

Silver Nanoparticle-Forming Mussel Bioadhesive as a Novel Surface-Independent Antibacterial Coating Material

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During implant surgeries, antibacterial agents are needed to prevent bacterial infections, which can cause the formation of biofilms between implanted materials and tissue. Silver nanoparticles have been considered to be a promising antibacterial agent due to their broad antibacterial activity. Mussel adhesive proteins (MAPs) are bioadhesives that show strong adhesion and coating ability on various surfaces even in wet environment. Here, we proposed a novel surface-independent antibacterial coating biomaterial by incorporating the strong adhesion ability of recombinant MAP into a silver-binding peptide. This sticky recombinant fusion protein enabled the efficient coating on target surface and the easy generation of silver nanoparticles on the coated-surface. The synthesized silver nanoparticles showed excellent antibacterial efficacy against various bacterial strains, and also revealed good cytocompatibility with mammalian cells. Thus, this facile surface-independent silver nanoparticle-generating antibacterial coating material has great potential to be used for the prevention of bacterial infection in diverse biomedical fields.