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An Ex Vivo Analysis of Sertoli Cell Actin Dynamics Following Gonadotropic Hormone Withdrawal

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The receptors for the steroid hormone testosterone and the peptide hormone follicle-stimulating hormone are localized to the somatic Sertoli cell in the seminiferous epithelium. In the rat, prolonged gonadotrophic hormone withdrawal has been shown to result in substantial germ cell apoptosis. Previous studies have shown that, coincident with the loss of germ cells following hypophysectomy, the actin cytoskeleton of the Sertoli cell becomes disorganized and diffuse throughout the cell's cytoplasm. The molecular mechanisms that govern Sertoli cell actin filament dynamics in response to the loss of gonadotrophic hormones remain undefined. It was therefore hypothesized that hypophysectomy brings about a decrease in the amount of polymerized actin (F-actin) within the Sertoli cell and that this decrease is associated with changes in the expression of genes known to govern Sertoli actin dynamics. To this end, Sertoli cells were isolated from adult control and hypophysectomized rats. Sertoli cells from hypophysectomized rats were found to contain significantly less (72%) F-actin relative to untreated controls, although overall, ß-actin protein and mRNA expression remained constant. The expression levels of genes known to directly influence the amount of F-actin in cells were then examined by Northern blot analysis. Cofilin and profilin I gene expression was unaffected by hypophysectomy, whereas the expression of profilin II and espin both decreased significantly (47% and 42%, respectively). Taken together, these results suggest that, following hypophysectomy, the actin cytoskeleton of the Sertoli cell shifts to a predominantly depolymerized state, perhaps in part because of decreases in profilin II and espin gene products.

Key words: Espin, profilin, cofilin