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Bioactivity of Androgens Within the Testes and Serum of Normal Men

JONATHAN P. JAROW^{*,†}, WILLIAM W. WRIGHT[†], TERRY R. BROWN[†],
XIAOHUA YAN^{*,†} AND BARRY R. ZIRKIN[†]

From the ^{} Department of Urology, Johns Hopkins University School of Medicine, Baltimore, Maryland; and the [†] Division of Reproductive Biology, Department of Biochemistry and Molecular Biology, Johns Hopkins University, Bloomberg School of Public Health, Baltimore, Maryland.*

Correspondence to: Dr Jonathan P. Jarow, Department of Clinical Chemistry, University of Helsinki, 601 North Caroline St, Baltimore, MD 21287 (e-mail: jjarow{at}jhmi.edu).

Little is known about how human spermatogenesis is regulated, so it is not surprising that there have been few breakthroughs in the treatment of male infertility resulting from abnormalities of spermatogenesis. Testosterone is the predominant intratesticular steroid in both the rat and man. Previous studies have shown that the testosterone concentration within the rat testis that is required for the quantitative maintenance of spermatogenesis is far higher than the total testosterone concentration in rat blood, indicating that much of the testosterone within the testis might be biologically inactive. In contrast to the rat, little is known about the androgen requirements for human spermatogenesis, in part because, until recently, a minimally invasive method suitable for obtaining intratesticular fluids from the human testis has not been available. Percutaneous aspiration now makes it feasible to do so. A major objective of the present study was to assay the bioactive androgen concentration within the testes of normal, fertile men. Percutaneous aspiration was used to obtain intratesticular fluid from such men, and we adapted a highly sensitive recombinant protein mammalian cell-based bioassay to measure androgen bioactivity. Total intratesticular testosterone concentration, which we define as immunoreactive testosterone as measured by radioimmunoassay, was well in excess of that in serum (1236 ± 86 nM vs 11.7 ± 0.7 nM). The concentration of bioactive androgens within the normal human testis was found to be about two thirds that of the total testosterone concentration. Interestingly, the concentration of the major, known binding proteins for testosterone within the testis, serum hormone-binding globulin (SHBG)/ABP (52.4 ± 9.7 nM), was insufficient to account for the difference between total testosterone and bioactive androgens. This indicates that, in addition to its binding to SHBG/ABP, androgens may also be bound by unknown molecules, and that this contributes to reducing androgen bioactivity. These observations could have relevance for understanding the relationship between spermatogenesis and intratesticular androgens in normal men and in men diagnosed with infertility.

Key words: Intratesticular testosterone, infertility, human

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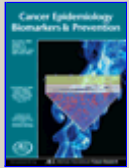


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