Lack of retinoid acid receptor-related orphan receptor alpha accelerates and melatonin supplementation prevents testicular aging

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Abstract:

The role of retinoid acid receptor-related orphan receptor alpha (RORα) on male reproductive functions during aging is unclear. Here, we analyze the morphological changes in the testis of both young and aged RORα-deficient mice, with and without melatonin supplementation. Young mutants showed vacuolation, degeneration and pyknosis of spermatogenic epithelium and Sertoli cells. Aged mutants showed atrophy of the seminiferous tubules and absence of mitotic spermatogenic cells. Absence of sperms in many tubules, loss of acrosomal cap, vacuolation and hypertrophy of Sertoli cells were detected in aged mice, with a significant reduction in the number of seminiferous tubules and a significant increase in the number of Leydig cells and telocytes. Repair in seminiferous tubules and interstitial tissues with enhancement of spermatogenesis was observed in melatonin-treated aged mice. Young mutants overexpressed VEGF that was weaker in aged animals and observed only in the spermatocytes, while melatonin increased VEGF expression in spermatocytes and spermatids. Caspase 3 increased in both young and aged mutant mice in all seminiferous tubules and interstitium; caspase 3 immunostaining in seminiferous tubules, however, showed a normal pattern of apoptosis with melatonin supplementation. The present study reports that age-dependent testicular changes in RORα mutant mice were recovered by melatonin treatment.

Keywords:

aging, Leydig cells, seminiferous tubules, RORα, Sertoli cell

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