Native-quality spider silk fiber produced from metabolically engineered *Escherichia coli*

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Spider dragline silk is simultaneously light, fine, strong, and tough. It is thus an ideal material for many applications. Here we develop a sustainable process to mass-produce artificial silk while maintaining the amazing properties of native silk. First, we pieced together the silk gene from oligonucleotides, and then inserted into the expression host, *Escherichia coli*. Systems metabolic engineering of *E. coli* was performed to overcome the difficulties due to the unique characteristics of the silk protein. Next, a simple, easy scale-up, but robust purification process was developed for the silk protein. Later, the purified protein was spun into water-insoluble, beautiful silk fiber. Notably, the artificial fiber displayed the tenacity, elongation, and Young's modulus values that are comparable to those of the native silk. This platform would enable broader industrial and biomedical applications for spider silk. [This work was supported by the Converging Research Center Program (2009-0082332) of MEST through NRF. Further support by the World Class University Program (R32-2009-000-10142-0) of the MEST is appreciated].