

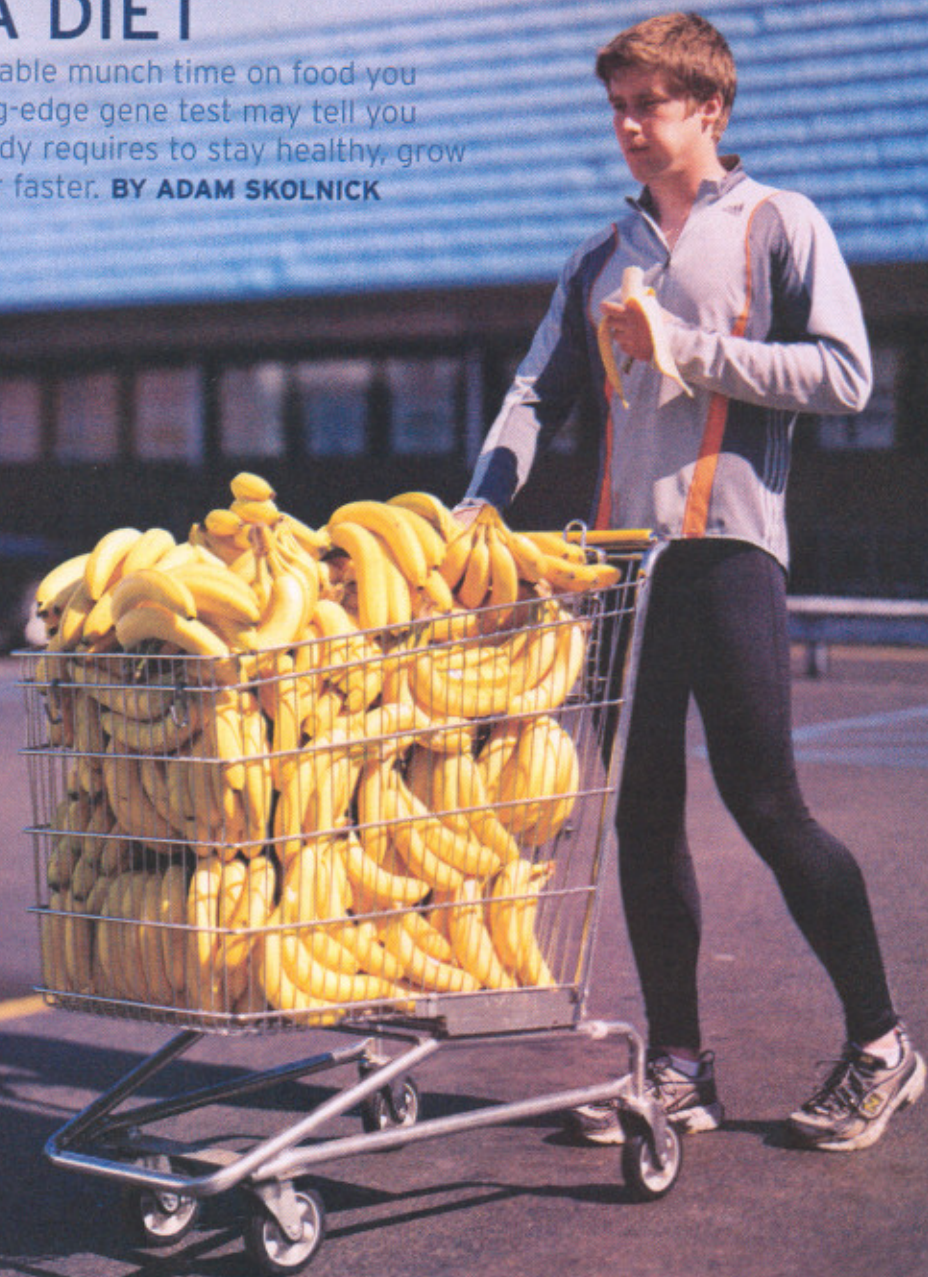
FITNESS, HEALTH, AND NUTRITION FOR THE OUTSIDE ATHLETE

# BODYWORK

## THE DNA DIET

Are you wasting valuable munch time on food you don't need? A cutting-edge gene test may tell you exactly what your body requires to stay healthy, grow stronger, and recover faster. **BY ADAM SKOLNICK**

**GO BANANAS:**  
Your genetic profile could tell you if you need to consume more potassium.



PHOTOGRAPHS BY GREG MILLER



**YOU EAT A BALANCED DIET** and train like a madman. You've even given up beer. But no matter how hard you try, you can't keep up with the hammerheads on bike rides or the LeBron wannabes on the basketball court. What's a genetically challenged striver to do? One option may be nutrigenomics—a fast-emerging (and controversial) nutritional science that can help you overcome your genetic limitations with a diet tailored to your DNA.

Nutrigenomics spun out of the Human Genome Project, the effort begun in 1990 by the U.S. Department of Energy and the National Institutes of Health to identify the nearly 25,000 genes that make us who we are. With the job complete, scientists have started using this knowledge to uncover revelations in fields like evolution, anthropology, molecular medicine, and forensics and to research cutting-edge cures for dozens of genetic disorders like diabetes.

Over the past ten years, countless studies have looked at nutrigenomics and the correlation between diet and genes. A 2002 study published in *BMJ (British Medical Journal)* stated that specific nutritional advice based on patients' DNA can help them avoid diseases. But it's only recently that this technology has been connected to sports performance.

"It stands to reason that this knowledge would positively affect athletic results," says Mark Troxler, a team physician for USA Track & Field. "Right now athletes take supplements they don't need, and need supplements they don't take, but they don't know it. Nutrigenomics can eliminate a lot of that misunderstanding."

While scientists are still deciphering the effectiveness of manipulating genes through diet, the private sector has already jumped on what it sees as the next big thing. Among the first consumer products to come out of the Genome

Project were individual DNA tests designed to help patients deal with predispositions to diseases. "We identified 19 genes that give us an idea of a client's future overall health," says Keith Grimaldi, 45, a molecular biologist and a director of research for Sciona, a Boulder, Colorado-based biotech lab that developed one of the first nutritional DNA tests, in 2000. "We also found that four of those genes were directly relevant to athletes."

For example, the MnSOD gene concerns an individual's ability to produce and regulate the protein MnSOD, an antioxidant formed in cells that squashes muscle-damaging free radicals and aids endurance and recovery. To compensate for a weak MnSOD protein, the natural-foods solution calls for a glass of pomegranate juice or a handful of blueberries (both high in antioxidants) after a workout. Two other genes, IL-6 and TNF $\alpha$ ,

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correspond to the production of cytokines, proteins that repair the type of muscle damage caused by exercise. Some people, however, overproduce these helpers, resulting in excessive muscle and joint swelling. The antidote diet includes wild salmon and broccoli, which both contain anti-inflammatory nutrients. The fourth gene identified is ACE, which is connected to muscle endurance. Your ACE makeup can tell you whether or not you need to fatten up the fish and flaxseed-oil portions of your diet to help create more long-running power.

**»HOW IT WORKS**

ONCE LIMITED to hospitals and crime labs, DNA testing is now available to the masses, thanks to a handful of companies such as the Great Smokies Diagnostic Lab, in Asheville, North Carolina (see "Code Breakers," below); Global DNA Solutions, in Malibu, California; and Sciona, which dominates the direct-to-consumer market thanks to a take-home test first sold at the end of 2002.

Despite its sci-fi nature, plugging nutrigenomics into your training plan is fairly simple. The Sciona test is available online or through distributors like Seattle-based Genelex, which charges \$495 for processing the kit. You just swab the inside of your cheek and mail the swabs to the lab for a chemical analysis of genes that relate to heart health, antioxidant and detoxification, inflammation, bone health, and insulin sensitivity. After you receive the analysis, you can get in touch with one of Genelex's 60 nutritionists, like Los Angeles-based Carolyn Katzin, who's assisted dozens of marathoners and triathletes with their diets. Over the course of a 30-minute phone consultation, Katzin will go over your genetic profile and create a meal plan to help you get the most out of your training. "My job," says Katzin, "is to pack you with energy and antioxidants."

Last fall, recreational athlete Alesandra Rain, 48, experienced nutrigenomics firsthand. An avid cyclist, she was forced to give up her 100-mile-a-week riding schedule because of a weakening spine. A DNA test from Global DNA Solutions pointed out that she couldn't metabolize vitamin B or calcium in pill form, conditions that resulted in a loss of bone density. Her dietary consultant told her to add pine nuts, broccoli, cauliflower (for vitamin B-6), and onions (a key source of quercetin, which helps bones retain calcium) to her salads. A month after her dietary shift, "my spine healed," says Rain, who also enjoyed giant gains in her workouts—lifting three times the weight she had previously.

The list of amateurs and pros jumping on the nutrigenomics train continues to grow. Currently, the NFL Players Association is considering ordering tests for all their athletes to help them boost their performance naturally and safely. But they may want to wait a couple of years. That's when Sciona plans to release a \$200 jock-specific test that analyzes ten additional genes not found in the current 19-gene nutrition test.

"We'll look for genetic variations involved in lung capacity and heart rate that can reduce or increase the amount of oxygen in the blood, a factor that affects performance and endurance," says Grimaldi. The test will also indicate whether you're predisposed to anaerobic sports, like climbing or boxing, or endurance activities, like cycling or running—or if you're somewhere in between.

**»DOES IT WORK?**

SKEPTICS IN BOTH the sports-medicine and genetics fields argue that such tests collect information on an irrelevant percentage of the nearly 25,000 genes identified and that the relationship between genetic tendencies and an individual's diet still remains poorly understood.

"It's a field in its infancy," says Arthur Leon, a professor in the School of Kinesiology at the University of Minnesota. "It's premature to design a diet around such a small sample of genes. There's very little clinical-trial evidence to support that kind of claim."

For different reasons, former Ironman Triathlon champion Dave Scott isn't convinced the science is valid either. Currently a professional coach based in Boulder, he doesn't advise his clients to get tested yet. "I'm not sure genes tell the whole story. It takes years of training to bring about an athlete's potential," says Scott. "Plus food will never make you go faster. It just allows you to sustain an intense workload longer, based on your training and mental profile."

Even the Department of Energy, which manages the results of the Genome Project, is alarmed, noting on its Web site that companies like Sciona aren't subject to regulation by the FDA.

Grimaldi admits that while he and his colleagues may not know everything, "the 19 genes give us an idea, and it's enough to make a useful start." And he's certain that Sciona and its competitors are on the forefront of something huge. "Even at 64K, the computer was a useful tool," he says, "and the growth in computing power was very rapid. It's the same with nutrigenomics. Soon we'll be able to test for hundreds of genes."

From a risk standpoint, USA Track & Field's Troxler sees none. "As long as you work with a nutritionist and are careful not to develop new nutrient deficiencies, then it's safe." The worst that can happen is that you're out a few hundred bucks for the test and you end up with a much improved whole-foods diet. That's not a bad deal on something Troxler calls "the future of sports nutrition." ○

L.A.-based **ADAM SKOLNICK** has written for *Wired* and *Travel + Leisure*.

**»CODE BREAKERS**

If you're intrigued by DNA nutrition testing and want to see which foods may help you reach your performance peak, these three labs can get you started.

»For \$495, **GENELEX** will send you a Sciona self-testing kit. After the lab work is completed, a nutritionist will call to explain your results and how to alter your diet to take advantage of what the test found. 800-523-3080, [www.genelex.com](http://www.genelex.com)

»Like Sciona, **GLOBAL DNA SOLUTIONS** looks at 19 genes in its analysis. Included in the \$695 price is a two-hour phone consultation with a staff nutritionist, followed by regular checkups over the phone to see how you're progressing. 866-810-3809

»**GREAT SMOKIES DIAGNOSTIC LAB** conducts more than 125 different medical tests, including five for genomics. They require a licensed nutritionist, chiropractor, or doctor to order the test for you. Cost varies with the practitioner. 800-522-4762, [www.gsdl.com](http://www.gsdl.com)

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