Judah Folkman, MD, died as the result of a heart attack in Denver, CO, on January 18, 2008. At the time of his death, Dr. Folkman was the Director of the Vascular Biology Program at Children’s Hospital in Boston and the Andrus Professor of Pediatric Surgery and Professor of Cell Biology at Harvard Medical School. Dr. Folkman was a pioneer of research in the field of tumor angiogenesis and antivascular endothelial growth factor (VEGF) therapy for oncology and ophthalmology applications.

*Retina Today* spoke with two ophthalmologists who worked in Dr. Folkman’s laboratory. Anthony P. Adamis, MD, President and CEO of Jerini Ophthalmic in New York, and Robert D’Amato, MD, PhD, Chair in Surgical Research and Director of the Center for Macular Degeneration Research at Children’s Hospital and Associate Professor of Ophthalmology at Harvard Medical School, share their thoughts on Dr. Folkman.

**RT: WHEN DID YOU FIRST BEGIN WORKING WITH DR. FOLKMAN?**

**Dr. Adamis:** I began working with Dr. Folkman in 1990 when I was a fellow. I had heard him speak—he was such a compelling speaker, and the problem of angiogenesis seemed so central to ophthalmology that I decided to change my career and go work with him. I began training with him in 1990, and in 1994 he offered me a position as a faculty member in his laboratory. I worked at his laboratory until 2001.

**Dr. D’Amato:** I first met Dr. Folkman when I was a resident at the Massachusetts Eye and Ear Infirmary in 1991. He would come every year to give lectures on the development of antiangiogenesis to treat disease. Although his main focus was cancer, he was also interested in working with ophthalmologists on the ocular indications for antiangiogenesis. His affiliation with ophthalmology goes back to Arnold Patz, MD, former Chief of Ophthalmology at Wilmer Eye Institute in Baltimore, and a pioneer in the field of retinopathy of prematurity.

**WHAT WAS IT LIKE WORKING WITH DR. FOLKMAN?**

**Dr. Adamis:** Working with Dr. Folkman was, in a word, amazing. He was always full of ideas and was extremely enthusiastic about the science; he would be in his laboratory at all hours because he loved the science so much. Dr. Folkman was also an extremely generous mentor. He was a person who always highlighted the up-and-coming people within his department, whether they were students in training or young faculty. He tried to support his colleagues in any way possible.

**Dr. D’Amato:** Dr. Folkman was the former Chief of Surgery at Children’s Hospital and, even after he moved on from that post, he had a surgeon’s lifestyle. He arrived at the hospital at 6:00 am every morning and would stay until 9:00 pm every night, if not later. He used a portion of time every night to answer calls from patients. Interestingly, none of the patients who called him throughout the day seeking his help were his own. Instead, these were people who had cancer, or a child...
with hemangioma, or an ocular problem for which their doctor was telling them there was no treatment. There were many patients who would reach out to Dr. Folkman in desperation, and he always responded and tried to offer some hope.

Dr. Folkman’s father was a rabbi and, as he has said frequently, he learned from his father the importance of offering hope to patients. Dr. Folkman told stories of when he was as young as 5 or 6 years old, and his father would take him around to see patients who were in the hospital. It was there that he saw the hope that his father instilled in dying patients. As a physician, Dr. Folkman translated these experiences into trying to find some way to offer hope to patients who were without any other port. He almost always came up with something for the patient to try or some contact for the person to explore. He never told anyone, “that’s it—the jig’s up.” Rather, he always worked to find some new pathway for the patient to keep the hope alive that they could find some way to ameliorate their disease. That’s what drove him.

**RT (TO DR. ADAMIS): CAN YOU DISCUSS YOUR WORK WITH DR. FOLKMAN ON VEGF INHIBITION?**

**Dr. Adamis:** As I mentioned earlier, when I first heard Dr. Folkman speak, he discussed molecules that were being discovered that governed the growth of blood vessels. He also noted these molecules may be the same ones that are operative in eye disease. So, when I first began working with Dr. Folkman in the laboratory, we not only tested those molecules but tried to find new molecules. This is a simplification of events, but that’s how we started the process that led to VEGF.

At the time, VEGF had only recently been discovered, and it hadn’t been explored vis-à-vis its role in the eye. This is the line of research that we started in Dr. Folkman’s lab—to see if VEGF was, in fact, a factor in eye disease, specifically macular degeneration.

**RT: CAN YOU SHARE A MEMORY OF DR. FOLKMAN THAT IS PARTICULARLY MEANINGFUL TO YOU?**

**Dr. D’Amato:** Dr. Folkman was always very respectful and particular about doing things in what he saw as a proper way. For example, when he was receiving an award at the annual meeting of ARVO (Association for Research in Vision and Ophthalmology), I was asked to pick him up at the airport in Fort Lauderdale and drive him to the meeting.

When I picked him up, the temperature in Florida was 85°F, and he was wearing a three-piece wool suit—standard for Dr. Folkman. I pleaded with him to take it off and change to a short-sleeved shirt, telling him that this is what everyone else wears to the meeting, but he felt that this would not be appropriate to the occasion. This story, in my opinion, typifies how Dr. Folkman carried himself. He treated everyone with the highest level of respect and professionalism.

**Dr. Adamis:** When I was training with Dr. Folkman in his laboratory and we started to do the early work on VEGF in the eye, he was supporting the work and so, very appropriately, his name went on the papers that we authored. After the third or fourth VEGF paper was coming out, he pulled me aside after looking at the draft that we were planning to submit and he said, “Take my name off the paper.”

Quite frankly, at that moment I was a bit puzzled. “Why don’t you want your name on the paper?” I asked.

To that, Dr. Folkman replied, “Look, you’re young, you’re starting out and building your career, and this is important work. You want people to say that Tony Adamis did this and not that Judah Folkman did this. If my name’s on your paper, everybody will associate me with that work.”

There are very few people in academics who will sacrifice an authorship position on a paper, but Dr. Folkman was willing to do this. And he did this for others in his laboratory as well, as I witnessed.

**RT: WHAT IS DR. FOLKMAN’S LEGACY TO MEDICINE?**

**Dr. D’Amato:** Dr. Folkman left a huge legacy to medicine. He single-handedly created a whole field of therapeutics that will extend across all medicine—treatments for cancer, rheumatoid arthritis, all the blinding conditions in ophthalmology—it’s a tremendous legacy.

**Dr. Adamis:** To ophthalmology, Dr. Folkman’s legacy is of saving the sight of hundreds of thousands, and ultimately millions of patients. Antiangiogenic therapy is now first-line therapy in age-related macular degeneration. It’s being used in diabetic retinopathy and vein occlusions and all the leading causes of the loss of vision, as far as retinal diseases go, so I think that’s going to be his greatest influence in ophthalmology.

Dr. Folkman’s legacy, however, extends to all of those who he has inspired to work in angiogenesis research. It’s really just beginning. I was very happy that he was invited to give the keynote lecture at the 2007 Annual Meeting of the American Academy of Ophthalmology in New Orleans. The audience gave him a standing ovation, and if he hadn’t before, he truly recognized the impact he has had on ophthalmology.