Recombinant human G-CSF synthesized in *E. coli* BL21(DE3) suffers from C-terminal degradation that is effectively prevented by N-terminal protein fusion

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The solubility of human granulocyte colony-stimulating factor (hG-CSF) markedly increased in *E. coli* cytoplasm by using N-terminal fusion partner proteins. More importantly, we found that the C-terminal region of hG-CSF suffers from proteolytic degradation when hG-CSF is directly expressed in *E. coli* BL21(DE3). The recombinant hG-CSF that is expressed with an N-terminal fusion partner is effectively protected from the proteolysis. It seems that since the N-terminus of hG-CSF is located very close to the C-terminus, the presence of the N-terminal fusion partner masks the C-terminal region of hG-CSF and protects it from proteolytic degradation by *E. coli* protease(s). It is believed that rapid proteolysis occurs at the C-terminus of hG-CSF that is very easily exposed to *E. coli* protease(s) during a short period following protein synthesis and prior to completion of the formation of the inclusion body.