**PROJECT REVIEW**

## "Masss Spectrometry, Quantification, Isotope-Dilution Internal PSAQ Standard"

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Human chorionic gonadotropin (hCG) may be abused by male athletes in sports and is included in the banned substance list of the World Anti-Doping Agency. Anti-doping laboratories mainly use immunoassays to quantify hCG but cross-reactivity with the different forms of hCG can constitute a problem for quantitative hCG determination especially in urine samples.

Choriogonadotropin protein is a heterodimer composed of an alpha chain, which is also common to thyrotropin, lutropin, follitropin, and a beta chain, which confers its specific biological activity. The alpha and beta subunits are non-covalently linked and carry numerous disulfide bonds. The 2 chains also harbour carbohydrate moieties: 2 N-glycosylations and 4 O-glycosylations on the beta subunit and 2 N-glycosylations on the alpha subunit.

Liquid chromatography-tandem mass spectrometry (LC-MS/MS) offers analytical specificity superior to that of immunoassays and can be an alternative method for quantification of hCG in athletes biological samples. For optimal assay accuracy and reliability, a stable isotope labeled internal standard should be used. In a previous project, we developed a protocol to produce an isotopically-labeled version of hCG (PSAQ standard). The choriogonadotrophin heterodimer was successfully expressed in mammalian cells and purified. Stable isotope incorporation was determined to be greater than 98%.

The goal of this project is to produce 200 to 500 µg of hCG PSAQ standard according to the protocol previously developed to deliver different anti-doping laboratories.