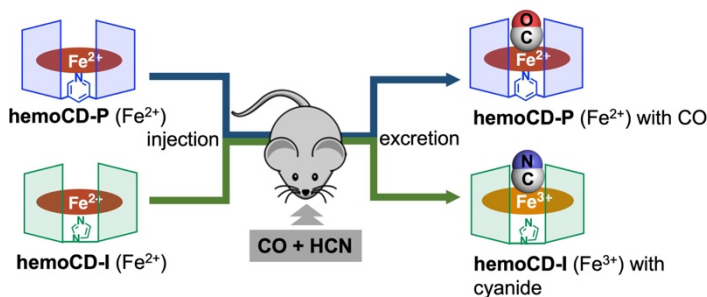
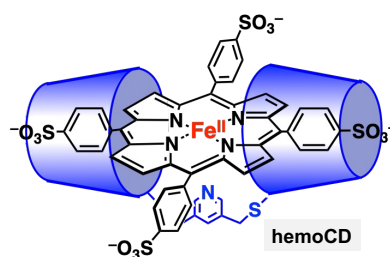


Biomimetic heme protein-model compounds, hemoCD, that are useful as a toxic gas scavenger *in vivo*

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Hemoglobin and myoglobin are well-known as an oxygen-binding protein in biological systems. Heme cofactors are surrounded by protein matrix in these proteins, in which isolation of heme in proteins is essential to achieve reversible oxygen binding in biological systems. To mimic the function of hemoglobin and myoglobin, a water-soluble synthetic porphyrin iron complex (FeTPPS) is encapsulated by per-*O*-methylated β -cyclodextrin (CD) dimer. The 1:1 supramolecular complex of FeTPPS with CD dimer, named by hemoCD, is a water-soluble synthetic hemoglobin and myoglobin model that can reversibly binds molecular oxygen (O_2) in aqueous solution as well as in biological media (in cell cultures and *in vivo*). Recent studies in our laboratory revealed that hemoCD can binds not only O_2 but CO, NO, HCH, and H_2S in a reversible manner depending on its iron oxidation state (II/III). Interestingly, the binding tendency of hemoCD is quite similar to native hemoglobin and myoglobin. As for application, our hemoCD is superior to be used as a chemical antidote against CO, HCN, and H_2S , because of its higher binding affinities than native hemes and its fast urinary clearance from the animal body. The synthesis and application of hemoCD will be overviewed.

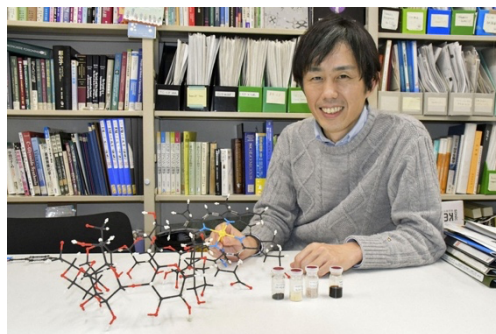


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RESEARCH FIELD:

Organic Chemistry, Bioinorganic Chemistry, Biological Chemistry