

Journal of Andrology, Vol 3, Issue 1 79-83, Copyright © 1982 by [The American Society of Andrology](#)

Abnormalities of the Hypothalamic— Pituitary—Leydig Cell Axis in Young Adult Rats with Vitamin A Deficiency

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The hypothalamic concentration of gonadotrophin releasing hormone (GnRH), the *in vivo* pituitary responses to GnRH, and the *in vivo* Leydig cell responses to bovine luteinizing hormone (LH) and to endogenous LH were determined in young adult male rats who had been on a vitamin-A-deficient (VAD) diet for 64 days and in age-matched controls. Hypothalamic GnRH content was 3.06 ± 0.25 ng/hypothalamus in VAD (mean \pm SEM) and 3.26 ± 0.25 ng/hypothalamus in controls. Baseline serum LH concentrations were 24.6 ± 4.7 ng/ml in VAD and 11.3 ± 2.3 ng/ml in controls ($P < 0.02$). Baseline serum follicle stimulating hormone (FSH) levels were 373 ± 61 ng/ml in VAD and 329 ± 16 ng/ml in controls. Fifteen minutes after administration of GnRH serum LH was 215 ± 16.3 ng/ml in VAD vs. 148 ± 18.3 ng/ml in controls ($P < 0.02$). Serum FSH levels 15 minutes after administration of GnRH were 866 ± 67 ng/ml in VAD vs. 566 ± 58 ng/ml in controls ($P < 0.01$). Baseline serum testosterone (T) concentrations were 1.0 ± 0.2 ng/ml vs. 1.7 ± 0.3 ng/ml in controls (n.s.). Sixty minutes after exogenous LH administration, serum T concentrations were 21.7 ± 1.0 ng/ml in VAD vs. 17.8 ± 1.0 ng/ml in controls ($P < 0.05$). Sixty minutes after administration of GnRH, which elevated endogenous LH serum concentrations, serum T concentrations were similar in both groups (7.8 ± 0.9 ng/ml for VAD vs. 9.7 ± 0.5 ng/ml for controls). The elevated serum LH concentrations, together with the increased pituitary responses to GnRH, are compatible with an appropriate hypothalamic-pituitary response to a direct impairment in testicular function secondary to the VAD. However, the increased *in vivo* Leydig cell responses to exogenous LH stimulation in these young adult males with VAD remains unexplained.

Key words: vitamin A deficiency (VAD), hypogonadism, testosterone, Leydig cell, hypothalamus, pituitary, gonadotrophin

Submitted on April 15, 1980

Revised on March 26, 1981

Accepted on May 1, 1981

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