CHEMICAL RECONSTRUCTION OF BIOLOGICAL FUNCTIONS OF PORPHYRIN CONTAINING PROTEINS

Iwao Tabushi
Department of Synthetic Chemistry, Faculty of Engineering,
Kyoto University, Yoshida, Kyoto 606, Japan

Hemoproteins, proteins containing a porphyrin·metal complex in their active sites show a wide variety of biological functions such as oxygen transport, electron transport, oxygenation via oxygen activation, or catalytic decomposition of peroxide. Nevertheless, their local situations of active sites are much the same.

To clarify this remarkable difference in biological functions, chemical models were prepared to mimic every "isolated" elementary function to see which factor is the most significant to give its own unique activity.

A $TPP \cdot Mn^{+++}-O_2-NaBH_4$ system as a P-450 model, a membrane functionalized with $TPP \cdot Mn^{III}$ as a electron transport model and $TPP \cdot Zn^{++}-Q$ as a reaction center model of the photosynthesis were studied.