

## The Osmoreceptor in Birds

It is well known about the idea that antidiuresis may be controlled by cells in the hypothalamus acting as 'vesicular osmometer'. There has been considerable debate on the identity and sensitivity of such cells, focusing mainly on the neurons located in osmosensitive nuclei.

The aquaporin (AQP) family of membrane bound water transporting channels is expressed in a variety of organisms. Channel-forming integral protein of 28 kDa was the first aquaporin to be identified and characterized. AQP4 is a newly discovered membrane of this family. AQP4 is widely distributed but expression of AQP4 mRNA transcripts in the CNS is at least 10-fold higher than in other tissues. In situ hybridization studies in adult rat brain have revealed AQP4 mRNA expression in cells lining the ventricular system, the pial surface, the SON and PVN. This distribution of AQP4 suggests a particular functional significance. The movement of water into and out of brain cells through AQP4 may lie at the heart of the central mechanism of osmoreception, and the osmoregulation of AVP secretion and dipsogenesis. In birds, any AQP cDNA did not yet identified. The purpose of this study was the cloning of AQP4 cDNA from the birds and understood the physiological function of AQP4 in related with osmoreception in birds.

### Material and Methods

The total RNA was extracted from one-day old chick brain and was reverse-translated into cDNA. cDNA was used for PCR with the primers designed from mammalian AQP4 cDNA sequence. The PCR product was subcloned with pGEM-T easy vector, and was sequenced.

Five one-day old chicks were dehydrated for one day and their brain was removed. In control chicks, five brains were removed without the dehydration treatment. The total RNA was extracted from the chick brain and was reverse-translated into cDNA. PCR was performed with chicken AQP4 primers.

### Results and Discussion

PCR products was 376 bp. Using BLAST program, this PCR products was searched the homologous gene. The results showed that this PCR product was highly similar to AQP4 cDNA sequence of mammalian. For example, between human AQP4 and this PCR product, identity was 318/368 (86%), and Score was 333 bits, and between mouse AQP4 and this PCR product, identity was 312/368 (86%), and Score was 303 bits. These results highly suggested that this PCR product might be chicken AQP4. But, this is still partial sequence, and then we are working on the cloning of full sequence of this gene.

With RT-PCR, the AQP4 mRNA expression in the dehydrated chicken brain was slightly higher than those in control brains. This result suggest that AQP4 may be relate with osmoregulation.