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 identified (2002) 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.

Teaching

Teaching and Advising Statement

The primary challenge of my undergraduate teaching is addressing needs of students in two majors, Nutrition and Food Science. While certain needs are common, I constantly seek to balance the approach to engage both constituencies. My didactic approach uses a combination of traditional lecture, in-class demonstrations, and themed assignments to both extend class concepts and explore new territory. I like to engage students in class to determine extent of understanding in advance of exams.

In research, I prefer to work directly with students in the lab, thus typically take only 1-2 students at a time. The approach is to get them to an independent stage as quickly as possible, which varies from student to student. Students work on their own projects, not as assistants to others, thereby taking ownership of the

quality of their work.

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.

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 (also FDSC 2000) Nutritional and Physicochemical Aspects of Foods
- NS 6310 Micronutrients: Function, Homeostasis and Assessment
- NS 6320 Regulation of Macronutrient Metabolism

Websites

Administration

Administrative Responsibilities

Director of Undergraduate Studies, DNS

Publications

Selected Publications

Frankel PH, Parker RS, Madsen FC, Whanger PD. 2014. Baseline selenium and prostate cancer risk: comments and open questions. J Natl Cancer Inst. Mar;106(3).

Nicod N, Parker RS, Giordano E, Maestro V, Davalos A, Visioli F. 2014. Isomer-specific effects of conjugated linoleic acid on HDL functionality associated with reverse cholesterol transport. J Nutr Biochem. Nov 12. [Epub ahead of print]

Bardowell SA, Ding X, Parker RS. 2012. Disruption of P450-mediated vitamin E hydroxylase activities alters vitamin E status in tocopherol supplemented mice and reveals extra-hepatic vitamin E metabolism. J Lipid Research 12: 2667-2676.

Bardowell SA, Duan F, Manor D, Swanson JE, Parker RS. 2012. Disruption of mouse cytochrome P450 4f14 (CYP4f14 gene) causes severe perturbations in vitamin E metabolism. J Biol Chem 287:26077-26086.

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.

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.

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.