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Follicle-stimulating Hormone Receptor Binding Inhibitors in Human Seminal Plasma

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Human seminal plasma, freed of spermatozoa by centrifugation, inhibited binding of iodine-125 (^{125}I)-hFSH to receptors in calf testes. Binding inhibition (BI) was seen in seminal plasma from intact as well as vasectomized adult males. There was a significant (60%) decrease in FSH-BI activity following dialysis against Spectrapor #1 membrane (passing substances of molecular weight 6000 or less). Both dialyzed and undialyzed seminal plasma gave binding inhibition curves nonparallel to that of human FSH. FSH-BI activity in seminal plasma was unaffected by repeated freezing and thawing or by extraction with ether or chloroform. It was, however, markedly decreased after adsorption of seminal plasma with charcoal and could be precipitated with 80% ethanol. There was no loss of FSH-BI activity upon heating seminal plasma at 95 C for up to 80 minutes, but an approximate 40% loss occurred after heating for 24 hours at 95 C. Gel filtration and ultrafiltration experiments indicated FSH-BI activity in seminal plasma to be associated with two major components, one with a molecular weight of about 19,500, the other with a molecular weight of about 1000. The inhibition of ^{125}I-hFSH binding to calf testes receptors by an 80% ethanol precipitate of human seminal fluid was studied by direct least-square nonlinear regression analysis. The data best fitted a model whereby the FSH receptor contained two hormone binding sites with identical affinity constants, one of which could be blocked by FSH-BI with a simultaneous reduction in affinity for FSH at the second site. Using the rat as a model, high levels of FSH-BI activity were detected in extracts of testis and other urogenital tissue, although to varying degrees. In contrast, extracts of rat heart had barely detectable levels of FSH-BI activity, suggesting a tissue specificity for the inhibitor. From our studies we conclude that human seminal fluid contains factors capable of inhibiting binding of FHS to testis receptors. The nature and physiologic significance of these factors are as yet uncertain.

Key words: FSH, binding inhibition, seminal plasma

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