

REVIEW

Structural domains of P450-containing monooxygenase systems

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All known P450-containing monooxygenase systems share common structural and functional domain architecture. Apart from P450 itself, these systems can comprise several fundamentally different protein components or domains, all of which are shared by other multicomponent/multidomain enzyme systems with various functions: FAD flavoprotein or domain, FMN domain, Fe₂S₂ ferredoxin, Fe₃S₄ ferredoxin, and cytochrome *b*₅. Either FMN domain, ferredoxins or cytochrome *b*₅ serve as the electron transport intermediate between the FAD domain and P450. The molecular evolution of both P450-containing systems and of each particular component does not follow phylogeny in general. Gene fusion and horizontal gene transfer events can lead to the appearance of novel redox chains in the same manner that artificial chimeric proteins can be constructed by humans. Recent studies using genetic and protein engineering techniques to investigate the separate domains and their interaction are described.

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