

Biosynthesis of ultra-molecular weight spider silk in *Escherichia coli*

김지용, 정해나, xiao-xia xia, 이상엽<sup>†</sup>  
한국과학기술원  
(leesy@kaist.ac.kr<sup>†</sup>)

Naturally found spider silk and silk-like elastin protein attract attention due to its outstanding physical properties coming from the highly repeated structure and size. However, the exceptional structure and size limits expression in heterologous hosts, where the repetitive sequences in mRNA create extensive secondary structures. And these structures decrease ribosome processivity and assist mRNA degradation. Using the naturally found protein, spider dragline silk protein, we present techniques to solve biological problems that occurred: using metabolic engineering as well as decreasing RNase to assist production of the protein. The newly synthesized native-size spider dragline silk protein produced increased titer than those reported previously. The results provide insight into approaches to control expression of useful recombinant proteins containing high molecular weight and highly repetitive sequence.

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