

**MEMORIAL RESOLUTION OF THE FACULTY OF THE
UNIVERSITY OF WISCONSIN-MADISON**

ON THE DEATH OF EMERITUS PROFESSOR ELIZABETH CAVERT MILLER

Elizabeth C. Miller, Senior Distinguished Research Professor Emeritus in the Department of Oncology, died at University Hospital on October 14, 1987 of kidney cancer. She was born on May 2, 1920, one of three children of William Lane Cavert and Mary Elizabeth (Mead) Cavert. The family emphasized social responsibility, hard work, and the importance of scholarship in a fulfilling life. Elizabeth Miller's father, Director of Research in Agricultural Economics at the Federal Land Bank at Minneapolis, Minnesota, was among the earliest Ph.D.'s in that field. Her brother, Henry Mead Cavert, M.D., Ph.D., is Professor of Physiology and Associate Dean of the Medical School, University of Minnesota. Her sister, Jane, is the wife of Professor Emeritus John E. Mitchell, Department of Plant Pathology, University of Wisconsin. Her husband, James A. Miller, is Professor Emeritus of Oncology, University of Wisconsin, where he held the Van Rensselaer Potter Professorship prior to retirement. One daughter, Linda Miller Forbess of Schofield, Wisconsin, is a Ph.D. candidate in textile art, and her second daughter, Dr. Helen Miller Alexander, mother of Diane Elizabeth Alexander, is an Assistant Professor in Botany-Ecology at the University of Kansas at Lawrence, Kansas.

Professor Miller graduated from the University of Minnesota in 1941 with a bachelor's degree in biochemistry; she was elected to Phi Beta Kappa and was awarded a WARF Scholarship at the University of Wisconsin. Professor Carl Baumann of the Department of Biochemistry was her major professor. She immediately demonstrated the personal qualities that made her a successful person in everything she undertook. Her aptitude for scholarship and her persistent hard work during her four years in Graduate School resulted in seven publications of original research in excellent peer-reviewed journals. This research involved the function of vitamin B₆ (pyridoxine) in the intermediary metabolism of tryptophan, findings that now are cited as fundamental knowledge in all textbooks of biochemistry. Her husband-to-be, James A. Miller, then a Teaching Assistant in Biochemistry, was her laboratory instructor in the graduate course in general biochemistry. On August 30, 1942, they were married, and soon thereafter they began a highly productive, professional collaboration that continued for 45 years at the University of Wisconsin. Elizabeth Miller earned her Ph.D. in June, 1945, and on July 1 she joined the McArdle Laboratory for Cancer Research on a Finney-Howell Postdoctoral Fellowship. She advanced through the ranks to become Professor of Oncology in 1969. Subsequently she became Associate Director of the McArdle Laboratory in 1973, WARF Professor of Oncology in 1980, Van Rensselaer Potter Professor of Oncology in 1982, and WARF Senior Distinguished Research Professor in 1984. Recognizing the critical nature of her illness, she asked for retirement and, on June 1, 1987, she was granted the title of Professor Emeritus. She remained optimistic that in retirement she would be able to continue her research. Indeed, until the last few weeks of her life, her students consulted with her at her hospital bedside about their latest data and future directions.

Her contributions to cancer research in the metabolic activation of chemical carcinogens and related topics are unrivaled. A paper coauthored by Elizabeth Miller and her husband, published in 1947, entitled "The Presence and Significance of Bound Aminoazo Dyes in the Livers of Rats Fed p-Dimethyl-aminoazobenzene," is a classic example of careful, thorough work and perceptive interpretation. This study established for the first time that carcinogenic molecules, which are generally unreactive lipid-soluble substances, had to be metabolically activated in the body. The reactive metabolites so formed are strong electrophiles that combine covalently with and alter critical cellular nucleophiles such as DNA, RNA, and proteins. Some of these interactions, especially those with DNA, initiate the carcinogenic process. The Millers and their associates were also the first to show the importance of the oxidases in the endoplasmic reticulum of cells that metabolize foreign lipid-soluble molecules. Many of these oxidations lead to detoxification. However, for the majority of the chemical carcinogens that are known, some of these oxidations lead to reactive carcinogenic electrophiles. Still further work by the Millers and their associates led to the discovery of the induction of large increases in the activity of these oxidases by a wide variety of foreign chemical compounds including noncarcinogens. This led to a whole new field of drug-drug interactions in metabolic studies in toxicology and pharmacology.

Dr. Elizabeth Miller's eminence in cancer research was recognized by her election, concurrently with her husband, to the National Academy of Sciences in 1978 and her subsequent appointment to important responsibilities within the Academy. Their collaborative achievements were also recognized by more than 25 joint awards, including the following: Bertner, Papanicolaou, Bristol-Myers, FASEB Life Sciences, the General Motors Mott Award, and honorary membership in the Japanese Cancer Association. Dr. Elizabeth Miller also received the Distinguished Alumna Award from the University of Minnesota, the Prix Griffuel from the Association pour le Developpement de la Recherche sur le Cancer, and an honorary Doctor of Science degree from the Medical College of Wisconsin.

Dr. Miller served on numerous national and international committees during her career. For many years she was the Associate Editor of Cancer Research. She was twice elected to the Board of Directors of the American Association for Cancer Research, 1957-1960 and 1974-1977, and was elected President for the 1976-77 year. She served continuously on the Board of Directors of the American Cancer Society since 1980 and was appointed to the President's Cancer Panel of the National Cancer Institute in 1978. She was a member of the Advisory Committee to the Director of the National Institutes of Health, 1984-1987. Her wisdom and judgment helped to shape national science policies.

In addition, Professor Miller, who was known as Betty to her many friends, worked tirelessly and effectively for the McArdle Laboratory for Cancer Research and the University of Wisconsin. She served as Associate Director of the McArdle Laboratory from 1973 until her retirement. Together with her husband, she taught many graduate students and postdoctoral fellows the joys of discovery by instilling in them an enthusiasm for research. Both were patient mentors, yet demanded the highest standards. People who trained in their laboratory have continued to be unusually productive scientists.

Betty was devoted to her family. Their children, Linda and Helen, grew up in a loving, caring family that took the time to go on canoeing and camping trips together and to learn the beauties of nature. Betty excelled as a wife, a mother, a scientist, and an administrator. In every role, she was very competent, friendly, modest, and helpful--an exemplary human being in every way.

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