

Reconstruction of an artificial ATP-regenerating system in the cilia of *Paramecium*

Munenori NOGUCHI¹ and Motoyuki TAKEMURA² (¹Grad. Sch. of Sci. and Eng., Univ. of Toyama, ²Fac. Sci., Univ. Toyama)

Cilia of *Paramecium* are long, thin organelles and diffusion from the cytoplasm may not be able to support the high ATP concentrations needed for dynein motor activity and intraflagellar transport (IFT). IFT brings axonemal proteins from the cell body to the ciliary tip. A phosphoarginine (PArg) shuttle system supports the intraciliary ATP concentration in *Paramecium* cilia. In this system, ATP and PArg diffuse into the ciliary compartment through a restricted opening to the cytoplasm. We do not know, however, whether proteins such as arginine kinase are able to diffuse into the ciliary compartment. We tried to construct an artificial ATP-regenerating system in the cilia of *Paramecium*. Exogenous creatine kinase diffused into the ciliary compartment through a restricted opening to the cytoplasm and worked as a phosphocreatine shuttle system. The intraciliary concentration of creatine kinase required for effective regeneration of ATP was estimated to be 7.4 μM .