

Robert Parker

Web Bio

Information

Biography

Biographical Statement

My research program focuses primarily on mechanisms of regulation of vitamin E and vitamin K status. We are addressing important gaps in the metabolic processing of the various forms of vitamins E and K in humans, including basic metabolic phenomena and applied aspects of their bioavailability. We recently (2002) identified and published the first enzyme-mediated pathway of vitamin E metabolism, and much of our current work centers on understanding how this pathway is regulated, the forms of vitamin E for which it is most relevant, and means by which the pathway can be manipulated to alter vitamin E status. Other efforts are aimed at elucidating how vitamin E is secreted from cells, with particular relevance to intestine and liver (bile). We apply a combination of cell culture, animal studies (genetically modified mice), and human metabolic studies to this research. The outcome of this research has impacted, and will continue to impact, the dietary recommendations for these nutrients (and foods containing them), in addition to providing insight as to their role in human health. My teaching program centers on nutritional and physicochemical aspects of foods, providing undergraduate and graduate students with a broad-based background in chemical and physical characteristics/phenomena which impact food quality, and on various subjects of current interest, including food safety and biotechnology. In addition, I teach in graduate courses in nutritional biochemistry, addressing subjects of fat soluble vitamins, lipoproteins, and lipid status. I carry a joint appointment in the Department of Food Science.

Professional

Current Professional Activities

Cornell University Graduate Field Membership: Nutrition; Food Science and Technology

Teaching in the areas of nutrition and food quality and nutritional biochemistry. Research in the areas of metabolism and bioavailability of fat soluble nutrients, particularly vitamin E and vitamin K

Research

Current Research Activities

Biochemical and physiological factors influencing metabolism, transport and bioavailability of vitamin E and vitamin K. Focus on cytochrome P450-mediated

vitamin E metabolism and on mechanisms of cellular secretion of vitamin E that influence vitamin E status, including response to supplementation and impact of genotype. Additional focus on novel pathways of metabolism of vitamin K, particularly those responsive to the anticoagulant warfarin.

Extension

Education

Education

- Ph.D. 1980 - Oregon State University, Food Science
- M.S. 1978 - Oregon State University, Food Science
- B.S. 1974 - Duke University, Zoology and Botany

Courses

Courses Taught

[NS 3450](#) Nutritional and Physicochemical Aspects of Foods

NS 6310 Micronutrients: Function, Homeostasis and Assessment

NS 6320 Regulation of macronutrient metabolism

Websites

Administration

Administrative Responsibilities

Chair, DNS Curriculum Committee

DNS representative to CALS Curriculum Committee

Publications

Selected Publications

Ulatowshi L, Parker R, Davidson C, Yanjanin N, Kelley TJ, Corey D, Atkinson J, Parter F, Arai H, Walkley SU, Manor D. 2011. Altered vitamin E status in Niemann-Pick type C disease. *J Lipid Research* 52:1400-1410.

Morley S, Danielpour D, Parker R, Atkinson J and Manor D. 2010. The tocopherol transfer protein sensitizes prostate cancer cells to vitamin E. *J Biol Chem* 285:35578-35589.

Bardowell, SA, Stec, D and Parker RS. 2010. Common variants in cytochrome P450

4F2 exhibit altered vitamin E-omega-hydroxylase activity. *J Nutrition* 140:1901-1906

Ohnmacht S, Nava P, West R, Parker R, Atkinson J. (2008) Inhibition of oxidative metabolism of tocopherols with omega-N-heterocyclic derivatives of vitamin E. 2008. *Bioorganic & Medicinal Chemistry* 16(16), 7631-7638.

Sontag, TJ and Parker, RS. (2007) Influence of major structural features of tocopherols and tocotrienols on their omega-oxidation by tocopherol-omega-hydroxylase. *J Lipid Res* 48(5), 1090-1098.

Frank J, Budek A, Lundh T, Parker RS, Swanson JE, Lourenco CF, Gago B, Jaranjinha J, Vessby B and Kamal-Eldin A. (2006) Dietary flavonoids with a catechol structure increase alpha-tocopherol in rats and protect the vitamin from oxidation in vitro. *J. Lipid Res* 47(12), 2718-2725.

You C-S, Sontag TJ, Swanson JE, Parker RS. (2005) Long-chain carboxychromanols are the major metabolites of tocopherols and tocotrienols in A549 lung epithelial cells but not HepG2 cell. *J Nutrition* 135:227-232.

Parker RS and McCormick CC. (2005) Selective accumulation of alpha-tocopherol in *Drosophila melanogaster* is associated with tocopherol-omega-hydroxylase activity but not with tocopherol transfer protein. *Biochem. Biophys. Res. Comm.* 338:1537-1541.

Ross AB, Chen Y, Frank J, Swanson JE, Parker RS, Kozubek A, Lundh T, Vessby B, Aman P, Kamal-Eldin A. (2004) Cereal alkylresorcinols elevate gamma-tocopherol levels in male Sprague-Dawley rats and inhibit gamma-tocopherol metabolism in vitro. *J Nutr* 134:506-510.

Soo CC-Y, Haqqani AS, Hidiraglou N, Swanson JE, Parker RS, Birnboim HC. (2004) Dose-dependent effect of dietary alpha and gamma tocopherol on genetic instability in mutatact mouse tumors. *J Natl Cancer Inst* 96(10):796-800.

McCormick CC, Parker RS. (2004) Cytotoxicity of vitamin E is both vitamer- and cell-specific and involves a selectable trait. *J Nutr* 134(12):3335-42.

Parker RS, Sontag TJ, Swanson JE, McCormick CC. (2004) Discovery, characterization and significance of the cytochrome P450 omega-hydroxylase pathway of vitamin E catabolism. In: *Vitamin E and Health*, Vol. 1031:13-21, F. Kelly, M. Meydani, and L. Packer, eds. *Annals Online*, www.annalsnyas.org

Frank J, Lundh T, Parker RS, Swanson JE, Vessby B, Kamal-Eldin A. (2003) Dietary (+)-catechin and BHT markedly increase alpha-tocopherol concentrations in rats by a tocopherol-omega-hydroxylase-independent mechanism. *J Nutr* 133(10):3195-3199.

Edwards AJ, Nguyen CH, You C-S, Swanson JE, Emenhiser C, Parker RS. (2002) Alpha- and beta-carotene from a commercial carrot puree are more bioavailable to humans than from boiled-mashed carrots, as determined using an extrinsic stable isotope reference method. *J Nutr* 132:159-167.

Sontag TJ, Parker RS. (2002) Cytochrome P450 omega-hydroxylase pathway of tocopherol catabolism. Novel mechanism of regulation of vitamin E status. *J Biol Chem* 277(28):25290-25296.

