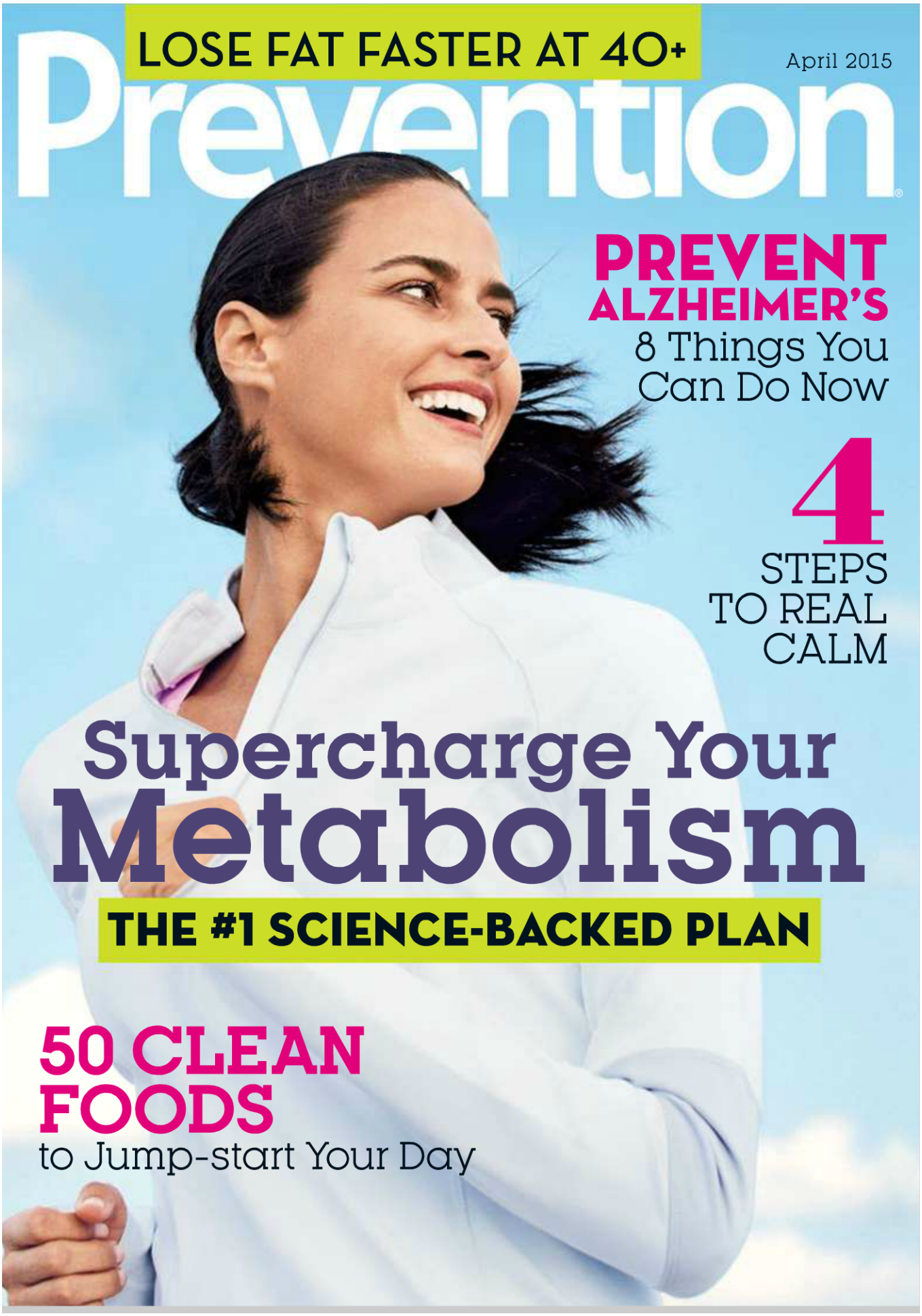
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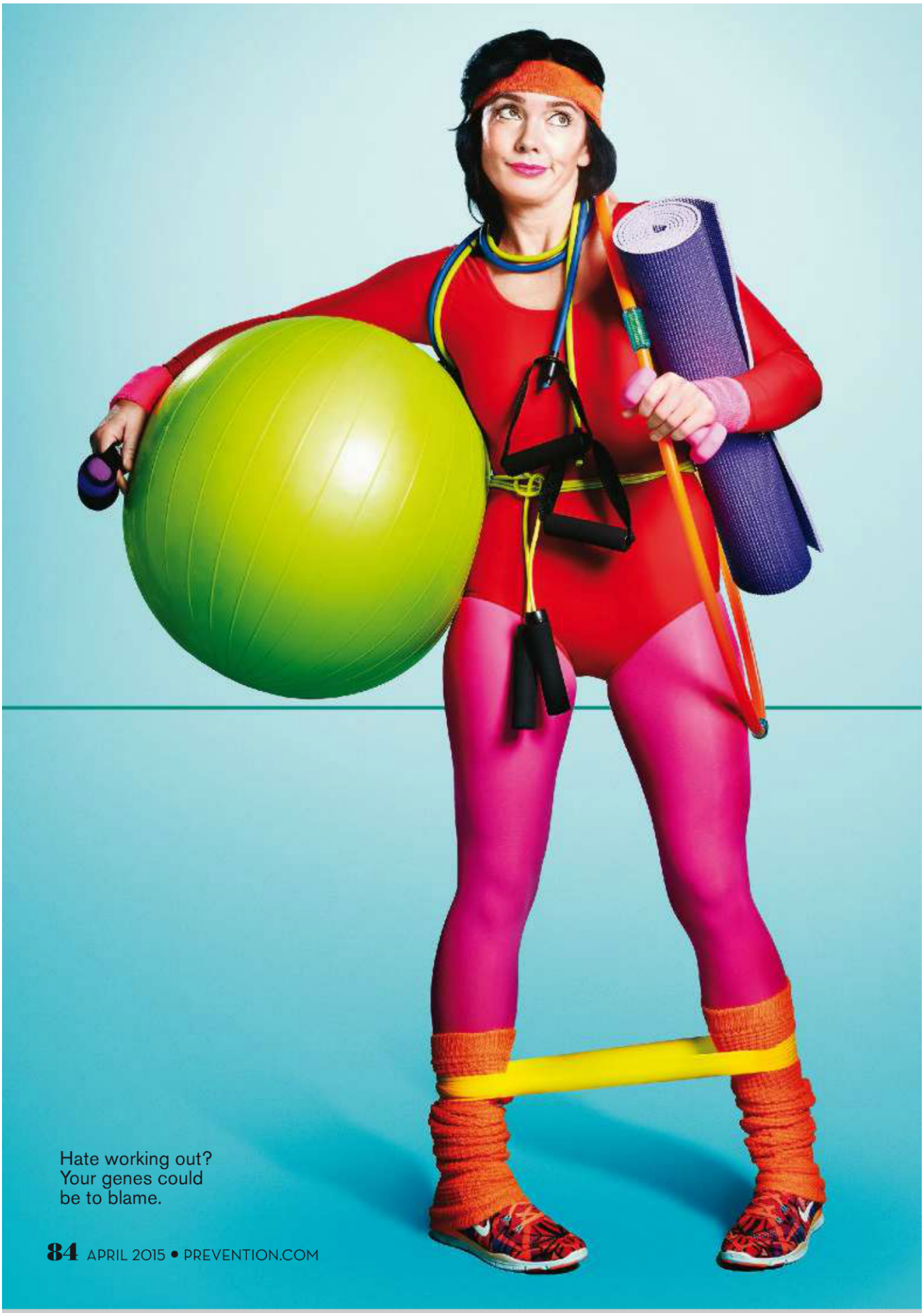


Hate working out? Your genes could be to blame.

It's Not You

It's Your DNA

Workouts are about to stop sucking for good: Master the bold new science of exercise genetics and you'll capture new motivation, finally rev your metabolism, and leave these six frustrations behind.

BY CINDY KUZMA | PHOTOGRAPHS BY DAN SAELINGER

We've all met them. They are the Naturals. The woman in yoga class pre-engineered to nail asanas like some kind of transcendent Gumby. The friend who needs only 2-pound dumbbells to pop Cameron Diaz–like biceps. That peppy guy who clearly sprang from the womb wearing his fitness instructor uniform.

You, meanwhile, haven't felt motivated to walk fast since some weirdo followed you in the parking lot. You can do strength routines for weeks without detecting a hint of triceps definition. Instead of the promised results, you've found frustration. You've maybe even beat yourself up for all the missed goals.

Well, you can check that little blame game at the genetics lab door. According to breaking research, it's not necessarily that you lack willpower; you just got stuck with the short end of a workout double helix. Turns out one in six of us is genetically destined to get hardly any response from endurance training, and one in five has a handicapped metabolism. Scores of us have the genes that make sitting in a chair heaven on earth and going to the gym as uncomfortable as dental surgery.

Is this arbitrary allotment of workout enthusiasm and excellence fair? No. Are you allowed to whine about it? Yes, for exactly 2 nights of *Naked and Afraid* binge watching. But then it's liberation time. Now that you know there are natural shortcomings built into your genetic code, use these tests to figure out exactly what they are and how to overcome them. You still won't love what your DNA doesn't want you to love. But at least your genes won't keep you out of your favorite jeans any longer.

1 You get no joy from working out.

Scientists have only begun to uncover the many ways genetics can sway your motivation to move. But they have pinpointed a bunch of genes linked to brain chemicals—like serotonin and dopamine—and to the brain's reward system, which scientists believe predisposes some people to derive pleasure from pushing themselves. The rest may be at a disadvantage, experiencing Tabata intervals as torture and even moderate sweat sessions as uncomfortable. Each individual gene in question likely has only a small effect—say, less than 1%—on how enjoyable exercise is, according to researcher Angela Bryan, who studies the genetic underpinnings of exercise behaviors. But together, genes add up: When University of Missouri scientists selectively mated rats that logged the most miles on their running wheels, they found 36 genes that may be involved—and ended up with rodents 10 times more naturally active than those bred for laziness.

WARDROBE AND PROP STYLING BY DOMINIQUE BAYNES; HAIR AND MAKEUP STYLING BY AMY GILLESPIE

You start strong but fade fast? You may have inherited genetic roadblocks.

Always sucking wind? Your grandmom may have huffed and puffed, too.

Is it your DNA? Consult your memory for proof your genetic blueprint spells *sofa spud*: If you can't recall ever looking forward to moving—not even playing hopscotch or tag with your buddies—you may be stuck with the don't-get-up-and-go genome, says University of Texas researcher Molly Bray.

The fix: Start by laughing out loud. You face an absurd disadvantage, and nothing works better than humor to keep you positive, says sports psychologist Michelle Cleere. Then put on your game face, because one of the only ways to outsmart deadbeat genes is to set a goal (say, your first 5K or 10K) and make it nearly impossible to miss a step along the way. Schedule every workout, and come up with specific

plans—like popping in a 10-minute DVD if you oversleep or hopping onto the treadmill if it's raining—to thwart excuses. You can employ strategies to make exercise fun: music, dance, games, whatever works, says Bray.

2 You're always out of breath.

Winded before the warm-up ends? Blame it on a low VO_2 max, a measure of endurance based on how much oxygen your muscles use. One of the largest studies of exercise genetics found that both your baseline VO_2 max—that is, how fit you'd be if you never left the couch—and your ability to improve it are tied to your DNA. On identical training plans, about 10 to 15% of people will remain huffing and puffing, getting very little increase in VO_2 max. Another lucky 10 to 15% will net almost a 50% increase, while the rest of us fall in the middle, according to geneticist and Heritage Family Study researcher Tuomo Rankinen, of the Pennington Biomedical Research Center in Baton Rouge, LA.

Is it your DNA? Genetic tests purporting to predict this training response can't give you the complete picture, Rankinen says. Instead, visit the human performance laboratory at your local university and ask for a VO_2 max test. (Sometimes the tests are available at health clubs, too.) You'll walk away knowing your current tap-out point and can retest in a few months to see if you've improved. Just be prepared to shell out $100 to $300.

The fix: You'll have to commit to the formula you've been ducking for years: high-intensity interval workouts. Do 2 each week, pushing hard to the winded point for 30 to 60 seconds, then walking or pedaling slowly for an equal or longer time frame. Start with 4 rounds and work up to 8 or even 10, says Mark McClusky, the author of *Faster, Higher, Stronger: How Sports Science Is Creating a New Generation of Super-Athletes—and What We Can Learn from Them*. After 6 weeks, you should finally notice more stamina. Look forward to it.

3 You never get any stronger.

If you've never moved a bag of mulch or pried open a pickle jar without calling for backup, you may be able to point a finger at your family tree. Your inherited baseline of strength and stamina is based on your mix of muscle fibers. Most of us have about half fast-twitch (FT, what sprinters and powerlifters are born with more of) and half slow-twitch (ST, what endurance runners have in spades), says exercise scientist Wayne Westcott. If you have a rough time building brawn, he says, your current workout might not be playing to your genetic strengths.

Is it your DNA? To find out if your muscles lean more toward FT or ST, you could submit to an expensive muscle

biopsy. Or try Westcott's DIY estimate: On a leg-extension or chest-press machine, find the heaviest weight at which you can do just a single rep with good form. Return exactly 5 minutes later and set up the machine with 75% of that weight. (So if you could lift 100 pounds once, reduce it to 75.) Count the reps you can do before complete fatigue sets in. Manage 8 to 12 reps and you have an average 50-50 mix of FT and ST. Do fewer than that and you likely have more FT; do more and you probably have more ST.

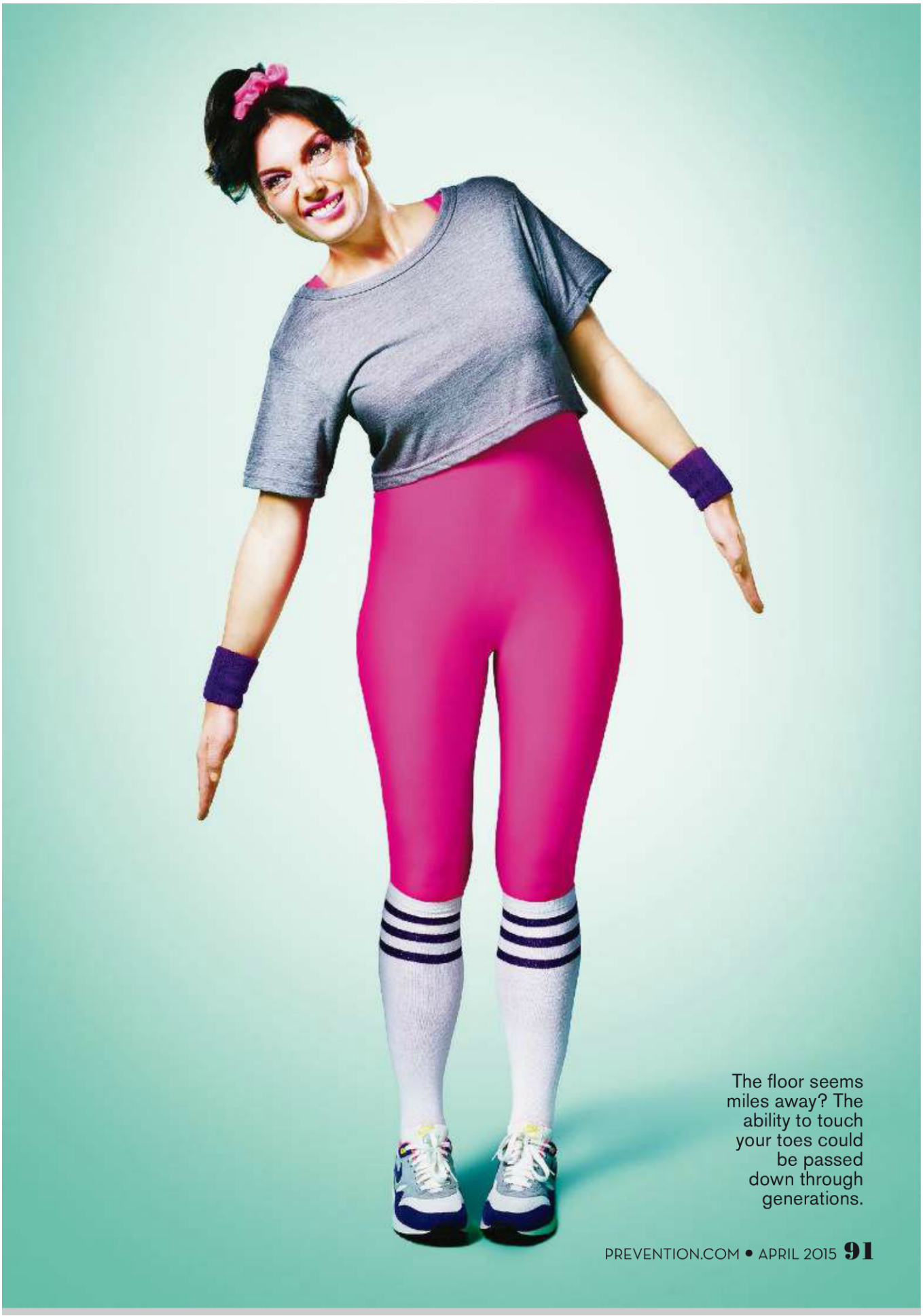
The fix: For starters, ditch the 2-pound dumbbells. But how much more weight you need depends on your fibers. FT ones tire more quickly, which means they'll get stronger faster with heavier weights and fewer reps. So if you lean that way, choose weights that allow you to do just 4 to 8 reps per set. But if you're super ST, you're geared for endurance exercise: Drop to an amount that allows you to complete 13 to 16 reps with proper form for each set. Fall around 50-50? Split the difference and go for a weight you can lift well for 8 to 12 reps. Once the last rep feels easy, increase the weight. Then stand back, flex, and admire your results.

4 You're as flexible as a pencil.

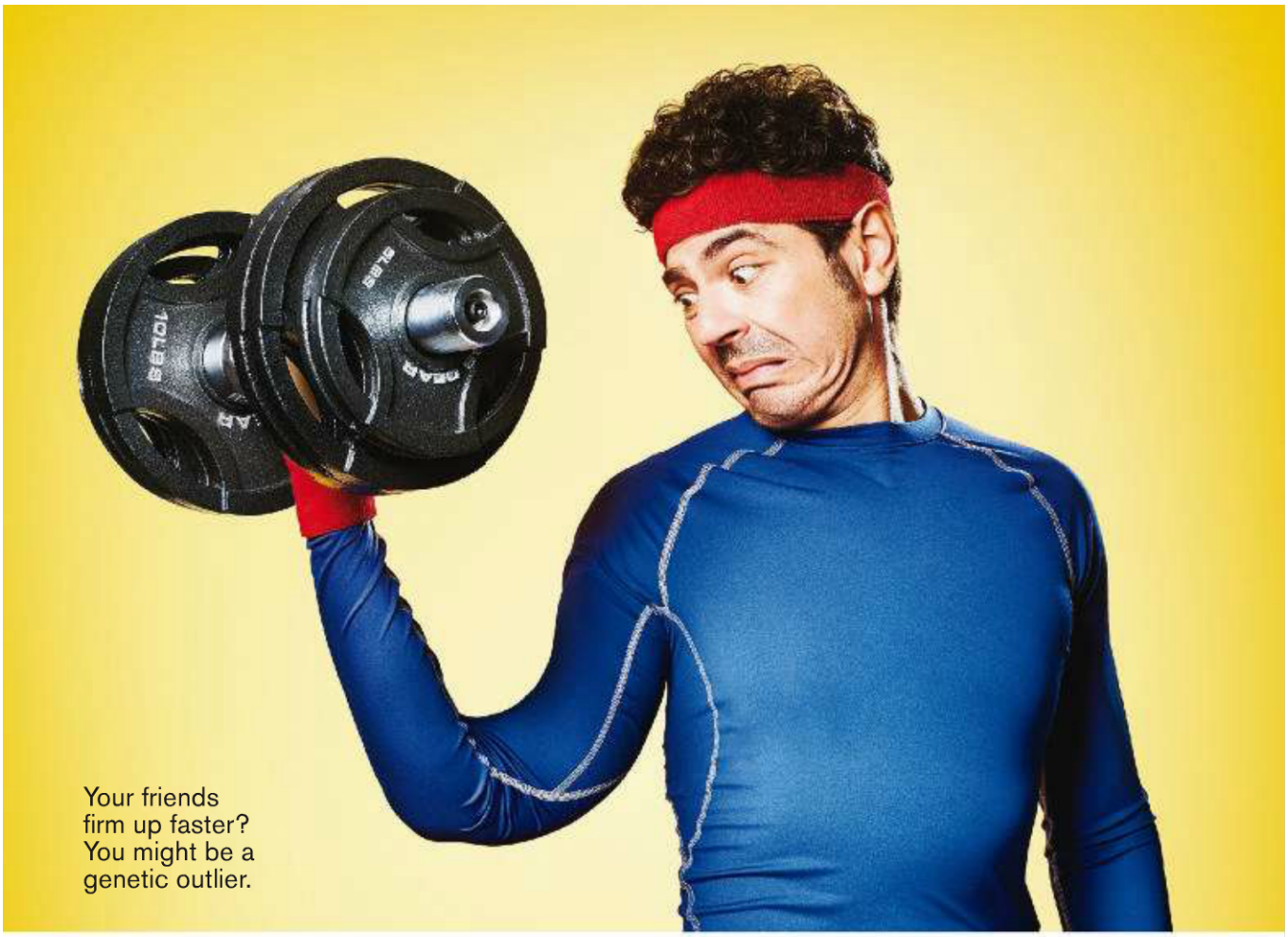
Call them yoga genes: bits of DNA that encode for the production of collagen—a protein that provides strength and elasticity to your skin and ligaments—and can influence the pliability of your body. Studies on twins show that, depending on the joint tested, as little as 50% (lower back and hamstring) or as much as 91% (shoulder) of differences in flexibility can be attributed to factors passed down through generations. One rare mutation causes Ehlers-Danlos (EDS) syndrome, a group of conditions featuring hypermobile skin and joints.

Is it your DNA? Freakily flexible sorts can test for EDS mutations by seeing if they can touch the tips of their tongues to their noses or bend their fingers all the way backward. For the rest of us, it's not quite as clear. However, if you've been doing yoga religiously for the past few months and still don't see much improvement in your Forward Fold or Backbend, there's a good chance you can blame some of that stiffness on good ol' Mom and Dad.

The fix: Whether you're genetically inflexible or just tight from too much sitting, you can loosen up by building in 10 minutes a day for stretching, preferably after your workout, when muscles are warm, says stretching expert Malachy McHugh, of the Nicholas Institute of Sports Medicine and Athletic Trauma at Lenox Hill Hospital in New York City. Be sure to perform each stretch for at least 60 seconds—a 2014 study found



The floor seems miles away? The ability to touch your toes could be passed down through generations.



Your friends firm up faster? You might be a genetic outlier.

that doing so significantly improved flexibility after 7 days and predicted long-term payoffs in pliability.

5 You just can't seem to tone up.

Melt flab and you hope to reveal toned abs underneath—not another layer of jiggle. But not everyone constructs muscle tissue at the same rate. If you look in the mirror after several months of resistance exercise and see no changes—or if you do the same moves a friend does but have less to show for the effort—it's possible you're among the approximately 30% of people who respond less robustly to muscle-building programs, says Marcas Bamman, director of the University of Alabama at Birmingham's Center for Exercise Medicine. One newly discovered reason is that some of us have more satellite stem cells—which work to repair and rebuild muscle in response to strength training—than others do. In fact, research shows that people with more of these cells at the start of a strength-training program appear to gain more muscle. Other genes influence how efficiently these cells donate their raw materials to your quads or triceps after a tough training session, says Bamman.

Is it your DNA? Sorry, you can't learn your number of satellite cells unless you're in a research study. But you can

assess how hard it is for you to tone, says Westcott. Strike a traditional biceps-flexing pose with your right arm, making a tight fist. Use the width of the fingers on your left hand to measure the distance between the bend of your right arm and the start of the biceps bulge. The average person can fit two fingers, while muscle-mag cover models can fit one at most. If you can fit three or more, your overall muscle size is relatively low, meaning you likely have the antibuffing genes.

The fix: Alas, there's no such thing as a satellite cell transplant. But whatever the state of your satellite cells, you won't see results without proper nutrition. Within 30 minutes of your cardio or strength-training session, aim for a 200- to 300-calorie snack with at least 20 g of protein. Whey protein (try it in a shake) and eggs contain the most leucine—defined as "the amino acid that is a spark plug for the processes underlying muscle building and repair" by Atlanta sports dietitian Marie Spano.

6 Your sluggish metabolism won't speed up.

How well you burn calories is closely tied to your number of mitochondria, the mighty cell powerhouses that pump out energy for muscles to feed on. Thing is, regular exercise increases their size and number for some people much more than for others, says Lauren Sparks, a researcher at the Translational Research Institute for Metabolism and Diabetes in Orlando. This is partly due to roadblocks that are programmed into our genes, leaving us unable to reap the metabolic rewards, says Sparks. While most people will see mitochondrial gains quickly—in one study of sedentary men and women in their late 60s, those who walked on a treadmill or rode an exercise bike for 30 to 40 minutes 4 to 6 days a week increased their volume by as much as 69% in 12 weeks—for up to a fifth of people, this perk is blunted.

Is it your DNA? This test doubles as a fitness plan: Sweat religiously—more than usual—for 10 weeks, tracking your weight and your blood sugar levels, which can show how efficiently your body burns food to make energy. If your numbers don't budge, your metabolism may be a genetic outlier.

The fix: Even if you're not a huge mito responder, you can still stoke your metabolism by firing up the intensity of your workouts (see the fix for No. 2). "The harder you push, the bigger your afterburn," says exercise physiologist Michele Olson. "But you really have to go hard to reach that state—working at an intensity of at least 90% of your max heart rate—where your body continues to burn calories for minutes to hours after you finish your workout." No shortcut there, it's true. But hey, at least you've got yoga Gumby beat in the genetic smarts department.