SYNTHESIS OF HAEMOXYDASE MODEL

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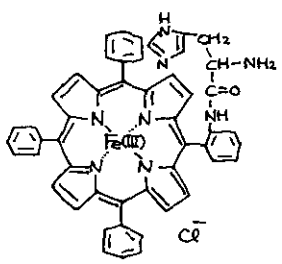
As the model for cytochrome P-450, compound 1 was prepared from mono-o-aminotetraphenyl porphyrin and histidine whose amino groups were protected by carbobenzyloxy groups by means of dicyclohexylcarbodiimide to which iron was introduced on treatment with ferrous acetate, and the mechanism of the oxygen activation was investigated.

Pale yellow dichloromethane solution of this haem(1) exhibited its absorption maxima in the visible region: 690, 655, 585, 512, 418, and 385 nm.

These absorption maximum of 1 was considerably defferent from that of TPPFe(III)Cl in the presence of ten-thousand times molar imidazole (system A),but it was practically the same as that of TPPFe(III)Cl in dichloromethane.

When air was replaced by Ar and the benzene-ethanol solution of 1 was treated with sodiumborohydride, its absorption maxima changed into 570, 536, and 429 nm. which are identical with that of system A reduced by sodiumborohydride under Ar.

Cyclohexene was very effectively oxygenated with molecular oxygen in the presence of compound 1, system A, or system A in the presence of thiophenol.



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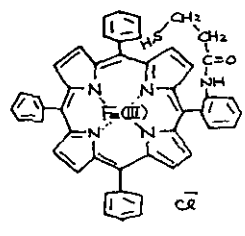

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In the present work,it was demonstrated that both imidasole and thiophenol activated oxygen, but especially when both two were cooperating,the oxygen activation was most effective. This is in a good agreement with the oxygen activation mechanism proposed for native cytochrome P-450.