An efficient bacterial surface display system based on novel outer membrane anchoring elements of Escherichia coli

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In this study, the Escherichia coli outer membrane proteomes were analyzed to identify potential candidates for using anchoring motifs. Of many proteins identified by mass spectrometry, the utility of outer membrane protein Y as an anchoring motif was examined. Two enzymes (an α-amylase from Bacillus subtilis or a lipase from Pseudomonas fluorescens SIK W1) were used for display as a target protein. SDS-PAGE, Western blot, and whole-cell enzyme activity measurement confirmed the successful expression of fusion proteins on the surface of E. coli. The fusion protein with Y232 as the anchoring motif had the highest expression level and enzyme activities. These results suggest that protein Y could be used as an anchoring motif of E. coli for displaying active enzymes and this system could be employed to various biocatalytic applications. [This work was supported by the Basic Science Research Program (2010-0008826) and Converging Research Center Program (2009-0093652) through the National Research Foundation of Korea funded by the Ministry of Education, Science and Technology]