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# A viable test for hGH? An interview with Prof. RIG Holt



In this issue Journals Editor Paul Trevorrow interviews Professor Richard Holt of the University of Southampton on the current state and future of human Growth Hormone (hGH) use, abuse and detection in sports. The following interview is a fully citable transcript from the Podcast published by *Drug Testing and Analysis* and available at <http://specandsepnw.libsyn.com/>

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**Why do athletes use hGH?** There are a number of reasons why athletes take hGH. Probably the most important reason is the effect that human Growth Hormone has on body composition. We know from a number of studies in people with Growth Hormone deficiency that if you replace the missing Growth Hormone, it builds skeletal muscle and at the same time burns fat, so you change your body composition (more muscle and less fat). If you can then translate that into more power for less weight, you will get a performance benefit.

The likelihood is that athletes are not just taking Growth Hormone alone but they are taking it in combination with a number of other anabolic agents, such as anabolic steroids and insulin. The combination of the different drugs is probably providing an additional benefit to the single drug alone.

As well as the effects on body composition, there are other potential benefits. For example, a lot of athletes report that hGH is good for bone strength and we know that Growth Hormone is important in maintaining skeletal health. It also affects the way that fuel supplies are made available to the athlete during performance; one of the actions of Growth Hormone is to increase the availability of free fatty acids which would be good in terms of endurance sports as well.

**How prevalent is the use of hGH by athletes?** To be honest, we are not really sure what the true prevalence of Growth Hormone abuse is because we don't have a good test in order to detect it. Equally, athletes are not particularly forthcoming in letting us know that they are taking Growth Hormone. Anecdotally, we

believe that Growth Hormone abuse is quite prevalent and we have seen a number of high profile cases where athletes have been found with Growth Hormone or have admitted to using it. Probably the most famous case was that of Ben Johnson who, after he was detected using anabolic steroids, admitted that he had been taking Growth Hormone as well but since then there have also been a number of other cases; Yuan Yuan the famous Chinese swimmer was caught with a suitcase of Growth Hormone going to the world swimming championships in Perth. We also know that the Mitchell inquiry into Major League Baseball suggested that Growth Hormone abuse is very prevalent. Most recently Dwayne Chambers admitted to having taken Growth Hormone when he was working with UK Sport to try to allow him to be rehabilitated in the British Olympic team.

**What tests for hGH use or abuse are currently available?** The test that has been approved by the World Anti-Doping Agency is based on the measurement of human Growth Hormone isoforms. When you say Growth Hormone you think of one entity but in reality it is a number of different proteins that are similar but are of different molecular weights. Recombinant human Growth Hormone produced by a pharmaceutical manufacturer contains just one isoform and what that does is suppress endogenous production of Growth Hormone. So the ratio between the different isoforms changes. This test was first introduced at the Athens Olympic games and was then subsequently used in Turin and Beijing and to date there have been no positive tests.

The main drawback of the isoform test is its very short window of opportunity. It is estimated that if an athlete were to stop taking Growth Hormone 24 hours before the test they would not get caught and so any sensible athlete having read this in the press

(and the details are available) should not get caught. It has been described by some people as an IQ test rather than a Growth Hormone test.

**What is the future for hGH Testing?** What is in the pipeline for the future? Probably the test that is nearest to being introduced is the one that we have been working on, which is based on the measurement of Growth Hormone dependent markers. The two markers that we have been specifically concentrating on are insulin like growth factor 1 and type 3 pro collagen. Both of these markers increase in response to Growth Hormone administration in a dose dependant manner. The advantage in our method over

the isoform method is that these markers remain elevated for a significantly longer period of time after the Growth Hormone has been discontinued. The results of the investigations that we have done so far would suggest that we have a window of opportunity of around 2 weeks, although it is longer in some individuals, so the chances of having a positive test are that much higher.

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