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Eating the right foods and spices—and avoiding the wrong ones—could go a long way toward staving off everything from gut ailments to cancer, say Hopkins experts. They share their tips for stocking a health-promoting pantry.

BY MAT EDELSON

ILLUSTRATIONS BY LUC NORMANDIN

"Let medicine be thy food and let food be thy medicine." — Hippocrates

Ever since man first climbed down from the trees (or, depending upon your view, plucked that apple off that tree), eating has never been far from his mind (survival has a way of prioritizing everything). Given that sustenance equals life, food and health have culturally ridden shotgun throughout the ages. "Good men eat and drink so they can live," noted Socrates. "Eat, drink, and be merry!" commanded Solomon. "You're famished. I'll make a plate!!" pleaded my mother.

And, most likely, yours.

In the days before medicine, food was medicine...or at least it was seen as such. A browned apple for an upset stomach, chicken soup for congestion, champagne for septicemia (Pulitzer Prize-winning novelist Eudora Welty said her Mississippi father swore his use of the bubbly saved her ill mother's life). It was sometimes hard to establish cause and effect (Garlic as an anti-vampiric? Hard to find test subjects), and yet generations of pantries held foods sworn to bind, purge, ameliorate, instigate, invigorate...in short, improve one's well-being.

And then came modern allopathic-oriented science, which until recently tossed nutrition—and its potential effect on both maintaining health and calming illness—into the compost heap.



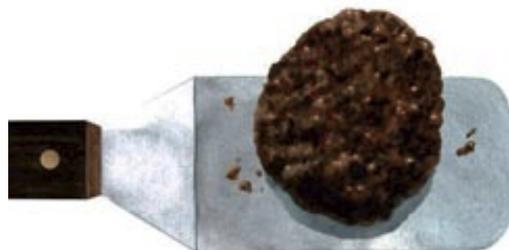
"Less than 2 percent of all cancers can be directly related to what the additives are in food. Up to 60 percent can be related to what we're not eating. As in enough fruits and vegetables."

— registered dietitian Lynda McIntyre

The reasons were myriad. Politically, no one had ever been elected on an anti-cheeseburger platform, so administrative pressure to funnel government dollars toward nutritional research traditionally was nil. Similarly, big pharma was scarce with cash, because they can't patent a food's natural properties. And from a practical viewpoint, studying food with its thousands of chemicals and nutrients is incredibly complex. By comparison, targeting and studying a single drug for efficacy in a double-blind model was far more straightforward and lucrative to both researchers and industry.

It took the American Medical Association until 2002 to reverse a long-standing position and suggest that adults take a multivitamin a day. Then again, many of its long-standing members had never been exposed to a nutrition elective while in medical school...creating a drug-oriented bias that historically expressed itself in both the clinic and the lab. "I think for a long time the major directions in molecular biology—the ability to make genetically altered mice that could measure the impacts of certain molecules on the body—was totally not applied to nutrition," says Hopkins' William Nelson '87, director of the Sidney Kimmel Cancer Center.

That Nelson can speak of such research deficiencies in the past tense is indicative of a huge shift toward nutritional



Nelson's research uncovered that in many cases the liver

research in just the past 10 years. The catalyst? We

can't metabolize "charred" meat carcinogens, and passes them through to the prostate, where people with a particular DNA mutation may be at much higher risk for developing cancer.

can't seem to shut our mouths, and the stats from the Centers for Disease Control back that up. With the exception of Colorado dwellers, more than 20 percent of the U.S. population is now considered obese. Given obesity's epidemiologically supported impact on cardiac, vascular, and cancer-related illness, researchers are now branching out to uncover the myriad ways food and its micro components enhance or disrupt life. The sheer numbers of nutritional studies bear out this interest. According to Pub Med, such published investigations more than doubled between the 1980s and 1990s, and leapt another 71 percent this decade. Part of the quantum leap in the last five years is the discovery that chronic inflammation is slowly being linked to diseases including cancer, and that foods—from cloves to walnuts—appear to contain anti-inflammatory properties.

This critical mass of information even has a name. Called the Food as Medicine movement, it's a growing recognition on the part of many academic clinicians that to ignore the role of food and nutrition in health is to lose a valuable tool that can support (or perhaps even lessen or replace) many pharmaceuticals currently in use. "The perfect example is ginger," says Hopkins gastroenterologist Gerard Mullin, arguably the nation's top expert on the relationship between food and gut disorders. "People who have nausea, or gastric dysmotilities or other GI problems, for them ginger is at the top of my list. It works the same way Zofran does, which is one of our most powerful anti-nausea drugs. It works on the same receptor in the brain. But a lot of docs aren't aware of it."

Similarly, food plays a huge role in how well people battle cancer. Researchers estimate that some 80 percent of cancer patients are malnourished, at the very time when chemotherapy often increases the body's need for proteins and other nutrients. Such malnourishment, if not addressed, can lead to a reduction of chemotherapy doses and ultimately poorer outcomes. Oncologist Bill Nelson says that the link between the amount of calories taken in—the so-called "caloric budget"—and its relationship to cancer is of great interest to him. Nelson notes that caloric intake drops among the elderly, while their cancer rates rise. It may well be that taking in fewer calories—especially of food of little to no nutritional value—leaves elders deprived of nutrients they need to stave off cancer, he says.

The thirst for nutritional knowledge is by no means limited to physicians and wellness professionals. A poll of attendees of A Women's Journey, an annual women's health symposium sponsored by Hopkins Medicine, showed a huge demand for more seminars devoted to the nuances of nutrition, and faculty speakers who could make sense of the flood of dietary data being unleashed on the public.

In response, the Fall 2009 A Woman's Journey featured numerous talks with a nutritional component, including three seminars—led by the aforementioned Nelson, Mullin, and nutritionist Lynda McIntyre—that, like a

well-balanced meal, triangulated how different research approaches are translating into smarter ways to eat for health. For Gerard Mullin, nutrition and health have always been intertwined. What's different now is the scientific rigor being applied to the field. "My mom had the first health food store in northern New Jersey. I've cooked since I was 10," says Mullin. "I was raised on food as medicine, and I'm glad the science has really borne out and supported what many of us were raised to believe since we were y'all high."

Mullin refers to himself as an integrative gastroenterologist, the adjective referring to physicians who use complementary modalities including stress management and nutrition in their clinical practices. In both interviews and talks, Mullin lays out a compelling explanation for the mind/body connection to the gut, and how different foods, spices, and herbs can promote better digestive health, especially in the 90 million Americans suffering from digestive diseases.

He focuses on the common negative feedback loop affecting the "cephalic" phase of digestion—the gastric and saliva secretions that occur when appetite is stimulated but before eating actually begins. Sleep deprivation, emotional upset, poor eating habits—all can lead to an impaired cephalic phase. It's the stomach's equivalent of not being in the mood, and the response is somewhat the same. Diminished blood flow impairs function: In this case the gut doesn't absorb nutrients. All that unabsorbed food can make us miserable (i.e., everything from diarrhea to gas, bloating, and beyond). That jacks up stress levels, makes eating even more undesirable, and before you know it you've worked yourself into a case of irritable bowel syndrome or worse.

While drugs can treat symptoms, Mullin says breaking the cycle is both a mental and physical process. Taking the time to cook can in itself enhance that first cephalic phase—everything from the meditative act of chopping to inhaling rich aromas can be relaxing—while choosing certain foods such as peppermint leaves and ground flax may reduce gut spasms.

According to British Medical Journal studies, Mullin says, "Peppermint works better than most IBS drugs. It works on relaxing calcium channel blockers. Sometimes it can make your gut so relaxed, right between the gut and esophagus, that you get some burping or heartburn, so you have to be careful how much you use. More isn't always better."

At Hopkins, Mullin has worked to improve both nutrition and timely access to food given to Johns Hopkins Hospital inpatients. "In a hospital setting, anywhere from 33 to 55 percent of people are malnourished," he notes. With study funding from Department of Medicine Chief Mike Weisfeldt, says Mullin, "we proved that if you feed people earlier (following admission), their hospital stay is shorter and outcome is much better. It is common sense, but we had to show the evidence. And it's reawakened a whole discussion" about improving gut health through diet.

Mullin notes that many common kitchen staples can be very effective for preventing and relieving gut-related maladies. "Caraway has been well-

studied," Mullin says. "Its oil is a treatment for gastroparesis, so for those with slow motility and problems with their upper GI tract, caraway can promote motility. Fennel, ginger, dill, cumin...all these things can help you on an everyday basis." From both a taste and nutrient viewpoint, fresh is generally better than dried, though dried is better than nothing. As for amounts, most research suggests moderation as a key, the idea being that it's the continuous, sustainable addition of herbs and other nutrients that enhance flavor and long-term gut health.

Equally important is what foods to avoid. Improving that cephalic response will be pretty much a waste if the gut is being overdosed with junk. Mullin cites studies noting that, while the average American consumes 100 grams of fructose a day—everything from "soda to ketchup to grapes"—the body can only tolerate about 50 grams. The overload acts as an IBS and gas trigger. "The first thing we do is say, 'Look, if you want to get better, you have to find a way to eliminate some of these sugars.'"

Mullin aims his last culinary salvo at inflammation. Many scientists believe that certain aspects of lifestyle—notably what we eat—can create a chronic inflammatory state within cells, tissues, and organs. In short, the immune system is in constant attack mode, which may have deleterious effects on health.

"We know that many conditions in the gut are mediated through inflammation. We're appreciating that now more than ever," he says, pointing to recent research links. "How do you help make yourself better? Again, it's a food as medicine approach. There are (anti-inflammatory) studies about blueberries and blackberries out there (see "Allies in the Pantry")."

Bill Nelson's interest in food literally comes down to a flip of the wrist. No, not as a chef, but rather a scientist fascinated by how foods—notably meats—are altered by the way they're cooked. Using World Health Organization data, Nelson concluded that some 35 percent of cancers probably include a dietary element, with inflammation—which could also have dietary factors—playing a role in perhaps another 30 percent of cases.

A highly respected molecular biologist and cancer clinician—he's principal investigator for one of the National Cancer Institute's Specialized Program of Research Excellence (SPORE) initiatives—Nelson has taken a microscopic interest in the interplay of diet and prostate cancer.

He notes that not only do Asian men have far less prostate cancer than their American counterparts, they appear far less prone to inflammation.

When comparing autopsies of non-cancerous prostates of men who live in America versus those in Asia, "Every prostate removed here showed signs of inflammation, while the Asian prostates were pristine." Curiously, the longer Asian men are in America, the more likely they are to develop prostate cancer. "If they're here 25 years or more, their rate becomes half that of Caucasians, and if their kids are born here, their risk is the same as Caucasians. There must be something in the lifestyle risks that we can

reduce."

While Asians tend to eat far more fish and far less meat and fowl than Americans, Nelson says that might not tell the whole story. The problem may lie in how we heat our meats.

"Heat changes a huge amount of the components in food," says Nelson, focusing on two particular carcinogens that can be created by cooking. The first, called heterocyclic amines, are formed by the heat-catalyzed interplay between creatinine (found in the muscle of meats and fish) and amino acids.

One heterocyclic amine called "PhIP" is extremely nasty: When given to rats in doses comparable to those consumed by humans, the male rats rapidly developed prostate and colon cancer, while the female rats developed colon and breast cancer. "For us, that was fascinating," recalled Nelson. "We just said, 'Holy cow!...that something you could eat could do that.'"

Not only can the amount and duration of heat increase these dangerous amines (i.e., well-done appears worse for you than medium or medium rare), but so can cooking technique. "You can take burger patties, put them on the same skillet, control for temperature and time, but in one case you flip them only once, in the middle of cooking, while the other you flip every 30 seconds." The burgers only flipped once "make a ton of amines," notes Nelson." So did sausages cooked as links versus patties. The links, in Nelson's opinion, act "as closed reaction vessels." Nelson's own research uncovered that in many cases the liver can't metabolize all these "charred" meat carcinogens, and passes them through to the prostate, where people with a particular DNA mutation may be at much higher risk for developing cancer.

Nelson also points out that the fat dripping along a deep grilled steak might taste delicious, but it's potentially deadly. The culprit, which also escapes from the fat in chicken skin, is something called polycyclic aromatic hydrocarbon carcinogens. To put some numbers to the science, Nelson says the amount of these carcinogens consumed daily by the average American "equals ingesting half a pack of cigarette smoke a day."

His suggestion: If you're going to eat meat, stick to lower-fat cuts, take the skin off of chicken before cooking, and look at alternatives such as broiling or, in the case of fish, poaching the filet.

Nelson believes that both the public and industry is ready to hear his message. In meetings with executives at a large grocery store, Nelson discovered that 16 percent of the chain's sales came from pre-cooked foods and meals that busy customers quickly reheated at home. The executives had quite an appetite for Nelson's food prep science. Not only would such techniques improve food safety, but long term, the executives saw such preparatory expertise as potentially marketable to health-conscious consumers.

"I'm tantalized about the way we could affect broad-based cooking

practices," says Nelson. "We're at the dawn of an era of figuring this out."

Figuring out how to translate serious science into tasty, healthy snacks and meals is where nutritionist Lynda McIntyre excels. A registered dietitian with a specialty counseling cancer patients at both the Kimmel Cancer Center at Hopkins and the Sibley Hospital Center for Breast Health in Washington D.C., McIntyre took A Woman's Journey attendees on a virtual tour of the supermarket. Along the way, she busted some myths regarding what it is about food that links it to perhaps the majority of cancer cases. "A lot of times people think I'm talking about pesticides or additives in food, when in fact I'm not," she says. "Less than 2 percent of all cancers can be directly related to what the additives are in food. Up to 60 percent can be related to what we're not eating."

As in enough fruits and vegetables. A familiar message, yes, but McIntyre gives it a twist, suggesting shoppers take a colorful approach to solving their qualms about which produce has the greatest overall benefits. "Eat the rainbow. The brighter the food, the richer the color, the higher its anti-oxidant count," counsels McIntyre, who also served on a statewide council that developed cancer prevention strategies for Maryland.

For McIntyre and other savvy nutritionists, the state of food science has allowed them to fine-tune their message and take some of the confusion out of the game. Take fresh versus frozen produce. McIntyre says both are effective. "Fresh is always best when it is in season," says McIntyre, since fresh produce retains top flavor and nutritional value. However, McIntyre notes that many fresh foods have relatively short seasons. As an alternative, from a nutritional viewpoint, "frozen can be just as nutritious because it's picked at the peak of ripeness, and frozen to keep the nutritional content intact."

Then there's eating whole foods versus taking supplements, a source of huge debate. The prevailing sentiment among many researchers is that supplementation can bring someone deficient in a given nutrient up to a supportive baseline, but people already at solid baseline levels may not benefit from additional dosing.

"In some cases, single supplementation of antioxidants can increase the risk of certain diseases," says McIntyre. "For example, vitamin E and heart disease. Another example is that single supplementation of vitamin A can increase bone fractures in women. And in smokers who took beta-carotene, we saw an increase in lung cancer. The studies show it is the whole foods that provide the most protective effect to the body."

Knowing how to combine those foods can increase the body's ability to absorb their nutrients. McIntyre says putting broccoli (sulforaphane) and tomatoes (lycopene) together "increases their tumor protective ability." Similarly carrots and avocado are a nice dynamic duo because beta-carotene is better absorbed in the presence of a fat (short on avocados? Try olive oil). Apples and blueberries, even spinach and strawberries ("It's a strange combination, but delicious," insists McIntyre) all make for nutrient-dense dynamic duos.

And as for the idea that healthy eating is restrictive, forget it. Nearly every family of food—be it nut, fruit, spice, fish, grain, or beans—has some members in it filled with high nutritional content. On every conceivable front, from the molecular level to the kitchen table (hey, it sounds more palatable than from bench to bedside), research is unlocking the power of certain foods to keep us in fighting shape. Since none of us has a "foodprint" yet—a DNA or some other molecular roadmap that will tell us why Sally's system can absorb beta-carotene from carrots, while Sue's can only assimilate that same beta-carotene from sweet potatoes—for now, eating a well-rounded, well-informed diet is all about playing the odds. And there's nothing better than improving your chances of beating the house. ★

Mat Edelson is a regular contributor to Hopkins Medicine magazine and the co-author, with Rebecca Katz, of *The Cancer-Fighting Kitchen, Nourishing, Big-Flavor Recipes for Cancer Treatment and Recover*, Celestial Arts, 2009. For a health-promoting recipe from the book *Emerald Greens*, visit www.hopkinsmedicine.org.

Allies in the Pantry

The following foods contain properties that, in scientific studies, have been noted for potential disease-fighting/health-promoting benefits: Agave nectar, almonds, anise, apples, apricots, asparagus, avocados, barley, basil, beans, bell peppers, blueberries, brazil nuts, broccoli, cabbage, cantaloupe, cardamom, carrots, cauliflower, cayenne, celery, cherries, chickpeas, chives, cilantro, cinnamon, cloves, coconut milk, cranberries, cumin, edamame, eggs, fennel, flaxseeds, garlic, ginger, green tea, halibut, kale, leeks, lemons, limes, millet, shiitake mushrooms, nutmeg, olive oil, shallots, oregano, parsley, pineapple, radishes, raspberries, brown rice, saffron, sesame seeds, spelt, Swiss chard, thyme, walnuts.

(Source: *The Cancer-Fighting Kitchen*, Rebecca Katz, Mat Edelson, Celestial Arts, 2009) ★

Calming Herbs

Gastroenterologist Gerard Mullin, author of the upcoming 700-plus page book *Integrative Gastroenterology* (Weil Integrative Medicine Library) uses the following common herbs to help treat symptoms and issues related to irritable bowel syndrome:

Ginger (for dyspepsia), berberine (antibacterial properties), peppermint (gut spasms), tannins (diarrhea), ground flaxseed (constipation), and goldenseal (antibacterial, antiparasitic, motility promotion).

Mullin also suggests the following foods as carminatives; foods that relieve

gas, bloating, and generally promote gut health:

Allspice, anise seed, basil, cabbage, chamomile, caraway, cardamom, cinnamon, cloves, coriander, cumin, dill, fennel, ginger, licorice, marjoram, nutmeg, oregano, peppermint, rosemary, sage, saffron, sarsaparilla, spearmint, thyme. ★



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