Curriculum Vitae

Susan Colette Daubner, Ph. D.
Professor, Department of Biological Sciences
St Mary's University, San Antonio TX 78228

Education and Experience:

B. S., Zoology, University of Wisconsin-Milwaukee, Milwaukee, Wisconsin, 1978.

Research Assistant, Laboratory of Dr. Ruth Phillips, Department of Zoology, University of Wisconsin-Milwaukee, Milwaukee, Wisconsin 1977-78.

Ph. D., Biological Chemistry, University of Michigan, Ann Arbor MI, Research Director: Prof. Rowena Matthews. Worked on enzymes of folate metabolism. Thesis: Purification and Properties of Methylenetetrahydrofolate Reductase. 1982.

Postdoctoral Research Fellow, Laboratory of Dr. Stephen J. Benkovic. Worked on enzymes of purine de novo biosynthesis. Department of Chemistry, Pennsylvania State University, University Park, Pennsylvania, -1986.

Research Scientist, Department of Biochemistry and Biophysics, Texas A&M University, College Station TX, 1986-2006.

Professor, Department of Biological Sciences, St Mary's University, San Antonio TX, Aug 2006-present.

Membership in Professional Societies:

American Society for Biochemistry and Molecular Biology
American Association for the Advancement of Science
American Chemical Society: also member Biological Chemistry Division
National Science Teachers Association
American Association of University Professors: national association and St. Mary's University chapter

Recent Relevant Published Articles

27. *Daubner, S. Colette* and Fitzpatrick, Paul F. (1999) Site-directed Mutants of Charged Residues in the Active Site of Tyrosine Hydroxylase. *Biochemistry* **38**, 4448-4454.

30. *Daubner, S. Colette*, **Melendez, Julie**, and Fitzpatrick, Paul F. (2000) Reversing the Substrate Specificities of Phenylalanine and Tyrosine Hydroxylase: Aspartate 425 of Tyrosine Hydroxylase Is Essential for L-DOPA Formation. *Biochemistry* **39**, 9652-9661.

35. *Daubner, S. Colette*, Moran, Graham R., and Fitzpatrick, Paul F. (2002) Role of Tryptophan Hydroxylase Phe313 in Determining Substrate Specificity *Biochem. Biophys. Res. Commun.* **292**, 639-641.

46. *Daubner, S. Colette*, **McGinnis, J. Thomas, Gardner, M., Kroboth, Stacie L., Morris, Adam** R., and Fitzpatrick, Paul F (2006) A Flexible Loop in Tyrosine Hydroxylase Controls Coupling of Amino Acid Hydroxylation to Tetrahydropterin Oxidation. *J Mol Biol.* **359**, 299.

51. *Daubner, S. Colette*, **Le, Tiffany**, and Wang, Shanzhi (2010), The R Domain of Tyrosine Hydroxylase and Regulation of Dopamine Synthesis. *Arch. Biochem. Biophys*. **508**, 1-12.

52. Wang, Shanzhi, Lasagna, Mauricio, *Daubner*, *S. Colette*, Reinhart, Gregory, and Fitzpatrick, Paul F (2011) Effect of Phosphorylation of Tyrosine Hydroxylase on the Dynamics of the Regulatory Domain, *Biochemistry* **50**, 2364-70

53. *Daubner, S Colette* Avila, **Audrey M., Bailey, Johnathan, Barrera, Dimitrios, Bermudez, Jacklyn Y., Giles, David, Olivas, Crystal A.**, **Shaheen, Noel, Thompson, Janie, Vasquez, Jessica,** Oxley, Susan, and, Fitzpatrick, Paul F., (2013) Mutagenesis of a Specificity-Determining Residue in Tyrosine Hydroxylase Establishes that the Enzyme is a Robust Phenylalanine Hydroxylase but a Fragile Tyrosine Hydroxylase, *Biochemistry*, **52**,1446-55.

Evolution of the aromatic amino acid hydroxylases

Tyrosine hydroxylase (TyrH) evolved from phenylalanine hydroxylase (PheH) about 700 million years ago; prior to that, only phenylalanine could be hydroxylated by ancient hydroxylases. Critical in the evolution of the new activity was a mutation in a flexible loop containing aspartate425. In PheH the homologous loop has a valine in that position. We have studied the function of this loop by making site-directed mutations. We studied variant forms of TyrH with every other amino acid at position 425 and found that the more hydrophobic the substitution, the less able the variant is to hydroxylate tyrosine. While such variants cannot hydroxylate tyrosine, they can hydroxylate phenylalanine. Furthermore, they are still able to react with oxygen and cofactor tetrahydropterin in the presence of tyrosine. We propose that the flexible loop containing position 425 folds tightly onto substrates to prevent the entry of water into the active site. We speculate why the amino acid R group at position 425 is critical for this purpose when tyrosine is bound but not when phenylalanine is bound.