

Judah Folkman — A Personal Tribute

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The cancer research community recently lost a colleague, and I also lost a personal friend. Judah Folkman, M.D., was a leader, an original thinker, and a kind human being; in short, he was a mensch. But he was also a physician, a pediatric surgeon, and a visionary whose work inspired a generation of scientists.

In 1889, Stephen Paget hypothesized that to grow and produce metastasis, tumor cells, or “seeds,” must interact with specific organ factors, the “soil.” The “seed and soil” hypothesis suggested that the predicted patterns of metastasis can be explained by the interdependence of tumor cells on the organ microenvironment. Judah Folkman was among the very few scientists in the twentieth century to recognize the validity of the seed and soil principle. He popularized the concept that all cells are dependent on vasculature for oxygen and nutrients and, thus, if tumors are to expand beyond one millimeter in diameter, they require the concomitant expansion of the vasculature. For this process, he coined the term “angiogenesis.” He also predicted that inhibiting vascular expansion or destroying the existing tumor vasculature would lead to prevention of tumor growth or the destruction of an existing lesion. Angiogenesis as a means of cancer metastasis was originally greeted with skepticism by many highly established scientists, but Judah’s perseverance led to the acceptance of this developing field.

Judah’s sense of humor and ability to withstand stress always amazed me. For example, his greatest ambition as a physician was to shepherd the study of angiogenesis into the realm of therapy, although this mission proved to be difficult. Joint studies from our two laboratories showed that the progressive growth of infantile, cutaneous hemangioma is directly correlated with hyperplasia and angiogenesis and inversely correlated with expression of the endogenous angiogenesis inhibitor, IFN- β . Attempts to translate

these findings to the clinic were met with numerous requests for “more basic studies.” To calm me down, Judah said, “You know, this reminds me of a story: A pediatric surgeon in Boston just finished a difficult operation. To relax, he went to the Charles River and sat down on a bench. Suddenly, he heard cries of ‘Help! Help!’ and saw a person drowning. The surgeon jumped into the river and pulled the person to safety. He lay exhausted on the banks of the river and again heard, ‘Help! Help!’ He glanced at the river and saw another person drowning. Despite his exhaustion, he jumped into the river and pulled the second drowning person to safety. Now, he was truly exhausted and lay on the ground huffing and puffing and again heard, ‘Help! Help!’ He raised his head to look toward the river and saw a third person drowning, but he also noticed two basic researchers walking by the river. The surgeon shouted, ‘Colleagues, you must help! This is the third drowning person in the river in one afternoon!’ The researchers looked at the river and then at the surgeon and said, ‘Three people drowning in one afternoon? This is very interesting! We’ll walk upstream to see who’s throwing them in!’”

Dr. Folkman was also an active member of AACR. He was an editorial board member of two AACR journals, *Cancer Research* and *Clinical Cancer Research*. In addition to serving on several AACR committees and chairing several AACR conferences, he was also the 1985 recipient of the AACR-G.H.A. Clowes Memorial Award. More recently, he served as a trustee of the AACR Foundation for the Prevention and Cure of Cancer.

Judah Folkman inspired me with his vision, his leadership, and his enthusiasm. We have lost a giant, the father of angiogenesis. Continuing his work toward saving patients from the dreaded disease of cancer is our way of thanking him.