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Personal

Born: September 18, 1941, Los Angeles, California

Education

<i>Institution (Preceptor)</i>	<i>Degree Year</i>	<i>Field</i>
U.C.L.A.	B.S.	1963 Chemistry
Stanford Univ. (McConnell)	Ph.D.	1967 Physical Chem.
Oxford Univ. (D.C. Phillips)	Post.Doc.	1968 Biophysics
Stanford Univ. (McConnell)	Post.Doc.	1969 Phys. Biochem.

Positions

The Ohio State University, Assistant Professor of Chemistry, 1969-1975.
The Ohio State University, Associate Professor of Chemistry, 1975-1982.
The Ohio State University, Professor of Chemistry, 1982-2001.
The Ohio State University, Adjunct Professor of Medical Biochemistry, 1992-2001
University of Denver, Professor and Chair, 2000 - present

Honors

Fellow, American Association Advancement of Science
Established Investigatorship, American Heart Association, 1975-1980
NSF U.S.-Industrialized Countries Visiting Scientist, Univ. Groningen, Holland, 1977-78.
Lady Davis Visiting Professor, Technion (Israel Institute Technology, Haifa), 1981
National Academy of Sciences Eastern European Exchange Visitor, 1979, 1982.
UNESCO-OAS Multinational Biochem. Program Postgrad. Course, Universidad Austral, Chile, 1979.
N.S.F.-N.C.S.T. U.S.-Romania Workshop, 1981, 1982.
SON Visiting Professor, Univ. Groningen, Holland, 1986.
Ministry of Education Visiting Professor, Kyushu Univ., Fukuoka, Japan, 1989
Fogarty Center NIH Senior International Fellowship, 1992 – 1994, Victorian College of Pharmacy, Monash University; Biomolecular Research Institute, Melbourne, Australia
Silver Medal for Biology/Medicine of the International EPR Society, 2000.

Scientific Activities

Editor, Biological Magnetic Resonance, 1978-
Editor, Thrombosis Research, 1983-1987
Associate Editor, Journal of Protein Chemistry, 1990 -
Associate Editor, Spectroscopy, 2001 -
Editorial Board, Bulletin of Magnetic Resonance, 1986 -1999
Board, International EPR Society (since inception)
Board, Subdivision on Spatially Resolved Magnetic Resonance, Societe Ampere, 1993-
Biology and Medicine Steering Committee, Int. Soc. Magnetic Resonance, 1990-1998

Biophysical Chemistry Study Section, NIH, 1983-1985
Biomed. Engineering Technology Study Section, NIH, 1983-1987.
Biophysical & Chemical Sciences SBIR Study Section, NIH, 1998-

Society Memberships

American Chemical Society
American Society of Biological Chemists Mol. Biol.
American Association of Advancement of Science
Society for Magnetic Resonance in Medicine
Societe Ampere
International Society of Magnetic Resonance
International EPR Society
The Oxygen Society

Areas of Research Interest

Structure function relationships in biological systems as studied by magnetic resonance and other physical methods; development of new non-invasive diagnostic instrumentation; free radical chemistry and biology; protein-protein interactions in catalysis (lactose synthetase).

Thirty-five years experience in magnetic resonance spectroscopy, including the development and application of the spin labeling method to protein systems. Editor of four complete treatises on spin label theory and applications. Founder and coeditor of the first and only continuing series on special topics in biological magnetic resonance spectroscopy, theory and applications.

One of our overall research goals is to understand structure/function relationships in proteins and enzymes. Our approaches involve the applications of magnetic resonance (NMR, ESR) and fluorescence techniques, which shed light on the dynamic aspects of biological structure in solution. Another interest is in the detection and characterization of free radicals in biology and medicine. This exemplifies our need for an interdisciplinary team of researchers spanning molecular biology, biochemistry, enzymology, instrumentation development, biological spectroscopy, physiologists, and organic syntheses. Our current interests fall into two areas: lactation (lactose synthase), and in vivo ESR imaging. Our work has made significant contributions in both fields:

Lactose synthase is an enzyme-protein complex which catalyzes the biosynthesis of lactose. The enzyme component, galactosyl transferase, alone catalyzes the formulation of N-acetyllactosamine in the absence of the protein α -lactalbumin. We are studying the structure and mechanism of both components of this complex. Our research approaches also involve genetic engineering and bioinorganic chemistry since α -lactalbumin is a calcium binding protein which binds several metal cations. More recently, we are examining other 'non-EF hand' calcium binding proteins in order to learn whether some of these structure-folding criteria are more universal.

With the recent revolutionary developments in magnetic resonance imaging and in vivo monitoring of metabolic processes, we have been involved in the development of instrumentation and techniques using ESR (electron spin resonance) for in vitro and imaging studies. Recently, we have examined lipid radical adducts from xenobiotics as diverse as nitrosobenzene and the pharmaceutical nifedipine, a calcium channel blocker. A new area involves studies of free radical reactions induced by diesel fuel particulates on lung tissue.

Publications to date: 171

Funding to date: \$4.41M + \$970K (core group equipment)

Books to date: 27

Invited talks to date: over 300