Implication of Na^+, Cl^- -Dependent Amino Acid Transporter in Sea Water Adaptation of Oyster

Haruhiko Toyohara and *Yoshihiro Yokoyama

Graduate School of Agriculture, Kyoto University

*Kobe Shoin Women's College

Summary

Highly developed cellular osmo-responsive mechanism equipped with marine invertebrates was studied by using oyster (*Crassostrea gigas*), because they are supposed to have exclusively efficient cellular osmo-responsive mechanism. In the present study, we focussed on a Na^+, Cl^--dependent amino acid transporter that intakes amino acids from extracellular fluids into cells to maintain cell volume constant under various osmotic condition.

A Na^+,Cl^--dependent amino acid transporter cDNA was cloned from oyster gill. The transporter has twelve-tansmembrane structure commonly seen in vertebrates counterparts. The oyster transporter showed the highest homology with human glycine transporter. In the transient expression experiment in COS-7 cells, however, no intake activity was observed for glycine, while considerable activities were detected for glutamic acid, phenylalanine, leucine, isoleucine, tyrosine, and threonine. Remarkabe induction of mRNA under hypo-osmotic as well as hyper-osmotic conditions strongly suggests that the oyster transporter cloned in the present study plays a crucial role in the osmotic adaptation in the sea water.