Analysis of molecular property of ascidian opsin, Ci-opsin1

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Opsins are photoreceptive proteins in animals which belong to G protein-coupled receptors (GPCRs). Ci-opsin1, ascidian (Ciona intestinalis) opsin, was found to be expressed in the ocellus of ascidian larvae to regulate the swimming behavior. The phylogenetic analysis indicated that Ci-opsin1 was more closely related to vertebrate visual opsins than invertebrate ones. However, the detailed molecular properties of Ci-opsin1 remain unknown. Our spectroscopic analysis indicated that Ci-opsin1 showed intermediate photoreaction and G protein activation efficiency between those of vertebrate and invertebrate visual opsins. Based on our results, we discuss the molecular properties of Ci-opsin1 in the linkage of vertebrate and invertebrate visual opsins.