



## IN MEMORIAM

William S. Allison  
Professor Emeritus of Chemistry  
UC San Diego  
1935-2011

Professor William S. Allison was born June 16, 1935 in North Adams, Massachusetts and spent much of his youth in nearby Williamstown. He attended Dartmouth College, where he received an A.B. in Chemistry in 1957 and an M.A., also in Chemistry, in 1959. He then moved to Brandeis University, where he received an NIH pre- doctoral fellowship and obtained a Ph.D. in 1963 with Professor Nathan O. Kaplan, who later became a Professor at UCSD. Dr. Allison carried out post- doctoral studies with Dr. Ian Harris at the Medical Research Council Laboratory of Molecular Biology in Cambridge, England on an NIH postdoctoral fellowship and then returned to Brandeis, where he served as an Assistant Professor of Biochemistry, supported by an NIH Career Development award from 1966-1969.

Dr. Allison was appointed as an Assistant Professor at UCSD in July 1969 and advanced through the ranks, becoming a full Professor in 1980. Although his appointment was in the Department of Chemistry (later renamed as Department of Chemistry and Biochemistry), he was also one of the first appointments in the fledgling School of Medicine.

Dr. Allison trained as an enzymologist and protein chemist eventually focusing on the structure and function of the mitochondrial F<sub>1</sub>ATPase (also called ATP synthase), the central enzyme in ATP metabolism being responsible for the synthesis of ATP in mitochondria. This is a very complex, multi- subunit, membrane-bound enzyme. As such, it can be viewed as one of the most complex enzymes one could study. Dr. Allison carried out extensive studies of its structure and function, relying heavily on chemical approaches to labeling the active sites of the F<sub>1</sub>ATPase.

His careful analytical studies over the years laid the foundation for understanding the molecular basis for ATP synthesis. The accuracy and rigor of his work was most fully appreciated when the pioneering crystallographic achievements of John Walker were realized in 1994 with the crystal structure of the F<sub>1</sub>ATPase. John Walker and Paul Boyer subsequently received the Nobel Prize for this work, and both fully acknowledged the importance of Dr. Allison's work in interpreting how the structure moved to achieve the enzymatic mechanism using the many active sites in the way Dr. Allison's mechanistic studies had indicated.

The structure led to a hypothesis that F<sub>1</sub>ATPase is a molecular motor and that ATP synthesis is driven by rotation of the 3 3 hexamer around the  $\sigma$  subunit which serves as a shaft. Dr. Allison's laboratory had already conceived this model using a variety of techniques that included protein engineering and protein chemistry. His work was of the highest quality and challenged some of the established dogma. He was one of the leaders in this area of coupling protein analysis with mechanisms of bioenergetic processes. He used state- of- the- art techniques for the expression of the F<sub>1</sub>ATPase from several different species and had chemical insights that were exceptional. The growing recognition and interest in mitochondrial diseases in recent years provided a challenging new direction for his work. Dr. Allison's work defining the processes by which conformational changes are induced at the active site of F<sub>1</sub>ATPase was insightful, rigorous, and often challenged accepted dogma.

Dr. Allison's research was continuously supported by NIH grants and he also received a prestigious Fogarty grant. He always published regularly in first rate journals, especially in Biochemistry and the Journal of Biological Chemistry, and had over a hundred publications to his credit. He also presented seminars on a regular basis, often in Europe and Japan, and chaired the 1999 Gordon Research Conference on Bioenergetics.

He served for many years as the Executive Editor of Analytical Biochemistry, and on the Editorial Boards of the Journal of Biological Chemistry, the Journal of Bioenergetics and Biomembranes, and as an expert analyst for ChemTracts on Biochemistry and Molecular Biology. In addition, he served as a member of the NIH Physical Biochemistry Study Section and as an ad hoc reviewer for NSF and many journals.

At UCSD together with colleagues, Dr. Allison created the first undergraduate course in Biochemical Structure and Function and the first graduate course in Enzyme Mechanisms, both areas of his academic expertise. He also taught Biochemical Energetics and Metabolism. Much of his teaching was in the Cell Biology and Biochemistry Core Course for the first year students in the School of Medicine where he participated in many aspects of the curriculum including Physical Biochemistry, Clinical Correlates, Laboratory Workshops and Reading Groups. Dr. Allison trained numerous graduate students and postdoctoral fellows at UCSD and for many years served as Chair of the Graduate Admissions Committee in the Department of Chemistry and Biochemistry.

Bill Allison was an avid skier dating from his days on the Dartmouth Ski Team and which he continued at his beloved Mammoth Mountain until just a couple of years before his untimely death. Bill was also an avid fisherman, a sport he pursued frequently with his colleagues from the Biomedical Sciences Building of the School of Medicine; trips were always followed by smoked albacore for his laboratory and adjacent colleagues.

Bill Allison passed away on July 30, 2011 after a two year battle with amyotrophic lateral sclerosis (ALS), also known as Lou Gehrig's disease. He is survived by his wife Irene of 47 years, who devoted her professional time to the UCSD Biomedical Library, and by his two children Carl and Catherine.

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