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Nutrition Action HEALTH LETTER®
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CENTER FOR SCIENCE IN THE PUBLIC INTEREST

SOS
SAVE OUR SEAFOOD
What's good for us *and* the oceans

Seafood is good for our health. But the world's growing appetite for fish isn't so good for the creatures that inhabit our oceans.

Roughly 30 percent of the world's fish stocks are "overexploited"—in danger of collapse—according to the United Nations Food and Agricultural Organization. Another 57 percent are "fully exploited"—at or close to their sustainable limits. Then there's the threat from climate change and pollution.

Here's how to find fish that protect your health *and* the oceans.

Continued on page 3.

MEMO FROM MFJ

The Farmer in the Market...

If you're like me, you *love* farmers markets.

Out in the country, farm stands range from small tables with little pyramids of brilliant red tomatoes to huge sheds with everything from locally grown peaches and watermelons to jams and flowers (and maybe even a playground).

In the city, a farmers market might be anything from one farmer selling produce out of the back of a truck to block-long extravaganzas with dozens of farmers and artisans offering a multitude of delicious fresh and prepared foods.

The farmers market phenomenon has exploded in recent years, with more than four times as many markets (7,864) in 2012 as in 1994 (1,755). The U.S. Department of Agriculture estimates that consumers spend upwards of $1.5 billion annually at those markets.

Fresh fruits & vegetables, plus a chance to see your neighbors and support local farmers.

It's more than fitting that every Friday during the summer (and Wednesday during the winter) a farmers market is located right next to the headquarters of the USDA in Washington. I'm lucky enough to have a one-truck market (Tuscarora Organic Growers) set up every Saturday morning and Tuesday evening right across from my home.

One thing I love about farmers markets is not just that the food is as fresh as can be, but that I can discover and sample new foods—vegetables like tatsoi and rutabaga, for example. I might or might not end up liking them, but experimenting adds a bit of adventure and fun to my sometimes-in-a-rut diet.

But the benefits of farmers markets stretch beyond food.

Most people these days drive from one place to another and seldom just hang out outside with their neighbors. "My" farmers market pulls people out of their houses and gets them together. I wouldn't be surprised if the value of farmers markets was reflected in higher house prices. Why else would realtors list farmers markets when they tout the virtues of a nearby home?

I also value farmers markets for providing income to local farmers. That keeps the farmers in business, and it may shield farmland from land-paving exurban developers.

The only "but" when it comes to farmers markets is that you can't assume that everything there is good for you.

Last fall I went to a farmers market in a lovely town park in Delaware. Amidst the fruits and the veggies were booth after booth of white bread, pastries and other baked goods of all kinds, and "no sugar" jams that were sweetened with agave (which is almost pure fructose, and probably less healthful even than ordinary table sugar).

Believe it or not, I'm no food purist. I've been known to pick up a jar of sugar-rich preserves or a bread that isn't 100 percent whole wheat.

But as long as I'm mostly there (and you're mostly there) for the fresh produce, farmers markets are a win-win. To find the farmers market nearest you, go to search.ams.usda.gov/farmersmarkets (or do a search for "farmers market").

Mike Jacobson

Michael F. Jacobson, Ph.D.
Executive Director
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Photo: © BlueOrange Studio/fotolia.com.

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CENTER FOR Science IN THE Public Interest

SOS
SAVE OUR SEAFOOD
What's good for us *and* the oceans

Barton Seaver is director of the Healthy and Sustainable Food Program at the Center for Health and the Global Environment at the Harvard School of Public Health. He is also a National Geographic Fellow and the first Sustainability Fellow in Residence at the New England Aquarium. A graduate of the Culinary Institute of America and an award-winning chef, Seaver is the author of *For Cod and Country* (Sterling Epicure, 2011) and *Where There's Smoke* (Sterling Epicure, 2013). He spoke to *Nutrition Action*'s Bonnie Liebman by phone from Boston.

Q: *Are our oceans in trouble?*
A: They certainly are, for a host of reasons, from pollution to overfishing to acidification due to climate change caused by increased carbon dioxide in the atmosphere. For a long time, we have not had a very healthy relationship with our oceans. We're beginning to understand how our irrational relationship with the ocean is leading to deleterious health effects in humans.

Q: *How is our relationship irrational?*
A: We don't use what we take out of the oceans very well. About 20 percent of the entire global wild capture is not used to feed humans directly.

For example, the Peruvian anchoveta is the world's largest single-species fishery. And 98 percent of its anchovies are cooked down to a mush to create fishmeal and fish oil that goes to feed pigs, chickens, and farmed salmon. And now we're seeing this great influx of supplements, cosmetics, and pharmaceuticals enhanced with omega-3s from fish oil.

Q: *Anchovies can be more than a pizza topping?*
A: I happen to think that anchovies are delicious and wonderful. I'll take a pile of anchovies, grilled up with a side of nut pesto, and put that onto a salad of fresh sliced heirloom tomatoes, or stewed into a tomato sauce for pasta. I'll take that any day of the week. And yet, people don't have access to those anchovies.

Q: *Is some seafood thrown out?*
A: Yes. By some estimates, 30 to 40 percent of all that is captured is unwanted by-catch, meaning that about a third of all seafood caught is tossed overboard dead, bringing no benefit to humans. For example, in some fisheries, up to 10 pounds of seafood are discarded for every pound of fish that is caught.

Q: *Why?*
A: In America, we eat about 16 pounds of seafood per person per year. And about 95 percent of that comes from only 10 species. And three of them—salmon, shrimp, and tuna—account for more than 60 percent of our seafood consumption.

In American fisheries alone, there are hundreds of available commercial species, and yet we eat only 10. We have the most robust fishery management in the world, but we do not take best advantage of what the oceans can provide.

So when we ask ourselves, "How do we get more salmon?" we're asking the wrong question. The problem is that we make demands of the ocean rather than asking what the ocean can provide for us.

Q: *Fishermen can't sell unpopular fish?*
A: When a cod net comes back into a boat, up with it comes pollock, cusk, ling, whitefish, dogfish, monkfish, wolffish, you name it. Yet when that fisherman comes back to dock, only cod commands a high price.

None of those other species are valuable. In fact, many of them lose money because of the ice, the labor, the gas, the space in the hold, and all the expenditures that go into catching the fish. So it often goes overboard dead.

Each of those species is equally profitable for sustaining the human body, but they're not profitable to the industry. We've created a system that skews toward waste and skews toward demand, rather than supply.

Q: *Because we ask for only 10 species?*
A: Right. When you walk into a store and say "I want cod," you get whatever cod is available, from wherever. When you walk into a store and say "I want whatever seafood is freshest and best fits my price point," you get a better piece of fish, because you're asking for quality, not for species.

Some fisheries end up with 10 pounds of by-catch for every pound of fish caught.

Q: *Do unfamiliar fish taste odd?*
A: Come on over to my place for dinner and I'll convince you otherwise. We have created these taboos or biases that are really quite detrimental.

Each of those species is absolutely delicious when treated as it should be. If you treat bluefin tuna and cod the same way, you are not going to get the same result.

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Illustration: © radoma/fotolia.com (top). Photo: National Oceanic and Atmospheric Administration (right).

Bait & Switch

Looking for seafood that's not endangered or raised on fish farms that damage the environment? Here's a list of substitutes from acclaimed chef Barton Seaver.

Instead of...	Try...
Atlantic bluefin tuna	pole-caught yellowfin tuna, blackfin tuna, albacore, wahoo
Atlantic cod	Atlantic or Pacific pollock, Atlantic haddock
Atlantic halibut	Pacific halibut
Chilean sea bass (Patagonian toothfish)	Alaskan sablefish
freshwater eel	Spanish mackerel
grouper	haddock, pollock, farm-raised barramundi, lemonfish
orange roughy	tilapia, haddock, pollock
shark	domestically farmed sturgeon, lemonfish
shrimp	Oregon pink shrimp, Maine pinks, U.S. farm-raised shrimp, Fisherman's Daughter wild Sonora Coast shrimp
snapper	farm-raised barramundi
sturgeon/paddlefish (wild-caught)	sturgeon (domestically farmed)
yellowtail (imported)	Kona Kampachi

Source: National Geographic Ocean Initiative (ocean.nationalgeographic.com).

But the difference between cooking cod and dogfish and wolffish and monkfish and pollock and haddock and hake and cusk is not all that different. My favorite thing to do with those fish is to just turn the oven to 275 degrees, lightly salt and oil the fillet with olive oil, and throw it in.

Q: *At that temperature, won't it take longer to cook?*

A: Yes. Your fish is going to take 25 minutes to cook. Meanwhile, you can cook some broccoli and make a brown rice pilaf. But you'll get all of that succulent meat, with all of the moisture and richness in the fish, instead of having it dried out by high heat.

You get a piece of fish that's done to perfection, not one that's scorched under the broiler at 700 degrees. The difference between undercooked and overcooked at 700 degrees is 30 seconds. The difference in a 275 degree oven is 10 minutes or so.

Q: *Why don't people try new fish?*

A: They say, "I'm nervous that it's going to make my house smell like fish." But if you're focusing on buying quality, not species, your house won't smell like fish.

Q: *And you might save money?*

A: Yes, because cod is king and it commands that high price. But if you put cod in a category of "flaky white fish," it has a whole host of company. You can find the most-available, best-priced species, and then cook it simply: put it under a fresh tomato salsa with olive oil and diced red onion on top.

One trick to open people up to new fish is to give them a familiar flavor. They might not know what hake tastes like so it might be a little intimidating. But put a little fresh pico de gallo on top with a little bit of fresh cracked black pepper and beautiful Tuscan olive oil, and people say, "I might not know the fish, but I know what the dish is going to taste like."

Q: *Is it hard to find unpopular fish?*

A: Yes. If Americans only eat 10 species, grocery stores are only going to stock 10. But stores are beginning to carry some of these options, and they need consumer participation.

As giant retailers like Wal-Mart, Whole Foods, Target, and Safeway and small mom-and-pop stores begin to look at selling sustainable seafood, they're seeing that there isn't enough from those 10 species to fulfill the market demand. So they're saying, "Maybe we should look outside of those 10 species to see what is sustainable."

Who needs cod? Ask for the freshest flaky white fish instead.

Photo: © Lsantilli/fotolia.com.

Q: *Should we avoid farm-raised fish?*

A: It's a common misconception that wild seafood is good and farm-raised is bad. But globally, farm-raised seafood now accounts for about half of production and consumption. So aquaculture is here to stay. And it runs the gamut from environmentally just terrible to restorative. In some cases, it can even increase the health of the oceans that it is raised in.

For example, farm-raised clams, mussels, and oysters remove the excess nutrients that get into water systems from agricultural runoff and pollution.

Nutrients like nitrogen and phosphorus have created an abundance of phytoplankton in marine and estuarine systems. Well, why don't we grow some delicious farm-raised mussels down there that will actually take in those nutrients and give us fabulous protein? They increase the quality of water and increase the profitability of waterfront communities.

They also preserve tradition and heritage by allowing families to continue to prosper in waterfront communities. We need to save fishermen as much as we need to save the fish.

Q: *Can salmon be farmed sustainably?*

A: Yes, but not if you create an economic system that produces the most salmon at the lowest price. Not if you're paying for anchovies in Peru to be milled down in energy-intensive production, paying for it to be shipped to Norway to feed to salmon that are grown in densely packed pens of just salmon, and then having your salmon air freighted to San Francisco. If that's the system we're relying on, then you're putting economic pressures on a biological system that is not sustainable.

Fishing for Answers

BY BONNIE LIEBMAN

"Study: Fish oil's work against heart attacks limited," ran the headline in *USA Today* in May. It was the latest disappointment from recent trials testing fish oil pills on people at high risk for heart attacks.

Yet many studies that follow fish eaters for years find a lower risk of heart disease, stroke, memory loss, depression, and a dozen other health problems. What gives?

Heart Attack & Stroke

"People who eat a diet that's high in fish have a lower risk of heart attacks and strokes in many observational studies," says JoAnn Manson, chief of preventive medicine at Brigham and Women's Hospital in Boston.

But those studies, which *observe* a lower risk in fish eaters, can't prove cause and effect. "Fish may replace foods—like red meat—that increase risk," notes Manson. "Or fish eaters may have other behaviors that lower their risk."

To prove cause and effect, researchers need a trial that *randomly assigns* people to take either a placebo or fish oil pills (since it's tough to find a placebo for salmon or tuna, and there's evidence that it's the omega-3 fats in fish oil that protect the heart).

Early trials on fish oil—from Italy in 1999 and Japan in 2007—were encouraging.[1,2] "But the recent randomized trials are casting doubt on the heart benefits of omega-3 fats," says Manson.

The latest: researchers gave more than 6,200 Italians at high risk for a heart attack either fish oil (1,000 milligrams a day) or a placebo. After five years, there was no difference in deaths or hospital admissions for cardiovascular causes.[3]

What could explain fish oil's flops?

"These trials are in people with a history of heart attack or those with a high risk of heart disease," says Manson. "Many of them are taking statins, aspirin, ACE inhibitors, and other medications that lower their heart disease risk." And since some drugs work through similar pathways as fish oil, they may lower risk so much that fish oil adds nothing.[4]

"The key question now is whether fish oil helps people at average risk who are not taking multiple medications," says Manson.

To find out, her Vitamin D and Omega-3 Trial (VITAL) is giving a total of 1,000 mg a day of the two major omega-3 fats in fish oil, EPA and DHA, to 25,000 men and women with no history of heart disease or stroke. Results are due in 2017.

Until we know more, stick with fish, not fish oil pills.

Photo: © goldenangel/fotolia.com.

Fish oil does have one clear benefit. If you have high triglycerides, talk to your doctor about taking 2,000 to 4,000 mg a day of EPA plus DHA.

Beyond Blood Vessels

What about benefits beyond the heart? Here's what we know so far:

■ **Memory loss.** DHA doesn't seem to slow Alzheimer's disease or the usual cognitive decline that occurs as healthy people age, but few studies have been done.[5-7]

■ **Depression.** The largest trial done so far was an industry-funded one of 432 people with major depression. EPA (1,050 mg a day) plus DHA (150 mg a day) had a modest benefit among those who didn't also have anxiety disorder, but most studies have been disappointing.[8,9]

■ **Vision loss.** DHA (350 mg a day) plus EPA (650 mg a day) didn't slow the progression of macular degeneration or prevent cataracts.[10,11]

■ **Type 2 diabetes.** Oddly, some U.S. studies have found a *higher* risk in people who eat the most fish, while Australian studies have found a lower risk.[12] Stay tuned.

The Bottom Line

Manson is hoping that the VITAL trial sheds light on those and other questions.

"Our main goal is to look at cancer and cardiovascular disease," she says. "But we're also looking at diabetes, memory loss, depression, atrial fibrillation, cardiac function, bone health, fractures, falls, knee pain, asthma, thyroid disease, and autoimmune conditions like rheumatoid arthritis and lupus."

In the meantime, she says, "aim for two servings of fish a week. Unless you have high triglycerides, there isn't enough evidence to take fish oil supplements."

1 *Lancet 354*: 447, 1999.
2 *Lancet 369*: 1090, 2007.
3 *N. Engl. J. Med. 368*: 1800, 2013.
4 *Arch. Intern. Med. 172*: 686, 694, 2012.
5 *Neurol. 71*: 430, 2008.
6 *Am. J. Clin. Nutr. 91*: 1725, 2010.
7 *JAMA 304*: 1903, 2010.
8 *J. Clin. Psychiatr. 72*: 1054, 2011.
9 *Mol. Psychiatr. 17*: 1272, 2012.
10 *JAMA* 2013. doi:10.1001/jama.2013.4997.
11 *JAMA Ophthalmol.* 2013. doi:10.1001/jamaophthalmol.2013.4412.
12 *Diabetes Care 35*: 918, 2012.

Q: *What's the alternative?*

A: Salmon is a carnivorous species. So we can figure out how to use selective breeding to reduce the fishmeal they need but still grow healthy salmon that are resilient to disease, and therefore need few antibiotics.

How can we introduce other species, such as wrasse, that are naturally going to feed off of parasites such as sea lice? How do we introduce seaweed, sea cucumbers, scallops, other species that can take advantage of the waste cycle of salmon?

There are also species of catfish that are naturally disease resistant because they're highly resilient to the problems caused by highly dense populations. And you can introduce other species so you utilize whole systems of nutrients—much like farms do with animals' creating fertilizer for the fields and being fed off of the fields.

When we say that aquaculture is bad, we tend to vilify the species, but it's the system, not the species, that matters.

Q: *Why eat low on the food chain?*

A: The marine food chain is like a pyramid. At the base you've got your

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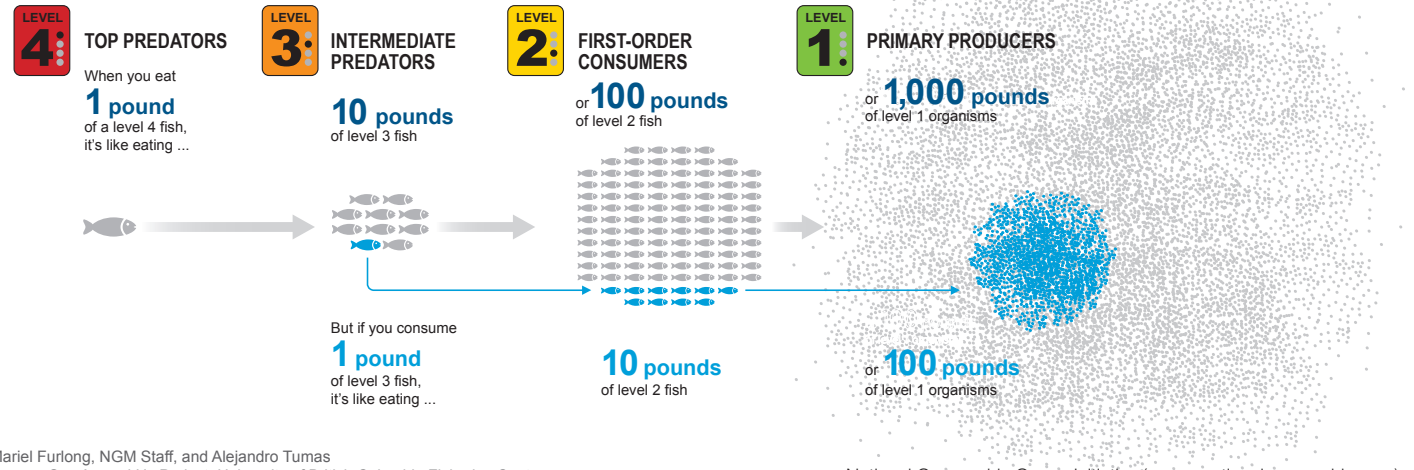
What We Eat Makes a Difference

Your dinner has less impact on the ocean if it's from lower down on the food chain. Try fish from Level 2 (like clams, sardines, scallops, or tilapia) or Level 3 (like catfish, sole, or trout) rather than Level 4 (like mackerel, mahi mahi, swordfish, or tuna).



Mariel Furlong, NGM Staff, and Alejandro Tumas
Source: Sea Around Us Project, University of British Columbia Fisheries Centre

National Geographic Ocean Initiative (ocean.nationalgeographic.com).

photosynthetic flora and your fauna like plankton. There is a vast bulk of biomass churning out in unbelievable quantities.

One step up you have filter feeders like clams, mussels, scallops, oysters, sardines, and schools of fish in huge quantities.

The next step up you have your first-level predators—catfish, trout, sole, and others. And at the tip of the pyramid you've got your big predators—sharks, tuna, swordfish—the tigers and lions of the sea. We're choosing seafood higher and higher up on the food chain, and that's not the way the ocean is designed to work.

Q: *Should we never eat predators?*
A: It's okay to eat them sometimes, but we need to place most of our burden on the sardines, the herring, and the anchovies—the small, silver fish that occupy most of our oceans. We need to eat mussels and oysters, which are inherently more efficient. By the time your anchovy becomes a tuna, you've eaten 100 pounds of seafood (see "What We Eat Makes a Difference").

Anchovies are delicious. I'd take 100 pounds of anchovies for a pound of tuna any day.

Q: *Is tilapia a good choice if you want a fish that's low on the food chain?*
A: It's a really good option because it's clean, lean protein, it's environmentally friendly, cheap, widely available, and it has a long shelf life.

Q: *Can we eat sustainable seafood in large quantities?*
A: We're not going to save ourselves, our wallets, or the oceans by eating sustainable seafood alone. The only way forward is for us to eat mostly vegetables, greens, fruits, grains, and nuts. This is what the science has told us for a long time.

Small but enjoyable portions of delicious, sustainable seafood should be a regular part of our diet, though, to take advantage of the heart-healthy omega-3s, the nutrients, the lean protein.

Moreover, every time we eat a small, delicious portion of seafood and vegetables, we're not eating red meat, which has a detrimental impact on climate change, our health, and on fisheries. You can't eat a hamburger six days a week and get all your omegas in one day and be fine.

Q: *What's a small serving?*
A: When I was running my restaurants, we did 4½ to 5 ounces. But we weren't cheating anyone. Our customers were getting delicious dishes like scallion risotto with wood-grilled sardines, topped with a pistachio-roasted garlic pesto, infused with a little bit of orange zest.

By the time you were done, you were very satisfied. And we were treating our guests with respect by not giving them more than they wanted.

Q: *Should people avoid frozen fish?*
A: No. The technology of freezing fish has evolved to the point where it's comparable to, if not better than, fresh fish.

Historically, seafood was frozen as a last-ditch effort to keep it from spoiling. If fish wasn't sold by Friday, it was frozen so it could be sold when demand was up. So it was a crappy piece of fish to begin with.

But these days, fish is pulled from the water, filleted, and frozen within hours. That sounds pretty good to me.

Q: *What about stores that sell previously frozen fish?*
A: That shortchanges the consumer of many benefits. If it's frozen, it can stay in the freezer until you use it on your schedule. Why thaw it and start the process of spoilage? Retailers are playing to a taboo about frozen fish.

Q: *What does Harvard's Healthy and Sustainable Food Program do?*
A: We work with a number of partners to help people understand that our health, and that of our children, depends on the health of the environment, and that we must do everything we can to protect it.

Environmentalism is often a story about how we have harmed ecosystems. However, humans are also harmed by environments. You can't have healthy people without a healthy environment, because we can be no healthier than the environment that our food comes from.

Q: *Hence the National Geographic Seafood Decision Guide?*
A: Yes. It was built around the idea that many people are not interested in sustainability, but everyone is immediately interested in health.

I try not to stand on my pedestal and tell you why you should care about the oceans. Instead, I invite you to talk about dinner and ask, "What do you care about?" We can talk about health, wellness, delicious food, jobs, culture… whatever.

And then I can use your own words to repeat back to you why you already care about the oceans.

One Fish, Two Fish...

Use this table, which is adapted from the National Geographic Seafood Decision Guide (ocean.nationalgeographic.com/ocean/take-action/seafood-decision-guide) to find fish that meet your needs. Green circles are best, yellow and orange are in between, and red are worst. (Grey means missing information.) Seafood in **bold** is low in mercury and has no red circles.
See key below for more details.

	Sustainability	Mercury	Omega-3	Food Chain
Anchovy, European	🟡	🟢	🟢	🟠
Arctic char (farmed)	🟢	⚪	🟡	🔴
Barramundi (US)	🟢	⚪	🟠	🔴
Black sea bass (US North Atlantic)	🟡	🟡	🟡	🟠
Catfish (US)	🟢	🟢	🟠	🟠
Chilean sea bass/Toothfish	🔴	🔴	🟡	🟠
Clams (farmed & US wild)	🟢	🟢	🟠	🟡
Cod, Atlantic (Canada & US)	🔴	🟢	🟠	🔴
Cod, Atlantic (imported)	🟡	🟢	🟠	🔴
Cod, Pacific (US non-trawl)	🟢	🟡	🟠	🔴
Cod, Pacific (US trawl)	🟡	🟡	🟠	🔴
Crab, blue	🟡	🟡	🟠	🟠
Crab, Dungeness	🟢	🟡	🟠	🟡
Crab, king (US)	🟡	🟢	🟠	🟡
Crab, red king (Russia)	🔴	🟢	🟠	🟡
Crab, snow	🟡	🟡	⚪	🟡
Crab, stone	🟢	🟢	⚪	🟡
Crayfish/Crawfish (China farmed)	🔴	🟢	🟠	🟡
Crayfish/Crawfish (US farmed)	🟢	🟢	🟠	🟡
Eel, freshwater (farmed)	🔴	🟢	🟠	🟠
Flounders (Canada & US)	🟡	🟡	🟠	🟠
Grouper (US Atlantic)	🔴	🔴	🟠	🟠
Grouper, red (US Gulf of Mexico)	🟡	🔴	🟠	🟠
Haddock	🟡	🟡	🟠	🔴
Halibut, Atlantic	🔴	🟢	🟠	🔴
Halibut, Pacific (US)	🟢	🟡	🟠	🔴
Herring, Atlantic (US)	🟡	🟢	🟢	🟠
Lobster, American/Maine	🟡	🟡	🟠	🟠
Lobster, spiny (Brazil)	🔴	🟢	🟠	🟡
Lobster, spiny (CA, FL, & Mexico)	🟢	🟢	🟠	🟡
Mackerel, Spanish (US)	🟢	🔴	🟢	🔴
Mahi mahi (imported)	🔴	⚪	🟠	🔴
Mahi mahi (US)	🟡	⚪	🟠	🔴
Monkfish (US)	🟡	🟡	⚪	🔴
Mussels (farmed)	🟢	🟢	🟠	🟡
Octopus	🔴	⚪	🟠	🟠
Orange roughy	🔴	🔴	🟠	🟠
Oysters (farmed & wild)	🟢	🟢	🟠	🟡
Pangasius/Basa/Swai	🟡	⚪	🟠	🟠
Pollock, Alaska (US)	🟡	🟢	🟠	🟠
Sablefish/Black cod (AK & Canada)	🟢	🟡	🟢	🟠
Sablefish/Black cod (CA, OR, & WA wild)	🟡	🟡	🟢	🟠
Salmon (AK wild)	🟢	🟢	🟢	🟠
Salmon (CA, OR, & WA wild)	🟡	🟢	🟢	🟠
Salmon (farmed, including Atlantic)	🔴	🟢	🟢	🔴
Sardines, Pacific (Canada & US)	🟢	🟢	🟢	🟡
Scallops (farmed)	🟢	🟢	🟠	🟡
Scallops (wild)	🟡	🟢	🟠	🟡
Sharks	🔴	🔴	🟡	🔴
Shrimp (Canada & US wild)	🟡	🟢	🟠	🟡
Shrimp (imported)	🔴	🟢	🟠	🟡
Shrimp, pink (OR)	🟢	🟢	🟠	🟠
Snapper, red (US)	🔴	🟡	🟠	🔴
Soles (Canada & US)	🟡	🟢	🟠	🟠
Squid	🟡	🟢	🟠	🟠
Striped bass (farmed)	🟢	🟢	🟡	🟠
Striped bass/Rockfish (US hook & line)	🟢	🟡	🟡	🔴
Swordfish (imported)	🔴	🔴	🟡	🔴
Swordfish (US)	🟡	🔴	🟡	🔴
Tilapia (China & Taiwan)	🟡	🟢	🟠	🟡
Tilapia (Ecuador & US farmed)	🟢	🟢	🟠	🟡
Trout, rainbow (US farmed)	🟢	🟢	🟡	🟠
Tuna, canned, albacore	🔴	🔴	🟡	🔴
Tuna, canned, light	🔴	🟡	🟠	🔴
Tuna, canned, albacore (troll/pole)	🟢	🔴*	🟡	🔴
Tuna, canned, light (troll/pole)	🟢	🟡	🟠	🔴
Tuna—albacore, bigeye, bluefin	🔴	🔴	🟡	🔴
Tuna—skipjack, yellowfin	🔴	🟡	🟠	🔴
Yellowtail (Australia & Japan farmed)	🔴	⚪	⚪	🔴
Yellowtail (California)	🟡	⚪	⚪	🔴

*An industry-funded study found average mercury levels in the "moderate" range.

Key

Sustainability Ranking	Best / Good / Avoid	See www.montereybayaquarium.org/cr/cr_seafoodwatch/content/media/MBA_SeafoodWatch_RecommendationProcess.pdf.
Mercury Level	Low / Moderate / High	🟢 less than 0.1 parts per million, 🟡 between 0.1 and 0.3 ppm, 🔴 above 0.3 ppm.
Omega-3 Content	High / Adequate / Low	🟢 takes one 6 oz. serving a week to get an average of 250 mg a day of omega-3, 🟡 takes 2 servings a week, 🟠 takes more than 2 servings a week.
Food-Chain Level	1 / 2 / 3 / 4	See "What We Eat Makes a Difference," p. 6.

For more information: National Geographic Ocean Initiative (ocean.nationalgeographic.com).

SALT

Clearing the air after a confusing report

BY BONNIE LIEBMAN

"Institute of Medicine: Lowering daily sodium intake below 2,300 milligrams may do more harm than good," reported CBS News in May. "No benefit in sharply restricting salt, panel finds," said *The New York Times*. "Is eating too little salt risky?" asked National Public Radio. "New report raises questions."

Questions, indeed. But not so much about salt as about what the IOM was asked, what it concluded, and whether it relied on discredited data.

When the Centers for Disease Control and Prevention asked the Institute of Medicine to quickly review the impact of very-low-sodium diets on health last year, the CDC expected to clear up some confusion. Instead, the report caused more. Here's what the IOM did—and didn't—say.

■ **The report wasn't about whether we eat too much salt.** The question wasn't whether typical U.S. sodium intakes—at least 3,400 mg a day, not including what we get from the salt shaker—are healthy. They're not.

Instead, the CDC wanted to know what happens at 1,500 mg to 2,300 mg a day.[1]

While that matters for setting daily sodium targets, it applies to few people, since only about 5 percent of adults get less than 2,300 mg of sodium a day (not counting what comes from the salt shaker).[2]

■ **The report found no harm for most people.** There's "insufficient and inconsistent" evidence that very-low-sodium diets cause harm in the "general population," the IOM concluded.

Why insufficient? Studies that have *observed* a higher risk of disease or death in people who eat very-low-sodium diets have weaknesses.

One example: "People who report eating very little sodium are more likely to be ill," explains Stephen Havas of the Northwestern University Feinberg School of Medicine. Odds are, it's illness that raises their risk of disease and death and makes them eat so little salt (and food).

Since all the evidence of harm in the general population was based on studies that had that or some other weakness, it added up to "insufficient," said the IOM.

■ **The report found evidence of harm in people with heart failure, but that's irrelevant, and the evidence is suspect.** The most persuasive evidence of harm came from a group of Italian researchers who randomly assigned patients with heart failure to normal or very-low-sodium diets. Those restricting sodium were more likely to be readmitted to the hospital or to die.[3]

Alarming? Not quite. First, the researchers restricted not just salt, but also how much water the patients could consume. *And* they put them on high doses of diuretics. That regimen isn't used here.

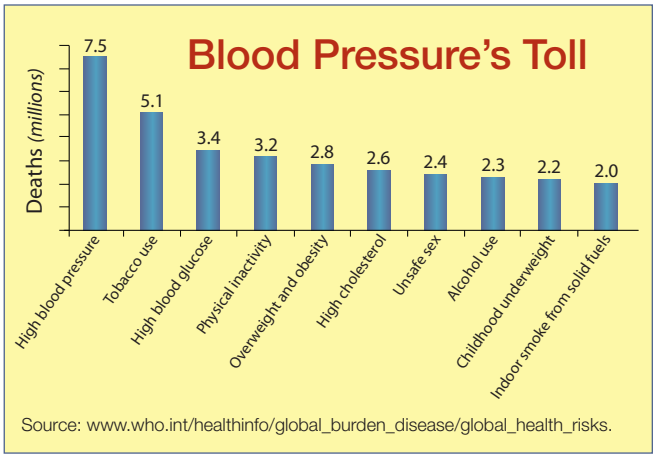
"This hyper-aggressive treatment may have caused severe depletion of blood volume," explains Frank Sacks of the Harvard School of Public Health.

More troubling, in June the journal *Heart* retracted a meta-analysis on sodium and heart failure by one of the Italian researchers, Pietro Di Pasquale of the University of Palermo.[4] Each of the six studies in the meta-analysis was done by his research group.

In March *Heart*'s editor warned that two of the studies had duplicate data. In June *Heart* explained that when its ethics committee asked to see the raw data, the researchers said it was "lost as a result of computer failure." The IOM didn't cite the meta-analysis, but it did cite the two studies with duplicate data.

"It's hard to believe that data can be lost from two trials," says Lawrence Appel of Johns Hopkins University in Baltimore.

"The editors from the journals that published these papers should ask for the data and conduct an independent analysis of all trials from this research group."



Worldwide, elevated blood pressure is the leading cause of preventable deaths.

The Bottom Line

There's no doubt that the higher your blood pressure, the higher your risk of having a heart attack or stroke.

One in three adults have high blood pressure, or hypertension. Another one in three have prehypertension. It's a worldwide epidemic (see graph). And it's clear from dozens of trials—which provide the strongest evidence—that cutting sodium lowers blood pressure.[5]

Yet the IOM didn't consider blood pressure a "health outcome."

"The IOM report is missing a critical component: a comprehensive review of well-established evidence that links too much sodium to high blood pressure and heart disease," says Nancy Brown of the American Heart Association (AHA).

What's more, we know from the Trials of Hypertension Prevention (TOHP) that cutting sodium leads to fewer heart attacks and strokes.[6] (The IOM mentioned TOHP only briefly because participants didn't get below 2,300 mg a day.)

We should all aim for 1,500 mg of sodium a day, said the AHA. But most people haven't the faintest idea how much they're getting. Since at least 95 percent of adults exceed 2,300 mg a day, though, the bottom line is clear: eat less salt.

"Focusing the debate on specific targets misses the larger conclusion..." wrote IOM panel members in the *Journal of the American Medical Association* in June.[7] Health authorities agree, they noted, that "excess sodium intake should be reduced."

Thank you. That *does* clear things up.

1 www.iom.edu/Reports/2013/ Sodium-Intake-in-Populations-Assessment-of-Evidence.aspx.
2 *MMWR 60*: 1413, 2011.
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4 *Heart 99*: 820, 2013.
5 *BMJ 346*: f1325, 2013.
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7 *JAMA* 2013. doi:10.1001/jama.2013.7687.

Photo: © Brent Hofacker/fotolia.com (top).

EPIGENETICS

It's what turns you on...and off

BY DAVID SCHARDT

Why don't identical twins always have the same personality and the same risk of disease, even though they have identical genes? How does a brain cell know to make only more brain cells and not heart or kidney cells? Could a woman's diet or weight while she's pregnant influence whether her child has a higher risk of illness decades later?

The answers may lie in how our cells turn our genes on and off. If scientists can better understand that process, they may be able to prescribe specific foods or drugs that can slash our risk of obesity, cancer, diabetes, and more.

Making your Mark

When all the genes in a human being were recorded for the first time in 2000, "there was a lot of hope that we would then have a complete understanding of human disease," says Rob Waterland, an associate professor of pediatrics and molecular and human genetics at the Baylor College of Medicine in Houston. "But that certainly hasn't happened."

"We know that heredity plays a role in a large number of diseases like diabetes, Alzheimer's, and cancer," notes geneticist Evan Rosen of Harvard University's Beth Israel Deaconess Medical Center in Boston. "Yet mutations in genes account for a minuscule portion of the inherited risks."

"We're finding that the impact of genetics on health is much more complicated than just the DNA sequence in an individual's genes," explains Waterland.

Genes consist of strings of DNA that serve as blueprints for synthesizing insulin, heart muscle, antibodies, and the other proteins that make life possible. Some of our 20,000 genes are always active—producing their proteins—while others get switched on and off at various times.

What flips the switch? Things called epigenetic marks.

A common example is a *methyl* group (which consists of a carbon atom bonded to three hydrogen atoms). When enough methyl groups become attached to a gene, they can turn the gene off (see "Flipping the Gene Switch"). The same can happen when methyl groups become attached to the histone proteins that DNA strands wrap themselves around. But if enough *acetyl* groups—each consists of two carbons, one oxygen, and three hydrogen atoms—become attached to a histone, the gene may get switched *on*.

Some epigenetic marks—ones that tell the genes in brain cells to make more brain cells but not liver cells, for example—appear soon after conception and last a lifetime. Others can appear and disappear at any time, in response to diet, weight, stress, and exposure to tobacco or chemicals like DDT.

"What's particularly exciting about epigenetic marks is that we may be able to alter them with our diet," says Trygve Tollefsbol, a professor of epigenetics and gene regulation in cancer and aging at the University of Alabama at Birmingham.

May. So far, the evidence is limited to test tubes and animals.

Of Mice and Humans

An agouti mouse can grow up fat and sick or lean and healthy. It depends on what happens to one particular gene during the animal's time in the womb.

If that gene is over-methylated—and therefore dimmed or silenced—the mouse grows up with a darker coat and is lean and healthy. If the gene isn't methylated—and therefore remains turned on—the mouse grows a lighter yellow coat, becomes obese, and is prone to cancer and diabetes later in life.

In 2003, when Waterland was at Duke University, he and Randy Jirtle altered the diet of yellow-coated mother agouti mice during their pregnancy.

"We fed the mothers extra folic acid, vitamin B-12, betaine, and choline," says Waterland. "Those nutrients provided methyl groups that increased the methylation of the *agouti* gene."

Flipping the Gene Switch

When enough *methyl* groups become attached to a gene (a section of DNA) or a histone (a protein that DNA strands can wrap themselves around), the gene can become less active or turn off. When enough *acetyl* groups become attached to a histone, the gene can turn on or become more active. Both may affect our risk of obesity or disease decades later.

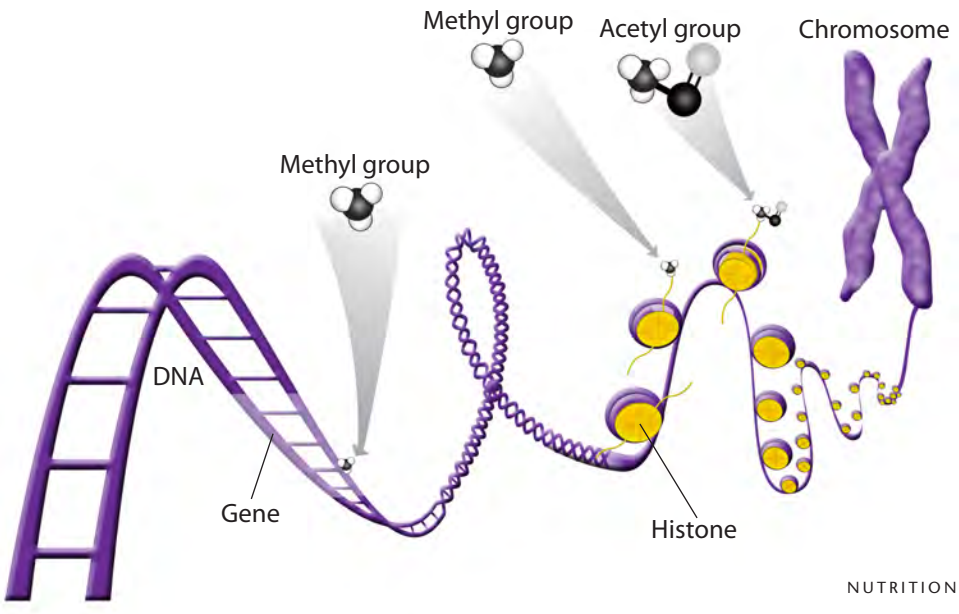

Illustration: Jorge Bach/CSPI.

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That silenced the gene, so that the mothers gave birth to leaner, healthier offspring.[1] The same happened when the researchers fed the mothers genistein, an estrogen mimic that occurs naturally in soybeans.[2] And the offspring of those mothers were less likely to grow up to be obese adults than mice whose mothers got no genistein.

While other studies have found that darker-coated agouti mice are less likely to develop diabetes or cancer, researchers haven't tested whether B vitamins or genistein lowers their risk of those diseases.

What about humans? If scientists could identify epigenetic marks in people, then change them with diet or drugs, they could, at least in theory, silence cancer, obesity, or diabetes.

That's the tantalizing promise. But researchers have a long way to go.

Cancer

"We used to think that cancer was caused mainly by mutations of genes, but we now believe that epigenetic aberrations are responsible for more than half of cancer cases," says Trygve Tollefsbol, who is senior scientist at the University of Alabama at Birmingham's Comprehensive Cancer Center.

"That's an important change because genetic mutations are very difficult, if not impossible, to correct, while epigenetic marks are potentially reversible," he explains.

"If you have a *BRCA1* gene mutation that increases your risk of breast cancer, you can't change that mutation," says Emily Ho, an epigenetics researcher at the Linus Pauling Institute at Oregon State University. But if an epigenetic mark turns that gene on or off, "that's potentially something you can change either with drugs or with diet." (That *BRCA1* mutation led actress Angelina Jolie to undergo a preventive double mastectomy in February.)

Our cells have families of "oncogenes" that can promote cancer by making cells proliferate. "Think of them as gas pedals that speed up cell growth," says Tollefsbol. We also have families of genes that suppress tumor growth. "Think of them as brakes," says Tollefsbol.

In healthy cells, the brake genes and the gas pedal genes are in balance. But if the oncogenes turn on (because they lack methyl groups) or the tumor-suppressing genes turn off (because they have too many methyl groups), "it's like a car barreling down the road with a stuck gas pedal or no brakes headed for cancer," says Tollefsbol.

So far, says Ho, researchers know that certain compounds in foods can change epigenetic marks in cancer cells, at least in test tubes. For example, the curcumin in turmeric, the EGCG in green tea, the genistein in soybeans, the resveratrol in grapes, and the sulforaphane in cruciferous vegetables like broccoli can hinder the enzymes that help attach methyl groups or remove acetyl groups from genes.[3]

"We've shown that feeding sulforaphane to mice that are genetically susceptible to colon cancer reduced the number and size of intestinal polyps in the animals and also altered epigenetic marks in their polyps," says Ho.[4] "But we're still not entirely sure whether these changes to epigenetic marks are a cause or a consequence of the lowered tumor growth."

In humans, there is only weak evidence linking foods rich in genistein, sulforaphane, curcumin, or EGCG to a lower risk of cancer.

"There's a lot we still don't know, such as whether people can absorb enough of these substances from food, whether the compounds they're metabolized into can get to the right cells, and how rapidly we clear, or remove, the compounds from our bodies," notes Ho.

Unless epigenetic changes silence a certain gene, Agouti mice grow up obese and unhealthy (left).

Photo: Randy Jirtle and Dana Dolinoy.

Meanwhile, scientists are beginning to investigate how epigenetics could help identify people at high risk for cancer.

Researchers at the National Institute of Environmental Health Sciences studied 910 women who had a sister with breast cancer. Those who were diagnosed with breast cancer during five years of follow-up had a different DNA methylation pattern in blood samples taken when they entered the study than those who remained cancer-free.[5]

"Since there was, on average, only 1.3 years from blood draw to diagnosis, we don't know whether the methylation pattern was a risk factor or a result of the cancer," says Regina Ziegler of the National Cancer Institute, who co-authored an editorial accompanying the study.[6]

"It could be an early and useful marker of disease that has not yet been clinically detected."

Obesity

"The nutritional status of a mother during pregnancy can have a profound, lifelong impact on whether her children become overweight or obese," says Baylor's Rob Waterland.

That was shown dramatically among the survivors of the Dutch "Hunger Winter," a period of starvation in the Netherlands during the winter of 1944-1945, the final year of World War II. When the Germans set up a blockade to keep food and fuel from reaching the western part of the country, people there had fewer than 1,000 calories—and sometimes as few as 500 calories—of food to eat a day.

Fifty years later, those who had been conceived during the days when food was most scarce weighed an average of 14 more pounds, had waists that were an average of 1½ inches larger, and were three times more likely to have coronary heart disease than those whose mothers were in their second or third trimester at the time.[7]

What role could epigenetics have played? Researchers found that an important gene for growth during pregnancy (it's the blueprint for making insulin-like growth factor 2, or IGF2) was less methylated—more turned on—in people who had been conceived during the worst of the starvation than in those who were less than six months away from being born.[8]

The study was the first evidence "that early-life environmental conditions can cause epigenetic changes in humans that persist throughout life," said the authors.

Those changes may have altered the fetuses' metabolism so that they could get the most out of the limited amount of food available. But when food eventually became abundant again after the war, the epigenetic changes that resulted in a "thrifty" metabolism were never reversed, and the children were more likely to weigh more as adults.

It's not just too few calories that may lead to overweight offspring. It's also too many.

Consider two studies that looked at 162 obese Canadian mothers who had children before, and then after, weight-loss surgery. The children who were born after the surgery were half as likely to grow up overweight or obese as the children who were born before the surgery.[9,10]

And the same researchers recently reported that 25 children born before their mothers lost an average of 103 pounds following gastric bypass surgery had different patterns of epigenetic marks than 25 of their siblings who were born after their mothers had the surgery. Genes that play a role in diabetes, inflammation, and cardiovascular disease were most affected.[11]

"The weight-loss studies are evidence that epigenetic changes in response to the mother's health during pregnancy may play a role in whether someone grows up lean or overweight," says Waterland.

"But there could be other explanations," he adds. For example, weight-loss surgery could have changed the women's gut microflora or blood sugar levels, or how their bodies used insulin to get blood sugar into cells. And that could have accounted, at least in part, for changes in their children's weight.

It's not just mothers who may matter.

In a study of 79 newborns, Duke University researchers reported that the gene for IGF2 was less methylated—more turned on—in those born to obese fathers than in those born to normal-weight fathers.[12] That might increase those children's risk of becoming obese adults.

How much newborns eat soon after birth may also be critical. In a 2013 study, Rob Waterland and his colleagues found that mice that were overfed during their first few weeks of life showed subtle changes in the methylation of genes in their hypothalamus that persisted into adulthood. (The hypothalamus is a specialized region in the brain that helps regulate body weight.) The overfed mice grew up to become heavier and fatter adults.[13]

"Epigenetic changes can be induced by early over-nutrition and may have a major long-term impact on behavior and weight," says Waterland.

Beyond Cancer & Obesity

Scientists are looking at whether epigenetics plays a role in other diseases. Most of the research is in its infancy.

■ **Alzheimer's disease and cognitive decline.** "Epigenetic changes may be an important part of the chain of events that leads to cognitive decline and to Alzheimer's disease," says Paul Coleman, director of the L.J. Roberts Center for Alzheimer's Research in Sun City, Arizona.

Coleman and his colleagues studied a pair of identical twins, one of whom developed Alzheimer's disease and one of whom didn't, even though they had identical genes.[14]

"We found that the brother with Alzheimer's had suffered a massive loss of DNA methylation in his brain cells," says Coleman. "The healthy brother hadn't."

That's consistent with a postmortem study that showed less methylation of genes in the brains of 20 Alzheimer's patients than in the brains of 20 people without Alzheimer's.[15]

The Sister Study suggests that epigenetic marks may be an early sign of breast cancer.

But there's no way to know if the epigenetic changes caused the dementia or vice versa.

"However, we know from experiments with brain cells in test tubes that certain chemicals can cause epigenetic changes that result in the formation of the plaques and tangles that we think cause Alzheimer's," notes Coleman.

"If we can identify these epigenetic changes early enough in people, we may eventually be able to intervene and postpone or prevent dementia from occurring."

■ **Endocrine disruptors.** Chemicals like phthalates (which are used to soften plastic), DDT, and PCBs can disrupt normal activity in the body by mimicking or blocking estrogen or other hormones. Epigenetics may help explain how even trace amounts of those compounds can cause havoc years later.

Take bisphenol A (BPA), which is used to make some hard plastic food containers and the linings of most food and beverage cans.

"When we expose mice in the womb to levels of BPA comparable to what people are exposed to, we see sets of genes that become over-methylated and sets of genes that become under-methylated," explains Dana Dolinoy, assistant professor in environmental health sciences at the University of Michigan School of Public Health.[16]

"We were able to reverse this effect of BPA by feeding the pregnant mothers a high-methyl donor diet with lots of folic acid or a diet with lots of soy and its phytoestrogen genistein," adds Dolinoy.[17]

So should women who could become pregnant load up on soy or get more than the recommended intake of folic acid, which is a B vitamin?

No, cautions Dolinoy.

"You don't know whether the epigenetic changes from lots of soy or folic acid will be good or bad because it depends on where they occur," she says.

"Hypermethylation of an oncogene can be great, but at a tumor-suppressing gene, it's not. And you have no control over where the methyl groups from soy or folic acid are hitting."

The Bottom Line

■ Epigenetics may help explain how diet, body weight, physical activity, stress, or exposure to chemicals may increase or decrease our risk of heart disease, cancer, diabetes, and other diseases.

■ We can't change our genes, but we may some day be able to change our genes' epigenetic marks with food and drugs.

■ Not all epigenetic changes are beneficial, so until researchers learn more, don't try to alter your epigenetic marks with food or supplements.

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15 *Neurobiol. Aging 31*: 2025, 2010.
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Soda & Stones

Drinking more fluids is thought to prevent kidney stones. But that may not apply to sugar-sweetened soda.

Researchers tracked more than 194,000 people for roughly eight years. Those who drank at least one serving of sugar-sweetened cola a day had a 23 percent higher risk of kidney stones than those who drank less than one serving a week. Likewise, those who drank at least one serving of sugar-sweetened non-cola a day had a 33 percent higher risk than those who drank less than one serving a week.

In contrast, people who drank regular coffee, decaf, or tea at least once a day had a 16 to 26 percent lower risk of kidney stones than people who drank those beverages less than once a week. The risk was 30 to 40 percent lower in people who had at least one serving of red or white wine or beer daily, and 12 percent lower in those who drank orange juice, but not other juices, at least once a day.

What to do: Minimize sugar-sweetened sodas. Researchers suggest that their fructose may raise the risk of kidney stones by making kidneys excrete more calcium, oxalate, and uric acid. (Most kidney stones are made of calcium oxalate.)

Clin. J. Am. Soc. Nephrol. 2013. doi:10.2215/CJN.11661112.

Less Meat, Long Life?

People who eat less meat may live longer.

Researchers studied roughly 73,000 Seventh-day Adventists. The Christian denomination encourages its members to be vegetarians and abstain from alcohol, tobacco, and caffeine. After nearly six years, the risk of dying among the vegetarians was 12 percent lower than among the non-vegetarians.

The "vegetarian" group included vegans (people who ate no meat, poultry, fish, dairy, or eggs), lacto-ovo vegetarians (who ate no meat, poultry, or fish), pesco-vegetarians (who ate no meat or poultry), and semi-vegetarians (who ate meat, poultry, and fish no more than once a week). The risk of dying was lowest in the pesco-vegetarians.

What to do: Eat less red meat. This kind of study can't prove that meat raised the risk of dying, but it's consistent with other evidence that meat eaters have shorter lives (see June 2013, cover story).

JAMA Intern. Med. 2013. doi:10.1001/jamainternmed.2013.6473.

Don't Just Sit There

It's not just more exercise, but less sitting, that matters.

Researchers studied roughly 71,000 women aged 50 to 79 who were asked how many hours a day they spent sitting while at work, in a car, eating, watching TV, etc. After 12 years, those who typically sat for at least 10 hours a day had a higher risk of a heart attack, stroke, or other cardiovascular event than those who sat for fewer hours.

The more exercise the women did, the less likely they were to have a heart attack or stroke. But for a given level of exercise, sitting for at least 10 hours a day still raised the risk, except in the most active women.

What to do: Get out of your chair. One study found that taking a two-minute walk every 20 minutes lowered blood sugar levels in people who were overweight or obese.

J. Am. Coll. Cardiol. 61: 2346, 2013.

Carotenoids & ALS

Foods rich in beta-carotene and lutein—two carotenoids found largely in fruits and vegetables—may lower the risk of ALS (amyotrophic lateral sclerosis), also known as Lou Gehrig's disease.

Researchers monitored 1.1 million people in five long-term studies for 11 years to find enough cases (1,153) of the relatively rare illness. Those who consumed the most beta-carotene and lutein had a 15 to 20 percent lower risk of ALS than those who consumed the least. The amount of beta-carotene in a third of a medium-size carrot was linked to a 6 to 10 percent lower risk of the disease.

What to do: Eat a diet rich in fruits and vegetables, especially dark green veggies. People who took beta-carotene supplements had no lower risk of ALS, so something in those foods other than the beta-carotene may protect against the disease.

Ann. Neurol. 73: 236, 2013.

Coffee, Tea, & Cancer

Coffee has been linked to a lower risk of dying of mouth and throat cancer in the largest study to look for a connection.

The American Cancer Society's Cancer Prevention Study II followed nearly 1 million participants for 26 years. Those who reported drinking more than four cups of caffeinated coffee a day had a 50 percent lower risk of dying of mouth and throat cancer than those who drank coffee occasionally or never. (One cup is 8 ounces, so a 16 oz. Starbucks grande is equal to two cups.)

The researchers found a hint that people who drank decaf had a lower risk of dying of mouth and throat cancer. However, tea wasn't linked to a lower risk.

What to do: This study doesn't prove that coffee lowers the risk of mouth and throat cancer (and four cups could keep you up at night and make you jittery). But coffee does contain compounds that protect against DNA damage in animals. Tobacco and alcohol are the strongest risk factors for mouth and throat cancer.

Am. J. Epidemiol. 177: 50, 2013.

Photos: ©Brent Hofacker/fotolia.com (top), ©volff/fotolia.com (bottom).

Summertime, and the tomato is easy...

BY KATE SHERWOOD

If I let the summer pass without a tomato page, I'd be disobeying one of the prime directives of the International Society of Healthy Cooks. These three stunning side dishes are great all year round, but sparkle most when their main ingredient is in its prime.

Got a question or suggestion? Write to Kate at healthycook@cspinet.org.

Grilled Corn & Tomato Salsa

Serves: 4 | **Total Time:** 30 minutes

- 2 cobs corn
- 2 poblano chili peppers, quartered lengthwise
- 1 red bell pepper, quartered lengthwise
- ¾ lb. tomatoes, diced
- 1 avocado, diced
- ¼ tsp. kosher salt
- juice of ½ lime

No grill? You can broil the corn and peppers instead. For a hotter salsa, use 1 or 2 jalapeños instead of the poblano. For a "no chili" taste, replace the poblanos with 1 green bell pepper.

Heat a grill over high heat. Once hot, scrub and oil the grate. Grill the corn and peppers until charred in places, about 5 minutes, then remove from the grill and allow to cool. • Cut the corn from the cobs. Remove and discard the stems and seeds from the poblano and red peppers, then dice the peppers. • In a large bowl, toss the corn and peppers with the remaining ingredients.

Per serving (1 cup): calories 150 | sodium 130 mg | total fat 8 g | sat fat 1 g | carbs 18 g | protein 3 g | fiber 6 g

White Beans with Roasted Cherry Tomatoes

Serves: 4 | **Total Time:** 40 minutes

- 2 pints cherry tomatoes, halved
- 5 cloves garlic, sliced
- 5 sprigs thyme
- 2 Tbs. extra-virgin olive oil
- 1 15 oz. can no-salt-added cannellini beans, drained and rinsed
- ¼ tsp. kosher salt
- freshly ground black pepper

Roasting the tomatoes brings out their tart-sweet juiciness. But if you don't want to turn on the oven, sauté the tomatoes and garlic in the oil with ½ tsp. of fresh thyme leaves instead.

Preheat the oven to 425°F. • In a 9" x 13" baking dish, toss the tomatoes, garlic, and thyme with the oil. Roast until the tomatoes start to brown and the garlic is tender, about 30 minutes. • Remove and discard the thyme sprigs. • Toss the beans with the tomatoes and garlic. Season with the salt and pepper.

Per serving (¾ cup): calories 180 | sodium 160 mg | total fat 8 g | sat fat 1 g | carbs 21 g | protein 6 g | fiber 6 g

Pearl Barley & Marinated Tomatoes

Serves: 6 | **Total Time:** 30 minutes

- 1 cup pearl barley
- 1 lb. tomatoes, chopped
- 1 bunch basil, chopped
- 2 Tbs. extra-virgin olive oil
- 1 small clove garlic, finely minced
- ½ tsp. kosher salt
- freshly ground black pepper

We used a mix of yellow and red heirloom tomatoes, but you can use any kind, as long as they're ripe and tasty. If you don't have pearl barley, try bulgur or brown rice.

In a large pot of water, boil the barley until tender, about 20 minutes. Drain and rinse under cold water. • While the barley is cooking, toss the tomatoes with the remaining ingredients and set aside. • When the barley is done, mix with the marinated tomatoes.

Per serving (1 cup): calories 170 | sodium 170 mg | total fat 5 g | sat fat 1 g | carbs 29 g | protein 4 g | fiber 6 g

Photos: Kate Sherwood/CSPI.

Your Serve? 9 labels that can trip you up

BY JAYNE HURLEY & BONNIE LIEBMAN

You can fool some of the people some of the time. That must be the mantra that many food companies use in picking the serving sizes for their packages' Nutrition Facts labels.

Smaller servings make foods look lower in calories, sodium, saturated fat, and sugar. So some companies ignore the Food and Drug Administration's labeling rules. In other cases, the FDA's rules are out of touch with reality, yet companies follow them (even when they don't have to) if that makes their foods look better.

Here are a few tricks to watch out for.

The information for this article was compiled by Paige Einstein.

How much hummus? A serving of hummus (or any other dip) is just two level tablespoons, says the FDA. Really? Odds are, you'd swallow that much by the third baby carrot.

Yet Sabra's single-serve tub of Classic Hummus with Pretzels holds seven tablespoons (3½ ounces) of hummus, and its Nutrition Facts panel assumes you eat all seven.

If you ate that much out of the *multiserve* **Sabra Classic Hummus** tub, instead of the 70 calories (and 130 milligrams of sodium) in the two-tablespoon serving shown on the Nutrition Facts panel, you'd end up with 260 calories (and 470 mg of sodium).

Oops.

So cheesy. "Aged Brie & sun dried figs create a flavor that would make even Mona Lisa smile," gushes the label of the frozen gourmet "grown-up" **Good Tastes Brie and Fig Mac & Cheese**, which is sold at stores like Whole Foods.

Smile? Chances are, she'd laugh at the tiny 1⅓-cup portion that's supposed to serve two. (She might also chuckle at some of the "wholesome, gourmet, exhaustively sourced" ingredients, like the maltodextrin, xanthan gum, and natural cheese flavor.)

How many people will notice that the Nutrition Facts apply to just half the box? Probably not many. After all, who would ever think that just over a cup of mac & cheese could have up to 640 calories and 16 grams of saturated fat?

Pesto change-o. It's bad enough that a serving of tomatoey pasta sauce is just half a cup, according to the FDA. (Of course, that's all it takes to coat the FDA's tiny one-cup serving of cooked pasta, which is more like a side dish.)

And it's not clear if the FDA's quarter-cup (four-tablespoon) serving for pesto would cover a cup of pasta well enough to satisfy most people.

But **Whole Foods 365 Traditional Basil Pesto** uses a *one*-tablespoon serving. It's hard to see a good rationale for that...other than to make a sauce with 280 calories in four tablespoons look like it has just 70.

Souper sneaky. On the back of the **Campbell's Go Soup** labels are instructions to microwave the pouch and "pour soup into bowl."

Campbell must have meant "bowls," because the Nutrition Facts apply to a measly one cup (8 oz.) of soup—a little more than half of the 14 oz. non-resealable pouch.

Let's see. That means the **Golden Lentil with Madras Curry Go Soup**, for example, has 280 (not 160) calories, 10½ (not 6) grams of saturated fat, and 1,350 (not 770) milligrams of sodium. Hmm.

It's not just Go Soups. Most soup companies hide behind the FDA's one-cup serving when they know better.

Photos: Paige Einstein/CSPI.

Calories disappear!

Voilà! Birds Eye Voila! frozen **Alfredo Chicken** is a mix of chicken, pasta, and veggies. It could be dinner.

So why does Birds Eye pretend that a serving is just one cup? No wonder each serving has just 240 calories.

Birds Eye is taking advantage of the FDA's one-cup serving for "foods measurable with cup." Most people would probably split the 21 oz. bag in two. That would mean 350 calories, 6 grams of saturated fat, and (Yikes!) 870 milligrams of sodium each.

Bertolli Chicken Alfredo & Penne Classic Meal for 2 has 500 calories, 13 grams of sat fat, and 940 mg of sodium per serving. But at least its serving—half of a 24 oz. bag—is honest. Birds Eye's isn't.

Batter up. Mozzarella sticks have hit the big time on restaurant appetizer menus. So it's no surprise that supermarkets want in on the action. Enter **Alexia Mozzarella Stix**.

Just pop them in the oven for 10 minutes and dig in. But don't dig too far. A serving is just two sticks (about an ounce). Alexia is probably using the FDA's serving for cheese. Most people eat cheese in a sandwich, on crackers, or with other foods. They eat mozzarella sticks with...well, *more* mozzarella sticks.

If you split the 12-stick box with an unlucky companion, you're each up to 360 calories and 7½ grams of saturated fat seasoned with 690 milligrams of sodium. Not in the mood to share? Maybe your fat cells will open up a new section for mozzarella-stick storage.

Off the trail. Trail mixes are hot. You'd think we were a nation of hikers and bikers who need to gulp down a lot of calories in just a few bites.

No doubt, some people grab a bag of **Emerald Tropical Blend Trail Mix** and hit the road (though most likely in their car). After all, the "delicious blend of fruit, nuts & chunks of granola" has just 130 calories, according to the Nutrition Facts panel.

Except that those Facts apply to a one-ounce serving—a little less than half the non-resealable bag. Eat the whole bag (it holds just half a cup) and you're up to 300 calories.

And the mix isn't even mostly fruit (plus added sugar) and nuts. The first ingredient is "granola clusters" (label-speak for oats, sugars, oil, flour, etc.). Want trail mix? Make your own.

The whole enchilada? **Amy's Cheese Enchilada** may seem like a 240-calorie bargain (though its 6 grams of saturated fat and 440 milligrams of sodium aren't exactly low).

Look again. The Nutrition Facts on the box are for just one of the two small enchiladas that are inside. Eat them both and your bargain morphs into about a quarter of a day's calories and half a day's sodium and sat fat.

The FDA's serving size for enchilada-plus-sauce is about 7 ounces. Each of Amy's enchiladas weighs 4.5 ounces. But thanks to a loophole in the labeling rules for foods that come in "small discrete units," Amy's can pretend that one enchilada is a serving.

You're not fooling us, kiddo.

Milano Math. Question: Why do **Pepperidge Farm Dark Chocolate Milano Cookies** have 180 calories, while **Pepperidge Farm Double Chocolate Milanos** have 140 calories, according to the packages' Nutrition Facts panels?

Answer: A serving is three Dark Chocolates but just two Double Chocolates.

The FDA's serving size for cookies is 30 grams (about an ounce). So Pepperidge Farm uses the number of Milanos that comes closest to 30 grams. And each Dark Chocolate weighs 11.3 grams, while each Double—thanks to its bit of extra chocolate—weighs 13.5 grams.

But do people typically eat three Darks but only two Doubles? Unlikely, since both are roughly the same size.

And single-serve On the Go! packs of Milanos have 180 calories because each bag holds three cookies. But why should Pepperidge Farm use a three-cookie serving for its Double Chocolate (or Mint Chocolate, Orange, or Raspberry) Milanos when it can get away with using just two?

Photos: Paige Einstein/CSPI.

About CSPI, publisher of Nutrition Action Healthletter

CENTER FOR Science IN THE Public Interest

Nutrition Action Healthletter has been published since 1974 by the nonprofit Center for Science in the Public Interest, an independent consumer health advocacy organization. Founded in 1971, CSPI educates consumers about food safety and nutrition and presses food companies and the government to improve their policies and practices. CSPI's work is supported by *Nutrition Action* subscribers, individual donors, and foundation grants. CSPI does not accept funding from government or industry, and *Nutrition Action* is free of advertising.

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RIGHT STUFF

BEST IN BEANS

You can't beat beans.

They're rich in fiber, protein, magnesium, potassium, iron, copper, and folate, and they're low in saturated fat, sugar, and sodium.

Well, they *start out* low in sodium. But every half cup of most canned beans delivers 250 to 500 milligrams of sodium. And even if you buy unsalted beans, most cans have BPA in their linings. The estrogen mimic increases the risk of behavioral problems and cancer in laboratory animals...and possibly in humans.

Solution: cook your beans from scratch if you have the time...or try **Whole Foods 365 Organic No Salt Added Black**, **Cannellini**, **Garbanzo**, or **Kidney Beans**. They're packed in cartons rather than cans, so they're BPA-free. Good riddance.

And they're cheap: we paid $1.49 for a 13.4 oz. carton, which holds three half-cup servings. That's about half the price of **Eden Organic No Salt Added beans** (which come in BPA-free cans).

So drain those *frijoles* and...

■ mix a carton of kidney beans with a vinaigrette of 2 Tbs. minced red onion, 1 Tbs. red wine vinegar, 1 Tbs. dijon-style mustard, 2 Tbs. olive oil, a pinch of sugar, and ¼ tsp. salt;

■ combine a carton of cannellini beans with 2 chopped roasted red peppers, 2 Tbs. olive oil, a spritz of lemon juice, freshly ground black pepper, and ¼ tsp. salt; or

■ toss a carton of black beans with a pesto made by puréeing 1 cup of cilantro, the juice of ½ lime, 1 clove garlic, 2 Tbs. olive oil, and ¼ tsp. salt in a food processor.

Sometimes, good things come in new packages.

Whole Foods: (512) 477-4455

dish OF THE MONTH

Smokin' Good Chickpeas

Sauté 3 minced cloves of garlic in 2 Tbs. extra-virgin olive oil. Add 1 cup chopped fresh roma tomatoes and a generous pinch of red pepper flakes. Simmer for 2 minutes. Add 1½ cups of drained, no-salt-added chickpeas and heat through. Season with ¼ tsp. salt and freshly ground black pepper.

FOOD PORN

MACHO NOTCH-O-BELT BURGER

"A hand-pressed beef patty on a grilled Cheddar bun with lettuce, Cheddar cheese, chili, tortilla chips, sour cream, freshly made pico de gallo and jalapeños." Got that?

Denny's new **Macho Nacho Burger** isn't for sissies. What red-blooded American would order just a plain beef patty with humdrum lettuce, tomato, onions, and ketchup?

Real men need a burger with something more—say, another entire menu item—on top. Something like nachos...and nearly everything you can get on nachos, like cheese, sour cream, and chili. Nothing like topping your ground beef burger with ground beef chili.

The burger alone has 1,020 calories (half a day's worth) plus 25 grams of saturated fat and 2,170 milligrams of sodium (more than a day's supply of each). It's equal to two McDonald's Quarter Pounders with Cheese. And that's without your choice of "wavy-cut French fries, hash browns, seasonal fruit or dippable veggies." *As if* a Macho Nacho buyer is going to order dippable veggies.

With fries, your total comes to 1,530 calories and 30 grams of sat fat spiked with 2,280 mg of sodium. Now you're up to *three* Quarter Pounders with Cheese.

Our advice: nix the Macho Nacho. Stick with the Cranberry Apple Chicken Salad, the Chicken Avocado Sandwich, or another Fit Fare Light item (they have less than 550 calories).

Denny's is "celebrating 60 years as America's diner." Let's hope its patrons get to celebrate *their* 60th.

Denny's: (800) 733-6697

Photos: Kate Sherwood/CSPI (left), Paige Einstein/CSPI (right).