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Research Interests

Dr. Porter's research is focused on two areas of cytochrome P450 biology and biochemistry: structure-function analysis, and the expression of a functional mammalian P450 monooxygenase system in *Escherichia coli* and *Salmonella typhimurium*. Cytochrome P450 is the generic name for a widely distributed family of over 300 enzymes that, in higher vertebrates, are involved in the metabolism of drugs, xenobiotics, and carcinogens, and in the biosynthesis of steroid hormones and eicosanoids. The ability to express this heme protein, along with its electron transfer flavoprotein partner, cytochrome P450 reductase, in catalytically active form in bacteria has permitted both site-directed mutagenesis studies aimed at elucidating mechanisms of electron transfer between these proteins, and the development of biotechnological applications that utilize this versatile monooxygenase system.



Selected Research Publications/Presentations

Porter TD and Larson JR. Expression of mammalian P450's in *Escherichia coli*. *Methods in Enzymology*, Vol. 206, MR Waterman and EF Johnson, Eds., Academic Press, pp. 108-116., 1991.

Porter, TD. Mutagenesis at a highly conserved phenylalanine in cytochrome P450 2E1 affects heme incorporation and catalytic activity. *Biochemistry* 33, 5942-5946, 1994.

Porter, TD. Correlation between codon usage, regional genomic nucleotide composition, and amino acid composition in the cytochrome P-450 gene superfamily. *Biochim. Biophys. Acta* 1261, 394-400, 1995.

Dong, J and Porter, TD. Coexpression of mammalian cytochrome P450 and reductase in *Escherichia coli*. *Arch. Biochem. Biophys.* 327, 254-259, 1996.

Tang, Y and Porter, TD. (1997) Deletion Analysis of the FAD Domain of NADPH-Cytochrome P450 Reductase. in *Flavins and Flavoproteins 1996*, Kenneth J. Stevenson, Vincent Massey, and Charles H. Williams, Jr., Eds., University of Calgary Press, Calgary, Alberta, Canada, in press.

Tang, Y and Porter, TD. (1997) Cloning of Human Squalene Epoxidase. in *Flavins and Flavoproteins 1996*, Kenneth J. Stevenson, Vincent Massey, and Charles H. Williams, Jr., Eds., University of Calgary Press, Calgary, Alberta, Canada, in press.

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