Role of N-terminal Sequences of Green Fluorescent Protein in *Escherichia coli*

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Green fluorescent protein (GFP), single-chain polypeptide, from jellyfish Aequorea victoria has become one of the most widely studied proteins for gene expression and protein localization in a variety of cells and organisms. Although its crystal structure was revealed in 1996, the role of each amino acid in N-terminus is still ambiguous. This study elucidates the obscurity of N-terminal role in GFP by single amino acid deletion using site-directed mutagenesis. The minimal functional region of GFP started at amino acid 5 in E.coli. Besides, each amino acid positioned from 5 to 11 was essential for the fluorescence in post-translational modification. Interestingly, single amino acid deletion in N-terminus of GFP affected on the syntheses of total and soluble GFP as well as GFP fluorescence in E.coli. Total and soluble synthesized GFP fractions were changed by 5'-UTR modifications or silent mutations in N-terminus of GFP. These results indicate that manipulating 5'-UTR and N-terminal sequences based on the designed strategy can provide the genuine reporting system that represents directly not only soluble expression, but also total expression.