

# In Memoriam

## Leonard I. Malis, M.D.

### 1919-2005

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ON SEPTEMBER 12, 2005, Mount Sinai lost one of its pioneering giants, Dr. Leonard I. Malis. Dr. Malis was born in 1919 in Philadelphia, and grew up in Atlantic City, NJ. His technological talents appeared early. At age 12, he was one of the youngest licensed ham radio operators in the United States. By 15, he had designed and built a 1,000-watt transmitter, which allowed him to talk with fellow enthusiasts around the world. At 16, he was repairing pinball machines and “take-your-own-photo” booths for board-walk amusement arcades, and slot machines for local gambling casinos.

At the University of Virginia, as part of the Department of Biology honors program, he designed and built his own laboratory equipment—radiowave generators and special optical, photographic, thermoregulatory, and light systems. He also studied the effects of radiation on cellular mechanisms and devised a binocular stereoscopic dissecting microscope that would pave the way for future developments in microneurosurgery.

During World War II, Dr. Malis served as a captain in the Medical Corps, where he became head of a neurological unit. After the war, ten months as a general practitioner (“an invaluable learning experience and the unhappiest time of my life”) preceded his neurology residency with Dr. Israel Wechsler at The Mount Sinai Hospital. Training in neurosurgery followed under Dr. Ira Cohen, who encouraged the development of full-column myelography. Using this technique, Dr. Malis clearly demonstrated disc herniation, intramedullary and extramedullary neoplasms, and spinal structural abnormalities.

In 1950, the Dazian Foundation supported his fellowship year at Yale in the laboratory of John Fulton, the eminent neuroscientist. While his primary research at Yale was in neurophysiology, Dr. Malis also achieved advances in neurosurgery



and neuroradiology. The monopolar Bovie electrocautery, with improper grounds, charring, and high impedance, was replaced by his new spark-gap bipolar forceps, an indispensable tool for pinpointing hemostasis in microsurgery. He also designed a serial cassette changer to replace the single-cassette technique then in use for cerebral angiography. The prototype machine, completed at The Mount Sinai Hospital in 1951, produced over 250,000 stereoscopic views of the intrinsic vasculature of the brain, before being retired.

When Dr. Malis returned to Mount Sinai, his electrophysiology laboratory was on the sixth floor of the old surgical pavilion. There, Dr. Malis regularly employed an operating microscope for a full range of animal experiments. All of his microsurgical instruments, oscilloscopes, automatic camera systems, physiological amplifiers, and electronic stimulators were put together in his basement workshop.

Demands on a full-time attending neurosurgeon, who was now authoring numerous publications in basic science and clinical research, were occasionally interrupted. Research into the extensive sensory cortex of the dolphin, to map the areas involved in vocalization, required a trip to St. Petersburg, Florida, and transport of Dr. Malis' entire Mount Sinai laboratory. The newly available 60-inch cyclotron at the Brookhaven National Laboratories stimulated him to construct a special gun-sight device that aligned a proton or deuteron beam and focused ionizing radiation on specific tracts of the cat brain. The hundreds of lesions created provided the earliest information on neuronal and glial radiosensitivity.

Until 1965, regular operating room use of the binocular surgical microscope was confined to otolaryngology procedures. While operating on a

child with a large craniopharyngioma, Dr. Malis found a fixed optic chiasm with only enough room for a minimal biopsy without damaging the carotid artery. He borrowed the binocular microscope and, using his own animal laboratory instruments, accomplished complete excision of the tumor. By 1968, he had adapted the same model television carried on NASA moon missions, so that residents and operating room staff could simultaneously follow his microsurgical procedures to clip aneurysms, ablate arteriovenous malformations, and totally remove acoustic neuromas—a neurosurgical feat that Harvey Cushing had thought impossible. Not content with this initial success in “telesurgery,” he established audiovisual connections to Neuropathology, Neuroradiology, and the Office of Neurosurgery, so that immediate consultation and communication with other professors became available. His inventiveness included running the needed cables between buildings by fly casting at night to avoid scrutiny.

The first microneurosurgical course in the United States was held at The Mount Sinai Hospital after Dr. Malis convinced the Zeiss Corporation to hold all microscope deliveries for three months so that 40 operating microscopes would be available for the program.

In 1970, Dr. Malis succeeded Sidney Gross as professor of neurosurgery and chairman of the department, at The Mount Sinai Hospital. The next two decades saw his Department of Neurosurgery achieve world-class status. Patients from all over the United States and abroad sought out Dr. Malis’ expertise in spine and brain disorders. Treatment of herniated lumbar and cervical discs, skull-based tumors, and carotid aneurysms, along with middle

cerebral-external carotid anastomoses, cerebrospinal fluid shunts, and cortical electrode placements, were included in the more than 300 operations performed each year. Each of his forty residents became board certified and went on to academic positions and successful practices. Innovations in microneurosurgery, neuroradiological technique, critical care, antibiotic prophylaxis, operative microphotography, and electroneurophysiology became the subjects of numerous journal articles and textbook chapters. Dr. Malis’ academic appointees presented papers frequently at New York City, New York State, and national neurosurgical scientific meetings.

Everyone who worked with, learned from, and operated with Dr. Malis was aware of his unique abilities—including ambidexterity and the ability to envision neuroanatomy in three dimensions. His staff watched in awe as he drew (left and right with both hands simultaneously) the axial images of his patients’ X-rays long before the advent of CT scanning. Dr. Malis’ warmth as a mentor and his kindness to patients in distress were just as apparent as his genius for problem solving.

Leonard Malis’ influence will endure. His numerous insights and innovations helped shape modern medicine and inspired many of those who will build its future.

He is survived by his wife, Ruth, whom he met while he was in medical school, two children, Larry and Lynn, three grandchildren, and a brother, Jerry.

Martin H. Savitz, M.D., Ph.D.

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