Androgen receptor in sertoli cell is essential for germ cell nursery and junctional complex formation in mouse testes

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摘要

Abstract

To examine the role of androgen receptor (AR) in Sertoli cells (SC), we used a SC-specific AR knockout (S-AR–/y) mouse to further evaluate the chronological changes of seminiferous tubules and the molecular mechanisms of SC androgen/AR signals on spermatogenesis. Testes morphology began changing as early as postnatal day (PD) 10.5 in wild-type (WT), but not in S-AR–/y mice. After puberty (PD 50), the SC nuclei of WT testes migrated to the basal area of the seminiferous epithelium; however, in S-AR–/y testes, SC nuclei were disarranged and dislocated. Results from electron microscopy further showed an obvious duplication of basal lamina of the seminiferous epithelium in S-AR–/y testes at PD 50 compared with WT testes. Using quantitative RT-PCR analyses, the expression of SC gene profiles were compared in PD 10.5 testes. In S-AR–/y testes, the expression levels of 1) vimentin were significantly increased and laminin 5 was significantly decreased in PD 10.5, which contributed to functional defects in cytoskeletons and production of the basement membrane component of SC leading to cell morphology deterioration and thus affecting the integrity of seminiferous epithelium; 2) claudin-11, occludin, and gelsolin were significantly decreased in PD 10.5, which contributed to defects in intact junctional complex formation of SC leading to impairment of the integrity of the blood-testis barrier; 3) calcium channel, voltage-dependent, P/Q-type, 1A subunit; tissue-type plasminogen activator; transferrin; and epidermal fatty-acid-binding protein were significantly decreased in PD 10.5, which contributed to functional defects in production and/or secretion of specific proteases, transport proteins, and paracrine factors of SC, leading to impairment of its germ cells' nursery functions.