

Functional Recombinant Mussel Adhesive Protein

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Mussel adhesive proteins have been suggested as a basis for environmentally friendly adhesives in aqueous conditions and in medicine. However, attempts to produce functional and economical recombinant mussel adhesive proteins (mainly foot protein type 1) in several systems have failed. Here, the cDNA coding for *Mytilus galloprovincialis* foot protein type 5 (Mgfp-5) was isolated for the first time. Using this cDNA we produced a recombinant Mgfp-5 fused with a hexahistidine affinity ligand, which was expressed in a soluble form in *Escherichia coli*, and was highly purified using affinity chromatography. The adhesive properties of purified recombinant Mgfp-5 were compared with the commercial extracted mussel adhesive Cell-Tak by investigating adhesion force using atomic force microscopy, material surface coating, quartz crystal microbalance, and mammalian cell attachment. Even though further macro-scale assays are needed, these micro-scale assays showed recombinant Mgfp-5 has significant adhesive ability and may be useful as a bioadhesive in medical or underwater environments.