



OUTSIDE JOB

We know how important hormones are when it comes to governing everything from our weight to our moods. Now research reveals that these key chemicals are far more vulnerable than previously thought: Even the tiniest amounts of substances found in such everyday items as snack foods and countertop sprays may be interfering with their infinitely delicate dance.

IT WAS FOUR A.M., and I was wide awake, just as I had been at that hour every night for the past week and a half—or so it seemed. Wired and utterly exhausted at once, I lay in bed going from hot flashes, and violently kicking off the covers, to cold shakes, when I'd yank them back on again. Over the past 10 days, I'd spent every waking hour either crying, laughing, or totally spacing out. A few days earlier, in fact, my husband had become so alarmed by my erratic behavior that he'd rushed me to the ER, thinking that maybe I was having a stroke.

I was, to put it mildly, flipping my wig. I felt I'd been flayed open to the world, its joys and sorrows hitting me directly, and my responses to all of them laid out for everyone to see. I was so raw and sensitive to everything, it was as though there were no processing center to deal with my emotions and move me through my days.

The cause of all the mayhem, I eventually learned, was withdrawal from estrogen and progesterone, the hormones that govern the female reproductive process, in the wake of the hysterectomy I'd undergone nearly two weeks earlier. I'd succumbed to the surgery as a last

resort after years of battling severe endometriosis, a condition that results in cells from the lining of the womb migrating to other areas of the body, and that can lead to excess bleeding and anemia. For the past decade or so, I'd also been living through another kind of hormone hell, driven by some combination of estrogen overload, adrenal fatigue, and a slightly underactive thyroid.

My malfunctioning female organs having been literally cut away, there was nothing left to oversee the job of orchestrating my hormonal function. I was eventually provided with an assortment of patches and creams intended to play that role, but when I asked my ob-gyn a simple question—"Why did this happen to me?"—his answer was vague: "It could just be genes," he said. "It could be stress. It could be having had a late-life baby [I gave birth when I was 40]. It could be something in the environment. There's just no way to really know."

Unfortunately, that seems to be the response a lot of women are getting these days. Canvassing my neighbors, I found that nearly every one of them is coping with some form of hormonal dysfunction; some are receiving

treatment, but nobody is getting any answers. Remola Turner, 29, is struggling with polycystic ovary syndrome and has been pronounced prediabetic despite her best efforts to eat well and exercise often. Kelly Winston, a 39-year-old nurse, experiences intense hormone-related migraines that she says have lately gotten out of control. Kally Elliott, 36, recently suffered a pulmonary embolism following the birth of her fourth child—most likely, the doctors speculated, because of an excess of estrogen in her system. And those are just the gals on my block!

We talk about it often, and we wonder: What the hell is going on? Our lifestyles, diets, sleep habits, and methods for stress management vary widely, and yet each one of us is dealing with major hormonal trouble. Nobody has the definitive answer, but, increasingly, the scientific and medical consensus seems to point to our environment.

Every day, it seems, those of us brave enough to read the papers find more bad news about how chemicals found in plastics, pesticides, fertilizers, flame retardants, and household cleaners can create chaos by mimicking or interfering with the effects of the body's natural hor-

Chemicals found in plastics, pesticides, flame retardants, and household cleaners can create chaos by mimicking or interfering with natural hormones.

mones. Government agencies, endocrinologists, and corporations have gone back and forth for years about what constitutes an acceptable level of exposure to known endocrine-disrupting chemicals (EDCs). And though legions of scientists are on the job, questions about the safety of these ubiquitous substances persist.

THE TERM ENDOCRINE DISRUPTOR was coined by a group of scientists in 1991 as they began to investigate the effects of environmental chemicals on the glandular systems of the body, explains Dr. Samuel Dagogo-Jack, chief of the Division of Endocrinology, Diabetes and Metabolism at the University of Tennessee Health Science Center, in Memphis. As the field is relatively new, there have been few gold-standard studies that can tell us just how much of a disruptor is tolerable before there is bodily malfunction, or how exposure to multiple disruptors might yield new or different symptoms.

Dagogo-Jack, a member of the American Association of Clinical Endocrinologists, acknowledges that disruptors have been identified in plastics, preservatives, pesticides, and fertilizers, and he recommends avoiding them where you can, especially if you're among the groups most susceptible to their effects—the very young, the very old, and pregnant women. But he also recommends keeping a level head. "We are immersed in a sea of chemicals in the postindustrial era," he says. "You can

take steps to avoid chemicals, but you shouldn't panic."

Maybe not, but a study published this month in *Endocrine Reviews*, a journal of the Endocrine Society, suggests that we *do* need to be aware of the risks of EDCs, even in minute amounts. "Every cell in the body contains hormone receptor sites," explains Laura Vandenberg, a post-doctoral fellow at the Tufts Center for Regenerative and Developmental Biology and the lead author of the report, which was based on a review of 800 scientific studies. "Think of them as locks and hormones as keys. We used to think that there was one lock for every key, but it turns out that these chemicals can act like keys too." Estrogen can bind with estrogen receptors, for example, but so can bisphenol-A (BPA) and dozens of other chemicals. These dysfunctional keys can block out the helpful keys, Vandenberg says, or so many keys can compete for a single lock that the cell might decide security has been breached to the point where everything needs to be locked down. If high exposure levels continue, the body may stop responding to certain hormones altogether.

And such effects can be triggered by even smaller amounts of the chemicals than previously thought. "Hormones work at extremely low doses," Vandenberg says. "Parts per billion or trillion—we're talking about one-twentieth of a drop of water in an Olympic-size pool." Similarly tiny doses of EDCs can have "potent effects" on the body.

"We don't really know how much of each chemical it takes to create these effects," she says, but she is of the belief that there is "no such thing as a safe dose. Period."

Needless to say, Vandenberg and others in the EDC community were dismayed to learn, in late March, that the U.S. Food and Drug Administration had rejected a request to eliminate BPA from the nation's food supply. While it acknowledged that studies have raised questions about the health effects of BPA, the agency said in its response to the petition, which was filed by the Natural Resources Defense Council, that there was "insufficient information to persuade [it] to issue a regulation prohibiting the use of BPA in human food and food packaging." It plans to continue studying the matter.

My hormonal problems and those of my neighbors may have nothing to do with environmental causes like BPA, but that doesn't mean that we shouldn't fight to have these potentially harmful chemicals removed from our lives. "You have a right to demand that our regulatory agencies and the officials who represent us place a higher value on human health than on the industries making money on these chemicals," Vandenberg says. She suggests lobbying for legislation that restricts or bans EDCs in food production and commerce, and exercising our power as consumers. "Once you're educated about these chemicals," she says, "you can take steps to reduce your personal exposure. Every little bit helps."

KNOW YOUR ENEMIES

There's no need to freak out and plot your move to a bubble. The first step toward better hormone health is to understand where the risks lie. Here, our guide to some of the most problematic substances, along with advice for minimizing exposure and protecting yourself and your family.

1 BPA BISPHENOL-A

COMMONLY FOUND IN: plastic bottles, canned food, cash register receipts

THE LOWDOWN: As if you needed another reason to stop buying plastic bottles. Exposure to bisphenol-A, or BPA, which is used in the bottles and in can linings, can have negative effects on brain development and reproductive function, and is especially problematic for young children. BPA is a known xenoestrogen, which means it can bind to the body's estrogen receptors and wreak hormonal havoc. According to Dr. Karlene ChinQuee, a gynecologist who runs the ChinQuee Center for Health & Wellness, in New York City, too much exposure to BPA might be enough to tip the finely tuned balance of female sex hormones. "If you're in contact with too many xenoestrogens, you may start to notice symptoms like depression, irritability, sleeplessness, and weight gain," she says. "This is because xenoestrogens can cause you to develop excess estrogen, which throws your progesterone out of balance, and can lead to a cascade of negative hormonal effects." Exposure to BPA has also been found to produce insulin resistance in animal studies. In its March statement, the FDA said that it would continue to address questions and potential concerns raised by studies of BPA.

PROTECTION PLAN: Switch to glass water bottles and drinkware (especially if you're breast-feeding), and look for canned foods that are labeled "BPA-free." Use glass containers to store or refrigerate leftovers. Don't reuse plastic water bottles intended for recycling, and never microwave food in plastic. If you have a family history of uterine cancer or forms of breast cancer that are estrogen sensitive, Dagogo-Jack recommends especially careful avoidance of any products or containers that might contain BPA.

2 ATRAZINE

COMMONLY FOUND IN: nonorganic crops, especially heavily sprayed corn and soy

THE LOWDOWN: This pesticide, which is used throughout the United States, was banned in Europe in 2003 because of concerns about its presence in drinking water. Atrazine's effects on the nervous and reproductive systems of animals and humans have been widely documented, including the fact that concentrations as low as 0.1 parts per billion have been shown to alter the development of male sex characteristics in frogs.

PROTECTION PLAN: Buy organic fruits and vegetables. If this is financially prohibitive, refer to the Environmental Working Group's "Dirty Dozen" list of most-polluted foods (ewg.org) and spend your limited dollars on organic versions of those. (Currently, the list includes apples, celery, strawberries, peaches, spinach, imported nectarines and grapes, bell peppers, potatoes, blueberries, lettuce, and kale.) If you must buy conventional produce, be sure to wash it thoroughly.

3 DIOXINS

COMMONLY FOUND IN: food, particularly meat, dairy, fish, and shellfish

THE LOWDOWN: In short, these are good old industrial wastes—found throughout the world and known to accumulate in the fatty tissues of humans and animals. You might know them as PCDDs, PCDFs, or TCDDs, all of which are members of this family of chemicals that has been linked to lowered sperm counts, breast cancers, and a host of reproductive and developmental disorders. "You really can't deny that signs of puberty are showing up in girls much earlier," says Dr. Christiane Northrup, an ob-gyn based in Yarmouth, Maine, and the author of *Women's Bodies, Women's Wisdom*. "Doctors are seeing breast budding and armpit and pubic hair as early as age eight." Northrup notes that other EDCs (BPA and phthalates) have also been linked to early puberty. About 90 percent of our exposure to dioxins comes through foods.

PROTECTION PLAN: Delete the meat, or at least minimize your exposure to fatty red meats, which are believed to pose the greatest risk. If you do eat meat, look for grass-fed animals, and go organic when you can. Also avoid nonorganic dairy, especially if you're buying full fat.

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PCBs POLYCHLORINATED BIPHENYLS

COMMONLY FOUND IN: fiberglass, electrical equipment, oil-based paints, caulking, floor finishes, adhesives, and fluorescent light fixtures, plus soil and groundwater

THE LOWDOWN: These man-made organic chemicals were banned in the United States in 1979, but due to a loophole, they may still surround us in products such as transformers and light fixtures. PCBs have been linked directly to liver and stomach cancers and to problems with the immune, reproductive, nervous, and endocrine systems.

PROTECTION PLAN: Replace old appliances and light fixtures. High concentrations of PCBs are found in lake and river sediments, and large fish are thought to be more contaminated than small ones. Check fish advisories, and keep your shoes on when walking in gardens and rivers.

5

PHTHALATES

COMMONLY FOUND IN: toys, food packaging, detergents, some beauty products, shower curtains, and adhesives

THE LOWDOWN: Known as “plasticizers,” these chemicals are used as fixatives in the products outlined above—and that’s just the short list. Phthalates are known carcinogens and endocrine disruptors, and may be especially hazardous to male sexual development. “This one needs to be on every pregnant woman’s radar,” says Dr. Louann Brizendine, founder of San Francisco’s Women’s Mood and Hormone Clinic and the author of *The Male Brain*, “especially if she knows she’s carrying a boy.” Phthalates can disrupt the neural development of the male fetus by binding with androgen receptors, she explains. “At about eight weeks of gestation, testosterone starts pumping and literally marinates the male brain,” says Brizendine. Theoretically, she adds, “if there’s something disrupting that process, you could end up with a child who develops female characteristics and even body parts, even though the genetic code is XY.”

PROTECTION PLAN: Use green home cleaners, especially if you’re pregnant, and look for unscented personal care items.

6

PERCHLORATES

COMMONLY FOUND IN: rocket and other fuels; they may also leak into water systems

THE LOWDOWN: An odorless, colorless class of salts, perchlorates have been acknowledged by the Centers for Disease Control as a risk factor for thyroid disorders, especially among women. “Perchlorate is a naturally occurring chemical in the environment but is not safe used in high concentrations,” says Dr. Tieraona Low Dog, director of fellowship at the Arizona Center for Integrative Medicine and the author of *Life Is Your Best Medicine*. “The problem is that it disrupts the thyroid’s ability to uptake iodine—which it needs for healthy function. It’s rampant in the water and food supply, and may be partly behind the epidemic of women with hypothyroidism, or low thyroid function.” Symptoms of deficient thyroid function include fatigue, sluggish digestion, weight gain, dry skin, a persistent feeling of cold, and brain fog.

PROTECTION PLAN: There’s no easy way to avoid perchlorates, although many states now monitor for them and alert the public when they reach dangerous levels. You can support your thyroid function, Low Dog says, by using table salt (sea salt doesn’t contain sufficient iodine), adding seaweed to your diet, and taking a multivitamin that contains zinc, iodine, and selenium. And acupuncture can help stimulate thyroid hormone production.

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PBDEs POLYBROMINATED DIPHENYLETERS

COMMONLY FOUND IN: old couches, futons, car seats, electronics, and carpets

THE LOWDOWN: This class of chemical flame retardants was near-ubiquitous before California banned the manufacture, distribution, and processing of products containing it in 2003. Several other states and the European Union have done the same. Although the U.S. federal government has failed to ban the distribution of products containing PBDEs outright, retail giant Walmart announced in 2010 that it would no longer carry household goods, toys, or electronics containing them. A growing body of evidence links the chemicals to problems in brain development and lowered thyroid and reproductive hormone function in laboratory animals.

PROTECTION PLAN: There might be good reason to bypass those thrift store finds and Craigslist deals. Furnishings, electronics, and clothing produced in the United States prior to 2006 are much more likely to contain PBDEs. The Environmental Working Group (EWG) advises making sure that coverings are intact if you can’t replace foam furniture. PBDEs are commonly found in household dust, so use a vacuum fitted with a HEPA filter. Be aware that children’s clothing—especially pajamas—labeled “flame-resistant” might be coated with toxins (similar to but different from PBDEs), and be hesitant to accept hand-me-downs. Flame retardants on fabric persist through at least 50 washings, and possibly even more, according to the EWG.

8 TRICLOSAN

COMMONLY FOUND IN: antibacterial soaps, toothpastes, dishwashing liquids, and household cleaners

THE LOWDOWN: Any worried parent might be tempted to reduce infection risk by buying products that promise to stamp out bacteria. But most of these rely on triclosan, a chemical that's been found in animal studies to interfere with the expression of testosterone and also to affect thyroid hormones. The U.S. Food and Drug Administration says that the chemical is not currently known to be hazardous to humans, but it is in the process of a regulatory review.

PROTECTION PLAN: Stick to soap and water, and apply a little elbow grease as needed to keep yourself and your house clean. "Studies show that soap and water works just as well," says Jill Blakeway, a certified acupuncturist and the founder of Manhattan's YinOva Center.

Going the Herbal Route

There are no miracle cures for endocrine problems. But herbs can be powerful allies, says herbalist Rosemary Gladstar, founder of the Sage Mountain Herbal Retreat Center, in East Barre, Vermont, and the author of *Herbal Healing for Women*. "Herbs are a gentle, natural way to help your body restore balance," she says. "And when you're working on one of the hormone systems, you're generally helping them all." Gladstar shares a few of her favorite formulas below; her proportions are for mixing liquid tinctures (which you can find at health food stores). Add ½ to 1 full dropper of the blended tinctures to a cup of water, and drink each formula two times a day.

FOR ADRENAL EXHAUSTION

"A lot of women in their forties come in thinking they're in menopause, when in fact they have adrenal fatigue—the symptoms are so similar," says Gladstar. "The stress of modern living overworks the gland so that it's constantly pumping cortisol." Her herbal remedy relies on the Ayurvedic healer ashwagandha. "It's relaxing and energizing at the same time," she says, "and works particularly well with licorice." To create your own adrenal tonic, combine 2 parts ashwagandha, 1 part wild yam, 1 part Siberian ginseng, and 1 part licorice. (Note: Licorice can increase blood pressure; those with hypertension should cut the dose in half.)

FOR INSULIN RESISTANCE

"Cinnamon is great because it really stabilizes the blood sugar, plus it's yummy," says Gladstar. She combines cinnamon with gymnema sylvestre, which helps diminish cravings, and artichoke leaves, to stimulate the liver so that the body can process hormones more efficiently. Mix 2 parts cinnamon, 1 part gymnema, and 1 part artichoke leaf. This formula should also work to bring the hormones that regulate hunger into better balance. Gladstar adds that you can also use gymnema on its own when sugar cravings hit. "If you put a drop or two of gymnema tincture directly on your tongue, it makes sweets taste terrible."

FOR ESTROGEN OVERLOAD

It can be tricky for menstruating women to restore hormonal balance, since the levels of estrogen and progesterone are always on the move. "This is where herbs are at their best," says Gladstar. "Rather than entering the body with a single agenda, the way traditional medicine does, they nourish the system so that the body can balance itself." The formula is designed to encourage hormonal function, support the liver, and "warm the reproductive system": 1 part vitex, 1 part black cohosh, ½ part wild yam, ½ part licorice, and ½ part ginger.

FOR OVERALL HORMONE WELLNESS

"The pituitary is the master gland, ruling and governing all the other glands," says Gladstar. "When you're treating it, you're treating every other part of the endocrine system." This daily support formula can treat existing imbalances and help ward off insults from environmental, dietary, and lifestyle stressors: 2 parts vitex, 1 part ashwagandha, 1 part dandelion, and ½ part Siberian ginseng.

9 EMPTY CALORIES

COMMONLY FOUND IN: processed snacks, sugary sweets, and sodas

THE LOWDOWN: It's no secret that our modern food system contains an overabundance of high-calorie carbohydrates and sweets, all of them available 24-7. And according to Dr. Todd Burstain, an associate professor of medicine at the University of Iowa and an obesity specialist, eating too many of the empty calories in processed carbohydrates and sweets can disturb the delicate balance between leptin and ghrelin, the hormones that tell us when we're full and when we're hungry, respectively. "We find that obese people never really feel hungry and never really feel satisfied—they've lost their sense of when they should be eating, so they're eating all the time," Burstain says. "They end up being driven by cravings, gravitating to sweet foods that light up the pleasure centers in their brains." The result—beyond just weight gain—can be insulin resistance and diabetes.

PROTECTION PLAN: Learn to cook. Most problematic high-calorie intake is linked to processed foods. Organic whole grains, lean proteins, healthy fats, and fresh fruits and vegetables are the best bets for a balanced diet, says Dr. Rebecca Booth, an ob-gyn in Louisville, Kentucky, and the author of *The Venus Week*. If you need to lose weight, move toward the Mediterranean diet, and find a group of people who are also trying to shed pounds. ("The accountability factor is powerful," Booth says.) And stick to three meals a day to turn your hunger hormones (leptin and ghrelin) back on. "It takes four to five hours between meals for leptin to go down and ghrelin to go up, so it seems built into the system that we should be eating three squares, just like Mom said," notes Burstain. "If you wake up and aren't hungry for breakfast, you know you need to reset the hunger hormones."