

PROJECT REVIEW

“Improving the long-term detection of testosterone and testosterone prohormone misuse in athletes”

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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 and to unambiguously differentiate between naturally elevated testosterone concentrations and doping.

Recently a promising new target analyte for IRMS determinations was reported, epiandrosterone (EPIA). This steroid enables to prolong the detection of a single testosterone or testosterone prohormone administration from 24 h to more than 100 h using IRMS. Unfortunately, EPIA is only excreted into urine in its sulfoconjugated form while all other steroids routinely employed in IRMS are excreted glucuronidated. To investigate EPIA an additional time consuming step in sample preparation is inevitable.

The aim of this study is to investigate the potential of two other possible long term markers in IRMS excreted glucuronidated and therefore avoiding the additional step. The so called “Epidiols” are known long term metabolites of epitestosterone and might also work for other steroid administrations. In a preliminary study employing dehydroepiandrosterone both Epidemiols were remarkably influenced by the steroid administration supporting the hypothesis that these new markers will improve steroid detection by IRMS. To further substantiate this finding we are going to re-analyze other excretion studies after improving and validating the already existing method for IRMS determinations of both Epidemiols.