

# GENETIC TWIST

*Could the secret to optimizing your training, nutrition, and recovery lie in your DNA?*

By Cindy Kuzma

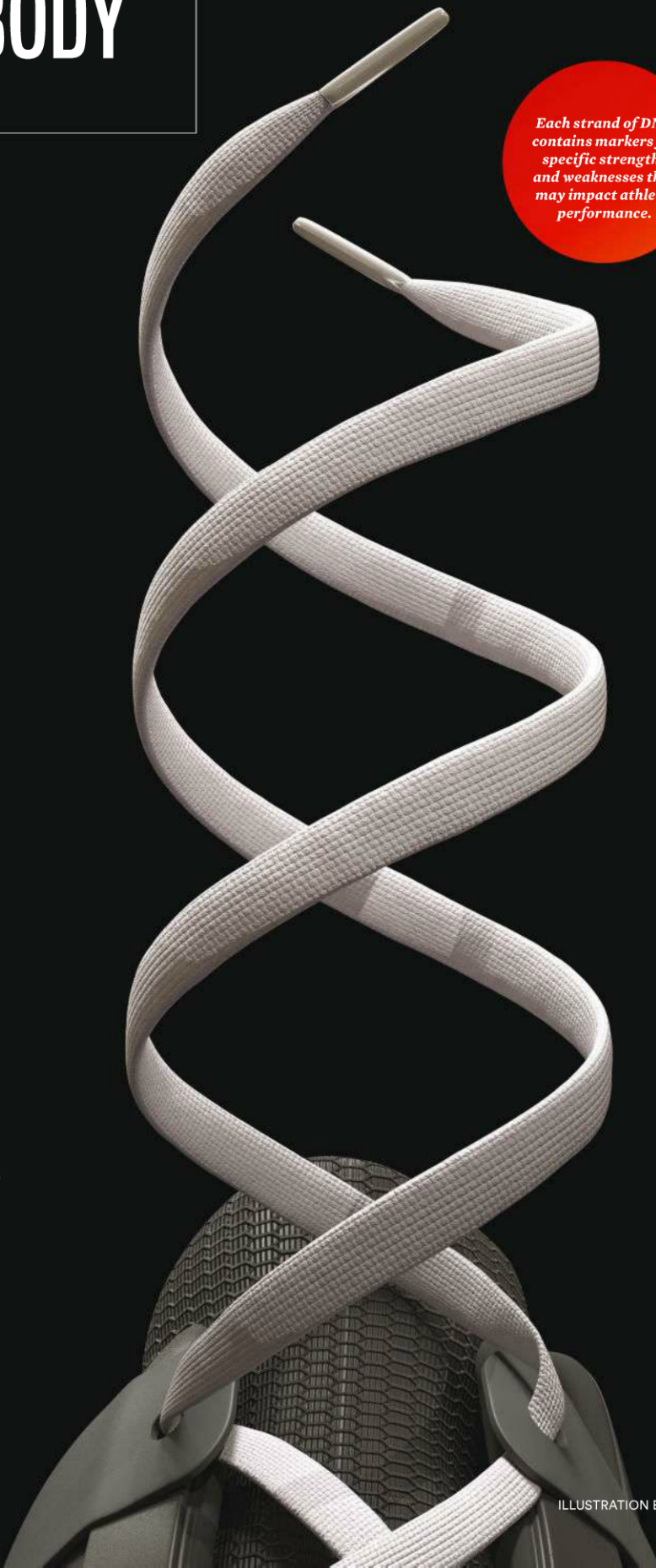
MUNA LEE KNOWS her strength lies in running short distances—after all, she's competed at the Olympics twice, in both the 100 and 200 meters. But sprinters need more than speed to succeed. As Lee prepares for the 2016 Olympic Track & Field Trials in July, she's putting a greater focus on building endurance and devoting more time to recovery, thanks to results from DNA testing.

Two years ago, Lee submitted a swab of saliva to the Canadian company Athletigen. The analysis she received back provided training suggestions based on several genotypes, including HIF1A (indicates how much oxygen the body delivers to muscles). This knowledge, she believes, may offer the edge she needs to make her third Olympic team. Already, she feels stronger and better rested. "I wish I would've done it sooner," she says.

Lee trains with more than 100 other athletes at Altis, a track-and-field training facility in Phoenix. Coaches there have collaborated with scientists at Athletigen for the past two years to profile athletes and understand the links between genetics and performance, says Altis CEO and founder John Godina, who's won Olympic silver and bronze medals in the shot put.

"As an organization, we're trying to push the boundaries as far as how much data and knowledge we can gather about the athletes," Godina says. "We still have our experience as coaches and the athlete's →

*Each strand of DNA contains markers for specific strengths and weaknesses that may impact athletic performance.*



→ experience as well. The genetics is just another way to turn the sculpture to look at the other side and see what's going on."

## CRACKING YOUR CODE

You don't have to be an Olympian to access this data. Athletigen and other companies—including DNAFit and FitnessGenes—offer DNA testing to everyday athletes (or at least those willing to pay up to \$500). The specifics vary, but most companies promise to assess genes related to muscle development, recovery time, and injury risk—and offer a training plan (and sometimes a diet) tailored precisely to your DNA.

Not everyone has bought into the theory. Genetics researchers say these claims outpace the evidence. In fact, a consortium of experts released a statement steering consumers away from these services in a recent issue of the *British Journal of Sports Medicine*. DNA undeniably influences such outcomes as your 5K time and body-fat percentages. But unlike some inheritable diseases that hinge on a single gene mutation, the DNA code underlying sports performance has proved far harder to crack, says Linda Pescatello, Ph.D., a University of Connecticut scientist who's spent years trying.

In some cases, genes shown in one study to influence athletic traits haven't held up to further scientific scrutiny, she says. In others, the effects of the mutations that scientists do understand pale in comparison to those that they don't. "Say you have 12 puzzle pieces out of hundreds or thousands," says David Epstein, author of *The Sports Gene: Inside the Science of Extraor-*

*dinary Athletic Performance*. "You're giving someone this measure that looks like you are telling them a balance of percentages inside 100 percent, when really, that entire 100 percent might be less than 1 percent of what's actually important."

## RACING THE CLOCK

Pescatello predicts it will be decades before scientists truly understand genetics

# INHERIT THE WIND

Four ways your genes could inform your running



## SPEED VS. ENDURANCE

### WHAT YOU'LL LEARN

Genes influence your balance of fast- and slow-twitch fibers, which plays a role in whether you'll excel at 100 meters or 26.2 miles. For instance, most elite sprinters do not have a particular variation of a gene called ACTN3, which hurts sprint performance.

**BUT IS IT HELPFUL?** Having this variation only tells you that you won't challenge Usain Bolt, not whether you'll qualify for Boston—and certainly not how to best train for it, says University of Maryland geneticist Stephen Roth, Ph.D.



## INJURY RISK

### WHAT YOU'LL LEARN

A certain copy of a gene called COL1A is linked to ACL ruptures. And 67 snippets of DNA influence your odds of developing fractures. Your genes likely explain part of your propensity for injury, says Stanford University scientist Stuart Kim, Ph.D.

**BUT IS IT HELPFUL?** The genetic markers scientists have pinpointed likely explain only a small percentage of the total genetic picture—what we don't know outweighs what we do know. In the meantime, look to the past—having one injury places you at high risk for a repeat.



## RECOVERY

### WHAT YOU'LL LEARN

Testing companies analyze genes such as IL-6, an inflammation marker, and recommend an ideal amount of downtime.

### BUT IS IT HELPFUL?

Many factors contribute to recovery rate, including how hard you ran and what you ate afterward, says Linda Pescatello, Ph.D., of the University of Connecticut. To track how it all fits together in real time, use a tool like Ithlete—which combines a fingertip sensor with an app (\$70 and \$9 at myithlete.com)—to keep tabs on your heart-rate variability, which can indicate overtraining.



## BODY TYPE

### WHAT YOU'LL LEARN

Most genetic tests identify so-called obesity genes, Pescatello says. Certain variations boost your risk, perhaps by influencing appetite or fat storage.

### BUT IS IT HELPFUL?

Pescatello says many other genes—plus lifestyle choices like diet—play a role in how easily you squeeze into your running tights. If you have a family link to obesity—or suspect it, based on a glance around the Thanksgiving table—use it as motivation. As little as an hour of running per week tips the scales in your favor, even if you're genetically prone to obesity.

well enough to derive useful, specific training guidance. But athletes like Lee—who, at 34, probably won't get another shot at the Olympics—don't want to wait. Godina says he understands the skepticism but sees little downside for his athletes.

Because he can monitor and understand so much of what's happening in their lives, he can help them implement the results

earlier than other runners might—he hopes to have even more useful insights from the testing within the next two years. "The genetics is an aspect of the whole," Godina says. "If you're seeking to get a 10th of a percent improvement and you've exhausted all other pathways, if genetics can provide you with that 10th of a percent of insight, it's done its job." ■