



Unlock Your Brain's Potential

Extraordinary abilities—from memory to supercharged creativity—may be within reach for all of us, says neuroscientist Berit Brogaard, PhD, coauthor of the new book *The Superhuman Mind*. We asked her to tell us more.

Q: YOU SAY ORDINARY PEOPLE POSSESS TALENTS THEY HAVEN'T EVEN TAPPED INTO. CAN YOU EXPLAIN?

A: Most people assume that folks with amazing mental abilities were born this way and that they operate on a plane that's inaccessible to the rest of us. But nothing could be further from the truth. For more than a decade, I've studied people with uncanny abilities—card counters who can beat the house, self-taught artists, people

who can remember an unbelievable amount of information. Here's the thing: These weren't innate skills—they were acquired.

Q: HOW?

A: We consciously use only a small portion of our brain, but we're constantly performing complex operations in other areas even though we're unaware of it. Savants gain access to unconscious areas when the brain's bossy left hemisphere is

muted. The left is in charge of much of our organized thought and decision-making and tends to suppress the right side, which generally rules creative activities.

Q: BUT HOW CAN THE AVERAGE PERSON ACHIEVE THIS? IS IT SIMPLY A MATTER OF WORKING OR THINKING HARDER?

A: Thinking harder will not tap into parts of our brain that we don't consciously use; it will just use the same regions more. To reach new areas, you have to get your brain out of its comfort zone. There are various ways to do it, but I believe the easiest is by training yourself in a neurological phenomenon called synesthesia, in which the brain makes unusual associations between things like sounds, colors, and emotions. Looking at the number 3, for example, might lead a synesthete to see the color green. Or the word *kiss* might flood her mouth with the flavor of bread soaked in tomato soup. When the brain makes these associations, it generates new neural connections—and these connections may help to spur creativity and improve memory.

Q: SO HOW DO YOU DEVELOP SYNESTHESIA?

A: A study in the journal *PLOS One* found that it could be activated in as little as two weeks. To get started, consciously associate things you normally wouldn't, and rehearse those associations until you internalize them. I know it sounds wonky, but it works. I recently teamed up with Johns Hopkins researchers to help a woman unlock her ability to write evocative poetry. First, we had her make a list of emotions (like happiness, love, anger) and match each one with a sound (a thunderclap, the hiss of a teakettle), a taste (zesty, burnt), a smell (fresh-cut grass, smoke from a campfire), and a color. She kept the list on her nightstand and looked at it in the morning or at night. After just a month, she began to experience her emotions as sounds, tastes, smells, and colors. When she felt jealousy, she heard a hissing sound and saw a pot of liquid spewing dark magenta. She channeled this newfound way of experiencing emotions into writing poetry like she never had before. —**ABIGAIL LIBERS**

The (Non-) Smoker's Disease

Why are so many women who have never lit up developing lung cancer?

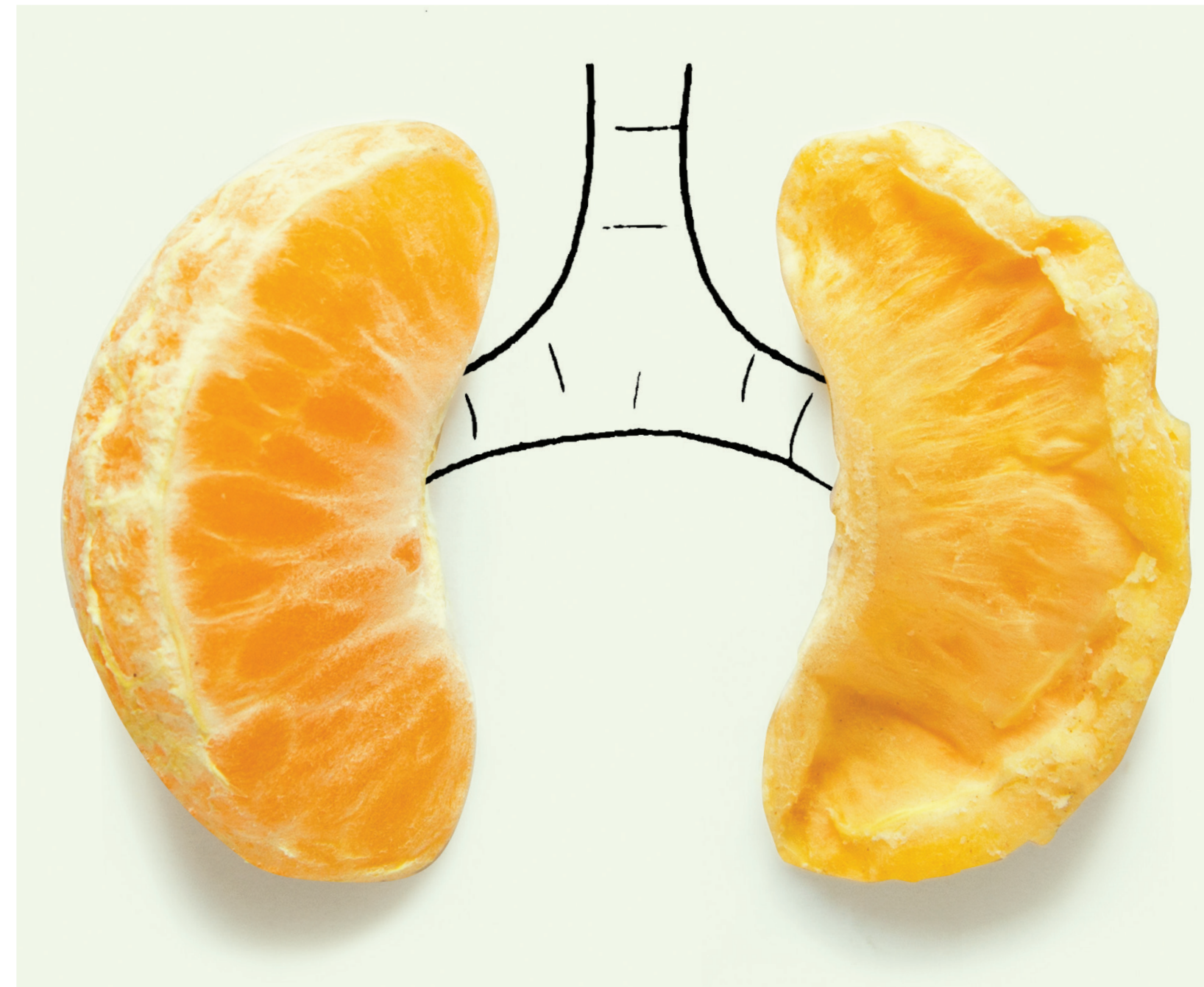
BY *Aimee Swartz*

➔ **IN 2012, SANDY JAUREGUI-BAZA** was hiking along the Tamul waterfall in San Luis Potosí, Mexico, when she started coughing and having trouble breathing. "I remember thinking I must be coming down with something," she recalls.

Jauregui-Baza was an avid exerciser; she ran or hiked daily, logging more than 100 miles each month. She ate clean, avoiding almost all processed foods. She figured she was too healthy for anything to be seriously wrong. But after developing flu-like symptoms, she went to an urgent care clinic in Los Angeles. The doctor thought it might be tuberculosis, based on the results of her cloudy chest X-ray and her recent honeymoon in Nepal, where the infectious disease is common. But a few days later, when the definitive test for TB came back negative, doctors did a lung biopsy to look for other causes.

The final diagnosis: Jauregui-Baza had stage IV lung cancer, the most advanced form of the disease; it had spread into the bones of her spinal column. "I thought the doctors had to be kidding," says Jauregui-Baza, now 32. "I've never even smoked, and I had just hiked to the base camp of Mount Everest. How could I have lung cancer?" The prognosis was grim: More than 95 percent of stage IV lung cancer patients succumb to the disease within five years of diagnosis. Jauregui-Baza was given just six months to live.

Until about a decade ago, most doctors considered it nearly impossible for young nonsmokers to develop lung cancer. "It would have been assumed that a tumor found on the lung had spread from cancer elsewhere in the body," says David



Carbone, MD, PhD, director of the James Thoracic Center at the Ohio State University Comprehensive Cancer Center. Today doctors know that isn't always the case: About one in five of the estimated 105,590 American women who will be diagnosed with the disease this year are what doctors call "never-smokers"—those who have literally never lit up or who have smoked fewer than 100 cigarettes in their lifetime. A 2012 French study revealed that from 2000 to 2010, rates of lung cancer among never-smokers shot up an alarming 33 percent. In fact, if lung cancer in

nonsmokers was its own category, it would rank among the ten deadliest cancers in the United States. This is in part because the symptoms—coughing, chest pain, shortness of breath—are so similar to those of common illnesses; as a result, the disease is often ignored by patients and overlooked by physicians.

That's what happened to Natalie DiMarco, a nonsmoker who was diagnosed at age 32. During a personal-training session one day, she was so winded, "it stopped me in my tracks," she says. "It didn't seem like I was just tired from

exercise." She made an appointment to see her primary care physician, who thought allergies were to blame. When she developed a nagging cough, she sought another opinion and was diagnosed with pneumonia. By the time her cancer was discovered through a biopsy six months later, DiMarco could no longer climb a flight of stairs without stopping to catch her breath. Like Jauregui-Baza, she had stage IV lung cancer.

If cigarettes aren't to blame, what is? Certainly, secondhand smoke plays a role, as do other environmental factors:

According to the U.S. Environmental Protection Agency, a leading cause of lung cancer in nonsmokers is exposure to radon, a radioactive gas, and in 2013, the World Health Organization officially recognized outdoor air pollution as another cause. But experts believe these factors account for only a fraction of lung cancer cases among young never-smokers. "These patients just aren't old enough to have had the degree of exposure we would typically associate with cancer," says Pasi A. Jänne, MD, PhD, director of the Lowe Center for Thoracic Oncology at Dana-Farber Cancer Institute in Boston. Though studies have linked lung cancer in never-smokers to other factors, from estrogen to viral infections like HPV, none has emerged as a definitive cause.

Researchers are having success looking for answers in the very place where cancer begins—our DNA. Advances in gene-sequencing technologies have helped doctors discover that certain cancer-causing mutations occur about two to six times more often in tumors of never-smokers than in tumors of those who have a history of lighting up. The good news: The FDA has approved drugs that can home in on these mutations and deactivate them. Although the meds are not a cure, they can buy some patients more time—sometimes years—before the cancer returns; in one clinical trial, a drug called Xalkori was found to slow the progression of a type of lung cancer more than twice as long as chemo.

Jauregui-Baza had been on Xalkori for more than two years and says it allowed her to live "almost the same life as before cancer." Recently, however, it stopped working. Now on a new drug, she's also taking part in a first-of-its-kind study by the Addario Lung Cancer Medical Institute that's looking specifically at the DNA of young people with lung cancer. The hope is to identify additional mutations that could point the way to better treatments. Jauregui-Baza remains optimistic: "If I can stay alive until the next treatment comes, I have a good shot at beating this." 📌