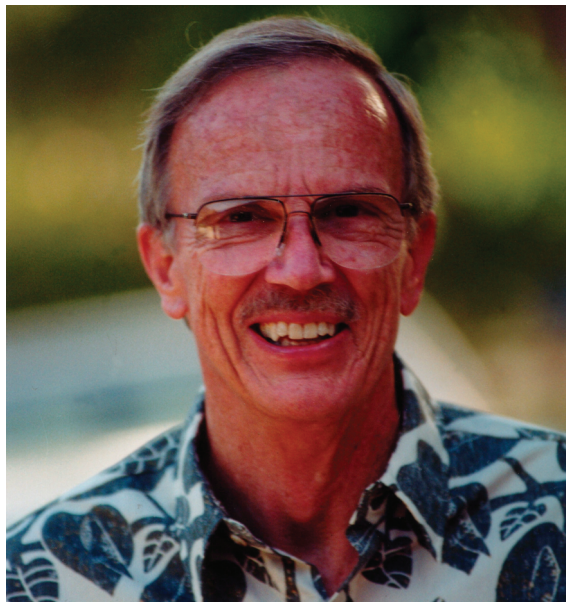


Editorial



Richard E. Moore (1933–2007)

It is our distinct privilege as Guest Editors of this special issue of the *Journal of Natural Products* to honor the late Professor Richard E. Moore with a diverse collection of research articles generously written by many of his former students, postdoctoral fellows, visiting scientists, and collaborators. Dr. Moore's scientific interests were wide and varied, covering many of the major thrusts of natural products research, and they are reflected in these assembled articles on isolation and discovery, biological evaluation, synthesis, biosynthesis, and genetics.

Richard "Dick" E. Moore, Professor Emeritus of the Department of Chemistry at the University of Hawai'i, died on December 11, 2007, in Honolulu after succumbing to cancer, a disease that he spent the majority of his academic career trying to mitigate. Dr. Moore was born on June 30, 1933, and was raised in the San Francisco Bay area, where he developed a strong interest in chemistry and geology. It would be chemistry that became his academic focus; he earned B.S. (1957) and M.S. (1959) degrees from the University of San Francisco and his Ph.D. in plant alkaloid chemistry under the direction of the late Professor Henry Rapoport at the University of California at Berkeley in 1962. Interested in exploring the natural product chemistry of marine organisms, Dr. Moore moved across the Pacific Ocean to the University of Hawai'i for postdoctoral work with the late Professor Paul Scheuer in this emerging field. He later joined the University of Hawai'i faculty in 1966 as an Assistant Professor and quickly moved through the academic ranks to become Full Professor in 1975 until his retirement in 2003. During this time span, Dr. Moore had a distinguished and productive career in natural product-based drug discovery where he published over 250 research articles in peer-reviewed journals (including 35 in *J. Nat. Prod.*) and was inventor or co-inventor of over 100 patents.

Dr. Moore's early independent work in Hawai'i focused on the odor of seaweed, where he and his group identified roughly 200 new natural products.¹ Many of these small molecules contained

fewer than 12 carbon atoms and were often halogenated, giving some of the first structural insights into the sexual reproduction of brown algae and the vast array of the halogenation chemistry of marine molecules. Also during this period, Dr. Moore tackled one of the most challenging natural product problems of the time, the chemical analysis of palytoxin, a massive neurotoxin with a novel $C_{129}H_{223}N_3O_{54}$ polyketide structure.^{2,3} He would spend about 20 years of his early academic life on the elucidation of this potent marine toxin from the coelenterate *Palythoa toxica*, which was referred to by the ancient Hawaiians, who used its exudates to poison spear-tips for warfare, as limu-make-o-Hana (the deadly seaweed of Maui).

After exploring the odoriferous constituents of seaweeds, Dr. Moore shifted his attention in the mid 1970s to the identification of anticancer agents from field-collected marine cyanobacteria from Hawai'i and Enewetok, which resulted in the discovery of a diverse range of fascinating molecules such as the oscillatoxins,⁴ debromoaplysiatoxin,⁵ lyngbyatoxin,⁶ the malynгамides,⁷ and malyn-golide.⁸ This work notably led to the characterization of the potent inflammatory agents and tumor-promoting factors in *Lyngbya majuscula*, the cyanobacterium that is responsible for outbreaks of seaweed dermatitis on the island of Oahu.⁹

Starting in the 1980s, Dr. Moore again shifted his research focus from field-collected marine cyanobacteria to the cultivation of terrestrial cyanobacteria in a long and very fruitful collaboration with Dr. Gregory Patterson. Over the ensuing 20 years, the Moore group pioneered this new resource in antitumor and antifungal drug discovery, leading to the discovery of a large collection of novel products, including the hapalindoles,¹⁰ scytopycins,¹¹ anatoxins,¹² tolytoxins,¹³ tantazoles,¹⁴ cyclindrocyclophanes,¹⁵ and the cryptophycin family of potent anticancer agents,¹⁶ which led to the phase II clinical evaluation of a semisynthetic analogue in collaboration with Eli Lilly.

The ability to mass culture cyanobacterial metabolites was instrumental in allowing the Moore group to further diversify its efforts to explore the pharmacology, biosynthesis, and genetics of cyanobacterial natural products. Innovation and adaptability were indeed hallmarks of Dr. Moore's entire career. At the same time, a constant thread in his long, distinguished career was NMR: Dr. Moore correctly surmised that high-field NMR would permit the elucidation of complex structures like palytoxin;³ later, he recognized that he could combine the laboratory culture of cyanobacteria to produce uniform ¹³C- and ¹⁵N-enriched products and new 2D-NMR experiments to readily solve novel structures such as puwainaphycin C¹⁷ and anatoxin-a(s).¹² His final publication was a testament to his ever-evolving research portfolio, where, in collaboration with Professor David Sherman at the University of Michigan in 2006, they reported on the biosynthesis, genetics, and chemoenzymatic assembly of the cryptophins by a hybrid polyketide synthase–nonribosomal peptide synthetase pathway.¹⁸

Dr. Moore's accomplishments were recognized in the U.S. and internationally through numerous honors and lectureships. His awards included National Science Foundation Creativity Awards in 1986 and 1993, the Regent's Medal for Excellence in Research from the University of Hawai'i in 1992, the Research Achievement Award from the American Society of Pharmacognosy in 2002, and the Paul J. Scheuer Award in Marine Natural Products in 2004. During his tenure at the University of Hawai'i, he trained over 20 graduate students and 60 postdoctoral fellows and visiting scientists, as well as numerous staff scientists and undergraduate research students.

Richard E. Moore is survived by his loving wife of 47 years, Marilyn Moore, their four children—Gregory, Christopher, Bradley, and Lori—and nine grandchildren. Upon his retirement in 2003, his grandchildren became the natural products he focused his energies upon, knowing that his academic progeny were actively continuing the Moore tradition of research excellence and innovation that he had inspired.

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