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Serum bioactive and immunoreactive follicle-stimulating hormone in oligozoospermic and azoospermic men: application of a modified granulosa cell bioassay

Haim Matzkin, M.D.*
Zvi T. Homonnai, M.D.†
Dalia Galiani, M.Sc.‡
Gedalia Paz, Ph.D.†
Nava Dekel, Ph.D.‡

Ichilov Hospital, Tel-Aviv Medical Center, Tel-Aviv, and Weizmann Institute of Science, Rehovot, Israel

Serum follicle-stimulating hormone (FSH) levels measured by radioimmunoassay (RIA) usually correlate well with the rate of spermatogenesis. However, in certain cases this correlation does not exist. The purpose of this study was to establish a reliable bioassay of FSH for the andrological clinic. Follicle-stimulating hormone was measured by both standard RIA and bioassay in 98 men subgrouped into normospermic, oligospermic, and azoospermic. Bioactivity of FSH was determined using in vitro cultures of granulosa cells utilizing progesterone measurements for assessing FSH activity. Results of FSH levels obtained by both methods correlated well ($r = 0.55$, $P < 0.01$) within themselves, and both correlated negatively and significantly with sperm concentration. The ratio between bioactivity and immunoreactivity of FSH did not correlate with sperm density. Thus, the decrease in sperm concentration and other sperm variables resulting from a germinal epithelial dysfunction was not mediated or associated with low biological activity of FSH. The application of this method can be of clinical value in cases where a discrepancy is found between serum RIA-FSH levels and sperm quality.
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Follicle-stimulating hormone (FSH) has a major role in regulation of normal spermatogenesis.[1] The observation that increased FSH serum levels are associated with severe germinal cell damage[2,3] is only partially explained by a decrease in inhibin produced by the damaged Sertoli cells.[4,5]

Clinicians in andrological units have shown that patients with elevated FSH might have quite normal spermatogenesis and vice versa.[2,3] This hints at the possibility that the FSH measured radioimmunologically does not necessarily always reflect the bioactivity of that molecule.

Biochemical changes in the FSH molecule have been demonstrated to be a result of changes in the hormonal milieu around the hypophysis.[6] Therefore, it was postulated that among men with different degrees of pathology in spermatogenesis, an altered, less active form of FSH is secreted by the hypophysis. This supposition could not be tested until recently. With the development of the in vitro granulosa cell aromatase bioassay for FSH,[7,8] it became possible to measure serum bioactivity of FSH in both physiological and pathological conditions.

In this study, using a modification of the above-mentioned bioassay, we measured the bioassay-FSH activity in a group of men with normal and abnormal numbers of spermatozoa in the ejaculate. Serum bioassay-FSH levels were compared with

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* Reprint requests: Haim Matzkin, M.D., Department of Urology, Ichilov Hospital, 6 Weizman Street, Tel-Aviv 64239, Israel.
† Institute for the Study of Fertility, Serlin Maternity Hospital, Tel-Aviv Medical Center.
‡ Department of Hormone Research, Weizmann Institute of Science.