Compound II in Cytochrome $P450_{BM-3}$ is Basic: Implications for the Reactivity of Oxidative Heme Proteins

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Recently, with the use of EXAFS and Mössbauer spectroscopy, it has been shown that chloroperoxidase compound II (CPO-II) is protonated at pH 6.5. This result has prompted the investigation of whether this intermediate 1) could be trapped in cytochrome $P450_{BM3}$ and 2) is protonated at physiological pH as in CPO-II. Using Mössbauer spectroscopy and freeze-quench techniques we have characterized compound II in $P450_{BM3}$ and assigned this intermediate to be a protonated ferryl. This result has implications for the mechanism of oxygen insertion by cytochrome P450s.