PROJECT REVIEW

"Detection of EPO and evaluation of CD71 expression from a dried blood spot following rEPO administration"

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Despite being banned by the World Anti-Doping Agency, blood doping is a common method of performance enhancement used by athletes wishing to gain an unfair advantage over their competition. One common way to achieve this advantage is by using erythropoiesis stimulating agents (ESAs), namely recombinant erythropoietin (rEPO). Though laboratory tests have been developed for the direct detection of all known isoforms of exogenously administered ESAs in both urine and blood, athletes have found ways to circumvent these testing measures using techniques such as microdosing. Thus, one such approach to increase the sensitivity of the Athlete Biological Passport may be to include more hematological markers. Because immature reticulocytes are expected to be more responsive to erythropoietic manipulation, there is a need to measure this cell population accurately and robustly for increased sensitivity of the ABP model. Additionally, much emphasis has recently been placed on anti-doping testing using alternative matrices. Comprehensive dried blood spot (DBS) testing, which already preliminarily includes hGH isoforms IGF-1 stimulants and anabolic steroid esters among others, could transform testing programs worldwide. The ability to include EPO testing to that list would be a significant addition to the DBS repertoire and advance the idea of anti-dope testing in a DBS closer to implementation.

This project seeks to explore the detection capability of rEPO administration from a dried blood spot. Primarily, the immature reticulocyte surface protein CD71 will be analyzed in a longitudinal manner to understand changes following EPO administration. Secondarily, we will seek to optimize direct detection of rEPO from a single or multiple dried blood spots using conventional SAR-PAGE techniques. Importantly, the ability to detect ESA abuse from a dried blood spot, whether directly or via longitudinal means (i.e. CD71+ cells), would be critical for the future of doping control testing.