

Mussel Adhesive proteins for new generation of biomaterials: Applied materials for tissue engineering, drug delivery and microarray technologies

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Mussel adhesive proteins (MAPs) have been generally regarded as promising bioadhesives thanks to their fascinating properties including strong and flexible adhesion in any substrates in wet environments. Currently, poly-cationic property as well as the biocompatible adhesion enables them to be used as new generation of biomaterials for the development of medical devices and drug delivery system. Here, we present some examples of potential uses of MAPs as a successful biomaterial. Firstly, MAPs allowed cell and tissue adhesion for efficient culture, and directly connect with two distinct organic moieties and can be applied to tissue integration and implant fixation. Secondly, MAPs were used as protein-based non-viral gene delivery materials in eukaryotic cells. Finally, MAPs were applied as an immobilizing material for microarray fabrication, where non-specific binding problem of background may be overcome. Our results suggest that MAPs may contribute to successful development of new biomaterials, although many challenges still remain in the MAP application.