

PROJECT REVIEW

“Development of intact hCG reference intervals in normal male urine samples for establishing a threshold value for doping control”

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Human chorionic gonadotropin (hCG) stimulates testosterone production by the testicles and is prohibited in males according to the World Anti-Doping Agency list of prohibited substances. Immunoassays are currently used by anti-doping laboratories to measure urinary hCG but results can vary widely among laboratories due to differences in cross-reactivity against different molecular forms of hCG (isoforms). We recently developed a sequential immunoextraction method with liquid chromatography tandem mass spectrometry (LC-MS/MS) detection for quantification of intact hCG, hCG free β -subunit and β -subunit core fragment in urine. Data from hCG excretion studies demonstrated that intact hCG should be monitored for detection of doping with hCG. In order to apply the LC-MS/MS method for confirmation of immunoassay screen positive hCG results a threshold concentration needs to be established. In preliminary studies we found that the current threshold concentration of 5 mIU/mL applied to immunoassays is not appropriate when measured by LC-MS/MS and needs to be significantly lower.

In the present study we plan to determine the concentration of intact hCG in 600 non-doping male urine samples using the recently developed immunoextraction method with LC-MS/MS detection. Half of the urine samples will be from normal male volunteers and the other half from non-doping male athletes. The data from this study will be immediately used to determine the appropriate threshold concentration for confirming doping with hCG.