Ulrich Sigwart

Spencer B. King., III, MD, MACC, FESC

Saint Joseph's Heart and Vascular Institute, Atlanta, Georgia, USA

Address for correspondence:
Spencer B. King., III, MD, MACC, FESC
Saint Joseph's Heart
and Vascular Institute
5665 Peachtree Dunwoody Rd., NE
Atlanta, GA 30342, USA
sbking@sjha.org

Professor Ulrich Sigwart was central to the greatest revolution in interventional cardiology since Andreas Gruentzig founded the specialty with the introduction of percutaneous transluminal coronary angioplasty (PTCA). He has been credited with the concept and realization of endoluminal stenting, a procedure that has revolutionized coronary and peripheral arterial revascularization, and also enabled the percutaneous catheter approach to carotid artery stenoses and other techniques requiring stenting (Figure 1). Sigwart was born in Germany on March 9, 1941, and was the fifth child of August R. Sigwart, a scientist who worked for Bayer Industries, and his wife Elizabeth. Most of his father's ancestors were doctors, philosophers, or theologians, and a street in Tübingen, Germany is even named after one of them. His father, who was an outspoken opponent of the Nazi regime, died suddenly after a "fight" at Bayer Werke, resulting in his being sent to a resort in Austria to "cure his weak nerves." He collapsed suddenly on his arrival at the hotel after being given a cup of tea. The family is convinced he was murdered by the Nazis. Sigwart was 1 y old at the time of his father's death.

After his father's death, Sigwart was raised by his mother and lived with her, his older brother, and sister in the Black Forest mountain region of southwest Germany, and later in northern Germany. He attended medical school in Freiburg and Basel, Switzerland, where he met his future wife, Christine Sartorius, a decedent of a most venerable Basel family of theologians and academics. Her father was a director at the United Nations Food and Agricultural Organization in Geneva, Switzerland. Sigwart met Sartorius in the student's café and they were engaged within 1 mo of their meeting. He was not one to sit on a good idea very long.

A general internship in Lörrach, Switzerland, in the vicinity of Basel, was followed in 1968 by Sigwart's migration to the United States to begin residency at Framingham Union Hospital, Framington, Massachusetts, where the couple's first daughter was born. The Boston winters, as he remembers, were tough with long night duty and little sleep. Perhaps partly because of those winters, he began his cardiology fellowship at the Baylor College of Medicine in Houston, Texas in the department of Henry McIntosh and under the supervision of Allan Reid. Sigwart was "thrilled to be able to do what he had long wanted to do."

Despite several offers to remain in the United States, in 1973 Sigwart returned to Europe. After additional training in the University Hospital, Zurich, Switzerland, "the cradle of many ideas," he was recruited to Bad Oeynhausen,

Germany to set up an invasive cardiology program in a newly established heart center. His work there on automation in cardiac catheterization played a significant role in the development of the current use of computers in hemodynamic evaluation. From there Sigwart moved to the University Hospital, Lausanne, Switzerland, where during his 10-y tenure (1979–1989), he played a pivotal role in the concept and ultimate application of coronary stenting. His description of the sequence of events in myocardial ischemia produced one of the most referenced illustrations.¹

Many, including this author, traveled to Lausanne, Switzerland to observe the technique of stenting with the self-expanding device. Our group had investigated a wire balloon expandable stent and deployed these for acute vessel closure after angioplasty the year after Sigwart's pioneering work. Sigwart was the first to report on the clinical use of stents to prevent sudden occlusion and restenosis after transluminal angioplasty in his landmark paper published on March 19, 1987 in the *New England Journal of Medicine*.² He also observed the shortcoming of stents when 3 mo after one had been implanted in the proximal left anterior descending artery, the patient developed recurrent chest pain. Angiography revealed severe restenosis and, at Sigwart's urging, the surgeon removed the stented segment intact. "Gazing at the massive tissue obstructing the stent lumen, the hypothesis of mechanical support for the prevention of restenosis looked like an illusion and that a combination of mechanical and biologic factors would be the sine qua non to overcome the problem of recurrence," mused Sigwart.³

In 1989, he was offered the position of the director of the Department of Invasive Cardiology at the Royal Brompton Hospital in London, England, where he enjoyed working with many luminaries such as Anthony Rickards, Philip Poole-Wilson, Sir Magdi Yacoub, and many others. It was in London that the second therapy altering revelation came to his receptive mind. Hypertrophic obstructive cardiomyopathy had only one therapeutic option if drug and pacemaker therapy failed, and it was surgical resection of the hypertrophied obstructing septal tissue. In the early 1990s, Sigwart envisioned a method for reducing the septal hypertrophy by producing a myocardial infarction in the tissue and allowing scar retraction to result in removal of the obstruction. After preliminary experimental work carried out in Lausanne, Switzerland, he began testing the method in patients with symptoms refractory to medical therapy and, in 1995, he described the first 3 patients treated with absolute alcohol injection into the

Figure 1: Professor Ulrich Sigwart (1941–).

first septal perforating artery. Clinical improvement was maintained at 12 mo and an alternative therapy known as hypertrophic obstructive cardiomyopathy was born.⁴ During his 12-y tenure in London leading the Department of Invasive Cardiology at the Royal Brompton Hospital, he submitted the first plan to compare percutaneous coronary intervention using stenting with the gold standard coronary bypass surgery. His advocacy for investigating this critical question for interventional cardiology led to both the Arterial Revascularization Therapy Study (ARTS) trial, conducted by Dr. Patrick Serruys, and the Stent or Surgery (SoS) trial, co-directed by his collaborator Dr. Rod Stables.

Sigwart's clinical acumen was recognized by many powerful leaders in parts of the world without first-class medical care, and he has often been called upon to provide cardiac consultation. He was recognized with many international prizes, including the European Society of

Cardiology medal in 1996, the King Faisal International Prize for Medicine in 2004, and the Maseri-Florio International Award from the American College of Cardiology in 2007. While in London, Sigwart and his wife, an accomplished musician and committed humanitarian, founded the Jonas Foundation, a charitable endeavor aimed at improving the lives of orphan children from countries ravished by violence in Africa and Eastern Europe. Sigwart's wife continues to direct this children's musical project from Geneva, Switzerland and London, England.

A most difficult decision was presented to Sigwart in 2001 when he was offered the chairmanship of the Department of Cardiology at the University of Geneva, Switzerland. His ties in London were strong and leaving would be difficult, but the return to the continent and to Christine's roots seemed inevitable. The 5 y at the helm in Geneva capped a career that few have experienced. Many of our colleagues can boast of hundreds of publications and contributions that are laudable, but few can claim 1, much less 2, publications that have changed the face of cardiology: first was stenting, and second was percutaneous septal reduction for hypertrophic obstructive cardiomyopathy. A retirement symposium on September 29, 2006 in Sigwart's honor featured captains of the medical industry, and many scientists and clinicians of distinction who spoke about his impact on cardiology.

Now in retirement at his home in central Geneva and in his twelfth century castle, Bioley-Magnoux, an ancestral home of Christine's family, this young man has hardly withdrawn from the field he helped build. "Retirement" remains very active for his consultative practice and his most recent appointment as the Associate Editor for Europe of the *Journal of the American College of Cardiology: Cardiovascular Interventions*. "For accepting this important assignment, I am deeply grateful."

References

1. Sigwart U, Grbic M, Payot M, Goy J-J, Essinger A, et al.: Ischemic events during coronary artery balloon occlusion. In: Rutishauser W, Roskamm H, eds. *Silent Myocardial Ischemia*. Berlin: Springer-Verlag; 1984; 29–36
2. Sigwart U, Puel J, Mirkovitch V, Joffre F, Kappenberger L: Intravascular stents to prevent occlusion and restenosis after transluminal angioplasty. *N Engl J Med* 1987;316:701–706
3. Sigwart U: Drug eluting stents: some thoughts from old Europe. *Am Heart Hosp J* 2007;5:135–137
4. Sigwart U: Non-surgical myocardial reduction for hypertrophic obstructive myocardial infarction. *Lancet* 1995;346:211–214