

## **PROJECT REVIEW**

### ***“Implementation of method for erythropoietin gene doping detection in WADA accredited laboratories”***

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Over the last decade, significant efforts by us and other researchers in the anti-doping community have led to the development of methodology for direct detection of gene doping, a new threat to the world of sport. The methodology involves polymerase chain reaction (PCR) assays targeting intronless complementary DNA (cDNA) sequences that are present in doping genes but absent in intron-containing endogenous genes. To ensure the method for detection of erythropoietin (EPO) gene doping performs as intended when implemented in routine test laboratories, an EPO DNA reference material (RM) has been prepared and characterized in our laboratory for use as a control. This RM has been carefully designed to ensure that inadvertent cross-contamination of a tested sample with the RM will not lead to a false positive test result. We are currently optimizing and validating protocols for blood sample collection, processing and storage. This will then provide a complete protocol from sample collection through to PCR detection together with an appropriate RM for ongoing monitoring of the method performance.

This project aims to translate the method for direct detection of gene doping into a routine test method which is implemented in three WADA-accredited laboratories. The method will be initially implemented in the Australian Sports Drug Testing Laboratory (ASDTL). The close association of the applicants' laboratory and ASDTL (both laboratories within the National Measurement Institute, Australia (NMI)) will allow efficient review of the method when conducted in a routine testing environment and enable rapid finalization of the routine test method protocol. The method will then be implemented in two additional WADA-accredited laboratories and the competency of the three laboratories demonstrated through interlaboratory analysis of test samples.

The project is scheduled for completion early 2016 which is several months prior to the Rio de Janeiro 2016 Olympic Games

### **Results and Conclusions:**

Over the last decade, significant efforts have led to the development and validation of methodology for detecting erythropoietin gene doping together with preparation of a DNA reference material to monitor test method performance. This project aimed to translate the method into a routine test and to implement it in one WADA-accredited laboratory, the Australian

Sports Drug Testing Laboratory, which is part of the National Measurement Institute of Australia. We documented the complete test for detecting erythropoietin gene doping, provided staff training and assisted the laboratory during method implementation. Following test implementation in a routine laboratory environment, we assessed staff competence in analyzing blind samples and validated the test using blood samples which were prepared to model positive and negative gene doping samples from athletes.