Meet the Champions

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'The Success of the Mentee Is the Mentor's Ultimate Reward'

An Interview with Dr. Michael L. Steer

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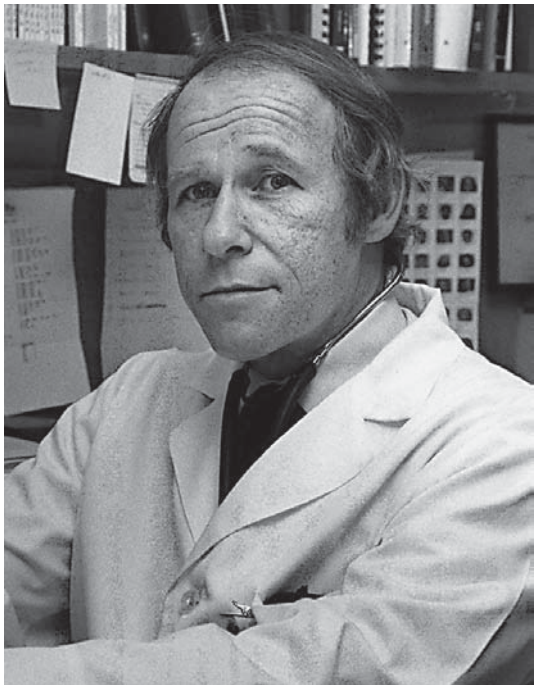
Abstract

In this interview, Dr. Michael Steer shares his life experience in pancreatic research, discusses the importance of mentorship and gives advice to young investigators starting in this field. Dr. Michael Steer is a world-renown investigator who has made an extraordinary contribution to the understanding of pancreatic physiology. His achievements in the field of acute pancreatitis were the foundation for the characterization of the cellular basis for this disease.



M.F.-Z.: What prompted you to work in pancreas research in the first place?

M.L.S.: As is frequently the case, my choice of a research area was purely a serendipitous event. When I was a junior surgical resident spending a year in what, in those days, was referred to as 'the dog lab,' one of my mentors, Dr. Al Hall, made the off-hand comment that 'we can fly to the moon and transplant hearts but we haven't the slightest idea about the mechanisms responsible for pancreatitis or inflammatory bowel disease'. Inflammatory bowel disease did not seem particularly interesting to me but my mentor's comment about pancreatitis was intriguing. It led me to participate in a series of studies designed to determine if serine protease inhibitors could be used to treat pancreatitis. As it turned out, our project ultimately failed to achieve its goals because we found that our protease inhibitors had many side effects that precluded their clinical use but my participation in the project provided me with my initial exposure to pancreas-related research.

Later, during my senior and chief residency years, I became interested in clinical gastrointestinal surgery but I also had an ongoing interest in research and, when the time came to choose a career path, I decided to become an 'academic surgeon'. At that time, being an academic surgeon meant that one would perform clinical surgery, teach residents and students, and also be involved in 'some type of research' but my background in research

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was limited to only the brief stint in the dog lab. I needed research training and, to get that training I took advantage of the fact that our hospital had been awarded an NIH Academic Training Grant that could provide up to two years of salary support for a surgery resident being trained in research. With the support of that grant, I spent the next two years (1972–1974) working as a Post-Doctoral Fellow in the Department of Biophysics at the Weizmann Institute of Science in Israel. There, during the period that spanned the Yom Kippur War, I learned the basic elements of protein chemistry and enzymology. I also participated in a series of studies aimed at identifying the allosteric mechanisms by which adenylate cyclase activity and cyclic AMP formation are regulated by adrenergic hormones, and amylase activity is regulated by chloride ions. It was an exciting time to be in Israel and a stimulating research experience at the Weizmann Institute.

When I initially returned to Boston, I continued that line of research by focusing my laboratory's efforts on mechanisms responsible for adrenergic regulation of adenylate cyclase activity in human platelets and turkey erythrocytes. My clinical practice, however, was heavily weighted towards gastrointestinal and pancreatic surgery and my research efforts on adenylate cyclase seemed to have no relationship to my clinical work. I realized that I badly needed to simplify and consolidate. Recalling my earlier mentor's comment about pancreatitis, I decided to combine my research interests in biological chemistry with my clinical interests in pancreatic surgery by re-directing my laboratory effort towards studies dealing with the biochemical and enzymatic mechanisms that might be responsible for pancreatitis. As it happened, two new and non-invasive models of acute pancreatitis had just been described – the diet model and the caerulein model. They seemed to offer significant advantages over the widely used but poorly controlled duct injection models and, in a grant application submitted to the NIH, I proposed studies using those non-invasive models to examine the cell biological events that occur during the earliest stages of pancreatitis. Fortunately, for me, the grant was funded and, as they say, 'all the rest is history.' Ironically, in the end I combined a career spent in pancreatitis research and a clinical specialty in pancreatic surgery with a personal experience with pancreatic disease.

M.F.-Z.: You have pioneered pancreas research in so many directions. At the end of the day, what has given you most personal satisfaction?

M.L.S.: Over the years, I have had the good fortune of collaborating with many scientists and research fellows with common interests in pancreatitis research. I have also had the opportunity of watching as the research careers of some of our own fellows have blossomed and many have gone on to establish their own independent laboratories. These interactions with others, from many countries and with many different backgrounds, have given me my greatest personal satisfaction.

From a scientific standpoint, my greatest satisfaction has come from the recognition that my generation of pancreas researchers has been able to advance the state of knowledge in our field. When I began my adventure in pancreatitis research during the early 1970s, little if anything was known about the very early cellular events that play critical roles in the evolution of pancreatitis and it was not even clear where, within the pancreas, pancreatitis began. Most of the work done prior to that time had consisted of either studies characterizing groups of patients with pancreatitis or studies which involved the use of relatively poorly controlled experimental models of pancreatitis. The relative crudeness of our science is, in retrospect, surprising given the fact that the pancreatic acinar cell had been used as the model system for many of the pioneering studies of cell biology and the tools needed for studying alterations in acinar cell biology during pancreatitis at the cellular and molecular level were widely available. Things have truly changed over the ensuing 30+ years and current pancreatitis research employs all of the cutting-edge tools of cell biology, immunology, and genetics to answer mechanistic questions. Many of the early cellular events in pancreatitis have now been identified using models of the disease in experimental animals and studies by many groups are currently examining potentially useful means by which progression of the experimentally induced disease might be interrupted. Hopefully, we are just around the corner from achieving a similar understanding of the cellular events that lead to clinical pancreatitis and then using that knowledge to design interventions that can prevent or effectively treat the clinical disease.

M.F.-Z.: Based on your experience as mentee and mentor, can you comment on the value of mentorship for the development of a new investigator?

M.L.S.: Mentor, according to Homer, was the wise and trusted man Odysseus left behind to oversee his household during his adventures and, in the form of Mentor, Athena acted as the guardian of Telemachus, Odysseus' son. Our modern concept of the mentor-mentee relationship is even more complex and multilayered. The phrase is currently used to describe a long-term relationship in which, at various times, the mentor may function as an advisor, a role model, a teacher, or simply as a friend and, in this relationship, the success of the mentee is the men-

tor's ultimate reward. In my own career, I have benefited from my relationships with several outstanding mentors including Bill Silen, my surgeon-scientist mentor at the Beth Israel Hospital and Alex Levitzki, my basic science mentor in Israel. In addition to serving as role models and teachers, they helped me focus my efforts on achievable goals and provided encouragement during the difficult times. Their influence on my career has been critical. I can only hope that I have had a similar impact upon the careers of the younger scientists and surgical residents that have worked with me.

M.F.-Z.: What is the best advice you received during your career?

M.L.S.: The best advice I received was to FOCUS. Isaac Asimov is frequently quoted as saying that 'the most exciting phrase to hear in science, the one that heralds new discoveries, is not 'Eureka!' (I found it!) but 'That's funny...'. While this is certainly true from a discovery standpoint, most of the really important contributions to our knowledge base have also been made possible by investigators who followed their own or others' discoveries by 'drilling down' on the issue. All too frequently, young investigators are tempted to jump from one 'funny' observation to another but, in the end, this relatively superficial and phenomenological approach is usually not nearly as rewarding as one which focuses upon a selected phenomenon, peels back its layers, and addresses its underlying mechanistic questions.

M.F.-Z.: What is your advice to the young investigators that are at the beginning of a career in research?

M.L.S.: In a general sense, I think that it is critical for the young investigator to find a supportive and nurturing environment. Ideally, that environment should include an inspiring mentor but it should also be one which guarantees the financial support and provides the free time that will be needed for the young investigator to achieve his or her potential. All too often, young investigators seem to be attracted by an institution's prestige or by a generous salary offer but, in the long run, these factors do not stand the test of time nearly as well as does a supportive department and/or institution.

It should be recognized that the budding 'surgeon-scientist' may have needs which are more specific but no less important to the chances of success. In contrast to the full-time scientist (i.e. the PhD) or even the 'physician-scientist,' the surgeon can not escape from his or her clinical activities and work full-time in the laboratory for weeks or even days at a time without losing his or her clinical identity and referral base. It is imperative, therefore, that the recruiting institution provide the emerging surgeon-scientist with sufficient technician support so that the work can go forward even during his or her absence. Over the years, I have watched as many young surgeons have attempted to establish their own laboratories without adequate technician support. Invariably, progress slows and the excitement fades. Grant support dries up and, eventually, the surgeon's scientific plans are discarded as he or she assumes a full-time clinical role.

M.F.-Z.: What do you think are the big questions that need to be answered in pancreatology?

M.L.S.: The big questions in pancreatology are all clinical. In the area of acute pancreatitis, the question is 'How can we intervene to reduce the severity of a pancreatitis attack?' while, in chronic pancreatitis, the question is 'How can we effectively manage the pain of chronic pancreatitis?' In the case of diabetes, the question is 'How can we prevent type 1 diabetes from ever developing?' and, in the case of pancreatic cancer, the question is twofold: 'How can we identify patients with pancreatic cancer when the disease is still localized and curable by simple excision?' and 'How can we successfully eradicate pancreatic cancer after it has become a systemic disease?' Over the past several decades, we have been relatively successful in using animal models and cell culture systems along with the recent and remarkable advances in immunology, cell biology, and genetics to identify and characterize many of the events which play critical roles in these pancreatic diseases, but the real challenge for the future will be translating those observations into clinically useful interventions.

M.F.-Z.: What do you think is the major need that a journal like *Pancreatology* should fill?

M.L.S.: *Pancreatology* should serve as a magnet for the most outstanding pancreas research papers. To achieve that goal, submitted manuscripts should undergo rapid and fair review but, in addition, the papers that are eventually published in *Pancreatology* should be widely read and they should have high impact. I believe that increasing the number of review articles that are published in the journal could expand the readership of *Pancreatology*. Those reviews could address either clinical or basic science issues but they should be up to date and they should focus on topics of current interest. They should not, however, be mere summaries of the authors' own contributions. I believe that the impact factor of *Pancreatology* papers could be increased if *Pancreatology* were to become an 'open access' journal with articles that are immediately available online.

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