

**Transposon Mutagenesis of *Synechocystis* sp. PCC 6803:
Application to the Molecular and Genetic Dissection of
Physiology and Behavior**

Yong-Cheol Yoo^{1,2*}, Eun-Ha Kim^{1,3}, Mi-Sun Cho^{1,4},
Yoon-Jung Moon¹, Young-Ho Chung¹, Jong-Soon
Choi¹, Choon-Hwan Lee³, Tae-Ryong Hahn², Yun-Il
Park⁴, and Young Mok Park¹

¹Biomolecule Research Team, Korea Basic Science
Institute, Taejon 305-333

²Department of Genetic Engineering, Kyunghee
University, Yongin 449-701

³Department of Molecular Biology, Pusan National
University, Pusan 609-735

⁴Department of Biology, Chungnam National
University, Taejon 305-764

We recently established random transposon mutagenesis in the cyanobacterium *Synechocystis* sp. PCC 6803 (Syn6803) to search for genes related to photosynthesis, phototactic behavior, and response to environmental stress. By using a derivative of transposon Tn5, which was delivered by conjugal transfer from *Escherichia coli* to Syn6803, kanamycin-resistant mutants of Syn6803 were generated at a frequency of 1.6×10^{-8} . While maintaining 4,000 Tn5 mutants of Syn6803 isolated using the mutagenesis method, a diverse set of aberrant phenotypes such as phototactic motility, color, and growth rate were observed. As an initial step of the mutants characterization, we started segregation a first set of 500 Tn mutants of Syn6803 and found that 22 mutants lost gliding motility and 20 mutants showed different color (light-green) from wild type one (blue-green) from among them. In additions, 12 mutants displayed slow growth rate under the normal growth condition. For the genetic dissection of altered phenotype, we currently introduced an inverse PCR method to determine the flanking sequences by transposon. The random Tn mutagenesis method adopted during this study will hopefully provide a powerful means to envision the physiology and behaviour of the photosynthetic cyanobacterium.

Keywords: *Synechocystis* sp. PCC 6803, transposon mutagenesis, gliding motility