

Baculovirus Polyhedrin as a Fusion Partner for Formation of Inclusion Body in *Escherichia coli*

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ABSTRACT

Baculoviral polyhedrin, which originated from *Autographa californica* nuclear polyhedrosis virus (AcNPV), was employed for the first time as a fusion partner for expression of foreign proteins in an *Escherichia coli* system. We characterized the expression of recombinant polyhedrin protein fused to green fluorescent protein (GFP). The polyhedrin fusion protein (~58 kDa) was successfully expressed as an insoluble inclusion body comprising approximately 30% of the total cellular protein. Interestingly, the polyhedrin fusion portion showed almost the same characteristics as the native baculoviral polyhedrin; it was rapidly solubilized under alkaline conditions, similar to the conditions found in the insect midgut. In addition, the polyhedrin fusion portion was degraded by specific alkaline proteases in insect *Plutella xylostella* midgut as well as by α -chymotrypsin, a protease that has similar properties to insect midgut alkaline proteases. These unique properties suggest that baculoviral polyhedrin is an advantageous fusion partner for production of special foreign proteins in *E. coli* expression systems (e.g., harmful proteins such as antimicrobial peptides and restriction endonucleases).

Key words: baculoviral polyhedrin, AcNPV, inclusion body, fusion partner, green fluorescent protein, *Escherichia coli*

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