THE CHEMICAL

GETTY IMAGES.

INVASION

For many people, compounds in the air and in everyday objects can wage an assault on the body. Here's what we know about chemical intolerance, a.k.a. multiple chemical sensitivity (MCS).

BY MERYL DAVIDS LANDAU

A DECADE AGO,

Corinne Segura, of Victoria, Canada, was an active 29-year-old who enjoyed salsa dancing and liked to cycle. But after exposure to mold in her rental home, she began having strange symptoms: Whenever Corinne was around certain very common chemicals—air fresheners, household pesticides, new carpet in a doctor's office, gas station pumps, even essential oil diffusers—she became dizzy, disoriented, and exhausted, and her throat would swell. The symptoms became so debilitating, she eventually had to quit her job as a grant writer and move.

Doctors prescribed antihistamines and an asthma inhaler, but the only thing that helped was avoidance. "The more I removed chemicals from my space, the simpler it was to tell which products bothered me," Corinne says. After several years of this and taking supplements prescribed by a naturopath, Corinne has greatly improved. But her recovery hasn't been a straight line: When smoke from the California fires of 2020 wafted her way, her sensitivities revved back up. Recently, she says, she was stuck in fumy traffic and had to spend a day recovering in bed.

Although Corinne has never been diagnosed, it appears that she suffers from a condition known as multiple chemical sensitivity (MCS). Others call it chemical intolerance, idiopathic environmental intolerance (IEI), or, when there is an identifiable initiating exposure, toxicant-induced loss of tolerance (TILT). And the condition is more common than many of us realize. A 2018 survey in the *Journal of Occupational and Environmental Medicine* found that 26% of Americans said they got symptoms after exposure to our environment's many odorous chemicals. Common complaints include migraines, skin rashes, brain fog, nausea, and even fainting or seizures, according to a survey published in *Air Quality, Atmosphere & Health*. And the problem seems to be growing, or at least it is better recognized than it once was: Rates of diagnosed chemical intolerance are up 300% from a decade ago.

MCS is thought to begin when someone encounters an irritating chemical either in one gulping dose (such as during the World Trade Center collapse) or from smaller but more lasting encounters, like the mold in Corinne's house. Once this happens, certain people can become sensitive to many fragrances. Scientists don't fully understand MCS, and not all physicians even accept that it exists. But a growing number are aiming to better grasp how contact with chemicals at levels considered safe can bother or debilitate so many, says allergist Jonathan Bernstein, M.D., a professor of medicine at the University of Cincinnati and editor in chief of *Journal of Asthma*, who sees many patients with the condition.

In some ways, chemical intolerance is similar to an allergy. When someone becomes allergic to, say, peanuts, contact with even a tiny amount creates a disproportionate reaction across the body. But MCS is not an allergy, because it doesn't cause the body to produce antibodies known as immunoglobulin E (IgE) as in an allergic reaction. For this reason, allergists often turn away people who complain of these symptoms because they don't know how to help them, Dr. Bernstein says.

SMELLS LIKE TROUBLE

Sensitivities can be initially caused or later triggered by a range of common factors, including:

FRAGRANCED PRODUCTS

This is one of the most common triggers, according to research by Anne Steinemann, Ph.D., a professor of civil engineering at the University of Melbourne in Australia. A single scented household or personal care product typically gets its smell from dozens of ingredients, most of which need not be listed on the label, any of which might set off a reaction.

OFFICE AND HOME MATERIALS

These may also be brimming with airborne chemicals—new furniture and flooring are two examples. That "new car smell" is actually formaldehyde and a soup of other volatile substances, says Gediminas Mainelis, Ph.D., a professor of environmental sciences at Rutgers University in New Brunswick, NJ. New or renovated buildings create some of the biggest problems. Ironically, when the Environmental Protection Agency redid its headquarters in the late 1980s, several employees developed the condition, says Claudia Miller, M.D., professor emeritus in the Department of Family and Community Medicine at the University of Texas Health Science Center at San Antonio. Even "green buildings" are not exempt, because the tight seals created around doors and windows to improve energy efficiency may trap gases and particles inside and worsen indoor air if ventilation is inadequate, Mainelis says.

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CIGARETTE SMOKE

Burning cigarettes emit a wide range of chemicals, including benzene and lead, according to the American Lung Association. "We have measured 10 times higher particle mass concentrations inside smokers' homes compared with nonsmokers'," Mainelis says. E-cigarette users are exposed to not only nicotine, but also ultrafine particles, volatile organic compounds, and other chemicals.

PESTICIDES AND INSECTICIDES

Even a single application of indoor pesticides has been known to initiate chemical intolerance, Dr. Miller says, and sufferers can be triggered when in houses or hotels where these are sprayed.

Often people can't put their finger on exactly which chemicals make them sick, Dr. Miller says, and some that don't even have smells can be triggers. (Test yourself at tiltresearch.org.) What's more, symptoms such as headaches may be chalked up to stress when they're actually due to a chemical trigger. The quantity of chemicals we're all exposed to has increased exponentially over the years, Dr. Bernstein says. "Some people are bothered by this more than others," he adds.

SOLVING THE MYSTERY

"Not having the scientific knowledge of what's going on [in the body of someone with MCS] is what causes some doctors to tell patients that it's not a real problem, that it's all in their head,"

says MCS researcher Thomas Uhde, M.D., chair of psychiatry and behavioral sciences at the Medical University of South Carolina in Charleston. But there are theories, including these:

A UNIQUE IMMUNE REACTION

Unlike the IgE arm of our immune system that is associated with allergies, immune cells known as mast cells are created in the bone marrow before spreading through the body to repel invaders. Dr. Miller believes mast cells that are erroneously called up even when chemicals aren't dangerous cause the wide-ranging reactions.

THE NOCEBO EFFECT

Some posit that people become intolerant to chemicals when symptoms are linked in the brain with certain odors (the opposite of the placebo effect). Then, when the person later experiences those odors, their body sets off a reaction. "Nocebo symptoms are real; it's people's attributions of the symptoms to environmental factors that is wrong," suggests Omer Van den Bergh, Ph.D., a psychology professor in Belgium, who published this theory in the journal *Clinical Psychological Science*.

SENSORY PROCESSING GLITCHES

"If you have a traumatic experience that involves an odorant in the environment, an association is going to be laid down," which is helpful from an evolutionary perspective to keep us from danger, says Bernadette Cortese, Ph.D., an assistant professor of psychiatry and behavioral sciences who works with Dr. Uhde at MUSC. The pair hypothesize that, especially in people with certain kinds of anxiety, a traumatic or chronic stress involving a smell might then increase sensitivity to other odors that are strong, acidic, or burning (the kinds most likely to be hazardous). In a study they published in 2018, people with anxious personalities were more bothered by a smoky smell (one of these so-called "trigeminal odors") than other people were. Meanwhile, a roselike scent didn't faze them.

BREATHING EASIER

Treatments currently being tested follow from these theories. Dr. Uhde and Cortese found in a small, exploratory study that a brief stint of cognitive behavioral therapy (CBT) reduced overall sensitivity to smells in those with high anxiety. Dr. Miller advocates medicines that target mast cells, such as the prescription drug Gastrocrom and the over-the-counter spray NasalCrom. Blocking histamine receptors with allergy or GI drugs can sometimes also help, she says. And Van den Bergh created a treatment in which patients are coached on how to disrupt nocebo reactions.

But until a treatment is proven to work in large clinical trials, people with MCS are left to figure it out for themselves. The majority aim to eliminate chemicals from their lives, something that is very hard because chemicals are everywhere. Still, the effort is worth it:

One study found that when air fresheners were taken out of office bathrooms, chemical concentrations in the air dropped by up to 96% within two weeks.

Still, living with MCS can be extremely disruptive. Janis Bell, an author near Tucson, was stricken decades ago while working in a newly constructed building. To get away from chemicals, she moved to Italy for several years because homes there tend to have fewer issues, she says. Once she returned to the U.S., Janis, now 71, experienced so much respiratory congestion and insomnia that she currently sleeps in a tent in her backyard or, in winter, in her car. Aside from avoiding chemicals, Janis has found that regular yoga and meditation help her find acceptance and reduce stress.

Corinne, for her part, grew into such an expert on minimizing chemicals in her home that she became a consultant, educating others with MCS and other respiratory illnesses about the ideal materials to use in their spaces. (Hint: Vinyl and laminate flooring are not among them.) "Most people who are sensitive lead strict lives in order to survive and function. But that can't be the answer. We need to find ways to treat them by better understanding the biological basis and studying which interventions are helpful," Cortese says.

Until then, Steinemann believes that all of us can help by reducing the mix of scented products that surround us. "People with chemical sensitivities are like human canaries," she has said. "They react earlier and more severely to chemical pollutants, even at low levels."

HOW TO REDUCE SCENTS IN YOUR ENVIRONMENT

These steps help folks with MCS as well as allergies and other ills.

- **Reduce air fresheners in your home, car, and office.** Even items with pretty fruits or flowers on their labels get their scents from chemicals. Essential oil diffusers bother many people too.
- **Choose the right filter.** Carbon- and zeolite-based filters quell odors and chemical irritants, Dr. Bernstein says. Opening windows if outdoor conditions are favorable may also help.
- **Keep laundry fragrance-free.** Because they leave your home through dryer vents, chemicals in laundry products become "secondhand scent" to others.
- **Limit perfume use.** So many are sensitive that the American Lung Association officially recommends that everyone shun perfume, cologne, aftershave, and scented lotions and hairsprays at the office.