

Novel protein immobilization through chimeric Silaffin-like peptide

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Novel immobilization techniques have many potential applications. Although sol-gel method has been used to encapsulate various biomolecules, the harsh reaction condition limits its application. Recently, it is reported that Silaffin polypeptides derived from *Cylindrotheca fusiformis* catalyze the silica formation *in vitro* at mild condition. The synthetic peptide(R5), the repeat unit of the Silaffin polypeptide without posttranslational modification, shows the activity of silica formation within minutes when added to a silica precursor at ambient condition. In our research, we designed the GFP chimeric protein with R5 peptide. R5 peptide was genetically fused to C-terminus or N-terminus of the target protein(GFP). The biosilicification *in vitro* was carried out with the GFP-R5 chimeric protein by mixing with TMOS, a silica precursor. SEM and IR spectroscopy analysis confirmed that the GFP was encapsulated in a silica matrix. The efficiency of protein immobilization was compared between GFP-R5 chimeric protein and R5 peptide alone. Compared with R5 peptide alone, GFP-R5 chimeric protein showed excellent immobilization efficiency. This novel immobilization method will be applicable for stabilizing commercially valuable enzyme & proteins.