

SPECIAL ARTICLE

บทความพิเศษ

96

The role of research in an academic surgical department

Frank G. Moddy, M.D. F.A.C.S.**

Denton A. Cooley Professor

Department of Surgery, The University of Texas Medical School, Houston, Texas, U.S.A

The following is the substance of a presentation that I recently made to the University Surgeons of Asia Second Scientific Congress held in Singapore August 10-12, 1996. Surgical research can be defined as research done by surgeons or as research whose results would directly apply to an understanding of the pathophysiology of surgical disease. Randomized controlled clinical trials that compare alternative medical or surgical therapies are also clearly within the domain of surgical research. These scholarly activities are essential to the further evolution of treatment or prevention of human disease by surgical means. My personal interest during the past forty years has been to contribute to surgical education and clinical care by maintaining an active participation in bench research that relates to the surgical problems that I encountered in my practice. I, therefore, invite you to join me in a personal odyssey that spans my four decades as an academic surgeon from internship to my current position as an Emeritus Chairman of Surgery, who continues to work and teach within the laboratory, the operating room, and the clinics.

My internship and subsequent residency in general surgery at the New York Hospital-Cornell Medical Center (1956-1963) provided a unique opportunity to develop the knowledge, judgment and technical skills to manage complex medical problems. From the beginning, I was fascinated by the challenge

presented by the diseases I was called upon to treat peptic ulcer, gallstones, inflammatory bowel disease, gastrointestinal cancer, etc. I was also impressed with the fact that our therapies were empiric and not always successful. The complications of peptic ulcer captured my imagination, and the availability of a dog laboratory made it possible for me to embark upon studies to examine the role of gastric acid secretion in peptic ulceration of the stomach and duodenum. The rigors of the clinic made the going slow, but by the time I entered a four-month rotation in the dog lab during the third of my seven-year residency, I knew the general area that I wanted to pursue. It involved trying to sort out the various humoral factors that led to gastric acid secretion. In order to answer this question, I first had to devise a way to isolate the acid-secreting portion of the stomach from the general circulation, and I accomplished this by devising an isolated perfused chambered segment model that maintained total control of what entered and left the stomach through its blood stream. This work during my residency years stimulated the curiosity of many students who also experienced the excitement of discovery. It provided an opportunity for me to present my work at national meetings such as the Surgical Forum of the American College of Surgeons. In addition, it brought several very desirable job offers at the completion of my surgical training.

**Presented at the University Surgeons of Asia, Second Scientific Congress in Singapore, August 10-12, 1996.

A very important event occurred during my job interviews. I was called aside by Dr. Francis B. Moore following a presentation of my work to the staff at the Peter Bent Brigham Hospital in Boston and was told in a kind way that I needed further scientific training, and he was right. In fact, he was both emphatic and specific ; he suggested that I should learn how water moves through biological tissues. He chose this topic with tongue in cheek, because he knew that an understanding of the precise mechanisms of this process would take me a lifetime but would along the way teach me about gastrointestinal secretions. Incidentally, to this day, we do not know all the details of the way water moves in and around cells, but we know more than we did when I started looking for answers to this perplexing question.

I was fortunate in obtaining a position as a Research Fellow in the Cardiovascular Research Institute in San Francisco with a biophysicist, the now deceased Dr. Richard P. Durbin. He was one of the few individuals in the world who knew how water molecules could find their way from the blood side to the luminal side of secretory cells such as those that secrete acid. We together learned that an osmotic gradient was generated at the site of proton (H⁺ ion) translocation in the stomach, and we developed strategies of how to manipulate and study the system. These were an exciting two years, but as a surgeon, I missed the operating room. I was most fortunate in being offered an appointment in the Department of Surgery at the University of California in San Francisco by its new chief, Dr. Englebert Dunphy.

I must pause at this point to interject a word of caution in being seduced by two powerful maidens—surgery and science. My total immersion in both areas over a nine-year period led to a divorce and the dislocation from a wife and three children whom I dearly loved. But I was a lucky one. Within a short period of time, I married Maja, my wife of 32 years,

and not too many years later, my children joined us, and I continued on my way but with a closer eye on my homelife and the need of my family.

My work in San Francisco led to independent funding from the NIH and an opportunity to join Dr. John Kirklin to establish an academic surgical unit in Birmingham, Alabama (1966). Since my interest was primarily focused on gastrointestinal surgery, I welcomed the opportunity to head up a Division of Gastrointestinal Surgery. This offered an opportunity to gain administrative experience at an early stage in my career, and to perform a large number of complex operative procedures. This presented the challenge of establishing a laboratory program in a setting of a wide variety of new challenges. John Kirklin was very supportive of my effort, and I learned how important it was to support young surgical investigators in their efforts to establish their laboratory programs during the early phase of their careers. In addition, I learned how to organize my time so that I could be productive in the laboratory and in my teaching assignments while carrying a heavy clinical load. The position also provided an opportunity to formally mentor young surgeons who wanted to add laboratory investigation to their repertoire. The success of our program offered the opportunity to assume a major leadership role in academic surgery at the University of Utah (1971).

As Chairman at Utah, I set about establishing an active surgical laboratory that allowed my colleagues and me to pursue the pathophysiology of peptic ulcer disease. The majority of residents spent a year or more in the laboratory pursuing their interests in topics that related to surgical disease. Many went elsewhere for two years of intensive research training under the sponsorship of an academic scholar program by the National Institutes of Health. The availability of grants from the NIH allowed medical students, residents, and international scholars to spend variable periods of time with us. It was in this

way that I have had an opportunity to know Professor T.K. Ti, the Chairman of this Congress.

Salt Lake City became my adopted home during this period (1971-1981), a place where my family grew up and enjoyed the many advantages of a beautiful mountain community. Our program attracted a large number of outstanding young men and women who were seeking an academic environment for their surgical training. They joined us for a program that offered five years of clinical training interspersed by a year or more in the laboratory between their second and third years. Many have gone on to assume positions of leadership at other academic centers in general surgery and the surgical specialties. Obviously, this was a source of great pride for my family and me. But I knew I had to move elsewhere to continue my quest to seek ways to better treat and hopefully prevent the diseases that were amenable to surgical care. It was for that reason that I moved to the Texas Medical Center in Houston, the largest concentration of medical facilities in the world, containing over 6000 beds and thousands of scientists. As Chairman and the Denton A. Cooley Professor of Surgery at the University of Texas and Chief of Surgery at the Hermann Hospital, I was able to broaden my research interest and enter into collaborative research with some of the best gastrointestinal physiologists in the world. But more importantly, I was able to attract a larger number of complex hepatobiliary and pancreatic cases for my students and me to treat and study. We continued our studies on the pathogenesis of stress erosive gastritis, gallstones, acute pancreatitis, and dysfunction of the papilla of Vater. Hermann Hospital was one of the major trauma centers in this area, and it did not take us long to focus our attention on a major cause of death in severely injured patients, multiple organ failure. We organized our efforts into a multidisciplinary, closely coordinated Trauma Research Center that was supported by the National Institutes of General Medical Sciences. The Center

has offered our residents and numerous international scholars an opportunity to work closely with basic scientists who are skilled in tools of modern biology and recombinant DNA technology. This has provided for us an opportunity to approach surgical problems at a high level of sophistication, and for the scientists, an opportunity to add meaning to their work as regards the human situation.

This indeed has been a remarkable journey for my students, colleagues and me as we have explored the peaks and valleys of academic surgery. Our contributions to the flow of knowledge while important are only a small component of the net worth of research endeavors. Of equal importance is the critical state of mind created by time in the laboratory, the discipline of the scientific method, and the satisfaction of seeking the truth and understanding the nature of the diseases we treat. I have recommended to the leaders of academic surgery attending the Second University of Surgeons of Asia Conference that they incorporate a period of surgical research into their training programs. The spirit of inquiry comes quickly to the young minds of surgical trainees, and they master with relative ease the tools of contemporary investigation. There is no better time to engage in serious study of the diseases we treat. Our understanding of how the human body works and how it interacts with the environment to cause disease is increasing at an exponential rate. The computer and the Internet is bringing all of us closer together. If you are interested in what we are doing in Houston, please visit our Trauma Research Center on the World Wide Web at

[<http://www-trauma.uth.tmc.edu/trauma>](http://www-trauma.uth.tmc.edu/trauma)

If you are interested to learn how we treat digestive disease, visit our Texas Virtual Clinic at

[<http://websurg.uth.tmc.edu/digestive>](http://websurg.uth.tmc.edu/digestive)

And finally, if your travels bring you to the States, visit with us in Houston.

I appreciate this opportunity to share with you the joy and satisfaction that I have received

from participating in the surgical education of a large number of outstanding surgeons during my thirty years in academic surgery. I can think of no better way to spend ones time then to do research, teach, and care for patients by surgical means. I can recommend it to you highly.