

Adhesive silk fibroin by addition of RGD-conjugated mussel adhesive protein

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Based on superior mechanical properties, silk has recently been exploited in various fields. However, due to lack of biological functions and relatively poor biodegradation of silk fibroin, its usage has been limited in applications related to cells and tissues. In this work, we improved the overall characteristics of silkworm silk fibroin(SF) by blending of RGD peptide-fused recombinant mussel adhesive protein (MAP-RGD). Recombinant MAP-RGD-blended SF improved not only bulk-scale adhesive ability but also micro-scale adhesiveness to cells and various biomolecules, for example, adhesion, proliferation, and spreading of mammalian cell as well as the efficient attachment of biomolecules. In addition, the hydrophilicity, swelling, and biodegradability of the MAP-RGD-blended SF material were improved, without notable hampering of the original mechanical properties of SF. Adhesive silk fibrous scaffold would be widen its application fields successfully, especially in biomedical engineering and tissue engineering.