

Use of small heat shock proteins in the production of recombinant proteins in *Escherichia coli* and its applications

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Abstract

Proteome profiling of the inclusion body (IB) fraction of recombinant proteins produced in *Escherichia coli* has suggested that two small heat shock proteins, IbpA and IbpB, are the major proteins bound to the IBs. The small heat shock proteins (sHsps) belong to a ubiquitous family of stress-induced, low molecular mass (15-30 kDa) proteins in prokaryotes and eukaryotes^{1,2,3}. This study investigated the role of IbpA and IbpB in production of recombinant protein by using *E. coli*. The cytosolic production, and Tat- or Sec-dependent secretion of the recombinant protein in *E. coli* strains possessing different levels of IbpA and IbpB were examined by using an enhanced green fluorescent protein (EGFP) as a model protein. Analysis of fluorescence histograms and confocal microscopic imaging of the various EGFP-producing cells revealed that overexpression of the *ibpA* and/or *ibpB* genes enhanced inclusion body formation, whereas knocking out the *ibpA/B* genes enhanced secretory production. This implies that IbpA and IbpB are crucial to the production of recombinant proteins as well as the protection of recombinant proteins from degradation by cytoplasmic proteases. This strategy is also viable for regulating the production of other recombinant proteins, suggesting that manipulation of IbpA and/or IbpB levels may be a good strategy for qualitative and quantitative control of recombinant protein production in *E. coli*. [This work was supported by the Korean Systems Biology Research Grant, M10309020000-03B5002-00000] of the Ministry of Science and Technology].

References

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