

**Alternative Assessment #1**

**Please read the following article(s) and then answer the questions.**

Name \_\_\_\_\_

Class Period \_\_\_\_\_

## SPORTS

# Born to Run? Little Ones Get Test for Sports Gene

By JULIET MACUR NOV. 29, 2008

BOULDER, Colo. — When Donna Campiglia learned recently that a genetic test might be able to determine which sports suit the talents of her 2 ½-year-old son, Noah, she instantly said, Where can I get it and how much does it cost?

“I could see how some people might think the test would pigeonhole your child into doing fewer sports or being exposed to fewer things, but I still think it’s good to match them with the right activity,” Ms. Campiglia, 36, said as she watched a toddler class at Boulder Indoor Soccer in which Noah struggled to take direction from the coach between juice and potty breaks.

“I think it would prevent a lot of parental frustration,” she said.

In health-conscious, sports-oriented Boulder, Atlas Sports Genetics is playing into the obsessions of parents by offering a \$149 test that aims to predict a child’s natural athletic strengths. The process is simple. Swab inside the child’s cheek and along the gums to collect DNA and return it to a lab for analysis of ACTN3, one gene among more than 20,000 in the human genome.

The test’s goal is to determine whether a person would be best at speed and

power sports like sprinting or football, or endurance sports like distance running, or a combination of the two. A 2003 study discovered the link between ACTN3 and those athletic abilities.

In this era of genetic testing, DNA is being analyzed to determine predispositions to disease, but experts raise serious questions about marketing it as a first step in finding a child's sports niche, which some parents consider the road to a college scholarship or a career as a professional athlete.

Atlas executives acknowledge that their test has limitations but say that it could provide guidelines for placing youngsters in sports. The company is focused on testing children from infancy to about 8 years old because physical tests to gauge future sports performance at that age are, at best, unreliable.

Some experts say ACTN3 testing is in its infancy and virtually useless. Dr. Theodore Friedmann, the director of the University of California-San Diego Medical Center's interdepartmental gene therapy program, called it "an opportunity to sell new versions of snake oil."

"This may or may not be quite that venal, but I would like to see a lot more research done before it is offered to the general public," he said. "I don't deny that these genes have a role in athletic success, but it's not that black and white."

Dr. Stephen M. Roth, director of the functional genomics laboratory at the University of Maryland's School of Public Health who has studied ACTN3, said he thought the test would become popular. But he had reservations.

"The idea that it will be one or two genes that are contributing to the Michael Phelps or the Usain Bolts of the world I think is shortsighted because it's much more complex than that," he said, adding that athletic performance has been found to be affected by at least 200 genes.

Dr. Roth called ACTN3 "one of the most exciting and eyebrow-raising genes out there in the sports-performance arena," but he said that any test for the gene would be best used only on top athletes looking to tailor workouts to their body

types.

“It seems to be important at very elite levels of competition,” Dr. Roth said. “But is it going to affect little Johnny when he participates in soccer, or Suzy’s ability to perform sixth grade track and field? There’s very little evidence to suggest that.”

The study that identified the connection between ACTN3 and elite athletic performance was published in 2003 by researchers primarily based in Australia.

Those scientists looked at the gene’s combinations, one copy provided by each parent. The R variant of ACTN3 instructs the body to produce a protein, alpha-actinin-3, found specifically in fast-twitch muscles. Those muscles are capable of the forceful, quick contractions necessary in speed and power sports. The X variant prevents production of the protein.

The ACTN3 study looked at 429 elite white athletes, including 50 Olympians, and found that 50 percent of the 107 sprint athletes had two copies of the R variant. Even more telling, no female elite sprinter had two copies of the X variant. All male Olympians in power sports had at least one copy of the R variant.

Conversely, nearly 25 percent of the elite endurance athletes had two copies of the X variant — only slightly higher than the control group at 18 percent. That means people with two X copies are more likely to be suited for endurance sports.

Still, some athletes prove science, and seemingly their genetics, wrong. Research on an Olympic long jumper from Spain showed that he had no copies of the R variant, indicating that athletic success is probably affected by a combination of genes as well as factors like environment, training, nutrition and luck.

“Just think if that Spanish kid’s parents had done the test and said, ‘No, your genes show that you are going to be a bad long jumper, so we are going to make you a golfer,’ ” said Carl Foster, a co-author of the study, who is the director of the human performance laboratory at the University of Wisconsin-La Crosse. “Now look at him. He’s the springiest guy in Spain. He’s Tigger. We don’t yet understand

what combination of genes creates that kind of explosiveness.”

Dr. Foster suggested another way to determine if a child will be good at sprint and power sports. “Just line them up with their classmates for a race and see which ones are the fastest,” he said.

Kevin Reilly, the president of Atlas Sports Genetics and a former weight-lifting coach, expected the test to be controversial. He said some people were concerned that it would cause “a rebirth of eugenics, similar to what Hitler did in trying to create this race of perfect athletes.”

Mr. Reilly said he feared what he called misuse by parents who go overboard with the results and specialize their children too quickly and fervently.

“I’m nervous about people who get back results that don’t match their expectations,” he said. “What will they do if their son would not be good at football? How will they mentally and emotionally deal with that?”

Mr. Reilly insisted that the test is one tool of many that can help children realize their athletic potential. It may even keep an overzealous father from pushing his son to be a quarterback if his genes indicate otherwise, Mr. Reilly said.

If ACTN3 suggests a child may be a great athlete, he said, parents should take a step back and nurture that potential Olympian or N.F.L. star with careful nutrition, coaching and planning. He also said they should hold off on placing a child in a competitive environment until about the age of 8 to avoid burnout.

“Based on the test of a 5-year-old or a newborn, you are not going to see if you have the next Michael Johnson; that’s just not going to happen,” Mr. Reilly said. “But if you wait until high school or college to find out if you have a good athlete on your hands, by then it will be too late. We need to identify these kids from 1 and up, so we can give the parents some guidelines on where to go from there.”

Boyd Epley, a former strength and conditioning coach at the University of Nebraska, said the next step would be a physical test he devised. Atlas plans to direct children to Epic Athletic Performance, a talent identification company that

uses Mr. Epley's index. He founded the company; Mr. Reilly is its president.

China and Russia, Mr. Epley said, identify talent in the very young and whittle the pool of athletes until only the best remain for the national teams.

"This is how we could stay competitive with the rest of the world," Mr. Epley said of genetic and physical testing. "It could, at the very least, provide you with realistic goals for you and your children."

The ACTN3 test has been available through the Australian company Genetic Technologies since 2004. The company has marketed the test in Australia, Europe and Japan, but is now entering the United States through Atlas. The testing kit was scheduled to be available starting Monday through the Web site [atlasgene.com](http://atlasgene.com).

The analysis takes two to three weeks, and the results arrive in the form of a certificate announcing Your Genetic Advantage, whether it is in sprint, power and strength sports; endurance sports; or activity sports (for those with one copy of each variant, and perhaps a combination of strengths). A packet of educational information suggests sports that are most appropriate and what paths to follow so the child reaches his or her potential.

"I find it worrisome because I don't think parents will be very clear-minded about this," said William Morgan, an expert on the philosophy of ethics and sport and author of "Why Sports Morally Matter." "This just contributes to the madness about sports because there are some parents who will just go nuts over the results.

"The problem here is that the kids are not old enough to make rational autonomous decisions about their own life," he said.

Some parents will steer clear of the test for that reason.

Dr. Ray Howe, a general practitioner in Denver, said he would rather see his 2-year-old, Joseph, find his own way in life and discover what sports he likes the best. Dr. Howe, a former professional cyclist, likened ACTN3 testing to gene testing for breast cancer or other diseases.

“You might be able to find those things out, but do you really want to know?” he said.

Others, like Lori Lacy, 36, said genetic testing would be inevitable. Ms. Lacy, who lives in Broomfield, Colo., has three children ranging in age from 2 months to 5 years.

“Parents will start to say, ‘I know one mom who’s doing the test on her son, so maybe we should do the test too,’ ” she said.

“Peer pressure and curiosity would send people over the edge. What if my son could be a pro football player and I don’t know it?”

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**Please respond to the following questions.**

Do you wish your parents had genetically tested you as a child to see if there is a certain sport at which you might excel or to see if you might have a special gift for music? Use information from the article to explain why or why not?

What could be a benefit and what could be a disadvantage of having genetic analysis of this sort performed at an early age?



Why do some parents want to have their children tested for athletic ability? Why would some choose not to test their children?

Why do some experts, including some doctors, think genetically testing children for their ability to play certain sports is a good idea? Why do others disagree?

Who would likely have access to these tests (i.e. who can afford them)? Does that access give some individuals an advantage over others? If so, what can be done to avoid giving an advantage to some and not others?

Does genetics alone determine who you are? What other factors influence the kind of athlete you will become?