

Product Application Bulletin

Cell adhesion biomaterial based on mussel adhesive protein fused with RGD peptide

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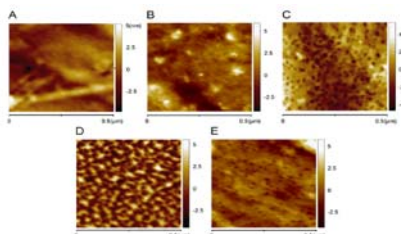
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Abstract:

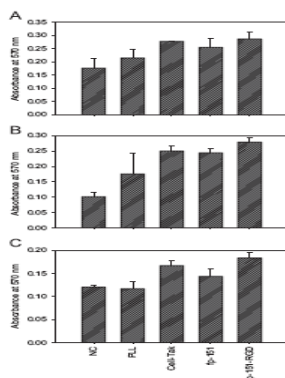
We designed and constructed a hybrid of the mussel adhesive protein (MAP) fp-151, which is a fusion protein with six type 1 (fp-1) decapeptide repeats at each type 5 (fp-5) terminus. Through various cell-adhesion analyses, we demonstrated that fp-151 has the potential to be used as a cell or tissue bioadhesive. In the present study, to improve the cell-adhesion properties of fp-151, we designed a new cell-adhesive protein, fp-151-RGD, which is a fusion with the GRGDSP residues, a RGD peptide sequence that has previously been identified at the cell-attachment site of fibronectin, at the C-terminus of fp-151. Although recombinant fp-151-RGD maintained the advantages associated with fp-151, it showed superior spreading ability, which is important for cell proliferation under serum-free conditions, as well as better cell-adhesion ability compared with other commercially produced cell-adhesion materials such as PLL and the naturally extracted MAP mixture Cell-Tak. Therefore, the new recombinant fp-151-RGD is suitable for use as a cell-adhesion material in cell culture or tissue engineering, and in any other area where efficient cell adhesion is required.

Figure 1. AFM topographies of cells cultured on a variety of surfaces



AFM topographies of (A) uncoated surface, (B) unmodified fp-151-coated surface, (C) modified fp-151-coated surface, (D) unmodified fp-151-RGD-coated surface, and (E) modified fp-151-RGD-coated surface.

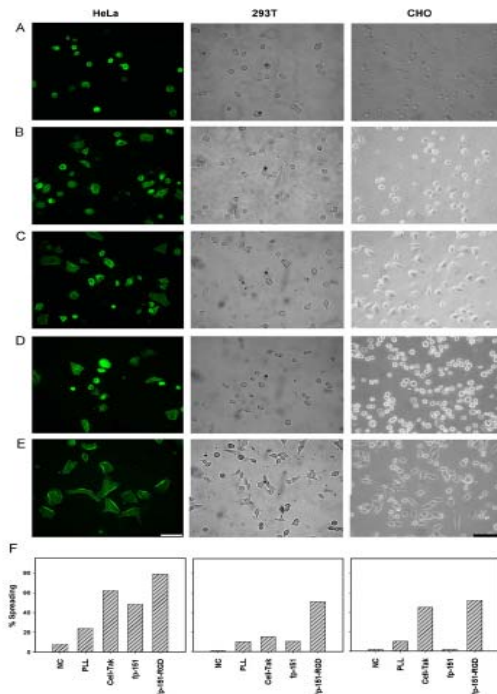
Figure 2. Cell adhesion assay



Cell adhesion of (A) human HeLa, (B) human 293T, and (C) hamster CHO cells on uncoated (NC), PLL-, Cell-Tak-, fp-151-, and fp-151-RGD-coated polystyrene surfaces. Each value and error bar represents the mean of triplicate samples and its standard deviation.

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Figure 3. Cell spreading assay



Cell spreading of human HeLa, human 293T, and hamster CHO cells on (A) uncoated (NC), (B) PLL-, (C) Cell-Tak-, (D) fp-151-, and (E) fp-151-RGD-coated polystyrene surfaces. (F) The numbers of spreading cells were plotted as percentages of the total number of cells for each coated surface.

References:

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Note: The above study was published:

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