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Stage-specific expression of *CYP26B1* in the adult testis is responsible for pulsatile retinoic acid signaling in spermatogenesis

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Background: The major physiologically active form of vitamin A, Retinoic acid (RA), plays important roles in germ cell development in both male and female. Studies of mice deficient in the RA degradation enzyme, *CYP26B1*, indicated that RA is responsible for meiotic initiation; however, the mechanisms underlying the pulsatile RA signaling in spermatogenesis has not been understood yet. We studied the localization and expression analysis of *CYP26B1* during development of rhesus monkey testis in order to better understanding of the mechanisms of RA signaling in spermatogenesis process.

Methods: Quantitative real-time PCR (qPCR) and immunohistochemistry was performed to determine the profile expression of *CYP26B1* at both mRNA and protein levels in the juvenile and adult rhesus monkey.

Results: The expression of *CYP26B1* mRNA was down-regulated during the development of monkey testis. As described previously, the *CYP26B1* protein was detected in the cytoplasm of undifferentiated spermatogonia in the developing testis. A rather heterogeneous pattern of the *CYP26B1* protein expression was observed along the different stages of seminiferous epithelium, indicating the expression of the protein is stage specific. In adult testes, the highest level of *CYP26B1* protein was found in differentiating germ cells within seminiferous epithelial stages X-XII. The peak of *CYP26B1* protein expression was coincided with the onset of meiosis and observed in preleptotene and early leptotene spermatocytes. Whereas, lowest level of *CYP26B1* expression was observed in stages VI-IX of the seminiferous epithelium, where undifferentiated Type A spermatogonia divide and differentiate to Type B spermatogonia, meiosis initiates and spermiogenesis occurs.

Conclusion: Down-regulation of *CYP26B1* mRNA during the development of monkey testis is consistent with initiation of meiosis in the adult testis. However, the stage-specific expression of RA degradation enzyme *CYP26B1* in the seminiferous tubules of adult testis led us to suggest that it might be responsible for pulsatile RA signaling in spermatogenesis. These findings presumably support that the elevated amount of RA in the undifferentiated Type A spermatogonia during stages VI-IX of the seminiferous epithelium of the adult testis is responsible for differentiation of spermatogonia and meiosis entry.

Biography

Seyedmehdi Nourashrafeddin had received his PhD from Tabriz University of Medical Science, Iran, in the field of Molecular Medicine. He is currently working as an academic Research Assistant at Magee-Women's Research Institute, University of Pittsburgh School of Medicine, USA. His research focuses on the molecular mechanisms that govern primate spermatogonial stem cell differentiation. His graduate school research focused on the analysis of gene expression during stem cell-based spermatogenesis *in vitro*. In 2005, he received his Master's degree in the field of Immunology from Tehran University of Medical Sciences, a premier University in Iran. In addition, from 2004-2006, he worked as a Research Assistant at the Hematology-Oncology and Stem cell Transplantation Research Center in Tehran, Iran. He is proficient in all standard molecular and cellular biology techniques. He is also an employee as Research Assistant in Tehran University of Medical Science. He has published more than 6 papers in reputed journals.

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