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THE FOOD ISSUE

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CONTENTS

THE FOOD ISSUE

Three Reasons to Read U of T Medicine Online

Bonus Stories:

Professor Barry Gilbert (BA '75, PGME '90) reviews *Love, Fear and Health: How Our Attachments to Others Shape Health and Healthcare*, by the Department of Psychiatry's Robert Maunder and Jonathan Hunter.

Professor Edward Shorter reviews *Memories Lost and Found* by Jonathan Kozol.

More about pioneering radiation oncologist Dr. Vera Peters (see Old School, p. 37, for a historic photo).

Videos:

Interviews with three inspiring alumni who are advancing medicine and alleviating suffering at home and abroad (see p. 24 for more about these award winners).

Food Photos!

In celebration of our food issue, we've asked students, faculty members and staff to send us photos of their lunch on Instagram. Check out the smorgasbord of snaps!

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A LOVE OF FOOD


JACKLYN ATLAS

"Food, glorious food!"

Those aren't just memorable lyrics from the musical *Oliver*. It's what we think when we see a sumptuous meal. It's what we say at dinner with family and friends. It's how we feel when we settle down on a cool fall day with some comfort food.

Food is deeply tied to our social structures, our emotions and our health. It says a lot about who we are, from our personalities to our genetics. In this issue of U of T Medicine magazine, we explore our love — and sometimes fear — of food and its consequences.

Each day seems to bring a new headline about the impact of obesity. Processed foods. Sedentary lifestyles. Overeating. These have led to expanding waistlines and worse health, including heart disease, type 2 diabetes and some forms of cancer. Our lead story, "Obesity: Have We Lost the War?" looks at how we got to a state where nearly a third of Canadian children are overweight or obese — and what role universities can play in treating this public health epidemic.

At the same time, we've become very concerned about what to eat. Gluten and sugar are out, and certain fats are enjoying a new day. But how do we separate solid science from slick marketing? In "You Are What Your Food Eats," we had a chance to follow the work of Richard Bazinet, a neuroscientist who is partnering with local farmers to understand how the quality of meat is improved by their own food. We also hear from Mary L'Abbé, our Chair of Nutritional Sciences and an international expert in food policy, about how food labelling in Canada needs to change.

In many ways, it's an uphill battle in a society that has become obsessed with food. From television shows, channels, magazines and books — not to mention an abundance of food photography in our social media feeds — we are surrounded by temptation. Writer Meera Rai explores our preoccupation with what we eat and what it suggests about our emotional health.

Some people overindulge in food while others face scarcity due to economic hardship. Professor Valerie Tarasuk is a national leader in investigating food insecurity — a lack of access to sufficient, safe and nutritious food. We invited her to curate a photo essay that explores this issue and reveals what it's like to not know where your next meal will come from.

Finally, as we decode our genetic makeup, we can now see how the meals we enjoy could be harmful to our friends, and vice versa. As if hosting a dinner party wasn't difficult enough! We talk to Professor Ahmed El-Sohemy, who helps us understand how our genetics can inform our diet.

In the Faculty of Medicine, we're addressing the problem of obesity in two important ways. We've established the Centre for Child Nutrition and Health, which is a locus for research and innovation in this area. This Centre, which has received generous support from donors Brian and Joannah Lawson, is ensuring good habits established early will lead to a lifetime of healthy eating. Professor Mike Evans, who holds the inaugural Chair in Patient Engagement in Child Nutrition, is ensuring those lessons stick. Secondly, we're integrating more nutrition and lifestyle education into our undergraduate medical curriculum. We want to ensure our students know the complex role food can play in our health and how to address it.

George Bernard Shaw said: "There is no love more sincere than the love of food." At U of T Medicine, we want to ensure the love is reciprocated. Through careful research, excellent teaching and a greater emphasis on communicating our findings, we can make that possible.

Trevor Young MD, PGME (Psychiatry) '88, MSc '89, PhD '95
Dean, Faculty of Medicine
Vice-Provost, Relations with Health Care Institutions

Obesity...

Have We Lost the War?

Story by Marcia Kaye
Illustrations by Dave Mazierski

Physician Alex Jadad was blissfully unaware of the whole issue of obesity — until it landed with an ominous thud in his own family.

NEITHER JADAD NOR his wife had ever had a weight problem. But 13 years ago, they were dismayed to learn that their 10-year-old daughter Alia was being bullied at school for her weight. Other kids nicknamed her the Blue Marshmallow (she often wore a blue jacket) and taunted her with chocolate. As her self-esteem fell, her weight climbed. Soon Alia was beyond pudgy; she was obese.

If anyone should have had answers, it was Jadad. A physician who also holds a doctorate from the University of Oxford, he had just become the Canada Research Chair in eHealth Innovation and had been named by *Time* magazine as one of the six most innovative medical researchers in Canada. He would soon become a professor in the Faculty of Medicine and Dalla Lana School of Public Health. But today he laments, "Twenty years of medical education and nobody taught me anything about obesity."

Obesity, together with a pandemic of chronic conditions including diabetes, is such a serious and growing problem worldwide that Jadad calls it one of the Four Horsemen of the Apocalypse (alongside the other destructive forces of environmental damage, violence and inequity). The World Health Organization reports that more than 1.9 billion adults are overweight (with a body mass index, or BMI, of 25-plus) or obese (with a BMI of 30-plus). There's even a new term for this global epidemic: *globesity*.

In Canada, six in 10 men and almost half of women are overweight. So are nearly one-third of children ages five to 17, most of whom will grow up to be overweight or obese adults. The associated health risks include heart disease, stroke, diabetes, breast cancer, colon cancer, arthritis, depression and a host of other ailments, which add up to an estimated $7 billion in annual costs to Canada's health care system, or a sobering $2 trillion worldwide.

IT'S A PUZZLING EPIDEMIC. Our knowledge of nutrition keeps improving. Our understanding of the importance of physical activity keeps increasing. The links between obesity and ill health keep getting stronger. Why, then, do we keep getting fatter? And what can we do about it?

One of the problems is that, as desperate as we are for a magic-bullet solution, obesity is not a simple issue with a single identifiable cause. Eating more calories than you burn off is an overly simplistic view that doesn't take into account the many factors that have come together over the past 30 years for the first time in human history.

Among them: the 24/7 availability of inexpensive, quick food; relentless marketing; socioeconomic inequities that leave poorer people unable to access or afford healthy food; our natural human attraction to fatty, sweet and salty tastes; our shared human evolutionary heritage, which like many mammals gives us bodies designed to store fat easily (particularly if we went hungry as children); a drop in home cooking and corresponding jump in processed foods and restaurants; supersized portions; sugar added to previously unsweetened products such as bottled pasta sauce; a move from physical jobs to sedentary ones; a proliferation of screen-based entertainment; hormonal disruption from too little sleep or shift work; side effects of medication, medical conditions and disability; babies born to overweight or smoking mothers; and excessive weight gain in infancy.

The links between obesity and ill health keep getting stronger. Why, then, do we keep getting fatter?

Scientists are each looking at one small part of the story, so it's a challenge to understand the complexity.

Obesity is so complex that the research has spread to a variety of disciplines, including microbiology, chemistry, endocrinology, genetics, psychology, sociology, anthropology, kinesiology and socioeconomics. "We're building up our knowledge in a piecemeal way," says nutritional anthropologist Daniel Sellen, Associate Dean of Research at the Dalla Lana School of Public Health and a professor in the Faculty of Medicine's Department of Nutritional Sciences. "Scientists are each looking at one small part of the story, so it's a challenge to understand that complexity and to translate that piecemeal science into clear public health messages and policies and programs."

The result is bits of messages entering the public sphere. Many are incomplete, even downright contradictory. For instance, are we more likely to have healthy weights when we live in cities or in the country? Well, that depends. Some studies show that people in cities walk more and eat less fat, but other studies show that urban high-rises and public housing offer less access to fresh food, exercise facilities or safe places to walk or bike. Here's another dramatic incongruity: the Mediterranean diet, based on vegetables, legumes, fish, nuts and olive oil, is touted as one of the healthiest ways to eat. But, according to a 2013 report from the International Association for the Study of Obesity, which country has the highest rates of childhood obesity in the world? Greece. And second? Italy. Whether due to an increasingly processed diet or genetic changes, we simply don't know.

TO ADDRESS THIS FRACTURED APPROACH to obesity within academia, the Faculty recently formed the Centre for Child Nutrition and Health (CCNH). Led by researchers from nutrition, paediatrics, and family and community medicine, the Centre brings together scientists from around the university to find evidence-based solutions to the obesity crisis. Better yet, researchers are looking for ways to prevent children from becoming obese in the first place — in part by cutting through the confusion about how to eat, and reaching patients directly.

Robust nutritional research may in fact be taking place, but the public is not well served by it, says Dr. Mike Evans, who was recently appointed by the Centre as Canada's first Chair in Patient Engagement. Too often, he says, the media will latch on to a study's findings about a single nutrient — fat or carbs, gluten or salt — and the take-home message becomes skewed, rarely portraying the larger picture. For instance, the low-fat craze has demonized all fats while ignoring sugar. Nutrition advocates tout "superfoods" but ignore balanced diets. Evans says, "We get nudged a lot towards bad eating decisions. You see that sign in the coffee shop for the high-fibre, low-fat muffin. Yes, it's better than a sweet white muffin, but it still has 450 calories. One of our questions at the Centre is how to nudge people from mindless overeating towards mindless healthy eating."

Evans, a professor of Family and Community Medicine, has become a YouTube star with a series of short animated videos on personal health topics. His viral YouTube channel has had an astonishing 12 million views worldwide.

"I feel strongly that the university has a key responsibility to be a knowledge resource for the community," says Evans. "People are solving their problems in new ways — shouldn't we support that?"

Another physician on the front lines of the obesity crisis, Ottawa's Yoni Freedhoff (MD '99) uses social media to reach opinion leaders with his message that obesity is a societal issue, not just an individual responsibility. To that end, he's taken on a very public watchdog role, calling out food manufacturers and institutions for their role in the obesity epidemic.

"Telling someone to 'eat less and exercise more' is as useful to an overweight patient as 'cheer up' would be to a person with depression," says Freedhoff. A pioneer in non-surgical bariatric medicine, the Faculty of Medicine alumnus deploys an army of nutritionists, personal trainers and psychologists to customize weight-management plans for patients.

When faced with a flood, Freedhoff says, we need more than swimming lessons; we need levees, and some of these must come from government. For instance, in June the Government of Canada announced proposed changes to nutrition labels for packaged foods, including more information about sugar. It's a welcome change, but as happened with tobacco control, packaging changes are only one small part of the solution.

"Nutrition labelling will help, but the big improvements have to be system-wide," says U of T Professor of Nutritional Sciences Mary L'Abbé. These could include a national school food program, restrictions on advertising of low-quality food to children, subsidies for healthy food and a tax on junk food. Mexico, with one of the world's highest obesity and diabetes rates, last year added a tax on sugar-sweetened sodas, fruit drinks and energy waters. Consumption dipped, but critics argue beverage companies have the option of simply absorbing the cost and dropping their prices.

ACADEMIA HAS A MAJOR ROLE TO PLAY in obesity prevention. That includes ensuring the funding for studies is transparent and without strings. "One of the proudest things we can say about Canadian research, and U of T in particular, is that most of our scientists' funding comes from philanthropic or public sources," says Sellen. "We have greatly reduced most types of bias, and our research is well-known to be of high quality." He also advocates a two-way knowledge exchange, where universities not only educate the public but learn from them. "Many of the solutions are in people's homes and communities. Scientists don't have all the answers."

Freedhoff questions whether university medical schools have taken obesity seriously enough. "Where medicine fails is addressing lifestyle," he says (and Jadad agrees). "I graduated from U of T in 1999, and I learned more about conditions that I will never see in my practice than I did about nutrition." While he says today's young doctors are more attuned to preventative measures, he'd like obesity to be a larger part of the curriculum, with the emphasis on health, not weight.

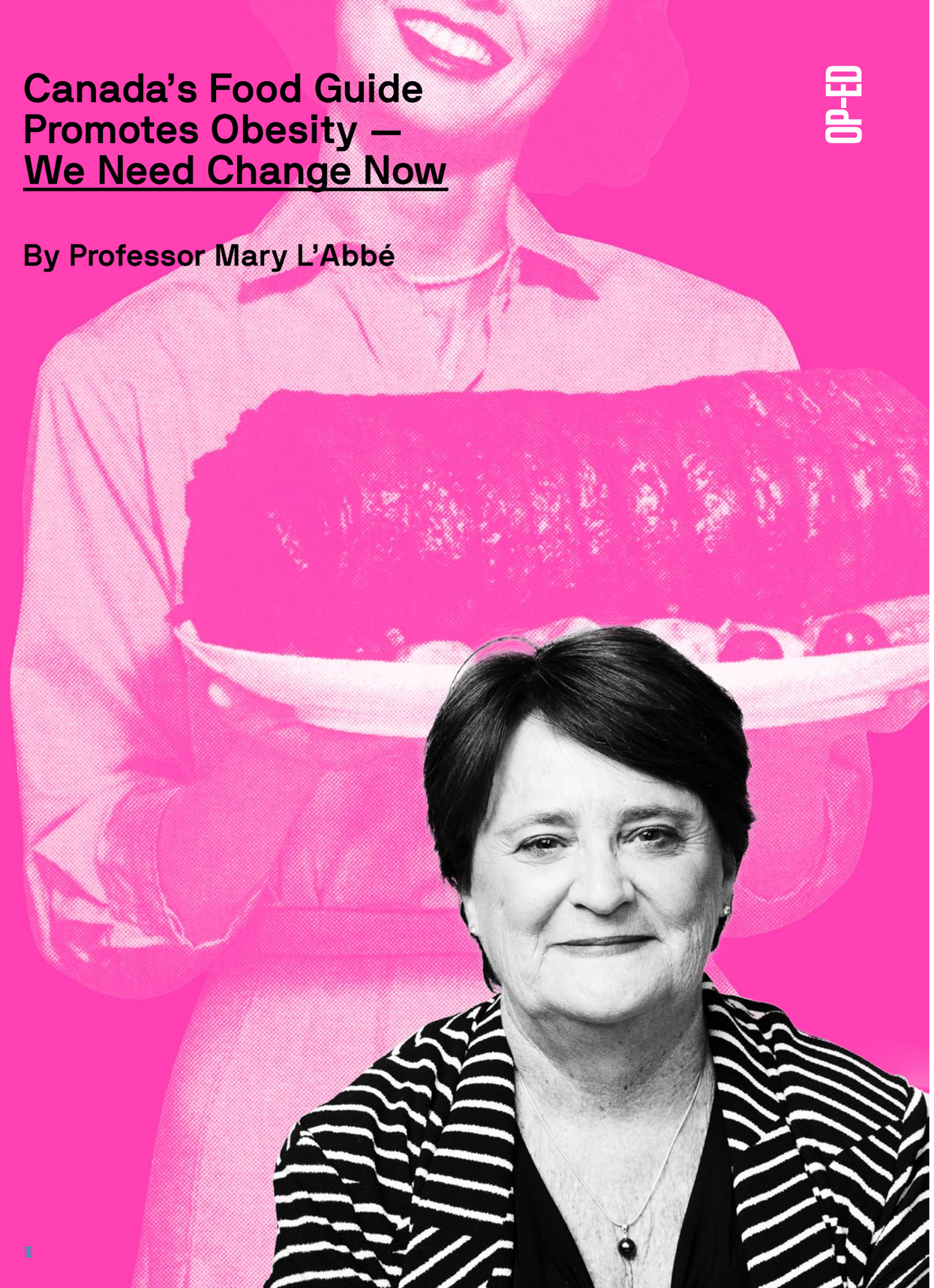
That message has been heard at U of T, where a major curriculum overhaul is underway. It's understood that nutrition and exercise are the cornerstone therapies for the prevention and management of chronic disease, says Nutritional Sciences Professor John Sievenpiper, who is leading the overhaul. "The biggest improvement will be in reinforcing the existing nutrition and exercise curriculum in key areas relevant to family medicine and general paediatrics," he says. "But we plan to do a better job of weaving lifestyle education into new learning objectives."

As for Alex Jadad, the physician whose young daughter was obese, a radical revamp of the family's lifestyle habits helped Alia achieve a healthier weight and become the vibrant, happy 23-year-old she is today. Her father says, "Obesity is one clear example, among many, of how our financial, political, medical, communication and alimentary systems are turning against us. Academia must now lead the way, moving us from third-person singular — he or she has a problem — to first-person plural. It's about our survival."

Canada's Food Guide Promotes Obesity — We Need Change Now

By Professor Mary L'Abbé

OP-ED



JACKLYN ATLAS / ISTOCK

Canada's Food Guide needs a facelift. The blueprint that informs our relationship with food fails to help people make the healthiest choices. In the midst of an obesity crisis that threatens our health and our health care system, this document is obesogenic. We need to do better.

The Food Guide emphasizes all the wrong things — namely, meeting our daily dietary requirements for vitamins, minerals and other nutrients. But getting enough nutrients is not Canada's most important nutritional problem — eating too much food is the real issue.

Last updated in 2007, the guide still focuses on how many servings of different types of foods are needed to meet our vitamin and mineral needs. This forces Canadians to think in terms of numbers of required servings of various food groups but not about the balance and quality of what they eat. For example, you would need a whopping 10 "servings" of cheddar cheese, more than 500 calories' worth, to get all of your daily calcium. Nobody would recommend you eat that much cheese in one day, so why are we breaking it down in this way?

Getting the Food Guide right matters a lot. This is the blueprint for the meals that are served in school lunches, nursing homes and other places. It's the second most used government publication after the Income Tax Guide. Updating it would be a golden opportunity to educate Canadians, not just on how much to eat, but also on how to eat healthier. Right now, the space for this advice within the document is only about a quarter of the space devoted to the number of servings we should eat.

There's a much better way, supported by research in countries like the US, Australia and the UK. It's about shifting the focus to whole dietary patterns and, importantly, teaching Canadians how to interpret nutritional knowledge and messages so they can eat better. We have to make the healthy choice an easy choice for Canadian consumers.

Beyond overhauling the Food Guide, we need coordinated federal-, provincial- and municipal-level policy changes to turn the tide in our fight against chronic diseases and obesity caused by poor diets.

Take, for example, nutrition labelling on supermarket products. Statistics show that Canadians are familiar with the nutrition labels, and the majority of people say they consult them when making purchasing decisions. Most of us would be able to identify a healthier choice between two similar products based on the Nutrition Facts tables on the back of packages. But are most of us really doing it?

I doubt it. The Nutrition Facts table is complex, and we make purchasing decisions in seconds. It's absurd to think shoppers are adding up all the per cent daily values of vitamins, minerals and nutrients, and tracking their daily intake of calories, sugars and sodium. The nutritional information on our labels is excellent, but useless if people aren't using it. We need to help people understand this information at a glance — and quickly and easily understand a product's nutritional value in the context of their whole diet. We don't have to reinvent the wheel to do it: Australia and the UK already have rating systems for quickly interpreting the nutritional quality of food in stores, using simple star ratings and traffic lights that show red for the worst choice, green for the best and so on. These simple innovations make the healthy choice very clear, and they're already showing a vast improvement in the foods people buy. Unfortunately, the Canadian government has not yet shown even a willingness to try something similar.

However, we're seeing some bright spots. The Eat Well Plate, a Health Canada tool, helps consumers visualize food proportions so they easily understand what a meal balanced in vegetables, grains and proteins looks like. Health Canada's new My Food Guide mobile application is another example of a practical and easy-to-use tool that makes nutrition information more accessible to Canadians.

This June, the Government of Canada proposed changes to nutrition labelling regulations to promote healthier food choices. Most of the proposed changes are excellent, and, in many cases, are long overdue. Calories would be displayed more prominently, and sugars would be listed as a percentage of the recommended daily limits (although some argue these are too high). Serving sizes would be standardized, so that the same size yogurt would show the same suggested serving size — making it easier for consumers to compare calories between two products, and harder for manufacturers to hide the extra calories with smaller serving sizes.

Unfortunately, this proposal doesn't go far enough: we still won't see the total number of servings per container — a requirement in the US since 1993. With almost a third of Canadian kids now overweight or obese, we need to do much better than simply catching up with the 1990s. We also lag years behind in the area of regulating nutrition labelling on menu items in restaurants. Laudably, the Ontario government has announced plans to introduce menu labelling legislation in the province, but the rest of the country remains a black hole in this area — despite evidence that menu labelling has worked in the US.

There is no doubt that we have a long way to go in terms of updating our country's Food Guide and food policy in general, at all levels of government, to make the healthy choice an easy choice for Canadians. Everyone in our society needs to shift their thinking about this paradigm as soon as possible. For our part, as academics, we will continue to study and further improve the science behind how we understand the food supply and how we should be eating. Increasingly, though, academics such as myself are recognizing the need to use our research results to actively advocate for change.

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Professor L'Abbé is Chair of the Department of Nutritional Sciences.

You Are What Your Food Eats

By Mark Schatzker
Photos by Jacklyn Atlas

Five years ago, the University of Toronto's then-Chair of Nutritional Sciences found a peculiar email in his inbox from a man who had spent the previous summer feeding a rare breed of cow a great deal of fruit and small amount of nuts. The man had even gone so far as to give his cow several pints of beer on the morning before she was slaughtered. The beef from this cow, the man declared to the Chair, was delicious. But now he was curious about its nutritional properties. Could the University of Toronto help?

Nutritional scientists get a lot of odd emails, ranging from rants about the widespread use of fluoride in tap water to conspiracy theories involving agri-food companies and political leaders. Many are politely declined. This query, however, was forwarded to the department's most junior member, Richard Bazinet (PhD '03).

Just two years out of his post-doc, Bazinet was studying how some of the body's most important fats — long-chain omega-3s and omega-6s — get beyond the blood-brain barrier, the body's formidable wall that keeps unwanted chemicals out of our grey matter. Bazinet had five staff working in his lab, running detailed analyses of rodent brains and scanning for metabolites that existed in quantities measured in trillionths of a gram. In the midst of all this arrived the email from the man with the fruit-and-nut-fatted cow. Bazinet did not write back.

That's because two minutes after receiving it, Bazinet contacted the man by phone.

Now is probably as good a time as any to let you know that I was the guy with the cow. And as fanciful and indulgent as my fruit-and-nut-fed steak might sound, there was a higher purpose. I was researching my first book, called *Steak: One Man's Search for the World's Tastiest Piece of Beef.* For the previous two years, I had covered a serious amount of geography — Scotland, France, Argentina, Italy, Japan, the United States — attempting to find not only the most delicious steak, but also the reason behind a steak's deliciousness. Why, I wanted to know, did we humans love eating meat so much in the first place? And what was so special about steak? Why were there steakhouses, but no chicken or pork houses?

As the quest got bigger, it got deeper. I found an undeniable relationship between what a cow ate and how its meat tasted. This is what led me to purchase a heifer from a dairy farmer near Guelph, Ontario, and spend a summer encouraging her to eat as much grass and as many apples — and even the odd bucket of Persian walnuts — as possible. Soon, the very nature of deliciousness itself began to intrigue me. Cows, I learned, sought out the sweetest, most nutrient-rich grass in a field. To a cow, delicious grass is healthy grass. Cows appeared to be programmed to seek out the foods they most need. Was the flavour of beef related to its healthfulness?

For decades, the North American beef system has operated on the premise that fat equals flavour. The more marbled a steak is, the more it's worth. Over the past half century, our agricultural system has transformed into an elaborate cow-fattening apparatus. We place our cattle in feedlots, where they gorge on corn or barley. After eating beef in other countries, with different agricultural systems, I had come to regard Canadian beef as greasy and bland. And now I had a deeper question: Was a steak that tasted better good for me?

To my great thrill, Professor Richard Bazinet, U of T's very own fatty acid expert, thought this was an interesting question. He also wanted to know the answer.

Bazinet (right) with Bill Parke, who raises cows, pigs, ducks and geese on pasture at Blackview Farm.

Chicken + Grass = Salmon?

That, at least, is what he told me. And I think he was telling the truth. Just not the entire truth. Because I now suspect Bazinet was at least as interested in eating some of that steak. A few weeks later, he was seated at my dining-room table performing a very personal analysis — inserting morsels of medium-rare apple-and-nut-fed steak into his mouth. Not long after that, Bazinet analyzed the steak at his lab. My cow most certainly did produce special and unusual beef. It had more omega-3 fats than feedlot beef, and less omega-6s.

Both of these fatty acids are "essential" — without them you'd die. But most nutritional scientists believe we should consume them in relative balance, roughly five parts omega-6 to one part omega-3. However, most people's diets don't come close to that balance because our agricultural system is built on grain, which is extremely rich in omega-6s and poor in omega-3s. Not only do we eat grains such as wheat, corn, oats and barley, but we process grains into oil, which finds its way into all sorts of processed food. We also feed grain to livestock.

Thanks in large part to our dependency on grain, a typical Canadian diet has an omega balance more like 10:1, though Bazinet says some people have diets of 20:1 or worse. Perhaps most worrisome, a diet high in omega-6s has been linked to many medical problems, from heart disease to major depression. Bazinet was gratified to discover a steak from a "grass-fed" cow contains about 50 milligrams of omega-3s in a single serving. It tips the dietary balance of fats back towards omega-3s.

Bazinet began asking me for other meats to analyze. Over and over, the same pattern presented itself. If pigs were raised outdoors on pasture, and were allowed to root in the fields and forest, not only did the pork taste better, it contained more omega-3s. If you let ducks and geese waddle and peck their way over pasture, the meat is more savoury and better for you. With chicken, the results were, as Bazinet put it, "mind boggling." Not only did chickens on pasture deposit omega-3s, they turned the simple omega-3s found in grass into the complex omega-3 fat called DHA, which is typically found in salmon and mackerel.

It was like Bazinet had put a different lens on his scientific research. For so long, he had delved into the micro aspects of brain chemistry. Now he had panned out to see a much bigger picture. Understanding the interplay of fats in the human brain was one route to someday improving human health. Changing the human diet was another.

And omega-3s were just a single piece of that expanding puzzle. "There are a whole bunch of fat-soluble vitamins and nutrients that come into these animals when they eat grass," Bazinet says. "They're not getting into the flesh of grain-fed livestock."

Pastured livestock is simply more "nutrient dense." Each bite packs a bigger wallop not just of flavour, but micronutrients, too.

Crowding Out the Junk

The happy story of pastured chicken doesn't end with micronutrients. Such a chicken doesn't require deep-frying, or being covered in a sugary, salty barbecue sauce to be tasty. A delicious tomato, furthermore, doesn't need to be drenched in ranch dressing. And strawberries that taste like strawberries don't need to be covered in whipped cream.

Bazinet is convinced, as I am, that improving the flavour of whole foods — fruits, vegetables, legumes, unprocessed meat — is an overlooked weapon in our nutritional arsenal.

"For a long time," he points out, "we've known that a diet rich in fruits and vegetables and some unprocessed meat is good for us. What we need to do now is get people to eat that way. And one very interesting strategy is to make that food taste better."

Bazinet hopes he can attract funding to launch more research into understanding the relationship between flavour and nutrition, and examine ways to improve the food supply.

This past July, he and I visited Vineland Research and Innovation Centre, a 218-acre agricultural research station on Ontario's Niagara Peninsula. Its CEO, Jim Brandle, showed us rows of long, dark, thin vegetables that he informed us were from Asia. Many Asian immigrants, he told us, loved eggplants but were not familiar with traditional Sicilian eggplant and were put off its bitter flavour. As a result, thousands of eggplant lovers weren't eating eggplants. So Vineland is developing Asian varieties that will thrive in Ontario conditions, to be be grown by farmers and sold in Toronto's large Asian communities.

A few hundred metres from the eggplants, Brandle showed us an apple orchard with a hundred different varieties, some of them dating back to the 1500s. All are being tested for flavour, and the very best will make their way into new varieties. "Apples generally taste pretty good," Brandle says. "So we're looking for novel and interesting flavour combinations that have never existed before."

We picked apples off different trees. One tasted mealy. Another was arrestingly sour — a cooking apple from an era when high acidity meant a longer shelf life. Last, we picked a Lubsk Queen, a small pale apple from Russia with good crunch, a tart zing, and a captivating floral flavour. "If I could find an apple that tastes like that, I'd buy it for sure," Bazinet said. Surely, he is not the only one.

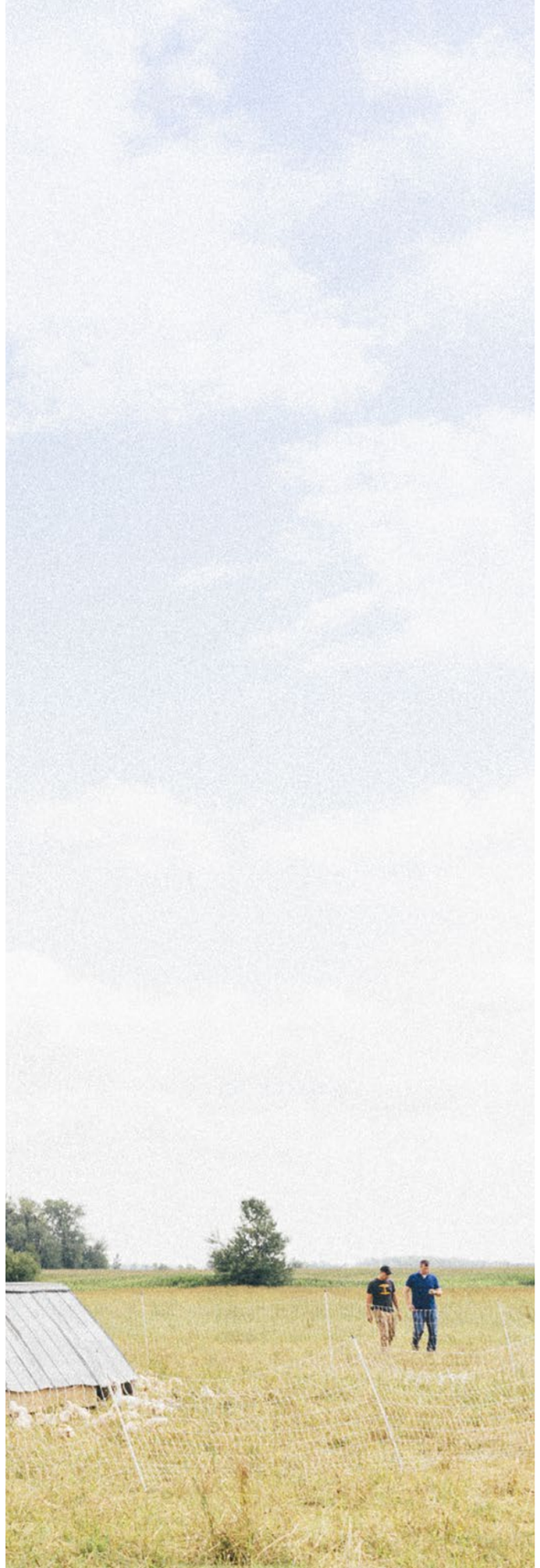
Mark Schatzker (BA '96) is the author of *The Dorito Effect: The Surprising New Truth About Food* and *Flavor* and *Steak: One Man's Search for the World's Tastiest Piece of Beef.*

What's in a Label?

A lot of people want better tasting food that's better for you. But how do we know that our meat is being raised on grass? Labels like "grass fed" are not regulated in Canada. Anyone can claim their meat was raised on grass, but nobody is checking.

Bazinet decided to check. Over the summer, he visited farmers' markets, supermarkets and butcher shops across Toronto and analyzed their steaks to see if the packaging matched the meat inside. The news was mostly good. Several steaks being presented as "grass fed" at supermarkets and butcher shops passed with flying colours, boasting omega-6 to omega-3 ratios of around 4:1 or better. A grain-fed steak purchased at one of Toronto's most expensive butcher shops, by comparison, came in at 38:1.

But Bazinet did find one disturbing case of improper labelling. Steak being sold at numerous stores in Toronto as "PEI grass fed" had a ratio of 24:1, which suggests the cattle that produced these steaks had been fed an awful lot of grain. "There's just no way you could get those levels of omega-6s from eating grass," he worries.



Just stop eating. You can do it. Celebrities do it all the time ...

FOOD OBSESSED

By Meera Rai

I love watching cooking shows while I eat. My favourite is Nigella Lawson. She has a coy way of smiling as she tastes her dishes, saying things like, "Mmm, it's the lightest, most fluttering caress in my mouth." It makes me giddy to see her dig in — but the party's over when I look down at my salad of organic greens (no dressing). Thank goodness for the Food Network.

Nigella and her contemporaries are the perfect fodder for a culture obsessed with food. And celebrity chefs are just one piece of the proverbial pie. Anybody with Internet access is just a few keystrokes away from millions of highly stylized images — everything from cheeseburgers to cheesecake, or my personal favourite, chocolate molten lava cake with the ganache gushing out, topped with a big scoop of vanilla ice cream.

But are we only in it for fun, games and sexy descriptions of dessert? When does a healthy celebration of good food cross into an unhealthy fixation? According to some U of T researchers, our culture's complex relationship with food makes it an increasingly relevant question.

On one side of the spectrum is food porn — a never-ending visual feast for the viewer, coming to us online, in print and on television. The other side is a lot less fun, and some medical professionals are seeing it in spades: the healthy eating obsession. It too floods our media, but with the promise that perfect eating (think goji berries and turmeric) could lead to perfect health.

"As a culture, we're confused about food," says Pier Bryden (BA '86, PGME '01), an Associate Professor of Psychiatry. "It's become much more complicated for all of us." Today's food is more varied and potentially delicious than ever before, she notes, but our increasingly hectic lives suggest the experience of eating it may be less satisfying.

I believe food porn is pleasurable partly because it sparks something like the feeling of happiness we get from sitting down at a table and sharing a meal with people we care about. We don't gather over food like we used to, so instead we share it through our computers and mobile devices.

Over-scheduled lifestyles and the rise of single-person households in Canada are the new normal. Could they help explain the rise of food porn? Like sex porn, it's a fantasy of the ultimate satisfaction, shown in unreal perfection. The more time we spend engaging in a virtual world of food, we start to confuse it with reality — often forgetting, notes food writer and cookbook author Gwendolyn Richards, that "food porn images are carefully cultivated and not at all representative of normal, everyday eating."

Food porn is not a new term — it's been around for nearly 40 years — but it's experiencing a renaissance, particularly through social media sites such as Instagram where it's one of the network's most frequently used hashtags.

"We eat with our eyes first," says Richards. "Food porn is meant to be provocative. It makes you crave and desire things, but that's a double-edged sword, because it can prompt people to consume food they don't need, and that's usually something very high in fat or sugar."

Richards, a self-described food pornographer, says that we've shifted away from food simply as fuel. It's not what we eat that matters as much anymore, it's where and how. Most social-media platforms prompt users to tag their location, especially when an image is being posted. Food images tagged at restaurants tend to be popular. A recent, UK-based study found a strong correlation between photos of high-fat, calorie-laden foods and levels of social media approval (indicated by liking or favouriting posts). We seek identity through our food choices and sharing them online gives us virtual validation of our preferences.

That's the painful side of food porn — much like its sexual cousin, our addiction to it probably fills a void we'd rather not think about. But unlike sex porn, no significant evidence has emerged to suggest that the rise in food-porn consumption is truly warping the way we eat. So, where's the problem? Surprisingly, the other side of the food-obsession spectrum is where the potential for danger exists.

For some of us, it's as innocuous as lifestyle changes. It's amazing how fast these can spiral out of control into highly dysfunctional behaviours.

I think of my own experience over the past six months, as I attempt to shed a few pounds before my wedding this fall. I know I'm doing all the right things, like exercising more, eating my greens and avoiding sugar, but it's not enough. The weeks are flying by but the pounds are not flying off.

The same thoughts creep into my brain over and over: "Just stop eating. You can do it. Celebrities do it all the time. When you're hungry, just chew on some ice chips or a piece of gum. Nobody wants to look at a fat bride." For several weeks, I found myself feeling increasingly afraid of eating meat and carbohydrates. I thought that if I could just give those up, I'd be fine. My thoughts quickly turned to other foods I believed to be too fattening, like dairy products, or sugary, like fruit. Trying to control my food intake made me feel more out-of-control than I ever have in my life.

For others, it typically begins with well-intentioned choices such as ethical vegetarianism or veganism, fair trade foods or non-GMO products. On their own, these may be reasonable options, but a person who is already vulnerable may become fixated — gradually eliminating more and more foods until their diet is so restricted that they become malnourished and unable to function in their social and professional lives.

In popular culture, this phenomenon is referred to as orthorexia, a clinical-sounding name that simply means abnormal preoccupation with healthy eating. Bryden says that while orthorexia is not a true psychiatric illness, she does see patients "pursuing what they believe they've learned about health — either on the Internet or in popular literature — and taking it to an extreme degree."

Miseducation about healthy eating is problematic for people of all ages, but it's especially challenging for children and adolescents who are quick to retrieve information but may not understand the context of what they read. "They are tortured by decision-making around food choices," Bryden says of the patients she sees at the Hospital for Sick Children's eating disorders clinic. "It gets to a point where they're spending hours reading food labels." This happens with adults, too, leading them to be so fearful of ingesting the wrong thing that they are unable to eat anything at all.

Thoughts and behaviours that impair a person's ability to function normally are major components of an eating disorder. Allan Kaplan (MD '78, PGME '83, MSc '88), Vice-Dean Graduate and Academic Affairs and a Professor of Psychiatry and Senior Scientist at the Centre for Addiction and Mental Health and the University Health Network, has spent more than three decades researching eating disorders. He is careful to point out that while orthorexia is not a recognized eating disorder, there is a category in the DSM-V known as Eating Disorders not Otherwise Specified (EDNOS). EDNOS is meant to capture disordered eating that reaches a level of impairment. "It's a small group, where perhaps some of the people with highly selective eating would fit, especially when it interferes with their relationships and professional life."

[In truth, there are only three eating disorders, as defined by DSM-V: anorexia nervosa, bulimia nervosa and binge eating disorder. Anorexia nervosa is particularly dangerous; with 10 per cent of patients dying of the disease, it has the highest mortality rate of any psychiatric illness.]

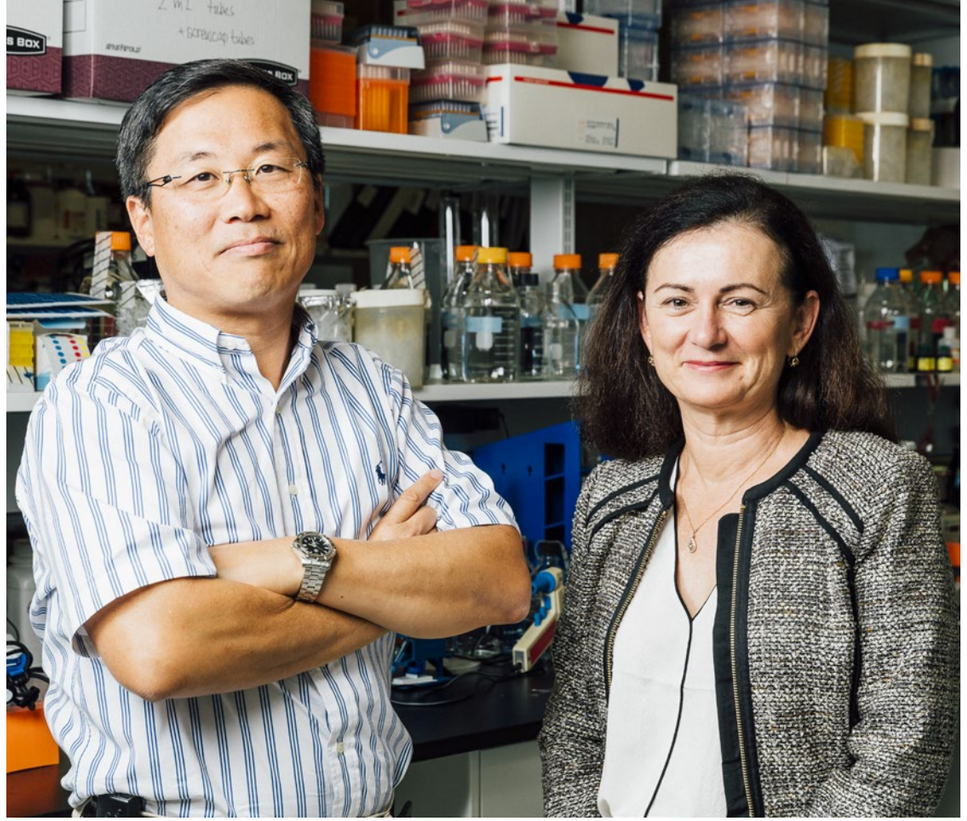
Bryden, a staff psychiatrist at The Hospital for Sick Children, questions the whole notion of what truly constitutes healthy eating. "Is it really about restricting your food intake entirely to foods that are supposedly completely unprocessed, meeting the most austere standards for pure nutrition? Absolutely not," she says. "It becomes almost impossible to have a relaxed and pleasurable relationship with food. It reaches proportions that are just unmanageable."

Food obsession is part of our culture. We are exposed to far more information and imagery than ever before — and the rise of genetically based, personalized nutrition will raise the emotional stakes of putting a fork wrong. Is the way we manage our love and fear of food key to our culinary well-being?

My wedding is only two weeks away. I'm still watching what I eat, feeling irrationally nervous about every piece of food I put in my mouth, and drinking lots of lemon water in the unrealistic hope that it will melt away a few more ounces before the big day. But I've come to accept that just like food itself, food images and information are best consumed in moderation. I'm going to have my (wedding) cake and eat it, too.

Meera Rai has worked at the Faculty of Medicine for four years. She got married on October 3 and is no longer afraid of carbohydrates.

Overleaf: *Banquet Still Life*, Adriaen van Utrecht, 1644. Rijksmuseum, Amsterdam



JACKLYN ATLAS

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Professors Young-In Kim and Deborah O'Connor explore the dark side of vitamins.

Too Much of a Good Thing?

By Carolyn Morris

In the 1940s, physicians gave high doses of folic acid to patients with cancer, including children with acute leukemia, based on promising findings from animal studies. Instead of helping, the treatment unexpectedly accelerated the disease. In fact, this was the origin of anti-folate chemotherapies such as methotrexate and 5-Fluorouracil that are still used today.

Decades later, health experts identified the importance of folic acid for pregnant women, and recommended supplementation. In 1998, it was added to the food supply, reducing neural tube defects in Canada by as much as 50 per cent. Folate intake, especially consumed from natural sources in food, has been associated with a reduction in colon and other cancers. But other studies seem to show the opposite — that folic acid supplements can in fact be associated with higher rates of these cancers.

As it turns out, folate might have been doing both — alternately preventing cancer in some people and fuelling it in others — and simultaneously punching holes through our image of the benevolent vitamin.

"The more you look into vitamins, the more complex they become," says Medicine and Nutritional Sciences Professor professor Young-In Kim (MD '87, PGME '92). He points out that antioxidant vitamins such as vitamins A, C, E and beta carotene have been linked to increased risk of and mortality from cancers and

The more you look into vitamins, the more complex they become.

their purported protective effect on cardiovascular health has not been supported in clinical trials. "The research keeps overturning itself. We know vitamins are crucial to human health, but they can have a bad side too. It's not a panacea."

According to Kim's animal research, folate's effect on cancer risk can vary drastically, depending on both timing and dose. Like a tale of Dr. Jekyll and Mr. Hyde, it has two opposing effects. In normal tissues, modest amounts of supplements can decrease the risk of cancer, but too much will increase the risk. In precancerous tissue, however, even small amounts of folic acid can accelerate cancer growth. This is disturbing news, especially considering the many cancer survivors taking high doses of folic acid through multivitamins and naturopathic remedies, as well as in fortified flour, health drinks and nutrition bars.

Those taking the highest doses, however, are women of reproductive age. Pregnant women can have blood folate levels three times higher than what is considered high. Kim wanted to find out how this might be affecting the fetus. Using rat models, he found that maternal folic acid supplementation in mother rats decreased the risk of colon cancer in the pups. But another study showed that it significantly increased the pups' risk of breast cancer.

"Folic acid has different effects on different cancers — probably organ specific," says Kim. "Some organs may benefit, but for other organs, it may be detrimental. As with other vitamins, the problem is that people think the more the better. And vitamin companies are pushing supplements for health benefits. But you have to be very careful. There may be an optimal range, but go too low or too high, and it can have unintended adverse effects."

Nutrition Professor Deborah O'Connor is well-versed in finding that balance. Having led the development of one of the first widely available human milk fortifiers for pre-term babies, she's keenly aware of the need for vitamins and minerals — and many of the risks as well. She's concerned about the simplistic characterization of vitamin supplements as either "good" or "bad".

"Vitamins and minerals are extremely important for very vulnerable babies," she says. "They certainly have elevated requirements, but there's a very narrow window between their requirements and too much."

When it comes to the adult population, O'Connor argues that current multivitamin formulations are leftovers from a different era. In the 1970s, certain micronutrient deficiencies were very common. But with the availability of fruits and vegetables year-round, socioeconomic factors like guaranteed income for seniors, and massive fortification efforts over the past several decades, our deficiencies have shifted and the vitamin supplements haven't kept up. "For anyone going to the supermarket and getting multivitamin supplements these days, they're probably getting more of what they don't need and not enough of what they do need."

Breastfed babies need vitamin D; women planning a pregnancy need a folic acid-containing multivitamin supplement; post-menopausal women should take a calcium and vitamin D supplement for bone health and perhaps a vitamin B12 supplement. But most of us, unless on a restrictive diet or planning a pregnancy, are getting enough and likely too much, of the B vitamins including niacin, thiamin, riboflavin and folic acid, and the antioxidants beta-carotene, and vitamins C and E.

To complicate matters further, O'Connor is investigating how the bacterial ecosystem in our gut — our microbiota — can affect our levels of vitamins and minerals. She has found that a certain bacteria in our colon produces folate that is then absorbed by our bodies. So those with a strong contingent of vitamin-producing intestinal bacteria may not need as much from their diet. At the same time, Kim is researching how genetic biomarkers affect our metabolism of certain nutrients and may determine how much we need to consume to have normal blood levels. Their work makes most supplement advice seem arbitrary.

"It puts the establishment of dietary requirements a little on its head because your requirement for a certain vitamin may be influenced by how much your microbiota is making," says O'Connor.

And vitamins might have yet another connection with our gut — our beer gut anyway. According to U of T nutrition researcher and professor Harvey Anderson, it seems vitamins could be playing a role in our expanding waistlines.

As Canada kept fairly tight restrictions on fortification of food products, the rules became much more lenient in the US, where vitamin consumption soared. Anderson wondered if vitamins could be leading to higher levels of obesity south of the border, a theory he tested on rats. Working in collaboration with Kim, his team fed mother rats close to 10 times the recommended rate of a selection of vitamins, and measured the signs of metabolic syndrome in the pups.

"Two things happened," says Anderson. "The kids got fat, and the grandkids got fat." The pups whose mothers had had the high-vitamin supplementation showed characteristics of metabolic syndrome and an alteration in their brain regulatory system, causing them to eat more. While cautious not to extrapolate these results to the human condition, or to assume causation, Anderson wonders if high vitamin consumption isn't at least partly to blame for our obesity epidemic.

But before pointing any fingers, he noted another complication. If you take the pups from a mother on the high-vitamin diet, and give them a high-vitamin diet as well, they do not develop signs of metabolic syndrome. He's not entirely sure why.

It's yet another example of how complex and unclear our vitamin balancing act is. One thing is certain when it comes to vitamins — they are not always as innocent as they may appear.

HUNGRY IN TORONTO.

Food insecurity in Canada is growing. The struggle to afford food now affects more than four million Canadians. It's profoundly linked to bad health — and to higher medical costs. The man in these photos, Matt, is one of hundreds of thousands of Torontonians whose days are consumed with the struggle for food while trying to pay rent and manage his many health problems, including diabetes and rheumatoid arthritis.

←

Walking by any restaurant, even McDonald's, where you smell food being cooked is frustrating if you're hungry.

—Matt

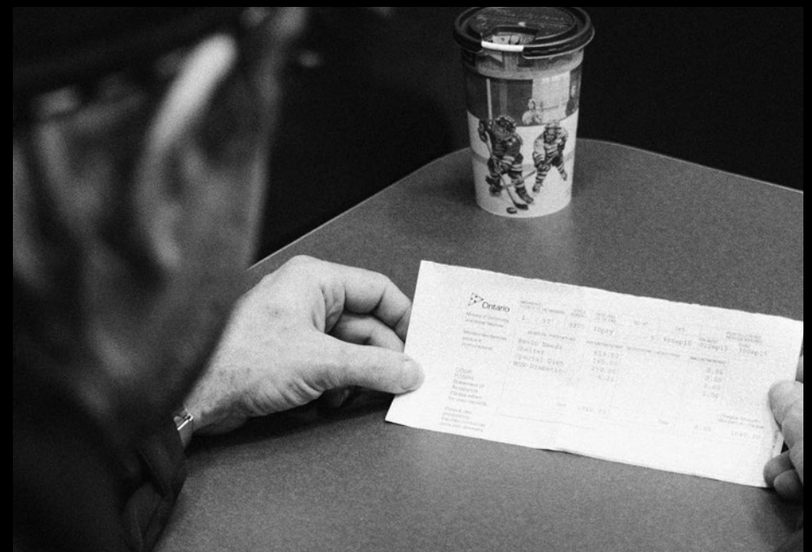
Commentary by
Prof. Valerie Tarasuk
(MSc '87, PhD '91), Department of Nutritional Sciences.

Photos by
Kristin Foster.

→

Hunger is not a food problem. It's a problem of people not having enough money to make ends meet. With his monthly disability cheque of $1,040.20, Matt is in a better situation than many. And yet his days are defined by an all-consuming worry about food and the struggle to find it. It's hard to imagine how anything will get better for him.

So far, our main response to hunger has been food banks. But food charity can't solve this problem. The number of people struggling to put food on the table is far higher than the number using food banks, and food banks can't provide enough help for those who do use them. We need to rethink how we support people who can't earn enough to meet their needs. →



Everyone's An Outlier

For some people, coffee can kill. For others, cutting salt increases their risk of heart disease. The more we know about nutrition and genetics, the more 'outliers' we find.

Illustration of **Ahmed El-Sohemy** by Melinda Josie
Story by Carolyn Morris and Patchen Barss

Ahmed El-Sohemy (BSc '94, PhD '99) can trace his research in personalized nutrition back to the late 1990s when he offered his cousin a cup of coffee and was refused. While El-Sohemy loved how coffee made him feel — energized and awake — caffeine made his cousin jittery and anxious. At the time, El-Sohemy (pictured left) was a postdoctoral fellow studying nutritional epidemiology at Harvard, and he suspected this difference was genetic. A few years later, when he started his own lab at the University of Toronto in the early 2000s, he set out to prove it.

He found that genetic variations influence how fast we metabolize caffeine — with critical health implications for some people. Slow metabolizers who drank over two cups of coffee a day had an increased risk of heart attack. Whether coffee gave them the jitters or not, caffeine was accumulating and harming their bodies, and they had no idea.

The one-size-fits-all model of dietary advice just doesn't work for many people.

The notion that diet and DNA could clash in unexpected ways wasn't new. In the 1970s, several decades before the human genome was decoded, researchers began studying the genetics of several extreme and debilitating conditions involving children unable to metabolize certain foods. This was the birth of "nutrigenomics." With the 2003 sequencing of the human genome and advances in gene-sequencing technology, the research expanded from rare cases to more common genetic variations. El-Sohemy and a handful of other scientists began delving deep into people's genes to help explain why standard nutritional advice seemed so problematic for many people.

"You can go back and revisit every nutritional study that's ever been done," he says. "Sodium and hypertension, fiber and colon cancer — every single dietary factor and any health outcome. If there were enough studies, you'd find inconsistencies. There are responders, non-responders and opposite responders — outliers if you like."

El-Sohemy, a Canada Research Chair in Nutrigenomics, published a landmark study in the *Journal of the American Medical Association* in 2006, showing the link between coffee, genetic differences and risk of myocardial infarction. At Tufts University, Nutrition and Genetics Professor José Ordovás showed how genetic differences influence how we metabolize saturated fats. Other researchers found a genetic variation associated with a reduced ability to absorb iron. And El-Sohemy's lab has sifted through a variety of nutrition and basic science research to identify genetic biomarkers for vitamins C, D and E, fatty acids, sugar, salt and more. He and other nutrigenomics researchers argue that in nutrition, one size doesn't fit all.

Take salt. Research shows most Canadians get far too much, but for some people, cutting back on sodium can actually increase their risk of cardiovascular disease. El-Sohemy now tests people's genetic response to sodium and a handful of other nutrients as part of his 2012 start-up company, Nutrigenomix.

Some researchers contend that we know how to eat, more or less — a largely unprocessed diet of fresh fruit and vegetables, high-quality protein, lots of fiber — and that the major barrier to good health lies not in catering to our individual DNA but in providing access to healthy food to everyone in our society.

El-Sohemy agrees that access to food is a crucial societal concern. But for those who do have ample choice he believes that eating according to our genes is a step in the right direction for staving off many chronic illnesses. Nutrigenomics is just beginning; while multiple genetic factors are involved in many aspects of metabolism, making it an extremely complex puzzle to solve, we know enough to give tailored advice for certain substances like caffeine, salt and vitamin C. The one-size-fits-all model of dietary advice just doesn't work for many people.

"We can't feel what our liver is doing with these substances," says El-Sohemy. "We can't feel how much — or how little — is floating around in our blood. And we can't feel what it might be doing to our cardiovascular system."

If it weren't for his findings, El-Sohemy would be inadvertently overloading on the world's most widely consumed stimulant and increasing his risk of a heart attack. Despite his love of coffee, he discovered he is a slow metabolizer.

"I'd be drinking four cups a day," he says. "Health Canada says that's OK. But for me, because of my genetics, it's not."

Inspired Words, Inspiring Actions

This year's alumni award winners discuss the passion that drives their outstanding contributions to medicine.

Dean Trevor Young will present the second annual Faculty of Medicine Dean's Alumni Awards Nov. 16 at a Gardiner Museum luncheon. To learn more about the awards or how to nominate alumni, contact **morgan.tilley@utoronto.ca**

Lifetime Achievement Award

Recognizing alumni whose outstanding career achievements have earned them national or international prominence in research, teaching, clinical care, administration or public service.

I've always been really fascinated by the way people live with injuries to their brain and how they compensate and try to keep going. Early in my career, some of my colleagues asked, "Why would you want to study these depressing disorders like stroke and dementia?" But it isn't like that. I'm inspired every day seeing how people carry on with extraordinary courage and determination.

SANDRA BLACK

BSc '69, MD '78, PGME '82

Brill Chair in Neurology,
Department of Medicine
Officer, Order of Canada

Rising Star Award

Presented to alumni who have graduated in the past 15 years and have made an important contribution to the Faculty, their local medical/health care community, or a scientific or academic achievement.

What makes me passionate is the opportunity as a scholar to do social justice work. It's research with an emancipatory end. It has the potential to uncover systemic barriers that give some people a free lift and limit the opportunities of others. The chance to bring those typically invisible power structures into the light gets me excited.

STEPHANIE NIXON

MSc '00, PhD '06

Associate Professor,
Department of Physical Therapy
Pioneer in HIV and Rehabilitation

Volunteerism Award

Honouring alumni who have provided extraordinary volunteer service, demonstrating leadership advancing civic, charitable and social causes beyond the scope of their clinical or academic appointments.

Taking the residents overseas on medical missions and helping them give back makes me feel that I'm contributing even more: I know that in the future, one of those residents may go over in my place. And so it carries on.

W. GORDON SQUIRES

BSc '69, MD '73, PGME '86

Lecturer,
Department of Ophthalmology
Lead Ophthalmologist,
Medical Mission to the Philippines

Hospital Food That's Good

By Erin Howe

SOURCE PHOTOS: ISTOCK

At The Scarborough Hospital, fresh, appetizing food is what the doctor ordered.

Vegetable frittata made with fresh eggs from Lyn, Ontario. Banana bread baked in-house, from scratch and by hand. Channa masala made with locally sourced ingredients. A steaming bowl of congee, the Chinese comfort food.

These aren't examples of average hospital food. They're freshly prepared meals featuring local ingredients and culturally diverse choices. And they're menu options for people receiving care at The Scarborough Hospital's (TSH) General Campus.

"The food they receive today is very much what you would experience in a good cafeteria where you would have food prepared to your expectations with care," says Dr. Tom Chan (MD, '93), Chief of Staff at TSH. "The food is more palatable and much healthier than what many people traditionally think of as hospital food."

Three years ago, TSH launched ReFRESHing our Menu, a year-long project to improve the food being served to patients, supported by the Greenbelt Fund. The hospital did away with much of the outsourced frozen products and focused on preparing fresher, healthier and more appetizing food for people receiving care at the facility, and using local ingredients where possible.

A patient's experience and environment in the hospital can have a positive impact on their outcomes, says Chan. Although this idea hasn't been studied much, common sense dictates that advantages like windows with pleasant views or comfortable temperatures can play a role in helping people feel better, he says. And the same can be said for food.

"We all like to complain about the food that we receive on airlines because we really have no choice — that's the food that's there. And this is what happened with hospitals," says Chan. "When you show up to the hospital, you're expecting to be served lukewarm tea, jello pudding or the gelatinous goo that we used to serve our patients in plastic containers. Nobody ever looked forward to a meal like that."

Chan remembers the time he got to eat patient food from the new ReFRESHing our Menu initiative — a beef curry dish served during the hospital's accreditation process. The evaluators were served from the same menu the patients were eating from that day — to rave reviews.

"Members of our kitchen staff talk with patients, and sometimes their families, to choose what they would like from our menu," says Rhonda Seidman-Carlson (MN '99), Vice-President of Interprofessional Practice and Chief Nursing Executive at TSH.

The hospital has seen its food waste drop by nearly a quarter since the ReFRESHing our Menu initiative and bedside ordering were launched, although Seidman-Carlson is careful to point out the positive results can't be attributed to any single initiative. TSH's patient satisfaction scores regarding food — generally the lowest score on hospital satisfaction surveys — have also risen.

"Fresher food looks more appealing, and if it doesn't have to come a long distance to reach people's plates, the aromas, texture and taste are all enhanced," says Seidman-Carlson. "And when you have people on certain medications or receiving treatments that make it difficult for them to appreciate those things, the more we can do to make their meals fresher, more aromatic and appealing, the more we can help their ability and their desire to eat."

"The cultural understanding is that hospital food is as cheap as possible and that nobody's excited about it. But it persists," says chef Joshna Maharaj, the good-food advocate who led the menu overhaul at TSH and has worked with other Toronto hospitals. "Nobody questions the cost of drugs or the cost of the surgery; if that's what somebody needs to get better, that's what they get. Yet we nickel and dime the food so painfully and completely miss the potential for food to help people recover when they're sick."

We nickel and dime the food so painfully and completely miss the potential for food to help people recover.

A person recovering from surgery or infection needs a lot of calories, says Chan. That's why it's so important to make sure patients get the nutrition their bodies require while they're in hospital.

Balancing the dietary needs of a large group of people with varying therapeutic needs is no piece of cake. For example, Chan says people being treated for renal failure don't handle protein or some minerals very well. Cardiac patients often need low-salt diets. Factor in allergies or religious requirements and the result is a smorgasbord of challenges.

For some hospitals, there are physical barriers to providing patients with from-scratch cooking. Maharaj says in some cases, increasingly crowded hospitals may have had to surrender their kitchen space for other uses.

"Food isn't anybody's top priority," says Maharaj. "And so it doesn't get the attention and resourcing that it really needs."

Another obstacle is that the standard reheated food is easy to plate and serve. In most cases, fresh, local food also means raw ingredients that need to be prepared — like peeling onions and potatoes — and a need for more kitchen staff. But Maharaj says it's worth the effort.

"We had food to cure us and heal us before we had medication," she says.

DC10

A Decade of the Donnelly Centre

In November, the Terrence Donnelly Centre for Cellular and Biomolecular Research celebrates a decade of pioneering work decoding the mysteries of the human genome. With its army of biologists, physicists, computational scientists, engineers and every subdiscipline in between, there are few places like it in the world.

"Genome sequencing has revealed an astonishing level of genetic diversity in people. This is the key to disease — if only we can make sense of it," says Professor Brenda Andrews, the Centre's director. "Donnelly scientists are creating the understanding and building the tools to get us there. With time and vast effort, genomics will show us the way."

I / The Donnelly Centre has people who have come from nearly every continent. Getting that diversity of ideas and backgrounds allows us to create new things. Assistant Professor Amy Caudy investigates cell metabolism.

II / Many important questions lie in between disciplines. My goal is to understand how genes affect behaviour — I'm gratified by recent cultural changes that allow physicists to work side by side with biologists and ecologists to tackle these questions. Professor Will Ryu studies how animals respond to their environment.

III / I've got biomaterials experts to my right, molecular biologists and geneticists to my left. Computational experts one floor up and engineers one floor down. The synergies and collaborative possibilities are endless. Assistant Professor Penney Gilbert studies how stem cells can be used to replace broken body parts.

IV / We recently figured out how cells send out warning signs when they can't copy their DNA. The amount of sequencing we did for the project would have been unthinkable 10 years ago. New technology will allow us to investigate this process in even more detail — and soon we'll do it in single cells. Professor Grant Brown studies the cell's toolbox for keeping its DNA intact.

V / Next-generation sequencing and gene editing technologies have revolutionized our ability to understand biological systems. I am excited by the opportunity to interpret individual human genomes to guide prevention, diagnosis and therapy. Professor Fritz Roth studies the genetic paths to disease.

VI / I am excited about the future of genomic research. New methods coming out now will allow me to zoom into individual cells within a tissue. I'd like to use this technique to map the complex mix of cells that make up the brain. Serge Gueroussov (BSc '10) is a graduate student in the Blencowe Lab and studies how the brain is made.

JACKDYN ATLAS

Ground-breaking Research and News-making Faculty

By Caroline Klimek

Visit our website for the latest Medicine news!
uoft.me/medmag

U of T to Transform Regenerative Medicine

U of T researchers have an ambitious plan to lead the world in the design and manufacture of cells, tissues and organs to treat degenerative disease.

Thanks to the largest research grant in U of T's history — $114 million from the federal government's Canada First Research Excellence Fund — the "Medicine by Design" project will advance all aspects of regenerative medicine, from research to clinical application.

"We'll take regenerative medicine to the next level," says Peter Zandstra, a Professor in U of T's Institute for Biomaterials and Biomedical Engineering and Canada Research Chair in Stem Cell Engineering. Zandstra is one of the leading researchers involved with the Medicine by Design project, which includes scientists from SickKids, UHN and Mount Sinai Hospital. "We'll be able to design cells, tissues and organs from the ground up, to benefit both patients and the Canadian economy."

U of T Scientists Discover First 'DNA Ambulance'

An "ambulance" for injured DNA?

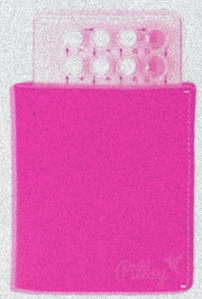
"We've always known that severely injured DNA was taken to specialized 'hospitals' in the cell to be repaired, but the big mystery was how it got there," says Karim Mekhail, a Professor in the Department of Laboratory Medicine and Pathobiology. For the first time, Mekhail discovered how it happens.

At the same time, he studied a DNA hospital — otherwise known as a "nuclear pore complex" — and found it wasn't fully accurate in fixing the DNA. While the repaired DNA could still replicate, it had irregular cell instructions — a scenario that could cause cancer.

"This process allows cells to survive an injury, but at a great cost," said Mekhail. "The cell has a compromised genome, but it's stable and can be replicated, and that's usually a recipe for disaster."

Student-led Start-up Gets Smart about Taking the Pill

Graduate students from the Institute of Biomaterials and Biomechanical Engineering recently worked with public health and aerospace studies students to create Pillsy, a pill pouch that syncs to your smartphone. This new device knows if and when you take a birth control pill, so it can give you timely reminders and advice. Patents and a Kickstarter fundraising campaign are pending.



PILLSY

One Sweet App

PROFESSOR MARY L'ABBÉ teamed up with the creators of the documentary film *Sugar Coated* to develop a mobile app teaching people about the potential dangers of excess sugar consumption. One Sweet App identifies the "free sugar" content in food products — sugars that are not listed on nutrition fact tables. "Right now, nutrition labels tell us about total sugars but recent guidelines from the World Health Organization have shown that most health dangers actually come from free sugars," says L'Abbé. Free sugar includes all sugar except what's naturally found in whole fruit, whole vegetables and unsweetened dairy. "The goal of my research is to help improve the health of Canadians," says L'Abbé. "What better way is there to get important nutritional information literally into the hands of the people we're trying to reach?"

Redefining Infant Brain Tumours

Researchers at the University of Toronto have discovered how to categorize children who are diagnosed with rhabdoid brain tumours, allowing for a more targeted treatment of this deadly disease. For years infants with the rare disease underwent the gruelling regimen of surgery, chemotherapy and sometimes radiation, but these treatments often failed.

Professor Annie Huang and PhD candidate Jonathan Torchia from the University of Toronto's Department of Laboratory Medicine and Pathobiology identified three categories of patients with rhabdoid brain tumours and studied the effectiveness of surgery, chemotherapy and radiation on this disease. Their research shows that one group of patients can be effectively treated with surgery and chemotherapy, while the other two have a lower survival rate.

"Until 15 years ago, these tumours were considered to be untreatable and almost universally fatal. Now we can identify children who have an increased chance of survival and who would benefit from surgery and chemotherapy," said Huang, a Neuro-oncologist and Senior Scientist at the Hospital for Sick Children (SickKids).

Unsung?

DR. M. VERA PETERS (MD '34), one of the Faculty of Medicine's first female professors, made contributions that changed medicine, yet some believe she never got her due. In the 1950s, this legendary radiation oncologist demonstrated that radical mastectomies were unnecessary in most cases. And she turned Hodgkin's lymphoma into a treatable disease with radiation therapy. Here she shows off U of T Medicine's pioneering weapon in the war against breast cancer, the "Cobalt X-otron" bomb developed by the scientific staff of the Ontario Cancer Institute, 1958.

— Susan Bélanger

Photo: Peters with the "Cobalt bomb," 1959.

Source: Ontario Cancer Treatment and Research Foundation Annual Report 1958/59.

Paging All Alumni!

We want to know where you are, what you're doing and how to get in touch with you.

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A great advantage to being part of the U of T Medicine alumni community is that you can access a wide network of nearly 50,000 graduates located across the globe who are engaged in exciting activities aimed at improving health care. We encourage you to keep connected with your peers, and help guide the path for other future health care leaders, by participating in events, reunions and speaking opportunities provided by the Faculty.

Please take a few moments to fill out this online form to update your contact information: **alumni.utoronto.ca/addressupdate**

For more information about updating your information or alumni volunteer opportunities, please contact Morgan Tilley-Woo, Alumni Relations Officer at **(416) 978-3588** or at **morgan.tilley@utoronto.ca.**

Toronto Events

November 12
Molecular Genetics Forum:
A Panel Discussion on Transforming Infectious Disease Research into Worldwide Health Solutions

November 18
Davidson Lecture in Physiology
The Brain-Glucose Connection

November 23
Dr. Peggy Hill Lecture on Indigenous Health
What are the Next Steps Towards Reconciliation?

December 10
Faculty of Medicine Research Awards Reception

February 20
Daffydil Alumni Reception

May 11
Physiology Macallum Lecture & Alumni Reception

May 12
Otolaryngology Percy Ireland Dinner

For more information about any of the above events, please contact **alumni.medicine@utoronto.ca.**

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