

Fabrication of Silk Nanofibers Using Recombinant Shematin

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Marine pearl oyster, *Pinctada fucata*, produces various kinds of organic matrix proteins for biomineralization. Shematrins are expected to be one of them and have high glycine contents. It is also interesting that shematrins contain repetitive silk-like peptides, which are similar to those of spiders and silkworms. We specifically chose shematin-5 as our target because it has Gly-Gly-(Leu/Tyr) domain. This tripeptide motif frequently appears in the protein, thought to build up 3_1 -helix secondary structure when formulated by appropriate methods. Thus, fibers made of shematin-5 by wet spinning or film casting might show remarkable extensibility. In the present work, we constructed recombinant *Escherichia coli* system harboring codon-optimized gene of hexahistidine-fused shematin-5. We successfully expressed and purified recombinant shematin-5. Using this protein, we fabricated electrospun nanofibers and measured its mechanical properties. This work can be truly valuable for researchers who need source to study the role of protein for calcification process and mechanical functions in marine environment. Moreover, we expect to apply this protein in medical and textile fields.