

Gene-doping test could save lives, researcher claims

Recent trial of German track coach indicates athletes may already be using viruses for performance-enhancing genes

BY MAURICE BRIDGE
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A University of B.C. researcher who is developing a test to detect gene-doping by elite athletes says it could save lives as well as keeping the playing field level.

"[Gene-doping is] a dangerous thing to be messing with," assistant professor James Rupert of the School of Human Kinetics at the University of B.C. said Monday.

"Right now, we're giving [gene therapy] to people who have extreme medical conditions, but to give it to somebody who's perfectly healthy and just wants to shave a couple of minutes off their time trial is probably an unacceptable cost-benefit."

Gene therapy uses a virus to carry therapeutic human genes past the immune system and into the body, eliminating the need to use detectable synthetic substances.

Among the dangers of gene-doping is the possibility of creating an unexpected side-effect or knocking out a gene that has a life-saving function, such as depressing the production of cancerous tumours.

"That's a big risk," he said.

One clinical trial of gene therapy resulted in the death of an American teenager, and two subjects in another trial unexpectedly developed leukemia.

Rupert hopes to have a prototype test ready within three years, and has received \$275,000 US from the Montreal-based World Anti-Doping Agency (WADA) to advance

Sporting dope

EPO is a naturally occurring hormone that stimulates bone marrow to produce red blood cells.

Injectable synthetic EPO can be detected by doping tests, so the development of EPO gene therapy has attracted interest from the underside of high-performance sports.

his work, which is focused on detecting genetic manipulation that augments the body's production of erythropoietin (EPO).

A hormone, EPO occurs naturally in the body. Its synthetic version is used to treat anemia.

An increased number of red blood cells boosts the oxygen-carrying capacity of normal blood and produces increased muscle power and endurance — features that make it extremely attractive to athletes willing to risk everything for a chance at the winner's podium.

But synthetic EPO can be detected by doping tests.

The recent trial of a track coach in Germany accused of supplying performance-enhancing drugs to athletes has produced evidence indicating gene-doping may already be a reality in sports.

Police who raided the home of Thomas Springstein in search of evidence found e-mails referring to obtaining Repoxygen, which was created for gene therapy on patients with anemia.

Rupert's test would measure gene activity and distinguish between the effects of naturally occurring levels of EPO and those caused by gene therapy.

He said if the EPO gene has been artificially introduced into an athlete's body, a distinct pattern of changes in gene activity compared to natural patterns will be detectable.

EPO, whether produced naturally or synthetically, has its own risks: with an overload of red blood cells, blood becomes thicker and more difficult for the heart to pump. It has been implicated in the heart-failure deaths of a number of athletes.

Rupert, who is working with sport-medicine specialist Dr. Don McKenzie on the project, said while he has heard of very few instances of gene-doping in sport so far, he believes its use will expand.

"It's good that WADA's taking a pro-active stance to this. We're going to start before it really is a problem, so we won't be caught playing catch-up."

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