Expression and Purification of Recombinant Spider Silk Proteins

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The spider silks, especially the dragline and the flagelliform silk proteins arouse interests in these days because of excellent mechanical properties. The spider silks have highly repeated amino acid sequences which are composed with several amino acid motifs so that it is hard to express in Escherichia coli. We redesigned sequences of the spider silks and expressed the dragline silk (estimate MW is 26.9 kDa) and the flagelliform silk (estimate MW is 25.2 kDa) successfully in E. coli system. The expressed recombinant silk proteins were purified by immobilized metal affinity chromatography with his-tag. In addition, we present structure-activity relationship of the spider silks to suggest the way of prediction of protein structure and function from amino acid sequences.