In Memoriam: Leonard L. Weiss, Sc.D., M.D., Ph.D.

Dr. Leonard L. Weiss, whose multidisciplinary research played a leading role in the development of concepts of the mechanisms of metastasis that served as a foundation to much of the progress made in recent years, died on May 5, 2000, in Buffalo, New York.

Dr. Weiss was born and educated in England, where he received his M.D. (1958), Ph.D. (1963) and Sc.D. (1971) degrees from the University of Cambridge. During his early clinical training at Westminster Hospital in London, he became interested in biophysical aspects of cell interactions involving the cell periphery. He subsequently made groundbreaking studies in quantitating cell contact, adhesion, and recognition during the time he held Medical Research Council posts at Mill Hill and Cambridge. He postulated the significance of these phenomena in the metastatic process in his first book, The Cell Surface, Metastasis and Other Contact Phenomena.

In 1964, he was invited to join Roswell Park Cancer Institute (RPCI) when worldwide recruitment of outstanding scientists was a high priority. His departure from Cambridge made headline news on both sides of the Atlantic as Dr. Weiss became one of the leaders of the famous “brain drain” of top British scientists to America that provoked a great deal of government controversy in the United Kingdom. At RPCI, he became Research Professor and Chairman of the newly formed Department of Experimental Pathology, the post that he held until his retirement in 1993. He also held the post of Chief Cancer Research Clinician at RPCI (1976–93) and was Research Professor of Biophysics at the State University of New York at Buffalo from 1969 until his retirement. He was a past or present member of a number of scientific societies and editorial boards in the United States and the United Kingdom.

Dr. Weiss’s more than 300 publications reveal the novelty and diversity of his research on cancer cell surfaces, patterns of metastasis, and translation of experimental studies to the clinic, but throughout his career, he was a bench scientist, with the support of only one or two technicians and a student or postdoctoral fellow. He encouraged research not directly related to his own and maintained a cancer cell-oriented but multidisciplinary department, with interests ranging from immunology, physiology, embryology, and biophysics of model membranes to quantum mechanics. The department was probably the most important single site in the initiation of the development of liposomes as drug carriers, and staff went on to do leading work in this area, founding foremost companies with approved liposome drugs for cancer therapy.

He did practice medicine and was a pioneer in the possible use of ultrasound for the detecting of cancers, but probably his most important contributions lie in bringing his amazing breadth of knowledge, from clinical medicine, to experimental pathology, to physics, to bear on delineating the complexities involved in the metastatic process and patterns of metastasis. He recognized these complexities in his own development of the concept of “metastatic inefficiency.” This concept holds that cancer is “efficient” in that the majority of patients with untreatable cancers die of metastatic disease, but it emphasizes that the metastatic cascade process itself is “inefficient” in that millions of cancer cells may be released from primary tumors, but only a very small fraction grow at secondary sites to generate metastases. Dr. Weiss investigated the death of the vast majority of cancer cells in the bloodstream of animals during hematogenous metastasis and showed from clinical autopsy data that, for many types of human cancer, metastasis incidence is directly correlated with blood flow to sites of metastasis, leading to the suggestion that organ site-specific development of metastases largely was a function of these two phenomena. He knew that this explanation was simplified and that there were exceptions, and he did not exclude other concepts, but he considered that not all others in this field were equally broad-minded!

Dr. Weiss was a dynamic, colorful figure, with a variety of passions outside his laboratory. They included driving fast cars, sailing, building model engines, as well as collecting watches. In addition to two seminal texts on metastasis, he published a book about watchmaking in the reign of George III of England.

Leonard Weiss was a concerned mentor, colleague, and chairman—a gentleman scholar. His science was conceptually cutting edge for more than 40 years, and his influence on the study of metastasis long will be felt.

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