

Extending the steroidal module in DBS: Inclusion of direct and indirect markers of AAS abuse

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Project Overview

The detection of the abuse of pseudo-endogenous steroid doping is based on the longitudinal monitoring of six urinary steroidal markers and their relative ratios, as described in the steroidal module of the Athlete Biological Passport (ABP) by the application of a Bayesian adaptive model that is able to predict the maximum variability for each marker based on the previous data and to outline atypical results. Even if the introduction of the longitudinal evaluation of the steroidal markers of the ABP improved the detection of the pseudo-endogenous steroid doping, it does not allow to gather any information on the occurrence of atypical profiles due to the presence of endogenous and/or exogenous confounding factors that could influence the urinary excretion of the markers of the steroid profile. To overcome this drawback, the evaluation of a parallel “blood steroid profile” has been proposed.

While the analysis of blood samples have become more widespread in doping control and are essential for the detection of human growth hormone (hGH) and erythropoiesis stimulating agents (ESAs), its collection necessitates venipuncture and reliable conditions for transportation and storage.

For the above mentioned reasons the aim of the current project is to develop and validate a liquid chromatography – tandem mass spectrometry method for the analysis of a wide panel of potential steroid biomarkers in blood using dried blood spots (DBS) as a sampling and transport devices. The sampling of DBS is less invasive, easy-to-perform and cost-reduced compared to the collection of blood samples. This will certainly facilitate the widespread collection of blood samples in a larger population of athletes. In addition, analytes in DBS are usually more stable than in whole blood. The research of testosterone esters in blood that is contemplated in the WADA TD2018EEAS would be facilitated in DBS.