2007, 95 percent of all young Nepali children were receiving vitamin A supplements twice each year, and the rate of deficiency-related eye disease and infant mortality had plummeted.

He told the graduates to be open to all possibilities, explaining that he knew early on that he wanted his career to benefit others, but he thought it would be through hard work in the field he had studied as an undergraduate: chemistry.

"I could picture myself in a lab discovering some miracle that would be helpful to people," he said. Then a chance opportunity to teach Nepali to a group of Peace Corps volunteers changed his path. "I learned how a simple intervention can improve the poor health conditions in a village . . . I learned that illiterate people have knowledge and that often it is disregarded by people like us who have formal education."

After sending applications to 15 public health and nutrition programs over a year and a half ("Sometimes the path you

Ram Shrestha, N90, who gave the commencement address, founded a nonprofit to improve maternal and infant health in his native Nepal.



Top, Katrina Brink, N13, helps a fellow graduate with her cap. Lara Park, N09, N12, receives her doctoral hood from her adviser, Associate Professor Sang Woon Choi.

choose will be covered in deep mud that you have to slog through to achieve your goal," he warned), Shrestha enrolled at the Friedman School.

When he eventually returned to Nepal, he had the chance to set up vitamin A implementation at the national level, using an existing network of community health volunteers. He made the volunteers' efforts noticeable by issuing green tote bags emblazoned with the program's logo and making sure that when he visited individual volunteers he had a government official or other funding agency official in tow. Soon the volunteers had the respect and support of their communities.

"I was so deeply absorbed in developing and testing innovative ideas that I didn't realize when we had reached all 75 districts in Nepal," he said. "I still can't recall what other events, other than vitamin A programming, happened in Nepal at that time."

"Be patient and flexible," he advised the graduates. "You will get there if you keep your eye on your goal."

In her address to the class, Rebecca Boulos, one of 13 Friedman School graduates who received doctorates, told the parable of the starfish thrower. In it, a man on a beach comes across a man throwing a starfish back into the sea to save it from the sun. When the first man points out that there are so many starfish on the beach that he couldn't possibly make a difference, the second man replies, "It made a difference for that one."

"There are going to be times when those close to you seem not to understand or believe in what you're doing. There will be times when you yourself lose faith in the path you've chosen," Boulos said. "Remember that when our efforts are motivated by love, passion and belief, they are never small. When we are active citizens in our communities, our work is worth it even if only one person or one community or one starfish—or one cow or one tomato—has benefited."

In addition to Shrestha, the university bestowed honorary degrees upon social psychologist Claude Steele, who was the keynote speaker; environmental activist Lois Gibbs; historian Philip Lampi; psychiatrist, philanthropist and entrepreneur Raymond Sackler; and philanthropist and business leader Aso Tavitian.



Above, Shilpa Bhupathiraju, N11; Josiemer Mattei, N04, MPH04, N09; former faculty member Katherine Tucker; Shivani Sahni, N04; and Aziza Jamal-Allial, N11.



Above, Prof. Mohsen Meydani; Jonathan Mein, N07, N11; and Katherine Tsaioun, N99. At left, Prof. Edward Saltzman; Suzen Moeller, N98, N02; and Ann McDermott, N02.



MEET AND GREET

The Friedman School and the HNRCA hosted a reception for students, faculty, alumni, staff and friends during the 2013 Experimental Biology conference, which was held this year in Boston. A record 236 people attended the gathering at the Westin Boston Waterfront on April 22. Two more events are planned for July: a reception during the 2013 IFT Annual Meeting & Food Expo in Chicago and an event welcoming recent graduates to the Washington, D.C., area. Go to nutrition.tufts.edu/joinus for more information and to register.

Welcome to Our Family



THE FRIEDMAN SCHOOL ALUMNI Association welcomes our newest members, the graduates of the Class of 2013. We know that many of you were students for just a few years, but you are members of the alumni association for life. We want to help you remain connected to the school and benefit from the great resources that the alumni association offers.

We also want to thank our alumni for all their great work and many accomplishments that continue to strengthen the Friedman School's reputation. Over the past year, we have hosted many events around the country, in Philadelphia, Boston, San Francisco, Washington, D.C., Cape Cod and Saratoga Springs. We have had a presence at many major conferences, including those of the Academy of Nutrition and Dietetics, Experimental Biology and the American Public Health Association. We have hosted such online seminars as the Friedman School Wednesday Seminar Series, which is streamed live and recorded, and the HNRCA seminar series "Collaboration on Healthy Aging at Tufts," many of which are available to view online. We have connected our students and alumni through career panels, lunch-and-learn events and the annual student/alumni networking trip to Washington,

D.C., where this year, 20 students and more than 30 D.C. area alumni came together to discuss careers in nutrition.

Beyond events, countless alumni connect through the Tufts Online Community (alumniconnections.com/tufts) and through the social media channels Facebook and LinkedIn. Alumni are able to find career listings and advice through the Career Advisory Network (tuftscan.org) and the Jobs in Nutrition Database. The Friedman School also offers its alumni opportunities to take classes, receive loan repayment assistance and volunteer in a variety of ways.

For more information about what the Friedman School Alumni Association offers, please visit alumni.nutrition.tufts.edu. We want to hear from you. If you have questions, have event ideas, want to volunteer or would like to be a resource for students and alumni, please let us know. Email me your thoughts and suggestions at ausen@alumni.tufts.edu. I hope to see many of you soon.

And don't forget, we can keep you posted about benefits and upcoming Friedman School events only if we have your most up-to-date information. Visit alumniconnections.com/tufts to update your current mailing address, email and phone number.

Sincerely,

ABBY USEN BERNER, NO3

PRESIDENT, FRIEDMAN SCHOOL ALUMNI ASSOCIATION

Keep in Touch with the Friedman School

VISIT US ON THE WEB

Stop by our web pages for information on upcoming events, ways to get involved and profiles of Friedman School alumni.

SEND A CLASS NOTE

nutrition-alumni@tufts.edu

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And be sure to "like" the Friedman School page on Facebook.

Alumni ALUMNI.NUTRITION.TUFTS.EDU **Friends** NUTRITION.TUFTS.EDU/FRIENDS

G69 **Carole Palmer** moderated an alumni career panel titled “Communicating Nutrition” on February 27. Panelist included **Kendrick Repko, N05, Jennifer Karl, N06, and Emily Guertin Stone, N08**. To listen to this career panel, visit nutrition.tufts.edu/event/recorded.

G79 **Mary Kay Fox** is the 2013 recipient of the Leadership and Expertise Award given by the Friedman School Alumni Association.

N82 **Liz Cochary Gross, N82, N88**, has been elected to the board of trustees of Tufts University.



She is the first Friedman School graduate to serve on the board; her five-year term begins

in November. Cochary Gross received a master’s degree and doctorate from the Friedman School, where she has held a number of administrative and teaching positions. A 2010 recipient of the Tufts Alumni Distinguished Service Award, she served as vice chair of Tufts’ \$1.2 billion Beyond Boundaries capital campaign. She is also a trustee of Mount Holyoke College.

N84 **Mary Kay Crepinsek** moderated an alumni career panel titled “Policy Primer: Jobs in Government, NGOs and Education” on November 14, 2012. Panelists included **Stacey King, N05, Aliza Wasserman, N09, MPH09, and Caitlin Westfall Howe, N10, MPH10**. To listen to this career panel, visit nutrition.tufts.edu/event/recorded.

N85 **Randa Wilkinson** gave a presentation titled “Positive Deviance: Inside Out, Upside Down and Backwards” as part of the Friedman School Webinar Series on February 28. You can find a recording of this event at nutrition.tufts.edu/event/recorded.

N86 Professor **Jeanne Goldberg, G59, N86, J92P**, presented “GREENing the Lunchbox” during the Friedman School Wednesday Seminar Series on April 17. All Wednesday seminars are available online at nutrition.tufts.edu/event/recorded.

N90 **Ram Shrestha**, a nutritionist from Nepal, received an honorary doctorate from Tufts University on May 19, the first Friedman School graduate to receive this honor. See story, page 32.

N96 **Christina Economos** is the 2013 recipient of the Leah Horowitz Humanitarian Award given by the Friedman School Alumni Association.

N98 **Andrew Halpner** is the 2013 recipient of the Innovation Award given by the Friedman School Alumni Association.

N99 **Andy Andres** recently gave a TEDxBeaconStreet talk on his summer teaching position at MIT. For more information, visit tedxbeaconstreet.com/speakers/andy-andres.

Ka He, N99, MPH99, is a tenured professor and the founding chair of the department of epidemiology

and biostatistics at Indiana University Bloomington School of Public Health. Previously, he was an assistant professor of preventive medicine at Northwestern University and a tenured associate professor of nutrition and epidemiology at UNC Chapel Hill School of Public Health. He has a son, 10, and a daughter, 8.

Kate Houston hosted a Friedman School event at her home on February 27, featuring Friedman School Associate Professor Sean Cash, who gave a talk titled “Weighing a Fat Tax: Can Food Price Interventions Improve Health?”

N00 **Andrew Shao**, vice president of global products science and safety at Herbalife, was the featured speaker at a Friedman School lunch-and-learn event on March 28.

N02 **Tara Mardigan, N02, MPH02**, team nutritionist for the Boston Red Sox, was featured on a panel about sports, leadership and fitness at UMass Boston. Other panelists included Boston Celtics captain Paul Pierce and sports columnist Bob Ryan. A recording of the panel is available at truthonhealth.org/blog/2013/03/21.

N03 **Abby Usen Berner** and her husband, Cliff, welcomed a daughter, Lyndsey Katherine, on March 12.

N04 **Mary-Jon Ludy** was selected by the Dannon Institute Board of Directors and Scientific Council as a participant in the Dannon Institute’s 2013 Nutrition Leadership Institute.

N05 **Kelly Horton** is now a board-certified specialist in gerontological nutrition.

Jennifer Shea married Adrian Lucas Rawn in September 2012 on Martha’s Vineyard, Mass. She is a health and nutrition expert, spokeswoman and registered dietitian for Supervalu, the parent company of Shaw’s Supermarkets.

Hilde Steffey, Chris Hillbruner, N07, Maura Beaufait, N10, MPH10, Asta Garmon, N10, and Taylor Salinardi, N12, were all featured in the Friedman School Sprout’s alumni spotlight section this academic year. For more information, visit friedmansprout.com.

N07 **Meaghan Murphy** and **Chris Hillbruner** welcomed Paul Murphy Hillbruner on November 30, 2012, in Washington, D.C. All are happy and healthy.

Janel Ovrut Funk and her husband, Aaron, welcomed a son, Zachary David, on April 16.

Nicole Ferring Holovach and her husband, Karl, welcomed a daughter, Elena Colette, on February 17. Nicole and her husband bought a farm and vineyard in Maryland in 2012. Nicole works as a registered dietitian at an integrative health clinic.

N08 **Emily (Guertin) Stone** married John Stone on December 28, 2012.

N10 **Betsy Rakola** and her husband, Matt, welcomed a son, Alexander John Rakola, on April 18. Betsy and the entire family are sleep-deprived, but happy.

Field Test

There is a refugee crisis brewing, as the Murani and Egunda people make noises about going to war. Humanitarian aid workers fly in, and their first order of business is getting an accurate count of the refugees and determining their immediate needs. That means fanning out to interview the refugees and making decisions about next steps to avert a true humanitarian crisis.

But these aren't real aid workers—they are students in the Humanitarian Response Intensive Course co-taught by Peter Walker, the Rosenberg Professor of Human Nutrition and Security at the Friedman School, and colleagues at Harvard. And the site of the crisis is actually a state forest in North Andover, Mass.

Each year the course culminates in a simulation of a humanitarian emergency as some 100 students take on the roles of aid agency workers responding to a refugee crisis. An equal number of actors play refugees, recalcitrant government officials, scary militia members and intrusive media types, just like in the real world.

Students have to develop plans to deal with the crisis, and just as in real life, the simulation conditions are not easy; it's a rain-or-shine, three-day event. "They learn a lot about the notions of leadership, self-reliance, how you deal with things being put in your way that aren't just intellectual," says Walker.

—TAYLOR MCNEIL





Gerald J. and Dorothy R.
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BODY WORK

If there is a magic bullet to weight loss, Associate Professor Jennifer Sacke, N01, thinks it is exercise. “It changes your infrastructure, your machinery and your metabolism,” making it easier to lose pounds, she writes in a new packed-with-useful-science diet book, *Thinner This Year*. That doesn’t mean you have to be a competitive rower like she is, but it does mean a commitment to exercising six days a week, for life. For more of her advice, turn to page 8.