

## Efficient and easy selection of positive metagenomic library using photochemical reaction

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Metagenome research has been focused on two screening methods. These are nucleotide sequence-based screening and enzyme activity-based screening. Before applying these screening methods, FACS has been widely used to select the positive clones in liquid cultures. Here we suggest the photochemical selection method of positive clones using photosensitive mutant of *E. coli* and vector system. We constructed the light sensitive mutant of *E. coli* and vector system. The selection system consists of hemH negative *E. coli* and p19hemH (derivative of pUC19) which contain SD sequence and hemH gene. Without proper promoter or promoter with genes, this mutant simply can not survive under light emission. From the system constructed, only light radiation was required to select positive colonies. Through this simple and efficient method, we could remove the clones containing self-ligation plasmids and selectively obtain positive clones in both liquid and solid cultures. Using the library obtained via this method, we are currently screening various useful genes from metagenome. Detailed results on this system will be reported. [This work was supported by the National Research Laboratory Program (2000-N-NL-01-C-237) of the Ministry of Science and Technology; the Center for Ultramicrochemical Process Systems (CUPS); and the BK21 project. Further supports by the LG Chem Professorship and IBM SUR program are greatly appreciated.]

### References

1. Hanjing Yang, Hachiro Inokuchi, and Julius Adler. Phototaxis away from the light by an *Escherichia coli* mutant accumulating protoporphyrin IX (1995). *Proc. Natl. Acad. Sci.* 92:7332-7336.
2. Allan Wallace Scruggs, Neal W. Woodbury. Optical processing of bacterial libraries for directed evolution (2003). *Biotechnol. Bioeng.* 84:445-451.