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Searching for the Genes Involved in Signal Transduction of *Synechocystis* sp. 6803 Phototaxis - Functional Genomics Approaches

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In order to search for the genes involved in the light signal transduction pathways in the cyanobacterium Synechocystis sp. PCC 6803 (Syn6803), we constructed a Tn5 mutant library. Among the pool of 2,000 mutants of Syn6803, we isolated ca. 50 nongliding mutants on the surface of agar plates. The genes responsible for the mutations in 35 phototatic movement mutants were identified by DNA sequence determination after amplifying the flanking DNA sequences of the transposon by an inverse PCR method. Some different genes were responsible for the mutations in phototatic gliding motility; a putative ABC transpoter, a MCP-like protein, RNA polymerase sigma factor, gln-binding/transporter, transcriptional regulator and several hypothetical proteins.

We recently showed that a putative methyl accepting chemotaxis protein (MCP), was involved in a signal transduction pathway of the gliding motility in Syn6803 (Chung et al., 2001, FEBS Lett. 492, 33-38). Also another protein responsible for the gliding motility was identified as a putative ABC transporter. Similar observation has been demonstrated for other gliding bacterium Flavobacterium johnsoniae (Agarwal et al., 1997, Proc. Natl. Acad. Sci. U.S.A. 94, 12139-12144). The translated protein sequences revealed the representative domains of two ATP binding motifs and ABC transporter family signature in C-terminal region. Interestingly, Disruption of RNA polymerase sigma factor had no noticeable effect on exponential growth, identifying its product as a member of the group 2; however, this disruption made some differences of proteome profiles. The biochemical and physiological study about the actual role of these proteins on gliding motility will be discussed.