

PROJECT REVIEW

“Bis-Conjugates in the Endogenous Profile of Steroids (BICEPS II)”

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Screening for EAAS misuse remains one of the main challenges in doping control. Currently, relevant EAAS are quantified by enzymatic hydrolysis, TMS-derivatization and GC-MS determination. However, several markers might be either lost or underestimated by this approach.

In a previous WADA funded project (15A290P, BICEPS), we obtained promising results with the detection of two steroid bis-sulfates, which substantially improved the retrospectivity of the T/E marker for oral testosterone misuse. Based on their MS behavior, we hypothesize that these markers are two isomeric forms of the compound 3,16-dihydroxy-5-androstane-17-one bis-sulfate (16OHAnd_EtioSS1 and 16OHAnd_EtioSS2). Synthesis of reference materials is required to confirm these results. In BICEPS, we also evaluated the occurrence of steroid glucuronide-sulfates in human urine. We found that one of them (5 α -androstane-3 β ,17 β -diol 3-sulfate 17-glucuronide) clearly increased after oral administration of testosterone supporting its potential usefulness for doping control.

This follow-up project (BICEPS II) aims to continue with the evaluation of the potential of steroid bis-conjugates for the detection of EAAS misuse. The project will be divided in three parts: Part I will be focused on the elucidation of the exact structure of 16OHAnd_Etio_SS1 and 16OHAnd_EtioSS2. Reference materials for a range of isomers will be synthesized and the confirmation of the marker identity will be performed by comparison with excretion urines already available at IMIM. Part II will be focused on the evaluation of the potential of mixed steroid glucuronide-sulfate conjugates for the detection of testosterone misuse by developing an untargeted screening method. Part III will evaluate the actual potential of these conjugates for the detection of testosterone misuse. For that purpose, a quantitative analytical methodology will be validated and applied to samples from excretion studies already available at IMIM.