The role of the outer dynein arm light chain 1 in regulation of the ciliary movements in *Paramecium tetraurelia*

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Ciliary movements of *Paramecium* depend on the intraciliary concentarion of second messengers. For example, Ca^{2+} induces a ciliary reversal and backwards swimming; cAMP induces a ciliary augmentation and faster swimming. The ciliary responses are regulated by axonemal dyneins. However, the individual role that each axonemal dynein plays in the regulation of ciliary movement is unclear. We examined the ciliary movements in *P. tetraurelia*, in which the gene termed the outer dynein arm light chain 1 (PtODA_LC1) is silenced using RNAi by the feeding method (Galvani and Sperling, 2002).

The PtODA_LC1 is an orthologue of *Chlamydomonas reinhardtii* ODA_LC1. Two days after the feeding, the PtODA_LC1-silenced cells swam slowly and displayed frequent avoiding reaction. The ciliary beat frequency of the reactivated cilia on the cortical sheets from the silenced cells was significantly decreased. In addition, the cilia did not showed the ciliary augmentation induced by cAMP. These results indicate that the PtODA_LC1 is essential not only for giving full activity of the outer dynein for producing the high ciliary beat frequency, but also for setting the beat direction by Ca^{2+} and cAMP.