

PROJECT REVIEW

“Pilot Project for a WADA Bioinformatics Core Facility”

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Many studies are being carried out to develop methods for identifying exposure to growth factors such as human growth hormone, IGF1 and other related factors with potential application in sport doping. A number of these studies are based on the hypothesis that identification of genes and their protein products abnormally expressed in tissues treated with these factors can provide definitive evidence – i.e., signatures - for exposure to such growth factors. A number of related parallel studies are being conducted under the sponsorship of WADA and an enormous amount of information is being accumulated. However, to date no concerted effort has been made to collate and compare these large data sets and results to identify factors common to these studies that would represent the markers most likely to be informative in a drug testing setting. We propose to carry out a pilot informatics study to compare results from several completed and on-going WADA-sponsored studies.

Results and Conclusions

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Most of the current methods to detect doping rely on the use of chemical tests to identify drugs in the body. These methods are very powerful and often highly effective. Recent advances have enabled scientists to develop entirely new and potentially even more effective kinds of tests that are based on the detection of the broad changes that drugs cause in the genes and the proteins of affected tissues. These new methods can examine the ways in which all of the 25,000 human genes are affected by exposure to drugs and how those changes in genes affect the content of the even larger number of proteins in human cells.

WADA has mounted a major research effort to use these approaches to develop detection methods for doping and is supporting work in more than a dozen laboratories scattered around the world aimed at finding genetic and protein changes in blood, urine and other body fluids and tissues that can definitively identify exposure to given drugs. Very promising results are coming from this effort and potentially useful "signature" gene and protein changes are being identified.

A feature of these approaches is that they produce enormous amounts of information that require unified methods of analysis that are generally beyond the computing and informatics capabilities of individual laboratories. To ensure that the data are being evaluated in a consistent and effective manner, WADA has established a centralized bioinformatics laboratory that uses the most modern computational and analytical methods to harmonize the results of all the separate research laboratories to ensure that tests coming from this approach are highly sensitive, accurate and specific. The facility has succeeded in establishing an effective infrastructure and operating procedures and is beginning to obtain and analyze data from the research laboratories. WADA is confident that this more unified and centralized approach to doping detection will lead to far more effective tests that are rigorous, accurate and sensitive and that provide an effective and fair approach to protect athletes and Sport from doping.