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# Cell Specificity of Aquaporins 0, 3, and 10 Expressed in the Testis, Efferent Ducts, and Epididymis of Adult Rats

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Aquaporins (AQPs) are transmembrane protein channels that allow the rapid passage of water across an epithelium at a low energy requirement, though some also transport glycerol, urea, and solutes of various sizes. At present, 11 members of the AQP family of proteins have been described in mammals, with several being localized to the testis (AQP-7 and AQP-8), efferent ducts (AQP-1 and AQP-9), and epididymis (AQP-1 and AQP-9) of adult rats. With the discovery of expression of multiple AQPs in different tissues, we undertook a systematic analysis of several other members of the AQP family on Bouin-fixed tissues of the male reproductive tract employing light microscope immunocytochemistry. In the testis, AQP-0 expression in the seminiferous epithelium was restricted to Sertoli cells and to Leydig cells of the interstitial space; no reaction was observed in the efferent ducts or epididymis. In Sertoli cells, a semicircular pattern of staining was noted, with only one fourth or one half of the Sertoli cells of a given tubule showing a reaction product. Furthermore, while Sertoli cells at stages VI–VIII of the cycle showed intense staining, those at stages IX–XIV were least reactive, with Sertoli cells at stages I–V showing intermediate levels of reaction product. The epithelial expression of AQP-10 was restricted to the microvilli of the nonciliated cells and the cilia of the ciliated cells of the efferent ducts; however, the endothelial cells of vascular channels of the efferent ducts and epididymis were also intensely reactive. AQP-3 expression was localized exclusively to the epididymis, where intense staining was noted exclusively over basal cells. Examination of orchidectomized rats revealed that AQP-3 expression was abolished over basal cells and that it was greatly diminished after efferent duct ligation. As the reaction was not fully restored in orchidectomized animals supplemented with high levels of testosterone, we suggest that AQP-3 expression in basal cells is regulated in part by testosterone, in addition to a luminal factor emanating from the testis. Together, the data indicate a cell- and tissue-specific expression for AQP-0, AQP-3, and AQP-10 in the testis, efferent ducts, and epididymis, as well as differential regulating factors for the expression of AQP-3 in basal cells.

Key words: Water transport, Sertoli, basal, nonciliated, androgens

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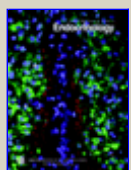
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