



Biographical Article

Biography of Donald B. McCormick, PhD (1932–2022)

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FIGURE 1. Donald B. McCormick, PhD (1932–2022). From reference (1).

Donald Bruce McCormick, PhD, Professor Emeritus of Biochemistry, Emory University, died on April 21, 2022, at age 89 y. Don was a prototypic “nutritional biochemist,” as he discussed in “On Becoming a Nutritional Biochemist” [1] and an associated interview [2]. His publications spanned 64 y and were major contributions to knowledge about riboflavin (vitamin B-2), vitamin

B-6, biotin, and lipoic acid, and to dietary guidelines and other aspects of nutrition as well as metal ion biochemistry, photochemistry, microbiology, and drug delivery [3]. Don was equally productive in teaching and service [1], which included a term as President of the American Society for Nutrition (ASN) in 1991.

Family Background, Early Life, and Education

Don was born in Front Royal, VA, into (as he would say) “a middle-class family with more than a modicum of pride in its heritage,” which included the inventor Cyrus McCormick as an ancestor, and (Don would add, with a twinkle in his eye) Duncan Larkin, who provided a horse ridden by Paul Revere. He said his childhood in Clifton Forge and Buchanan, VA, and “contact with nature, including snakes and spiders, was a formative part of my interest in nature. A tangential aspect of this was my rearing of these as well as raccoons, opossums, and a contiguous line of dogs and cats for whom I hold loving memories.” For his entire life, pets were members of his family; and in a broader sense, Don displayed a love for all nature by a desire to know everything about it—from the molecular composition and physiology of diverse organisms to their Latin names.

According to Don [1], “It was my good fortune to have parents who appreciated the value of a formal education (both had been teachers) and a “walking” knowledge of things about us. My father had taught biology and chemistry in high school and had become somewhat of an expert in explosives.” The family moved to Lookout Mountain, TN, where his father helped make trinitrotoluene for Hercules Powder Company, then moved to Oak Ridge, TN, “and a bigger bomb project” (the Manhattan Project that produced material for the atomic bombs used in World War II). According to Don, that was where his interest in science grew, “encouraged by excellent teachers and some significant national awards.” He was most proud of winning the National Westinghouse Science Talent

Abbreviation: ASN, American Society for Nutrition.

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Search (1950), which resulted in an invitation to the Oval Office with recognition by President Truman, and provided a full scholarship that he used to attend Vanderbilt University in Nashville, TN.

Don earned a BA in chemistry (1953) and PhD in biochemistry (1958) at Vanderbilt, with his thesis on the xylulose/xylitol pathway. He always spoke highly of his doctoral thesis advisor, Dr. Oscar Touster, and of Dr. William J. Darby, who profoundly influenced his subsequent nutrition career. Darby helped arrange for Don to spend a summer working at the University of Madrid, where he assayed vitamins and their metabolites in blood and urine. This experience triggered his interest in vitamins, which was cemented by his postdoctoral fellowship (1959–1960) with Dr. Esmond E. Snell at the University of California, Berkeley. During his postdoctoral years, Don accomplished one of the most sought-after objectives of biochemists (including many nutritional biochemists) of that period—the first purification and characterization of an enzyme, in this case, pyridoxal kinase, which is essential for the utilization of vitamin B-6.

Cornell University

Don's career as an independent investigator began at Cornell University, Ithaca, NY, where he was appointed an Assistant Professor in the Graduate School of Nutrition (later part of the Division of Nutritional Sciences) and the graduate program in Biochemistry, Cell, and Molecular Biology. Don thrived in this environment because it enabled him to study a wide range of topics, from basic chemistry to human nutrition. His major focus was on enzymes that metabolize flavins (vitamin B-2) and vitamin B-6, and identification of metabolites of these vitamins (and biotin and lipoic acid) produced by microbes, experimental animals, and humans [3]. These findings were instrumental to many nutritionally relevant studies in later years, such as the characterization of flavins in human milk [4] and the pharmacokinetics of riboflavin in humans [5]. He also studied basic chemical questions such as how flavins are utilized by flavoproteins, flavin photochemistry, and biochemically relevant interactions between metal ions and ligands [6]. In the course of his investigations, he often explored new approaches, such as tethering of an enzyme's substrate or cofactor to a matrix to facilitate enzyme purification [7], which would later be called "affinity chromatography."

Don's close friends and collaborators at Cornell included Lemuel Wright, with whom he coedited *Vitamins and Coenzymes (Methods in Enzymology)*. To select the topics for this multivolume series, they examined essentially every new publication concerning vitamins, which, combined with Don's nearly photographic memory, helped build his comprehensive knowledge about all aspects of vitaminology. This expertise was widely sought, especially when it was known that he rarely declined requests for help, no matter how busy he was, and that he always delivered in-depth, cogent comments well in advance of deadlines. Another colleague, Daphne Roe, often sought Don's biochemistry advice to complement her background as a physician, and her voice would echo through the third floor of Savage Hall as she called "Don, Don" en route to his office to discuss their collaborations [8]. For many years, Don's office and laboratory bordered that of James L. Gaylor, and their students and postdoctoral fellows did many things together, including visits to Ithaca pubs (which Don declined to join because he said that would keep them from being able to complain about

him). Other close friends of Don's at Cornell were Leon Heppel and Quentin Gibson, with whom Don relished taking long walks around Beebe Lake—Don and Leon often talking simultaneously and Quentin chiming in occasionally with his quintessential British outlook and humor. Don also cultivated many friends throughout the international community of scientists.

Don believed in hard work, but also thought the life of a scientist should be fun in and out of the lab. He organized evening volleyball and basketball games, and even in retirement would shoot baskets with teenagers and beat them with his hook shot. At every opportunity, he would watch televised Vanderbilt basketball games.

Don was a master at teasing, which he used both for fun and as a means for instructive criticism. He was a perfectionist (especially about precision in writing and speech) and could not resist commenting on something that he thought could be done better, but was also generous with compliments when he thought a task was well done. His attitude in reviewing other scientists' work was to critique even the most minor errors; but, nonetheless, to judge the merit of the work overall by what was new and solidly established. Something that greatly annoyed him was for a scientist to fail to acknowledge the findings of other investigators because giving due credit doesn't diminish your contribution and proves that you have a comprehensive knowledge of the literature. He enjoyed recalling a seminar where a famous biochemist claimed credit for discovering that a newly purified enzyme utilizes zinc, whereupon, someone in the audience declared that everyone already knew that because chickens on zinc-deficient diets lost that activity. A flaw that Don never condoned if he discovered it in science was dishonesty because it violates a fundamental pact that scientists make with each other and society.

Don received numerous honors as a result of his research at Cornell, including selection as a Fellow of the American Association for the Advancement of Science (1966), receipt of the Mead Johnson (1970), and the Osborne and Mendel (1978) awards from the ASN (then named the American Institute of Nutrition), and multiple visiting professorships in the US and abroad. He was also named a Cornell Liberty Hyde Bailey Professor.

Emory University

Don moved to Emory University School of Medicine, Atlanta, GA, as Fuller E. Callaway Professor and Chair of the Department of Biochemistry in 1979. He continued research on vitamins, including how they are transported [9] and how this might be exploited for drug delivery [10]. As Chair, he built the biochemistry department into one respected worldwide, starting with strength in flavins and redox biochemistry with his first 2 hires—Dale Edmondson and Dean Jones—and expanding to representatives of many of the "hot" topics of the time (cell signaling, mitochondrial genetics, DNA repair, and others). He was also instrumental in creation of a graduate program in Nutrition and Health Sciences, which drew on faculty at Emory and scientists from the US Centers for Disease Control & Prevention and other institutions. In his additional capacity as Executive Associate Dean for Science for the School of Medicine, Don utilized his vast knowledge and unique ability to communicate with basic researchers and clinicians to accelerate expansion of the medical school in quality and scope. While at Emory, Don was selected by the ASN for the Bristol-Myers Squibb/Mead Johnson Award for

Distinguished Achievement in Nutrition Research (1999) and named an ASN Fellow (2000).

Not long after arriving at Emory, Don lost his left eye to cancer, but took this in stride—even returning to his office after the surgery, until the anesthesia wore off and the pain was too severe for him to continue working. Thereafter, long hours of reading would noticeably fatigue his remaining eye, but he didn't let that interfere with research, teaching, or service. Over his career, he served as editor for dozens of books and journals, including *Vitamins and Coenzymes (Methods in Enzymology)*, *Vitamins and Hormones*, the *Handbook of Vitamins*, *Nutrition Reviews* (as a Contributing Editor), and the *Annual Review of Nutrition*. Furthermore, he was a member of many editorial boards, review panels and as an advisor for academic, governmental, industrial, and foundation laboratories that conduct nutrition and pharmaceutical research. As a member of the Food and Nutrition Board of the Institute of Medicine/National Academy of Sciences, he worked on the development of national and international guidelines for micronutrients.

Don was an enthusiastic and respected teacher at Cornell and Emory. His vitamins and cofactors course at Cornell was heavily attended. At Emory, he and Professor Mario DiGirolamo created a medical nutrition course that taught third year medical students both basic and clinical aspects of nutrition. Many who spoke with Don about his research will remember how eagerly he would describe his projects, especially to students who were considering joining his lab. He would summarize all of his projects on a single piece of paper, first writing single spaced, then inserting more lines between the spaces, along the margin, and wherever words or pictures would fit, eventually filling the page so full that the listener left the encounter with a piece of black paper. Don was the research mentor for >65 students, post-doctoral associates, and sabbatical colleagues in nutritional biochemistry, and an indirect mentor for countless others. Most of his trainees became leaders in academic institutions, government labs, foundations, and industry.

Upon his retirement, his trainees organized a session at the FASEB meeting where Don reviewed his work on cofactors [3] and they and other colleagues set up an endowment for a yearly “McCormick Award” to be given to an outstanding graduate student in the Nutrition and Health Sciences program at Emory. When Don learned about it, he personally increased the amount.

Retirement

In 1997, Don became an emeritus professor and continued to contribute to science [11], with his last publication in the most recent edition of *Present Knowledge in Nutrition* (11th edition) for a career with total >500 articles, reviews, commentaries, etc. (see **Supplemental materials**). He retained his remarkable curiosity about the world, and posted many thoughts on the internet, a few of which have been quoted in this biography. (Unfortunately, the websites are no longer active).

Don spent the majority of his retirement living in the North Carolina mountains. He described retirement this way: “I have enjoyed these past few years with some continued professional activity in advisement, consulting, and teaching—all at a modest pace. I have added the pleasant associations with the good people in the Highlands Institute for American Religious and Philosophic Thought, the Highlands Plateau Audubon Society,

The Scian Institute for Scientific Policy Analysis, and the Franklin Unitarian Fellowship. At the moment, life is good.” He and his wife Jean McCormick also supported the Highlands-Cashiers Land Trust, the Highlands-Cashiers Humane Society, and were instrumental in launching Emory's Emeritus College. This long list of activities illustrates how Don's “modest pace” in retirement was still quite vigorous.

Don summarized his “guidelines for living” in an internet posting dated 2008, which were

“Learning and Teaching: Be a constant learner; acquire knowledge broadly but especially in areas that are substantiated and evidence based. Pass on such secure knowledge to those desirous of learning; do not inculcate in others what is only unsubstantiated belief.

Conservation and Treatment: Seek greater understanding of all life and the substrates upon which it depends; respect and support diversity of life which reflects the common purpose of survival and extension of species as well as evolution of new forms. Help to maintain an essential genetic pool; take no more than will be replaced and restored.

Behavior and Expectation: Treat all with fairness and the hope that this will be reciprocated; avoid when possible those who are afflicted with closed minds.”

Don also expressed that “significant people in my life are Jean, my usually tolerant wife and helpful colleague” and “Our three children...all doing well.” Don is survived by Jean, Sue, Don Jr, Allen, and 3 much loved and loving dogs.

In “On becoming a nutritional biochemist” (1), Don concludes: “Altogether it has been an enjoyable career to be a nutritional biochemist. I recommend it for those who follow.” **fig 1**

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.tjn.2022.10.014>.

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