Perseverance Key to UA Cardiologist's Long Medical Research Career

Dr. Talal Moukabary
March 2015

When asked what makes him different from his colleagues, Dr. **Frank I. Marcus** says with a smile, "Stubbornness and self-confidence, a combination of those two. Everyone encounters adverse blockages in their career, and when I've encountered these, I've said I am going to continue."

Marcus, a member of the **UA Sarver Heart Center** [1] was born on March 23, 1928, in Haverstraw, New York, to Samuel and Edith Marcus. His hard-working immigrant parents spent much of their time and resources ensuring that he would achieve educational and professional success. Marcus took advantage of this opportunity and graduated from high school in 1944 at age 16.

In 1948, he received his undergraduate degree from Columbia University and applied to medical school. However, he was rejected. This was the future doctor's first major obstacle. It was his determination and self-confidence that spurred Marcus, upon this initial rejection, to work in medical research.

That year, he began a master's program in physiology at Tufts University in Medford, Massachusetts, and he performed corticosteroid research at the Worcester Foundation for Experimental Sciences in Shrewsbury, Massachusetts.

“I developed an interest in research during that year. In other words, the adverse event of not getting into medical school was good because it sparked my interest in research," he says.

In 1949, Marcus was accepted into the Boston University School of Medicine. After graduating cum laude in 1953, he did his internship and residency at the Peter Bent Brigham Hospital in Boston, then was a research fellow in cardiology there under the instruction of Drs. Samuel Levine and Bernard Lown. In 1958, he moved to Georgetown University Hospital in Washington, D.C., where he continued his cardiology training under the guidance of Dr. W. Proctor Harvey.

Marcus accepted the position of chief of cardiology at the Georgetown University Medical Service, D.C. General Hospital, in 1960 and was promoted to associate professor of medicine in 1968. While at D.C. General, Marcus pursued various interests in cardiac research.

Most notably, he and his colleagues published results on the metabolism of digitalis – a medication prescribed for some heart conditions – and other cardiac glycosides in normal subjects, patients with renal insufficiency, obese individuals, the elderly and patients who had undergone jejunoileo bypass, a surgical weight loss procedure performed during the 1950s through the 1970s that involved detaching and setting aside a portion of the small bowel.

In January 1969, Marcus joined the UA College of Medicine, which had opened in September 1967, as professor and chief of the Section of Cardiology, now the **Division of Cardiology** [2] in the **Department of Medicine** [3]. In 1971, he was offered the position of chief of cardiology at the University of Arizona Teaching Hospital, now **Banner – University Medical Center Tucson** [4], where he remains to this day.

From 1982 to 1999, Marcus was a UA Distinguished Professor of Medicine at the College of Medicine and was director of the hospital's Arrhythmia Service until he retired as UA professor emeritus of medicine in 2000. Today, he continues his National Institutes of Health-funded research, serving as principal investigator on the study "**Genetics, Mechanisms and Clinical Phenotypes of Arrhythmogenic Cardiomyopathy** [5]," which runs until 2018.

During his career, Marcus took two international sabbaticals, during which his research focus shifted from cardiovascular pharmacology to electrophysiology.

"I believe that a sabbatical is best served to try to change one's orientation in research and also to get a different cultural approach," he says. "I (thought that) I had been doing pharmacological research for many years and (it was) time to change my orientation and try something new."

During his first sabbatical, in 1979 at Hospital Jean Rostand in Ivry, France, he was exposed for the first time to arrhythmogenic right ventricular cardiomoyapthy, or ARVC, a genetic form of heart disease that causes the myocardium – the heart's muscular wall – to break down, increasing the risk of arrhythmia, or abnormal heartbeats, and possibly sudden cardiac death. He spent his time researching ARVC and learning under professors Yves Grogogeat and Guy Fontaine how to perform direct current ablation of the heart to remove abnormal cells.

When he returned to Tucson, Marcus used the techniques he had learned in France and worked to improve them by searching for a safer energy source for the ablation procedure, which carried a high risk of myocardial damage. After much research, he found that radiofrequency energy was a successful substitute for direct current energy.

Marcus attempted to get his groundbreaking findings published, but several journals were not interested. He also had

difficulty obtaining public funding for the research, but this did not stop him; he continued his research on radiofrequency ablation with private funding. Finally, he published an abstract in the journal Circulation in 1985, followed by a well-received publication in the Journal of the American College of Cardiology in 1987.

Marcus took a second, six-month sabbatical in January 1994 with Dr. Michel Haissaguerre in Bordeaux, France, where he refined his ability to diagnose and treat supraventricular and ventricular arrhythmias, developing expertise in radiofrequency ablation of these arrhythmias.

Marcus then focused his attention on improving the diagnosis and treatment of ARVC.

"We have accomplished quite a bit in our right ventricular cardiomyopathy studies, which were funded by the NIH from 2001 to 2008. I think the most significant achievement was that we recognized that the criteria for diagnosis were not very accurate," he says.

Since then, Marcus and his colleagues not only have revised the task-force criteria for the diagnosis of ARVC, but they have helped to establish and expand an international registry for individuals diagnosed with the disease. Utilization of the ARVC registry has spearheaded studies to collect more information about ARVC and its progression, including information about the chromosomal loci, specific gene mutations and the genotype/phenotype associations linked with the disorder.

Over the years, Marcus has published more than 300 manuscripts, contributed more than 60 book chapters, served on the editorial boards of 19 journals and held an active position on more than 30 medical committees.

Among his many honors and awards, Marcus has received the Golden Apple Award for excellence in teaching at Georgetown University College of Medicine, the Award of Excellence from the cardiology section of the UA College of Medicine, the Laureate Award from the American College of Physicians, the Outstanding Reviewer Award of the American College of Cardiology, the Distinguished Alumnus Award from the Boston University School of Medicine, the Masters Clinician Award from the American Heart Council on Clinical Cardiology and, most recently, the Pioneer in Cardiac Pacing and Electrophysiology Award from the Heart Rhythm Society and the Outstanding Achievement Award from the European Cardiac Arrhythmia Society.

He also was selected to deliver the**Spring 2015 Donald K. Buffmire Visiting Lectureship in Medicine** [6], sponsored by the Flinn Foundation earlier this month. He spoke on March 3 at the UA College of Medicine – Tucson and on March 4 at the UA College of Medicine – Phoenix. His presentation, "Quit Digging Your Grave With a Knife and Fork," about the consequences of the obesity epidemic, is archived for viewing **here** [7].

Colleagues, students and staff recognize Marcus as a kind physician who is calm even under pressure.**Nancy Ronan,** a nurse who has worked alongside Marcus for many years, says that the only way she could tell that he was stressed was a slight cough that would surface every so often.

Marcus' dedication to mentoring young physicians is evident by the amount of time he spends at the bedside teaching his fellows, covering all aspects of clinical practice from detailed physical examinations to complex arrhythmias. His commitment to medical education also is evidenced by the **Samuel and Edith Marcus Visiting Professor in Cardiology** [8], which he and his siblings established in his parents' names in 1997 to support yearly visiting professorships at the UA College of Medicine.

"Dr. Marcus is an eminent figure in cardiology, responsible for many advances in treatment of heart disease and arrhythmia," says **Dr. Nancy K. Sweitzer** [9], director of the UA Sarver Heart Center and chief of the UA Division of Cardiology. "It is an honor to work so closely with him here in Arizona."

Dr. Talal Moukabary graduated from the UA Sarver Heart Center Cardiovascular Disease Fellowship Program in 2011. He now is director of cardiac electrophysiology at Carondelet Heart and Vascular Institute and chief of the Division of Cardiac Electrophysiology at Carondelet St. Mary's Hospital.

Links
[1] http://heart.arizona.edu/ [2] http://deptmedicine.arizona.edu/division-cardiology [3] http://deptmedicine.arizona.edu/ [4] http://www.uahealth.com/ [5] http://opa.ahsc.arizona.edu/newsroom/news/2013/nih-awards-dr-frank-marcus-14-million-study-genetics-mechanisms-and-phenotypes-ar [6] http://opa.ahsc.arizona.edu/newsroom/news/2015/longtime-cardiologist-dr-frank-i-marcus-present-quit-digging-your-grave-knife-and [7] https://streaming.biocom.arizona.edu/event/index.cfm?id=25738 [8] http://heart.arizona.edu/marcus-lecture [9] http://heart.arizona.edu/faculty/faculty_2800