Tom Brenna

Web Bio

Information

Biography

Biographical Statement

Professor Tom Brenna's research couples Nutrition and Chemistry in a broadly interdisciplinary program. He is a member of graduate fields in Cornell's four large colleges: Nutrition (CHE and CALS), Food Science and Technology (CALS); Chemistry and Chemical Biology (Arts); Geological Sciences (Engineering and CALS), and in a long-standing collaboration with a prominent former member of Cornell's College of Veterinary Medicine. His research group has been funded by institutes/centers at the NIH (NIGMS, NEI, NICHD, NCCIH) and has included at least one active R01 continuously since 1992. These grants have supported fundamental work in the nutrition of polyunsaturated fatty acids, and development of advanced mass spectrometry instrumentation and techniques.

Most of the work of the Brenna Lab is translational, tying basic research to biomedicine and human nutrition. Some studies are designed with particular, topical human health questions in mind, and these studies have occasionally had immediate implications. The most prominent examples of this work are animal studies to evaluate the efficacy, safety, and metabolism of food sources of polyunsaturated fatty acids. This work often employs stable isotope tracer techniques and molecular or isotope ratio mass spectrometry to probe metabolism. Other projects, particularly those that develop instrumentation and methods for mass spectrometry techniques, have a longer term payoff. They are sometimes undertaken for the challenge of making measurements that have never been possible previously, with an eye toward eventual applications. An example of this area is the development of a novel gas phase reaction for derivatization of polyunsaturated fatty acids for facile determination of double bond structure, which has found applications associated with safety of edible oils, including detection of trans fatty acids. More recent research is on nutrition of saturated branched chain fatty acids, a neglected class of dietary fatty acids. Recent work involves development of methods for more precise and rapid detection of endogenous performance enhancing drugs, particularly testosterone, as well as methods for detecting exogenous drugs.

Professor Brenna has served on numerous national and international advisory panels on human nutrition. He was named to the 2015 Dietary Guidelines Advisory Committee by the US Secretaries of Health and Human Services and of Agriculture.

Teaching

Professional

Current Professional Activities

Cornell University Graduate Fields: Nutrition; Chemistry and Chemical Biology; Geological Sciences; Food Science and Technology.

2015 Dietary Guidelines Advisory Committee

International Society for the Study of Fatty Acids and Lipids, ISSFAL, President(-Elect)

Seafood Nutrition Parnership, Board member.

Fats of Life Newsletter, Editorial Board

British Journal of Nutrition, First Editor/Editorial Board,

Rapid Communications in Mass Spectrometry, Editorial Board

Institute for Food, Brain and Behaviour, Scientific Advisory Board

Research

Current Research Activities

Our laboratory is concerned with three areas, requirements for polyunsaturated and branched chain fatty acids especially in the perinatal period, development of advanced analytical chemical instrumentation particularly mass spectrometry for biomedical applications, and development of high precision isotope ratio mass spectrometry for anti-doping applications. Our polyunsaturated fatty acid work focuses on factors that influence demand for omega-3 and omega-6 fatty acids, and most of our studies are conducted in animals. Our instrumentation work is aimed at development of high precision isotope ratio mass spectrometry for tracer applications and for detection of natural physiological isotopic fractionation. Studies of omega-3 fatty acids are often based on stable isotope tracers and also employ molecular and genetic techniques. They are focused on brain and associated organ development, and on branched chain fatty acids in human nutrition. Our most recent work involves improvement of methods for detection of illicit doping with performance-enhancing steroids in the context of elite athletics.

Extension

Education

Education

Ph.D. 1985 - Cornell University, Analytical Chemistry

M.S. 1982 - Cornell University, Analytical Chemistry

B.S. 1980 - University of Connecticut, Nutritional Biochemistry

Courses

Courses Taught

NS 4444 - Sports Nutrition & Supplements: Concepts and Evidence. Spring.

NS 6900/Chem 6280 - Isotopic and Elemental Analysis. Fall.

NS 6430 - Macronutrients. Spring (Team-taught)

NS 6200 - Translational Research and Evidence-based Policy and Practice in Nutrition. Spring (Team-taught)

Websites

Related Websites

- Biomedically-Related Publications via PubMed
- Google Scholar Publications
- Graduate Field of Chemistry and Chemical Biology Page
- Division of Nutritional Sciences Home Page
- Fats of Life

Administration

Publications

Selected Publications

Please see the link under "Related Websites" for access to Professor Brenna's publications.