PROJECT REVIEW

"Athlete Biological Passport, Steroids and Pain Killers – Does hydroxysteroid dehydrogenase inhibition by nonsteroidal anti-inflammatory drugs alter the steroid profile?"

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The Athlete Biological Passport (ABP) represents an integral part of the anti-doping analyses. In the fight against doping laboratories rely on monitoring blood and steroid profile data to set up long-term, individualized profiles of athletes. To uncover a prohibited administration of pseudoendogenous steroids (class S1.1 of the WADA "List of Prohibited Substances and Methods") laboratories monitor concentrations and ratios of various endogenously produced steroidal hormones, their precursors, and metabolites since almost 25 years. Several studies reported only very small naturally occurring intra-individual variations of urinary endogenous steroid ratios like testosterone/epitestosterone (T/EpiT), androsterone/etiocholanolone (And/Etio), And/T, and 5α-/5β-androstane-3α,17β-diol (Adiol/Bdiol), that have been shown to be stable over months and even years in adult humans. In case of a misuse of pseudoendogenous steroids as doping substances, these ratios are altered. Thus, the ABP is used to uncover a prohibited administration of class S1.1 steroids. However, it was shown recently that some other (non-prohibited) drugs may also influence the urinary steroid profile.

In this project we focus our attention on the class of non steroidal anti inflammatory drugs (NSAIDs), that are frequently used as pain killers and antiphlogistics. Specifically, NSAIDs have been shown to inhibit the steroid metabolizing aldo-keto-reductases (AKR) 1C, namely the 3α-hydroxysteroid dehydrogenase (AKR1C2) and the 17β-hydroxysteroid dehydrogenase (AKR1C3). As no scientific data on the influence of these inhibitory NSAIDs on urinary steroids are available from literature, the project aims in closing this gap.