

## Testing the ethics of genetic testing in sports

**T**imothy Caulfield was always the fastest kid in his class. He took that speed to the track, where he became a serious sprinter. Running would remain an important part of Caulfield's life as he grew into adulthood. He even met his wife on a track. But things might have turned out differently if he had known as a child what he recently learned from a genetic test: He does not possess the genetic markers typically associated with athletes who excel in sports requiring speed.

"That whole part of my life could have been erased," says Caulfield, a Canada Research Chair in Health Law and Technology who devotes a chapter to genetic testing in his forthcoming book, *The Cure for Everything!*

Many genetic researchers and academics have raised questions about the scientific validity of these types of tests, claiming they have little predictive value ([www.cmaj.ca/lookup/doi/10.1503/cmaj.109-4063](http://www.cmaj.ca/lookup/doi/10.1503/cmaj.109-4063)). Some critics have also raised another concern: Is it ethical to test people, particularly children, for athletic potential?

"It's scientifically questionable and it's socially questionable," says Caulfield, who, in a paper on direct-to-consumer genetic tests, referred to the use of legitimate scientific language to market questionable products as "scienploitation" (*JCOM* 2011;10:C02).

"People should participate in sports because they love it and they want to be active," he adds. "Some great athletes rise above their mediocre genetic allotment and still excel. Yes, to be a truly great athlete, to compete in the Olympic Games, you have to have the genes, but they are on the tail end of the bell curve."

Perhaps such tests could be useful to elite athletes looking to tailor their training to their bodies, says Caulfield. Even a tiny advantage at that level can be significant. But for almost all amateur athletes, even very good ones, there appears to be little to gain from



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**Some people worry that fanatical parents will push their children too hard to excel in a particular sport based on the results of genetic tests for athleticism.**

possessing genetic information about their metabolisms or muscle fibres.

"The Olympics are a genetic freak show," says Caulfield. "The vast majority of us live under the bell curve. It doesn't matter."

Several biotech companies, however, would beg to differ. One of them is Colorado-based Atlas Sports Genetics, which in 2008 began selling a test based on the ACTN3 gene that it claimed could determine if you were better suited for sports requiring speed/power or for those requiring endurance. In June 2010, Richmond, Virginia-based AIBioTech launched a set of genetic tests that not only look for athletic potential, but also for possible health risks that are exacerbated by strenuous physical activity.

Shortly after these types of tests came to market, concerns were raised about the possible negative effects on children. Some critics worry that favourable genetic data will only lend support to the irrational dreams of any parent who believes the three-year-old across the dinner table will someday become a

scholarship-snagging, endorsement-earning superstar with a million-dollar contract to shoot, kick or throw a ball.

"With parental expectations in combination with genetic information, children can really be streamed into something they may not be talented in or even want to do," says Kerry Bowman, a bioethicist at the University of Toronto Joint Centre for Bioethics in Ontario. "It's not really in line with respecting the emerging autonomy of children, which any parent has an obligation to do. Pushing children into things they don't have an interest in is not the way to help them flourish."

If anything, steering a child toward a particular sport or activity based on genetic data will actually limit their future opportunities, not enhance them, says Michael McNamee, a professor in the Department of Philosophy, History and Law in Healthcare at the School of Human and Health Science at Swansea University in the United Kingdom.

"You want them to make choices that create opportunities rather than foreclose them. Early specialization forecloses

opportunities,” says McNamee. “If you give a child access to a general sports program, you are laying the foundation for them to gain abilities that could translate into a whole range of skills. I’m not against the idea of early introduction to sports, but it should be done in a way that creates greater choice. The real problem is limiting choice.”

In a paper exploring genetic testing and sports medicine ethics, McNamee raised several other ethical issues associated with using genetic markers to predict athletic ability (*Sports Med* 2009;39:339-44). There are confidentiality issues, for instance. What if a test for athletic ability also indicated a predisposition to a particular illness, such as Alzheimer disease? Who has a right to that information? Potential problems could also arise if professional athletes were compelled to undergo genetic testing.

“Which genetic anomalies are deleterious to given athletes in specific sports?” the paper states. “Should sports employers be allowed to hire and fire based on unexpressed genetic abnormalities?”

Perhaps, however, such problems are unfounded speculation. Many of the ethical concerns swirling around genetic testing in sports have no basis in reality, says Thomas Reynolds, vice president of science and technology for AIBioTech, which offers a basic set of genetic tests under the Sports X Factor banner to help athletes “perform better and safer” for US\$200.

“Some people say that these tests are going to be used to say that Bobby can’t play sports anymore, but that is an unfair and manipulative interpretation of what we are doing. We aren’t telling kids they can’t play baseball. It’s not our focus or our intent,” says Reynolds. “We are giving people real information

that is actionable, that can help them in a way they can fathom or could even save a life.”

As for accusations that genetic tests such as Sports X Factor are made for delusional parents who plan on achieving sports glory vicariously through their children — that’s absurd, says Reynolds. “No company is going to market to those types of people,” he says. “There are not that many of them.” — Roger Collier, *CMAJ*

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Editor’s note: Second of a two-part series.

Part I: **Genetic tests for athletic ability: Science or snake oil?**  
([www.cmaj.ca/lookup/doi/10.1503/cmaj.109-4063](http://www.cmaj.ca/lookup/doi/10.1503/cmaj.109-4063)).