Construction of Artificial Metalloproteins by Utilizing Heme Acquisition Protein from *Acinetobacter baumannii*

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Acinetobacter baumannii is a gram-negative and opportunistic bacterial pathogen which is infamous for its multidrug resistance. A recent study has reported that under iron restrictive conditions, *A. baumannii* can secrete a hemophore called HphA to obtain heme from hosts for use as an iron source.[1] Meanwhile, our group has been researching about another heme acquisition protein, HasA, which is secreted by some other gram-negative bacteria such as *Pseudomonas aeruginosa* for the same purpose. We have succeeded in the reconstitution of HasA with various synthetic metal complexes through heme substitution.[2,3] Some of the reconstituted HasA proteins have been applied to the growth inhibition or photosterilization of *P. aeruginosa* by exploiting the pathogen's heme uptake system. Although HphA and HasA have significantly different structures, they share some properties, such as change of protein's conformation upon heme binding/release, and high exposure of heme binding pocket to the solvent. Therefore, we proposed that it is possible to also incorporate non-native metal complexes into HphA.

In this work, we confirmed our hypothesis by attempting reconstitution of HphA with various synthetic metal complexes (**Figure**). The metal complexes were chosen to include different backbone structures and metal centers to test the versatility of HphA. After reconstitution, analyses of the resulting solutions by UV-Vis spectroscopy and ESI-TOF MS indicate the successful incorporation of all complexes into HphA.

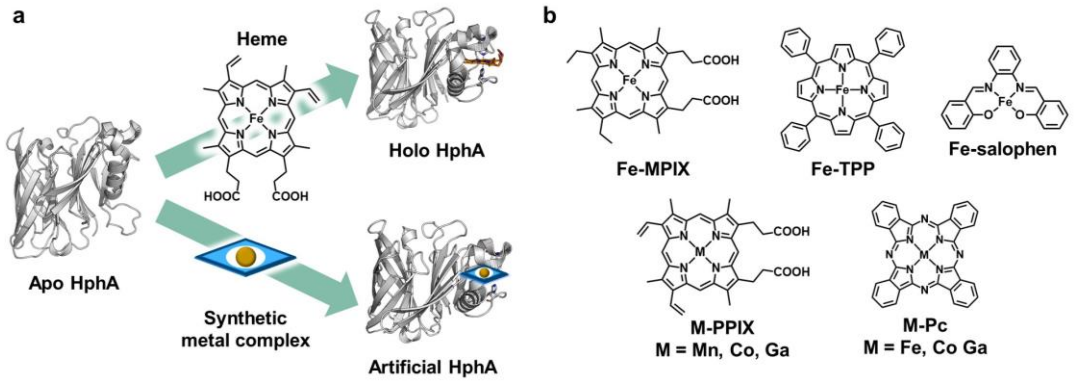

Figure. a Concept of reconstitution of HphA **b** Synthetic metal complexes used in this work

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