



THE FACULTY OF MEDICINE  
Harvard University

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# Kenneth D. Bloch

Kenneth D. Bloch, the William T.G. Morton Professor of Anesthesia and Professor of Medicine at Harvard Medical School, died on September 13, 2014 at the age of 58. He will be remembered for his seminal contributions in the fields of cardiovascular cell biology and molecular cardiology, his lifetime commitment to the Massachusetts General Hospital, his leadership of the American Heart Association, and especially for his role as a trusted colleague and friend, and mentor to a legion of former trainees.

Ken was born to be a physician-scientist. His grandmother studied astrophysics and his father Kurt is an esteemed Massachusetts General Hospital and Harvard Medical School physician-scientist. He went to elementary school in Brookline and attended the Roxbury Latin School. During the summers, he worked in MGH laboratories, studying regrowth of tadpole tails with Jerry Gross and learning electron microscopy. These early experiences solidified his interest in medicine and science. Ken attended the seven-year medical sciences program at Brown University and completed his residency in medicine at Massachusetts General Hospital in 1984.

After residency, Ken joined the laboratory of Jon Seidman in the Department of Genetics at Harvard Medical School. Together with Christine Seidman, Ken performed ground-breaking research on atrial natriuretic peptide (ANP). He cloned and characterized the gene encoding ANP and investigated the transcriptional regulation of the gene. He studied the biosynthesis of pre-proANP, and the post-translational processing and modification of the protein. He examined the trafficking and secretory mechanisms by which ANP is produced by both atria and ventricles. His work formed the basis of the early field of natriuretic peptide biology. His studies showing increased ANP expression in animal models of heart failure and hypertrophy laid the foundation for the utilization of natriuretic peptide levels as a biomarker in patients with cardiovascular disease. Later in his career, Ken would return to studies on ANP, applying new techniques in molecular biology and bioepidemiology to identify novel post-transcriptional mechanisms that regulate ANP expression.

Ken established his laboratory in the MGH Cardiac Unit in 1990, working closely with Tom Quertermous on the molecular biology of endothelins. He became a Principal Investigator in the Cardiovascular Research Center in 1992, and, upon Mark Fishman's departure in 2002, became Interim Director for two years. During this time, his interest turned to the new field of nitric oxide. Eager to pursue the characterization of the thus far unknown nitric oxide synthase enzyme in the cardiovascular system, Ken, together with his brother Donald Bloch, in the rheumatology group at MGH, and Stefan Janssens, a junior cardiology fellow from Belgium, cloned and characterized the gene encoding endothelial nitric oxide synthase now known as NOS3. Ken began a nearly quarter century collaboration with Warren Zapol of MGH Anesthesiology, studying the underlying mechanism by which nitric oxide causes selective pulmonary vasodilation, and leading in time to a joint appointment with the Department of Anesthesia and receipt of the HMS William T.G. Morton Professorship in 2007. Ken's laboratory described the role

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*In tribute to their dedicated efforts to science and medicine, deceased members of the Harvard Faculty of Medicine (those at the rank of full or emeritus professor) receive a review of their life and contributions with a complete reflection, a **Memorial Minute**.*

of NOS3 in the pathogenesis of pulmonary hypertension and the myocardial dysfunction associated with sepsis. Ken reported that cardiac-specific restoration of NOS3 could attenuate adverse ventricular remodeling in NOS3-deficient mice and identified NOS3 and its downstream signaling mechanisms as possible therapeutic targets.

In 2005, Ken became interested in bone morphogenetic protein (BMP) signaling in cardiovascular homeostasis. He explored how mutations in the gene encoding BMP type 2 receptor cause primary pulmonary hypertension. In collaboration with Paul Yu and Randall Peterson at MGH and Charles Hong at Vanderbilt, Ken identified the first known small molecule inhibitors of BMP signaling. The discovery of these small molecule inhibitors fundamentally changed the field of BMP biology by facilitating inhibition of BMP signaling. Ken and the members of his laboratory used these inhibitors to elucidate the role of BMP signaling in a variety of disorders, including heterotopic ossification, anemia of inflammation, atherosclerosis, and vascular calcification. In 2010, Ken was named the American Coordinator of a multi-national, multi-center LeDucq Network grant examining the role of BMP signaling in the pathogenesis of pulmonary and systemic vascular diseases.

Ken was a devoted member and staunch supporter of the American Heart Association. He served on the AHA's national board of directors and was vice chairman of the committee that planned the scientific sessions at the annual meeting. He chaired the AHA's Research Committee and Cardiopulmonary, Critical Care, Perioperative and Resuscitation (3CPR) Council and was a member of the AHA Science Advisory and Coordinating Committee, the highest scientific body of the organization. He received the AHA's 2013 Meritorious Achievement Award and the 2014 Distinguished Achievement Award from the association's 3CPR Council.

Ken had the rare gift of fostering multidisciplinary collaborations and importing expertise from diverse laboratories and principal investigators. With a magical ability to make people around him happier and more productive, he was a piper of scientists, always surrounded by a flock of young students and physician-scientists. He was known both locally and nationally for his commitment to training and mentorship. Ken spent his happiest hours in the laboratory, frequently whistling while he worked. In his hands-on mentoring style, he often did his research side-by-side with newcomers to his laboratory and devoted countless hours with trainees correcting and rewriting papers and grants. Between 1990 and 2006, Ken served as the primary research mentor for MGH cardiology fellows, guiding them to, and supporting them in, the best research training opportunities that Harvard Medical School had to offer. Since 2002, Ken served as Principal Investigator of the NIH-sponsored T32 training grant awarded to the Cardiovascular Research Center. Ken mentored three generations of cardiac fellows and a number of anesthesiology researchers, taking deep personal interest in their career development. Ken's mentees have gone on to careers not only in cardiology and medicine, but in nearly all branches of the biomedical sciences. He was an incredibly generous teacher who was always available and willing to help his own trainees as well as anybody who sought his advice and support. He received the Harvard Medical School Excellence in Tutoring Award in 2010 and the Clifford Barger Excellence in Mentoring Award in 2012.

Ken took pride in describing any of his personal achievements as team efforts, shying away from the spotlight. Ken had an unflappable personality; both in the lab and outside he was calm and thoughtful. Ken leaves behind a hundred intellectual offspring from nations around the globe. He brightened our lives with his wisdom, his amazing grasp of science, his carefully and gently articulated insights and opinions, and his remarkable way of helping us express ourselves. He was a private person, devoting his infrequent interludes of free time to his tight-knit family and close friends. Ken Bloch's outstanding

scientific contributions, his clinical skills, devotion to teaching, and passionate drive to improve patient care through innovative science will always be a model of excellence.

Respectfully submitted,

Warren M. Zapol, Chairperson

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