

A Potent Fusion Expression Partner, Stress Responsive *Escherichia Coli* Protein A, Enhances the Solubility of Aggregation-prone Heterologous Proteins

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It has been reported that a population of stress-responsive proteins are significantly upregulated under the stress condition of growing cultures of *Escherichia coli* BL21(DE3) compared to the non-stress condition. The expression level of a stress-responsive protein called Protein A is significantly increased under the stress condition. When the stress-responsive protein is used as a fusion partner for the expression of recombinant proteins aggregated to inclusion bodies in *E.coli* cytoplasm, the solubility of the proteins is significantly enhanced, whereas almost all of the proteins are directly expressed in insoluble state.

To demonstrate that the recombinant proteins maintain their native conformation, hG-CSF is chosen as an example among the proteins fused with *E.coli* Protein A. The spectra of circular dichroism measured with the purified hG-CSF are identical to that of standard hG-CSF. It implies that the synthesized hG-CSF has native conformation. These results indicate that the bacterial stress-responsive protein can be potent fusion expression partner for aggregation-prone heterologous proteins in *E. coli* cytoplasm.