

DNA

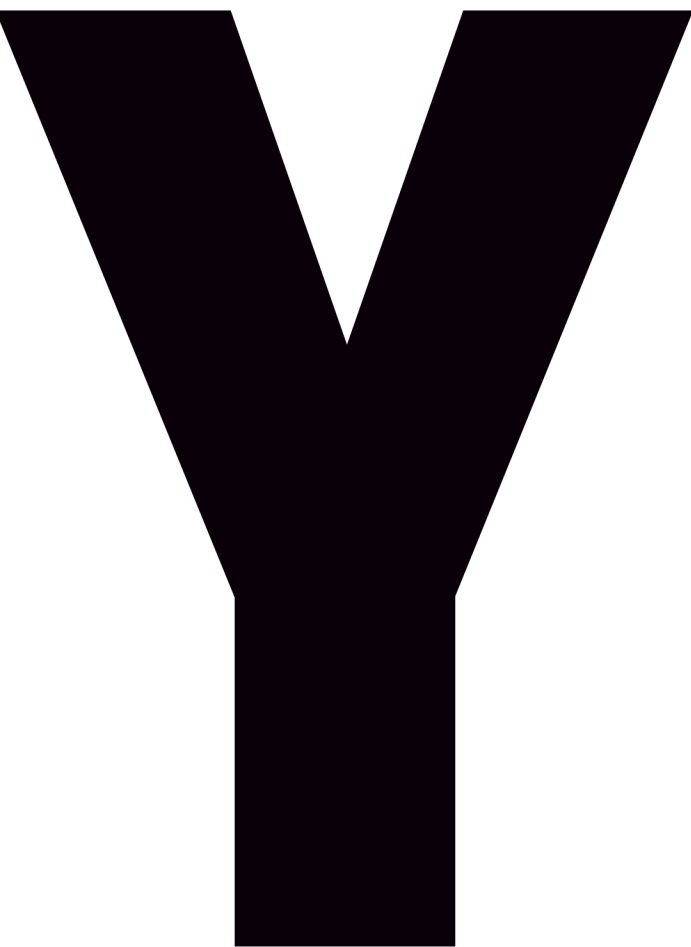
The ability to run a faster mile... to drop weight without really trying...to sculpt ultra-defined muscles, quick.

Are some people simply born to be fit? And if so, are the rest of us doomed? The nature versus nurture debate has come for our exercise routines, and it's revealing some fascinating insights into what we're truly made of.

BY LESLEY ROTCHFORD

MADE ME DO IT

CAVAN IMAGES/OFFSET



You can choose your #FitFam on Instagram, but you can't choose how fit your literal family is. Although fitness genetics doesn't have a trending hashtag, the anatomy-is-destiny discussion has dominated the cultural conversation around athletics in 2016. Maybe it was the fact that an astounding 24 sets of siblings competed in the Olympics this past summer. Or that Spartan Races and ultramarathons (both rooted in a primal drive to tap our bodies' true potential) continue to draw impressive numbers. Or perhaps it's the emerging group of fitness DNA tests: A half-dozen have flooded the market, promising to unlock the secrets of how we're built so we can better tailor our workout regimens. True, we still can't flat-out re-code our DNA. But we can manipulate it and make it work harder for us. Until we feel—to quote another hashtag—#blessed.



A Tale of Two Twins

Imagine a pair of 30-year-old twin sisters. Let's call them Allison and Amanda. They have the same DNA and grew up in the same home. So they should, theoretically, be about the same size and fitness level. Yet Allison is slim and fit and runs a full marathon in under three hours, while Amanda is 15 pounds overweight and couldn't finish a 5-K. Perplexing, right?

Researchers think so too. It's partly why they've been studying multiples for decades. Their shared DNA makes them ideal subjects because they're a controlled group. Longitudinal studies of twins have provided a boatload of info about how genes affect our health, and several have shown how strong a role they play in fitness. Claude Bouchard, Ph.D., director of the Human Genomics Laboratory at Pennington Biomedical Research Center in Baton Rouge, Louisiana, says that about 50 percent of our baseline fitness—what we're able to do without really training—is determined by variants in our genes.

Variants is the operative word here, people. Although certain athletic characteristics are strongly inherited, there are more than 200 genes linked with fitness, and because of conflicting study results, researchers can't quite pinpoint exactly how much they influence our strength, body type, and BMI. Height is pretty clear-cut at 80 percent heritable—meaning, if you're short, it's 80 percent due to genetics and only 20 percent due to other factors, like your nutrition as a child. Then, whoa Nelly, we get into sweeping-range territory.

Muscular strength is 30 to 83 percent heritable, body type is 32 to 82 percent, and BMI is 47 to 90 percent. So while it's unlikely for you to be 5'2" and 140 pounds when your sister is 5'10" and 140 pounds, it is, in reality, quite possible.

What we do know: Your genes beget your body type, which begets a direct competitive edge in sports. "You see someone like Simone Biles—she is amazingly compact and powerful," says Stephen Roth, Ph.D., a professor of applied environmental health and kinesiology at the University of Maryland. "She can do things in gymnastics that other people who are a foot taller biomechanically couldn't do." (For example, her body composition allows her to fly higher in the air off the vault.)

This theory holds true for the average exerciser as well. Narrow hips and long, muscular legs make running more efficient, and a long torso-short legs combination helps swimmers glide through the water more effectively. And...domino effect: The easier something is for you to do, the more likely you are to enjoy it, stick with it, and succeed at it.

Beyond literally shaping you, there are scores of genes that contribute to speed and endurance. The most famous and well studied of the bunch are ACTN3 and ACE1. ACTN3 is related to muscle strength and power, while ACE1 is linked to endurance. We all have 'em, but again, it's the *variations* that set people apart, says Roth. So if you're training for, say, a half-marathon, you'd theoretically be set up for a top-percentile finish if you have the strongest matchups of the gene for speed *and* endurance. On the other hand, athletic prowess could run on both sides of your family, but you could still—womp—wind up with the weakest blend of the two and have below-average ability in sports.



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Destiny's Child

Even our *attitudes* toward fitness are shaped in the womb. Here's how a Dutch study of more than 5,000 siblings and identical twins teased this out: First, researchers showed that people who tended to focus on the benefits of exercise (meeting new people, a sense of accomplishment) rather than the downsides (lack of enjoyment, time constraints) worked out more consistently than the folks who gravitated more easily to the negatives ("I'm so tired today!"). Okay, duh. But the scientists also found this: While the siblings often had differing approaches, the identical twins—who have the exact same DNA—shared mirrored attitudes, further confirming that our genes do, in part, call the shots.

Attitudes are one thing (and perhaps changeable, with some effort), but what about how our bodies respond to exercise? That too seems to be at least partly preordained: There's a genetic component called "acquired fitness," which is a fancy way of saying how predisposed you are to gain strength and tone up. Think of your *baseline* fitness like being gifted a puppy. You may have a Lab—super smart and eager to please—or a beagle that's innately stubborn. How well your dog listens to you after several months of training is like your *acquired* fitness. If the two dogs receive exactly the same training, the Lab's going to surpass the beagle. Bouchard confirmed this phenomenon with parents and their adult children. After 20 weeks of doing the same stationary bike workout, some of the subjects became fitter (those were the Labs), while others hardly saw any improvement (the beagles). People in the same families mostly had similar results.

So, can a beagle ever become a Lab, you ask. Here comes the good news (finally!). You can

"OUR PARENTS' HABITS AND OPINIONS CAN HAVE AS MUCH OF AN IMPACT AS ANY TRAIT."

figure out what your body reacts to, and tweak your routine to match it. While you could take a fitness-specific DNA test to reveal your should-be strengths, you can also tell what's not working based on how your body has changed after two weeks of an exercise program, says trainer Ashley Borden. (If you don't see or feel any difference, try the tips in "Defy Your DNA," at right.)

Parental Guidance

Our genes are just half the battle. Our environment, particularly our childhood homes, dictates the other 50 percent of our fitness level. Was your dad doing pull-downs on his basement Soloflex, or was he parked on the couch watching TV? Did your mom suggest you try out for the soccer team and shuttle you around for matches, or did she drive you to the mall every Saturday and never take the stairs? Experts say that our parents' exercise habits, and their opinions about sports and fitness, can have as much of an impact on our physical activity as any inherited genetic trait.

Take Chrissie Schwartz, 36, a quadruplet. She and her three siblings all played sports in college and are still super active—running half-marathons, hiking, and doing CrossFit. "Our dad was an all-American athlete and our mother was a dancer, so sports were an integral part of our life growing up. On the weekends it was always like, 'Let's go outside and throw the ball around,'" she says. Sheila Monaghan, a 34-year-old competitive runner and

DEFY YOUR DNA

If you're active more days of the week than you're not, you're eating pretty clean, and you're still seeing piddly progress, you can blame your genes for most of your troubles (boo). But you can override them (yay!)—here's how.

1

Fill holes in your routine.

Honest Qs: Are your workouts truly total-body? Hitting large muscle groups? Incorporating cardio and strength training? If you answered no to any of those, add what you're missing at least twice a week, and see if things change in another two weeks. If they don't, keep reading.

2

Pick up the heavy weights.

People who have difficulty building muscle—you're one of them if you've been lanky or overweight despite regular activity most of your life—need to increase their resistance to see growth. Anytime you hit the weight room, opt for a load that's challenging for six to 12 reps; do three sets, and rest no longer than 90 seconds between sets, says exercise physiologist Michelle Alencar, Ph.D.

3

Turn up the intensity.

Everybody responds to high-intensity training. If you ramp up your effort by two notches each time you work out (that's like going from barely-able-to-talk to breathless—which you should do at least twice a week), you'll definitely see results in a couple of weeks, says Borden.

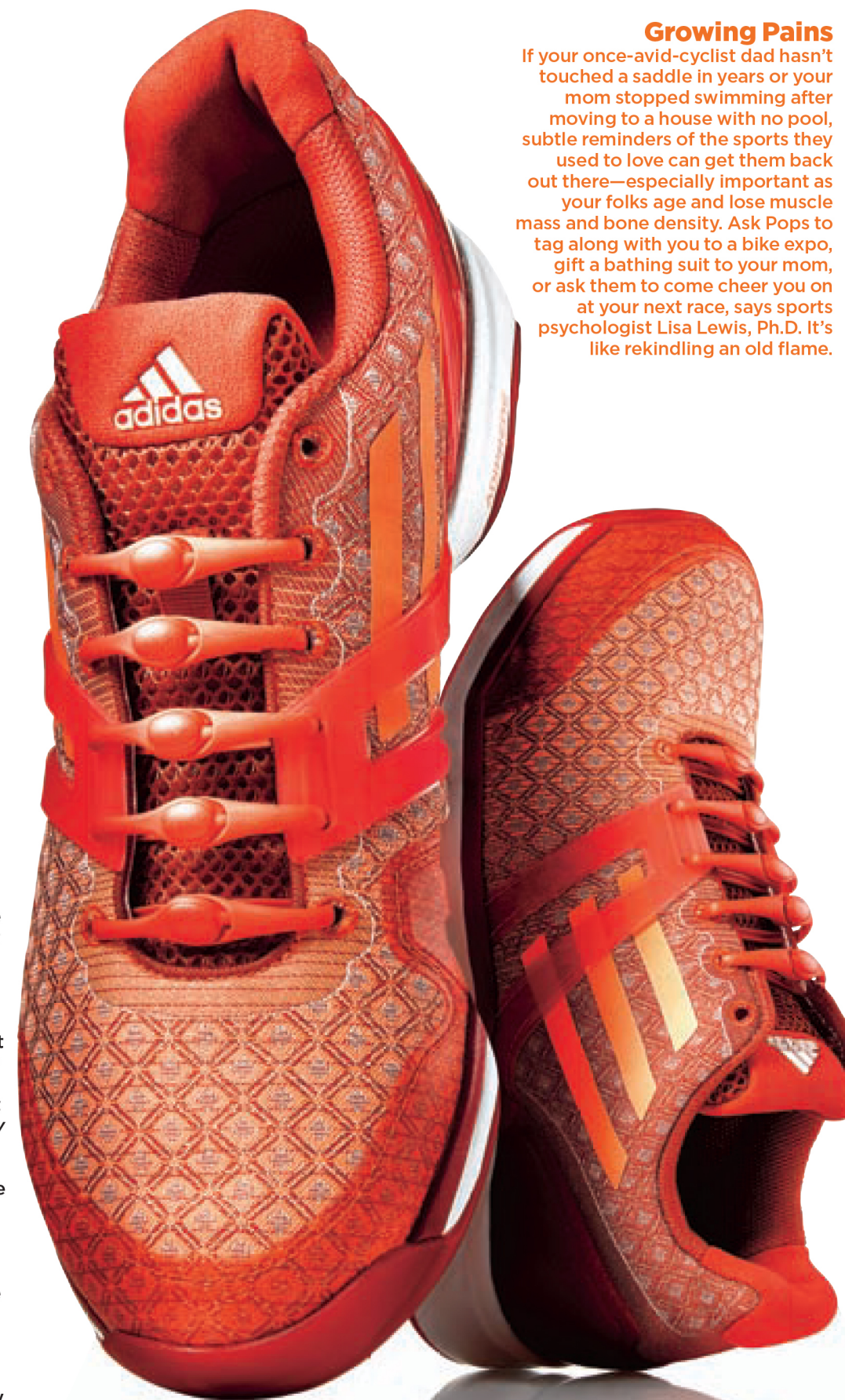
4

Control inflammation.

Your fitness regimen could be working and you wouldn't know it if you have inflammation throughout your body (it can make you look puffy, just like body fat, and exercise can make it worse). Foam-roll all over, add turmeric to your juice or smoothies, and eat dark-colored fruits and veggies.

Growing Pains

If your once-avid-cyclist dad hasn't touched a saddle in years or your mom stopped swimming after moving to a house with no pool, subtle reminders of the sports they used to love can get them back out there—especially important as your folks age and lose muscle mass and bone density. Ask Pops to tag along with you to a bike expo, gift a bathing suit to your mom, or ask them to come cheer you on at your next race, says sports psychologist Lisa Lewis, Ph.D. It's like rekindling an old flame.



Maternal Drive

So your mom's idea of exercise was ambling through the grocery store? Don't let her lack of gym time define you. When you have trouble pumping yourself up and can't help but channel her "eh, tomorrow" attitude, think about this: Pretty much *any* activity your mom adored would have been more enjoyable had she prioritized fitness. If she liked gardening, she'd have had less back pain. Cooking? More stamina for all the hours on her feet. Sounds cheesy, but it's your life—don't miss the opportunity for a better one.

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triathlete, had the opposite experience: “My parents weren’t athletic, unless you consider raising eight kids an athletic feat,” she says. “I discovered sports by playing with the boys next door, and I was always begging my parents to sign me up for every team.”

A mother’s influence is especially potent, finds a study in *Maternal and Child Health*. Daughters of moms who exercised were more likely to exercise themselves, and a daughter’s chances of being active increased if her mom provided logistical support (rides to practice, money for lessons) and had a positive perspective on fitness. “As women, mothers and daughters share a unique female bond, and a mother is a daughter’s primary role model,” says study author Alyce Barnes, Ph.D., senior research assistant at the University of Newcastle in Australia, who notes that, similarly, boys are more influenced by their fathers. So it’s not surprising that we tend to mirror our mom’s behaviors.

Of course, parental encouragement can be a slippery slope. The more a parent pushes a child to specialize in a sport with, perhaps, the starry-eyed hopes of a scholarship, the more likely a kid is to burn out and never want to work out again. But a mom’s influence is so deep-rooted that even when girls abandon exercise, for whatever reason, they often boomerang back. “My mother was active, and I grew up exercising. But in my teenage years, I rebelled by trying to be as sedentary as possible,” says sports psychologist Kate Hays, Ph.D., founder of The Performing Edge in Toronto. “Then in my thirties I fell in love with running, and I can remember coming to a standstill in the middle of a run and thinking, *I’m turning into my mother!* I began to appreciate the gift [of fitness] that my mother gave me.”

Breaking the Mold

The bright side for those who believe in hard work and steering your own destiny: New data shows that a primo DNA advantage becomes less of a factor once you’re off on your own. When researchers looked at adult twins who settled into separate homes, they found that each twin’s body fat was pegged to how much they exercised (i.e., the more active twin was fitter). So back to Allison and Amanda for a sec: Amanda likely has the genetic potential to run 26.2 at a killer pace like Allison, but her environment (say, a busy job, two kids, a couch-potato husband) doesn’t give her the time, support, or motivation to train for it. In this case, and in many, environment trumps genes. And she can change that ish!

Ultimately, experts say that optimal fitness requires both the right genes and the right environment, plus a healthy dose of grit. “Genetic predisposition contributes to a person’s potential, but behavioral patterns—things we do or don’t do—can contribute far more,” says Bradley Cardinal, Ph.D., a professor of kinesiology at Oregon State University. Prime example: Jackie Brokaw, a 20-year-old college lacrosse player, is tall and fit with long limbs that help her outrun opponents and catch high passes. She says her parents were athletes and presented sports to her as an option—no hard sell. “That helped, but I think it comes down to how much work you’re willing to put in,” she says. “And I’ve always been willing to put in a lot of work.”

Which is key, because fitness genes aren’t a gift that keeps on giving: They have to constantly be groomed and pruned, and the only way to do that is through regular exercise. In other words, your fitness destiny is in your hands, sister. ■

S.O. OR SOS?

Your significant other can make or break your fitness goals. Learn to navigate any situation so you both come out on top.

•You’re equally fit—and into the same workout.

Congrats! Now, kick his ass. Competition is like catnip to you two, boosting your bond along with your muscles. One study found that when people were told to ride a stationary bike against someone who had previously outperformed them, they pedaled nine minutes longer than when they rode solo.

•You know you should work out, but you both dread it.

Think positive. Ask your partner to rate his interest in getting healthy on a scale of 1 to 10. If he says “3,” ask why not a “2.”

You’ll force his mind to form encouraging thoughts (like he wants to have energy to play with the kids) that can become ingrained. Then go through this Q&A yourself.

•You’re starting a program; he refuses.

“Compromise!” says Dana Voelker, Ph.D., an assistant professor of exercise psychology at West Virginia University. Create healthy rituals to help you connect. Many guys who detest the gym still like sports, so suggest golf or tennis. Any activity helps.



BOOSTER SHOTS

Five ways exercising will keep your relationships in epic shape

1. You’ll freak out less.

Yell at home much? “Exercise reduces cortisol, which makes us feel calmer and more reasonable, and it sharpens brain function, so it’s easier to articulate how you feel,” says sports psychologist Gloria Petruzzelli, Ph.D.

2. Family crises? Pshaw.

No more in-law drama! “Working out can increase mental strength and competence, giving you a sense of ‘I am capable,’” says Hays. And with that boost in brain function comes a bonus: more creative problem-solving.

3. Lovey-dovey feels.

Research shows that when couples try novel sports together, they report feeling more satisfied in their relationship. The arousal you get from thrilling activities (think scuba diving) can mimic butterfly feelings of attraction.

4. Two words: Hotter.

Sex. “Working out releases endorphins that are like those released during sex, so it can get you in the mood,” says sex therapist Kat Van Kirk, Ph.D. It also amps blood flow to the genitals, which helps you orgasm more easily.

5. Longevity, man!

Stick around for your kiddos: One study found that the recommended 150 minutes of weekly activity makes you 31 percent less likely to die over a 14-year period. Real talk!