Genetics and Molecular Research

Age-related changes in renal AQP3 and AQP4 expression in Sprague Dawley rats

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Genet. Mol. Res. 15 (3): gmr.15037532
Received August 27, 2015
Accepted February 11, 2016
Published August 5, 2016
DOI http://dx.doi.org/10.4238/gmr.15037532

ABSTRACT. Aquaporin (AQP) 3 and AQP4 are important in urine concentrating mechanisms and in other physiological functions such as brain water balance, cell migration, cell proliferation, fat metabolism, and epidermal hydration. The results of studies investigating AQP3 and AQP4 expression in the kidneys are inconsistent, and systematic research is rare. This study aimed to obtain a better understanding of the changes in renal AQP3 and AQP4 mRNA expression that take place with age. The expression of AQP3 and AQP4 mRNA, during prenatal and postnatal development, and during aging, was investigated in kidneys from Sprague-Dawley rats. The pattern of AQP3 expression was similar to that of AQP4 expression during development, and both were detected at gestational day 19 in the rat kidney where they maintained a stable level to postnatal day 14. Subsequently, a significant increase in expression was observed from day 21 to day 35, with peak expression occurring at day 35. No significant change in AQP3 or

AQP4 mRNA expression was observed after day 35, apart from AQP4, which increased at day 540. Moreover, the expression of both AQP3 and AQP4 on day 850 was higher than on day -2, and lower than on days 28 and 35. The expression of AQP3 and AQP4 was similar on days 1, 7, 14, and 21. These findings indicate that mRNA expression of AQP3 and AQP4 varies with age, which should be considered when treating kidney disease in pediatric and elderly patients.

Key words: Age-related; Kidney; AQP3; AQP4; Sprague Dawley rat