

## SYNFACTS Highlights in Current Synthetic Organic Chemistry

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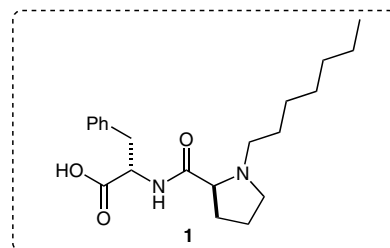
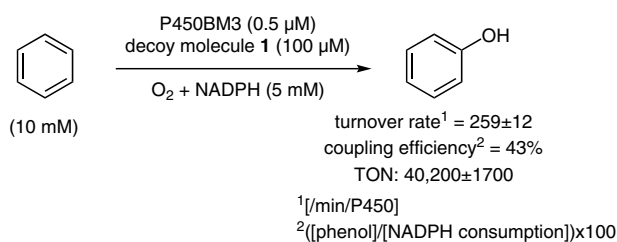
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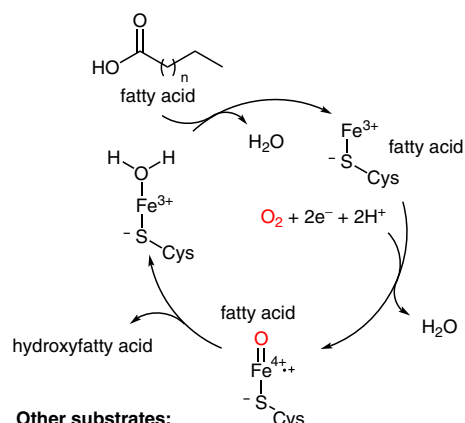
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Direct Hydroxylation of Benzene to Phenol by Cytochrome P450BM3 Triggered by Amino Acid Derivatives  
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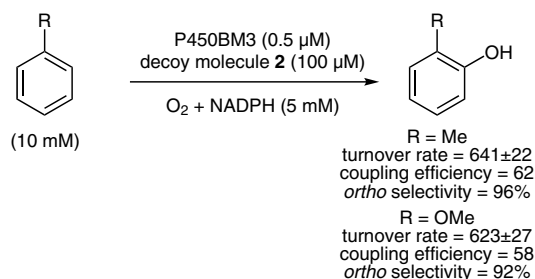
## Direct Hydroxylation of Benzene to Phenol by Cytochrome P450BM3



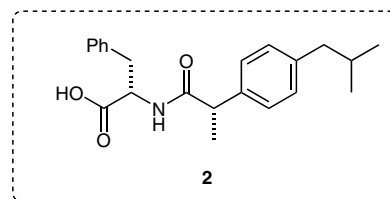
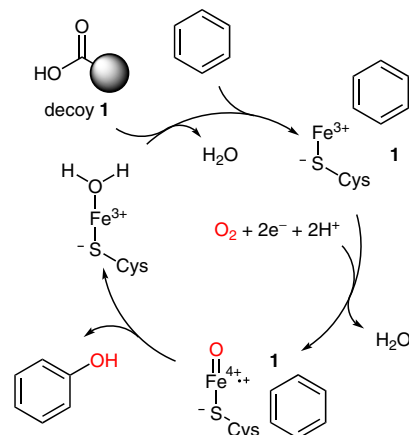
### General reaction mechanism of P450BM3:



### Other substrates:



### Plausible reaction mechanism:



**Significance:** The Watanabe and Shoji groups report an oxidation of benzene to phenol. The reaction is catalyzed by cytochrome P450BM3 using dipeptide **1**, which can be encapsulated into the enzyme with a substrate and is inert toward the oxidation. The methodology is also applicable to toluene and anisole, and the oxidized products are obtained with excellent regioselectivities.

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**Comment:** The authors have previously developed the oxidation of aliphatic C–H bonds by a similar strategy (*Angew. Chem. Int. Ed.* **2011**, 50, 5315), which is further extended to the oxidation of arenes. The use of unreactive decoy molecule **1** with arenes enables the desired transformation. Although a stoichiometric amount of NADPH is required, the presented methodology can be a nice alternative approach to access phenol derivatives.