Effects of fasting on AQP9 expression in the chick brain

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Aquaporin 9 (AQP9) is a water channel that is also permeable to metabolites such as glycerol, monocarboxylates and urea. AQP9 is expressed in neurons of rodents and chicken brain, and this channel has been supposed to be a route of energy substrates for neurons. However, the physiological function of neuronal AQP9 is still unclear. In this study, we examined the effect of fasting on AQP9 expression in the chicken brain by semi-quantitative Western blot analysis. Our data showed that AQP9 protein levels increased significantly after 24 hr fasting ($p<0.01$) and were restored to normal levels after 6 hr re-feeding ($p<0.01$) in the hindbrain but not in the telencephalon and diencephalon. In addition, we studied the immunohistochemical distribution of AQP9 in the hindbrain. The results showed that the distribution of neuronal AQP9 in chicken and rodent brain does not overlap. Significant AQP9-immunoreactivities were detected in neurons of the substantia nigra, the nucleus (n) nervi oculomotorii, n. of Edinger-Westphal, n. nervi trochlearis, n. vestibularis, n. cochlearis, n. nervi glossopharyngei, n. supraspinalis, and substantia reticularis pontis. This study suggested that AQP9 might be involved in the movement of energy substrates in hindbrain nuclei under fasted conditions.