In Memoriam: H. Allen Tucker (1936–2009)

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H. Allen Tucker was born on October 25, 1936 at the family farm in Milford, Massachusetts and died on July 15, 2009 at Sparrow Hospital in Lansing Michigan. He enriched the lives of family, students, colleagues and friends, and leaves an impressive scientific legacy. “Tuck”, as he was known to most, obtained his BS degree from the University of Massachusetts and his MS and PhD degrees from Rutgers University under the guidance of Ralph P. Reece. He then joined the faculty of the Department of Dairy Science at Michigan State University, from which he retired 38 years later, in 2000.

During his career, Allen Tucker distinguished himself as a prominent animal scientist, who made seminal research contributions to the fields of mammary gland biology and endocrinology. His research on photoperiod demonstrated that long day-length increased prolactin secretion and milk production in dairy cows. This research was soon adapted by the dairy industry, so that regulation of photoperiod is

now an important component of effective dairy cattle management. He and colleagues showed that although prolactin was lactogenic in dairy cows, it was not galactopoietic (*i.e.*, did not increase milk production) and was not a mediator of the milk production response to photoperiod. This led to a focused research effort on the role of somatotropin during lactation, an effort that was promoted by interactions with Dale Bauman, who was on sabbatical leave in Tuck’s lab during this germinal period. Tuck’s evaluation of mammary growth relative to general body growth pointed to the importance of the prepubertal (allometric) period of mammary gland growth. This led to subsequent studies that evaluated the impact of nutrition on prepubertal mammary gland development and elucidated interactions among diet, the growth hormone axis and mammary gland development—concluding that excessive nutrition during the prepubertal period inhibited mammary gland development and reduced milk production later in life. Because of its importance to the dairy industry, this remains an important topic of research and includes not only the immediate effects of nutrition on mammary gland development, but epigenetic effects on mammary development and nutrient partitioning. In the area of animal health, Tuck was an early pioneer in establishing protocols to accurately measure the content of leukocytes in milk as an index of udder health. This laid the foundation for the current monitoring system to assess milk hygiene and ultimately provided a phenotype that is being used for genetic selection to increase resistance to mastitis. Of course, these examples represent only a portion of Tuck’s contributions to dairy research.

Allen Tucker’s impact extended beyond the animal sciences. Using a variety of animal models (rats, mice, cattle, sheep, pigs; *in vivo* and *in vitro* systems) and developing numerous radioimmunoassays, he expanded

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knowledge about regulation of hormone secretion. He evaluated the roles and regulation of thyroid hormones, glucocorticoids, prolactin and growth hormone. He elucidated the endocrine control of lactogenesis and the galactopoietic effects of growth hormone and thyroid hormones. He was first to utilize xenotransplantation in nude mice as an approach to study endocrine control of mammary gland differentiation. Allen Tucker's research accomplishments are numerous, as evidenced by his publication of more than 300 scientific articles. Although much of his research was basic in nature, Tuck found greatest reward in the application of his research, which served as his ultimate research goal and motivation. He was also interested in facilitating interactions between those involved in lactation research and those involved in breast cancer research. To this end, he was an early proponent of the Gordon Research Conference (GRC) on Mammary Gland Biology, which he chaired in 1983. This journal represents one of the fruits of those interactions, for it was out of discussions at the GRC that Peggy Neville formulated her vision for *The Journal of Mammary Gland Biology and Neoplasia*.

Tuck was a particularly effective mentor, who was the major advisor for 45 graduate students, post-doctoral trainees and visiting professors. In the classroom, he conveyed his enthusiasm for science to his students and provided them with current information in well-prepared lectures. Indeed, the syllabus and lecture notes for his lactation physiology course have served as the foundation for courses at several institutions. Outside the classroom, Tuck was a demanding and effective mentor, challenging those around him to excel. There are several features of his training that I and others cherish. First, Tuck was an adamant proponent of hypothesis-driven research. If you could not formulate a testable hypothesis, your research proposal would be rejected at the weekly research seminar. Second, Tuck invested considerable time editing and critiquing written and oral presentations. He accepted criticism as readily as he gave it and believed that any

presentation, research proposal or manuscript could be improved by the critical analysis of others. Third was Tuck's collegial approach to research. He believed in collaborative research in which everyone involved contributed and benefited. Tuck and his colleagues rejected the title "doctor" and wanted students to be on a first-name basis with faculty, which engendered a feeling of community and acceptance of the student more like a colleague. Yet, it is somewhat ironic that few deserved the title "doctor" more than Tuck, for the term is derived from the Latin word meaning "teacher." The extent of collaboration that was fostered within Tuck's lab and with his colleagues was truly astounding. Fourth was Tuck's commitment to career guidance, which did not end when a student or post-doc left his laboratory. He was a reliable sounding board and counselor, who actively tracked the careers of his former charges—rendering advice over the telephone or at meetings. He was truly committed to ensuring the success of others. Finally, one cannot think of Tuck's scientific family without a sense of gratitude to his true family. Ann, his wife of 50 years, and their "boys" welcomed students and colleagues to their home to celebrate holidays, football games and other events. Tuck's interaction with his family and their interaction with us, drew us into the extended Tucker Family. One could not escape Tuck's lesson of appropriately balancing career and family.

Tuck was the recipient of numerous prestigious awards including the Sigma Xi Research Award at Michigan State, the Borden Award, the Morrison Award, Cyanamid Animal Physiology and Endocrinology Award, MSU's Distinguished Faculty Award, the Upjohn Physiology Award from the American Dairy Science Association, the Casida Award for excellence in graduate training and Rutgers Graduate School's Distinguished Alumnus Award.

Allen Tucker is survived by his wife Ann; his three sons, Glenn, Wayne and David and their wives, Joni, Audra, Jennifer; his grandchildren, Hannah, Zachary, Brittni, Shea, MacCabe; and his brother and wife, Wayne and Lois. Tuck will be missed very much.