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JOURNAL ARTICLE

Characterization of the fertility of male aromatase knockout mice

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Previous studies employing the male aromatase knockout (ArKO) mouse have indicated that local expression of estrogens appears to be important for the progression of spermatogenesis. In the absence of estrogen biosynthesis round spermatids are observed to undergo apoptosis and thus fail to differentiate into mature, elongated spermatids. This lesion appears to arise between the ages of 18 weeks and 1 year. To ultimately determine if the disruption to spermatogenesis arises earlier than 18 weeks, we performed an intensive study to examine the fertility of younger male ArKO mice. This involved an analysis of their mating capacity together with an extensive stereological analysis, determination of the in vitro potential of mature sperm, and sexual behavior. ArKO and wild-type (w/t) males at 7 weeks of age were placed with w/t females for 7 weeks. At age 14 weeks, the males were killed and the testes removed. ArKO mice were observed to sire significantly fewer litters than the w/t mice; 5 out of the 10 sired no litters at all. Stereological analysis performed on the removed testes found a significant decrease in round spermatid numbers between w/t and ArKO mice at this age; however, there were no differences in all other germ cells and Sertoli cell numbers. When mature spermatozoa were analyzed, sperm from 15-week-old ArKO mice had a significant reduction in motility. This was further reduced by 1 year of age with a decrease in concentration. A preliminary examination of sexual behavior found that ArKO mice did not attempt to mount the females, in contrast to the w/t mice, which mounted consistently during the time period. In conclusion, we observed that ArKO mice have reduced fertility at age 14 weeks. This may be due in part to a disruption in spermatogenesis because the phenotype does appear to arise earlier than 18 weeks, possibly leading to abnormalities in the mature spermatozoa. Or, in part, this may be attributable to an impairment in the development of copulatory behavior, which is consistent with the available evidence that points to a crucial role for estrogens in the neural development and initiation of male sexual behavior.

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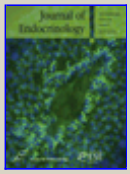

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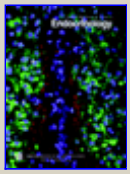

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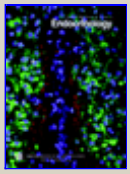

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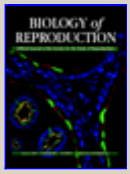

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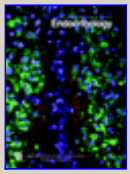

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