

Identification of novel Pax-6 splicing variants in squids and its relevance to camera eye development of the cephalopods

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The Pax-6 is one of the highly conserved genes across wide range of animals and involved in eye developmental processes. Previous studies reported at least four forms of Pax-6 splicing variants modulating different downstream genes each in the vertebrate eyes. We hypothesized that developmental mechanism mediated by the Pax-6 splicing variants is also involved in squid camera eyes, although the camera eyes of vertebrates and squids are believed to have independently evolved after the divergence of the two lineages. We found five types of the squid Pax-6 and examined their expression in various stages. As a result, two of them showed stage-specific expression in embryo (variant 1) and adult eye (variant 4). The variant 1 have an exon skip causing lack of homeo-domain, which is one of two independent DNA binding domains of the Pax-6. The variant 4 have an additional exon (21 aa) between the two DNA binding domains. These indels were conserved at least in the squid lineage but not in the snail *Lottia*, outgroup of cephalopods. Expression patterns of the above variants indicated that the similar evolutionary process to the vertebrates have been acquired also in the cephalopod lineages.