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In memoriam: Stephen F. Lowry, MD, MBA

Steve E. Calvano, PhD

Department of Surgery, UMDNJ-Robert Wood Johnson Medical School, New Brunswick, New Jersey 08903

*Address all correspondence to: Dr. Calvano at UMDNJ-Robert Wood Johnson Medical School, Department of Surgery, 125 Paterson Street, CAB 7078, New Brunswick, NJ 08901; calvanst@umdnj.edu

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Our friend, colleague, and inspirational spirit, Stephen F. Lowry, MD, MBA, passed away suddenly in early June 2011. At the time, he was Chair of Surgery and Senior Associate Dean of Education at the UMDNJ–Robert Wood Johnson Medical School in New Brunswick, New Jersey. He also had been continuously funded for 26 years by the NIH (NIGMS) through both R01 and R37 (MERIT) award mechanisms.

Dr. Lowry was born in Columbus, Ohio, in 1947 and those Midwestern roots stayed with him throughout his life, as displayed by his unwavering honesty, decency, loyalty, and persistence. He attended Wesleyan University in Ohio, receiving his BA magna cum laude and then went on to medical school at the University of Michigan, which, having come from the heart of the Buckeye nation, must have engendered some interesting discussions among friends and family back in Columbus. Following graduation with the MD, Dr. Lowry went on to his internship and surgical residency at the University of Utah in Salt Lake City where, it has been told, he oftentimes would rather ski in the nearby Wasatch Mountains than sleep after a grueling on-call night at the hospital. Dr. Lowry took a research hiatus during his residency, going to Bethesda where he worked with Dr. Murray Brennan at the Surgery Branch of the NCI. It was there that Dr. Lowry's curiosity and passion for science and research developed.[1] And, Dr. Brennan was sufficiently impressed with his scientific "chops" that, after Dr. Lowry completed his residency, Dr. Brennan invited him to the Memorial Sloan-Kettering Cancer Center (MSKCC) in New York City. There, Dr. Lowry completed a fellowship in surgical oncology and was appointed an Assistant Attending Surgeon.[2] While at MSKCC, Dr. Lowry's work and his potential came to the attention of Dr. G. Tom Shires, the Chair of Surgery at Cornell University Medical College (CUMC) which was across the street from and affiliated with MSKCC. Dr. Shires successfully recruited Dr. Lowry as an Assistant Professor and, while at CUMC, he really hit his stride as a scientist and researcher. After only three years at CUMC, Dr. Lowry was awarded an RO1 that, as stated above, continued without interruption for 26 years including 10 years with MERIT status. He also served as the Director of both the Laboratory of Surgical Metabolism and the Hyperalimentation Unit.

At first, Dr. Lowry's research focused on nutrition and metabolism issues in normal human subjects and in burn patients.[3] However, a paradigm shift occurred when Dr. Lowry, along with one of his fellows, Dr. Kevin Tracey, formed a collaboration with Rockefeller University scientists Dr. Anthony Cerami and Dr. Bruce Beutler (2011 Nobel Prize winner in medicine) to help characterize what was then known as cachectin and is now known as tumor necrosis factor-alpha (TNF-α), a factor previously discovered by Dr. Lloyd Old based on cytotoxic activity against tumor cells.[4] This led to publications in *Nature and Science* where Dr. Lowry,

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Dr. Tracey, and Dr. Shires and their collaborators showed that TNF-α was necessary and sufficient to recapitulate the signs of severe sepsis in animals.[5,6] Thus, TNF-α took its place alongside of interleukin1-beta (IL1-β), which had been previously discovered and characterized by Dr. Charles Dinarello.[7] Ultimately, these discoveries paved the way for the so-called cytokine theory of inflammatory diseases. Somewhat ironically, although these findings were made in the context of infection and sepsis, the subsequently developed "cytokine antagonist therapies" have proved not particularly efficacious in sepsis, although they are now mainstream therapies for many other inflammatory diseases including rheumatoid arthritis (RA), inflammatory bowel disease (IBD), gout, etc.

Along the way, Dr. Lowry was appointed Associate Professor and then, in 1992, Professor of Surgery, just 10 years after joining the faculty at CUMC. In 1997, Dr. Lowry moved to the Robert Wood Johnson Medical School (part of the University of Medicine and Dentistry of New Jersey) as the Chair of Surgery. While his new administrative responsibilities were immense, Dr. Lowry found the time to move his active research program forward. A large part of this revolved around the human volunteer endotoxin model, which he set up at CUMC nearly a decade earlier and which simulates, albeit moderately, the systemic inflammation associated with injury and infection.[8–10] Dr. Lowry became a steering committee member of the Inflammation and Host Response to Injury Large-Scale Project (one of the so-called glue grants) and, using the human endotoxin model, participated in the large-scale application of microarray and modern bioinformatics technology to the characterization of the blood leukocyte response to inflammation *in vivo*. These studies resulted in a letter to *Nature*.[11] The data from these studies also served as the basis for development of a mathematical model for human endotoxin-induced inflammation,[12,13] which is discussed in a subsequent article in this issue by Scheff et al. As all this was taking place, Dr. Lowry somehow found the time to matriculate at Auburn University, earning an MBA in 2006. The same year, Dr. Lowry was appointed the Richard Harvey Professor of Surgery and the Senior Associate Dean of Education at the Robert Wood Johnson Medical School, where he was instrumental in realizing a major revision in the curriculum and a very successful reaccreditation by the LCME.

In his later years, Dr. Lowry became interested in the role of physiological variability as it related to sickness and health. This interest led to studies of periodicity and variability in heart rate and other measures.[14–16]

During his career, Dr. Lowry won awards and honors too numerous to fully list here. However, several stand out. In 1987, Dr. Lowry was awarded the Traveling Fellowship of the James IV Association of Surgeons, an association in which he subsequently went on to become Secretary and a member of the board of directors. In 2003, he was honored with the Flance-Karl award, the most prestigious research award in surgery. Furthermore, in 2009, Dr. Lowry served as President of the Surgical Infection Society. And finally, just a few weeks before his sudden death, he received the Edward J. Ill Physician's Award for Excellence in Clinical Research.

In closing, Dr. Lowry was visionary in his approach to research and a brilliant thinker. He was also insatiably curious and always desirous of mastering new knowledge, even if not in biological research or medical fields. He truly was a renaissance man, and this was reflected in his ability to move easily between his multiple jobs of chair, administrator, physician, researcher, and teacher. In medical schools, the "triple threat" (physician, researcher, teacher) faculty member is something others aspire to. Dr. Lowry was a quintuple threat, and I doubt we will ever have the honor to know a more remarkable individual.

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