

REPRODUCTIVE ENDOCRINOLOGY

Mass spectrometry ‘gold standard’ for measuring steroid sex hormones?

Mass spectrometry does not substantially outperform immunoassays for assessment of testosterone levels in men, shows a large cohort study published in the *European Journal of Endocrinology*. The results of this analysis suggest that immunoassays are sufficient for measuring testosterone with the specificity required for diagnosis of male hypogonadism.

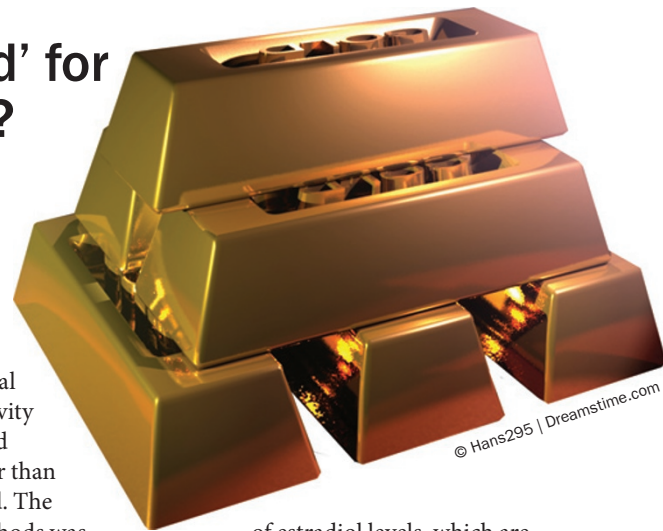
Commercial immunoassays have been the routine method for determining steroid sex hormone levels for clinical purposes for over 50 years. However, as mass spectrometry techniques have increased in sensitivity and reduced in cost, a move towards replacing this method with what is perceived as a more ‘high-tech’ approach has been promoted. This advocacy comes in spite of the fact that few studies to date have compared the two methods side by side.

The European Male Aging Study (EMAS) recruited individuals in eight European countries with the aim of identifying medical conditions associated with ageing in men from various regions. Huhtaniemi *et al.* determined the serum concentrations of testosterone and estradiol in 3,174 and 3,016 of EMAS participants, respectively, assessed both by a commercially available immunoassay platform and by an in-house mass spectrometry approach. The men were aged 40–79 years and did not have pituitary or testicular diseases.

The researchers found that the routinely used immunoassay method provided a reliable measurement of serum testosterone levels in eugonadal and hypogonadal men that was sufficient for clinical application. However, the sensitivity of the mass spectrometry method for detecting estradiol was higher than that of the immunoassay method. The correlation between the two methods was particularly poor when determining low estradiol levels (<40.7 pmol/l), in which case the immunoassay approach had 13.3% sensitivity compared with the mass spectrometry approach.

The researchers conclude that currently used immunoassays are sufficient for measuring testosterone levels in hypogonadal men and that the findings of their study do not support a mandatory move towards mass spectrometry for the measurement of testosterone either in the clinic or for analytical reasons. However, they point out that a combination approach that takes into account symptoms as well as testosterone levels is substantially more effective for diagnosis than relying on testosterone levels alone.

Whereas immunoassays seem sufficient for measuring male testosterone levels, could mass spectrometry become the ‘gold standard’ for estradiol measurement, at least in men? Accurate measurement



of estradiol levels, which are naturally low in men, is becoming increasingly useful as a diagnostic tool. For example, the level of circulating estradiol is more closely associated with BMD than the level of circulating testosterone, even though testosterone levels are routinely used as a diagnostic indicator in men with osteoporosis. Accurate measurements of low estradiol levels could also be important to evaluate the risk of cardiovascular disease.

Overall, “the selection of an assay should be driven by the measurement performance in light of the clinical need and not by assay technology,” the authors conclude.

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Original article Huhtaniemi, I. T. *et al.* Comparison of serum testosterone and estradiol measurements in 3,174 European men using platform immunoassay and mass spectrometry; relevance for the diagnostics in aging men. *Eur. J. Endocrinol.* doi:10.1530/EJE-11-1051