

PROJECT REVIEW

“Simplifying the sample preparation for routine IRMS analysis using immunoaffinity purification”

Prof. M. Thevis, Dr. T. Piper (German Sport University Cologne, Germany)

Testosterone misuse still remains a challenging task for doping control laboratories as this steroid is produced naturally by each and everybody. As it is detectable in all urine samples, concentration based thresholds have been established to uncover testosterone administration. As soon as these thresholds are exceeded, samples are forwarded to isotope ratio mass spectrometry determinations (IRMS) to elucidate the steroid’s source.

These IRMS determinations require highly purified analytes, which results in high requirements concerning sample preparation and necessitates time-consuming clean-up steps using high performance liquid chromatography. Immunoaffinity chromatography relies on gels produced from (polyclonal) antibodies that are specific against individual analytes, i.e. ideally only this particular analyte is retained on the gel and can be recovered. For testosterone, several gels are commercially available and one of these was successfully tested regarding its potential to support the clean-up of urine samples for IRMS analyses.

Within this project gels will be produced specific against other steroids relevant for IRMS in sports drug testing that are currently not available. These gels will be tested and used to develop a simplified and much faster clean-up procedure for IRMS analysis of doping control samples found beyond the established thresholds. Particular attention will be paid to fulfill all recent WADA requirements for IRMS.