

## The Levels of Neurosteroid 7 $\beta$ -Hydroxy-Epiandrosterone in Men and Pregnant Women

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**Abstract :** Background: 7 $\beta$ -hydroxy-epiandrosterone (7 $\beta$ -OH-EpiA) is an endogenous steroid, that has been shown to exert neuroprotective and anti-inflammatory effects in vitro as well as in animal models. However, to the best of our knowledge no information is available about concentration of this androgen metabolite in human population. The aim of the study was to measure and compare levels of 7 $\beta$ -OH-EpiA in men and pregnant women in different biological fluids and evaluate the relationship between 7 $\beta$ -OH-EpiA in men and their sperm quality. Methods: First, a sensitive isotope dilution high performance liquid chromatography-mass spectrometry method for measurement of 7 $\beta$ -OH-EpiA in different biological fluids was developed. Validation of the method met the requirements of FDA guidelines. Afterwards 7 $\beta$ -OH-EpiA in plasma and seminal plasma of 191 men with different degree of infertility (healthy men, lightly infertile men, moderately infertile men, severely infertile men) was analysed. Furthermore, the levels of 7 $\beta$ -OH-EpiA in plasma of 34 pregnant women in 37th week of gestation and corresponding cord plasma that reflects steroid levels in the fetus were measured. Results: Concentrations of 7 $\beta$ -OH-EpiA in seminal plasma were significantly higher in severely infertile men in comparison with healthy men and lightly infertile men. The same trend was observed when blood plasma was evaluated. Furthermore, plasmatic 7 $\beta$ -OH-EpiA negatively correlated with concentration (-0.215;  $p < 0.01$ ) and total count (-0.15;  $p < 0.05$ ). Seminal 7 $\beta$ -OH-EpiA was negatively associated with motility (-0.26;  $p < 0.01$ ), progressively motile sperms (-0.233;  $p < 0.01$ ) and nonprogressively motile sperms (-0.188;  $p < 0.05$ ). Plasmatic 7 $\beta$ -OH-EpiA levels in men were generally higher in comparison with pregnant women. Levels 7 $\beta$ -OH-EpiA were under the lower limit of quantification (LLOQ) in majority of samples of pregnant women and cord plasma. Only 4 plasma samples of pregnant women and 7 cord blood plasma samples were above LLOQ and where in range of units of pg/ml. Conclusion: Based on available information, this is the first study measuring 7 $\beta$ -OH-EpiA in human samples. 7 $\beta$ -OH-EpiA is associated with lower sperm quality and certainly it is worth to explore its role in this field thoroughly. Interestingly, levels of 7 $\beta$ -OH-EpiA in pregnant women were extremely low despite the fact that steroid levels including androgens are generally higher during pregnancy. Acknowledgements: This work was supported by the project MH CR 17-30528 A from the Czech Health Research Council, MH CZ - DRO (Institute of Endocrinology - EU, 00023761) and by the MEYS CR (OP RDE, Excellent research - ENDO.CZ).

**Keywords :** 7 $\beta$ -hydroxy-epiandrosterone, steroid, sperm quality, pregnancy

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