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[Substrate specificity and spectroscopic properties 2,4-dichlorophenoxyacetic acid/alpha-ketoglutarate dioxygenase](#)

Authors: [Ruth Elizabeth Saari](#), [Michigan State University](#)

Summary: 2,4-Dichlorophenoxyacetic acid (2,4-D) was one of the first herbicides used which act by mimicking a plant growth hormone; it and related phenoxy herbicides are still in wide use today. It is not highly persistent in soil, due to microbial biodegradation. In the soil isolate *Ralstonia eutropha* JMP134, the first step in catabolism of 2,4-D is catalyzed by 2,4-D/(\$\alpha\$-ketoglutarate (\$\alpha\$-KG)-dioxygenase (TfdA). This O₂ and Fe(II) dependent enzyme couples the oxidative decarboxylation of \$\alpha\$-KG to the oxidation of 2,4-D producing 2,4-dichlorophenol and glyoxylate. TfdA is a useful model protein for studying \$\alpha\$-KG-dependent dioxygenases because it is readily purified and assayed

Downloadable Article, 1998

English

Publication: Dissertation Abstracts International

Publisher: 1998



 Peer-reviewed

[Partial purification and characterization of bovine liver aspartyl beta-hydroxylase](#)

Authors: [R S Gronke](#), [D J Welsch](#), [W J VanDusen](#), [V M Garsky](#), [M K Sardana](#), [A M Stern](#), [P A Friedman](#)

Summary: In vitro hydroxylation of aspartic acid has recently been demonstrated in a synthetic peptide based on the structure of the first epidermal growth factor domain in human factor IX (Gronke, R. S., VanDusen, W. J., Garsky, V. M., Jacobs, J. W., Sardana, M. K., Stern, A. M., and Friedman, P. A. (1989) Proc. Natl. Acad. Sci. U.S.A. 86, 3609-3613). The putative enzyme responsible for the posttranslational modification, aspartyl beta-hydroxylase, has been shown to be a member of a class of 2-ketoglutarate-dependent dioxygenases, which include prolyl-4- and lysyl-hydroxylases. In the present study, we describe the solubilization with nonionic detergent of the enzyme from bovine liver microsomes and its purification using DEAE-cellulose followed by heparin-Sepharose. No additional detergent was required during purification. The partially purified enzyme preparation was found to contain no prolyl-4- or lysyl-hydroxylase activity. Using a synthetic peptide based on the structure of the epidermal growth factor-like region in human factor X as substrate, the apparent K_m values for iron and alpha-ketoglutarate were 3 and 5 μM , respectively. The enzyme hydroxylated the factor X peptide with the same stereospecificity (erythro beta-hydroxyaspartic acid) and occurred only at the aspartate corresponding to the position seen in vivo. Furthermore, the extent to which either peptide (factor IX or X) was hydroxylated reflected the extent of hydroxylation observed for both human plasma factors IX and X

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Publisher: 1990



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[Aspartyl beta-hydroxylase: in vitro hydroxylation of a synthetic peptide based on the structure of the first growth factor-like domain of human factor IX](#)

Authors: [R S Gronke](#), [W J VanDusen](#), [V M Garsky](#), [J W Jacobs](#), [M K Sardana](#), [A M Stern](#), [P A Friedman](#)

Summary: beta-Hydroxylation of aspartic acid is a post-translational modification that occurs in several vitamin K-dependent coagulation proteins. By use of a synthetic substrate comprised of the first epidermal growth factor-like domain in human factor IX and either mouse L-cell extracts or rat liver microsomes as the source of enzyme, in vitro aspartyl beta-hydroxylation was accomplished. Aspartyl beta-hydroxylase appears to require the same cofactors as known alpha-ketoglutarate-dependent dioxygenases. The hydroxylation reaction proceeds with the same stereospecificity and occurs only at the aspartate corresponding to the position seen in vivo. Further purification and characterization of this enzymatic activity should now be possible

 **Article**, 1989

Publication: Proceedings of the National Academy of Sciences of the United States of America, 86, 198905, 3609

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