# Accomplishments of Medal of Merit Recipients

## 1. Michael DeBakey: Houston, USA

Dr. Michael DeBakey was recently made a Fellow of the International Academy of Cardiovascular Sciences. In Winnipeg, at Cardiovascular Awards Day hosted by the Institute of Cardiovascular Sciences on October 1, 2002, he will be recognized for his extraordinary lifetime achievements with the Medal of Merit from the Academy. A native Louisianan, Dr. DeBakey received his undergraduate and medical education at Tulane. After his residency at Charity Hospital in New Orleans, he went to the Universities of Strasbourg and Heidelberg for further study. Returning to Tulane Medical School, he served on the surgical faculty from 1937 to 1948. From 1942 to 1946, he was on military leave, serving in the Office of Surgeon General as director of the Surgical Consultants' Division and led the development of mobile army surgical hospitals (MASH units). He joined the Baylor faculty in 1948, serving as Chairman of the Department of Surgery until 1993. Dr. DeBakey was president of the college from 1969 to 1979 and served as Chancellor from 1979 to January 1996. Dr. DeBakey is Chancellor Emeritus, Distinguished Service Professor and Olga Keith Wiess Professor of Surgery, and Director of the DeBakey Heart Center of the Baylor College of Medicine and the Methodist Hospital in Houston, Texas. Dr. DeBakey's surgical career has earned him world renown as a surgeon, innovator, medical educator, and international medical statesman. He has performed more than 60,000 cardiovascular procedures and has trained thousands of surgeons who practice throughout the world, many now as heads of their own departments of surgery. He has operated on heads of state, princes and celebrities, as well as paupers, and applies the same exacting surgical technique and compassion to all. While still a medical student, he devised a pump that years later became one of the essential components of the heart-lung machine that made open-heart surgery possible. He has developed more than 50 surgical instruments. Best known for his innovations in treating cardiovascular diseases, Dr. DeBakey was the first to do successful excision and graft replacement of arterial aneurysms and obstructive lesions, particularly on the carotid artery and aortic arch. A pioneer in the development of an artificial heart, he was the first to use a heart pump successfully in a patient. He also conceived the idea of lining a bypass pump and its connections with Dacron velour. In 1953, Dr. DeBakey performed the first successful carotid endarterectomy, thereby establishing the field of surgery for strokes. In 1964, Dr. DeBakey and associates performed the first aortocoronary bypass with autogenous saphenous vein graft. In 1968, he led a team of surgeons in an historic multiple transplantation procedure in which the heart, kidneys, and one lung of a donor were transplanted to four recipients. His ability to bring his professional knowledge to bear on public policy earned Dr. DeBakey a reputation as a medical statesman. He was a member of the medical advisory committee of the Hoover Commission and was chairman of the President's Commission on Heart Disease, Cancer and Stroke during the Johnson Administration. He has worked tirelessly in numerous capacities to improve national and international standards of health care. Among his numerous consultative appointments is a three-year membership on the National Advisory Heart and Lung Council of the National Institutes of Health. Dr. DeBakey holds membership and fellowship in the most distinguished medical and surgical societies in the world. A life-long scholar, he has published more than 1,300 medical articles, chapters, and books on various aspects of surgery, medicine, health, medical research, medical ethics and socioeconomics, and education. Dr. DeBakey is the recipient of numerous honourary degrees and citations from universities around the world. He has received honours from many heads of state, including the Medal of Freedom, the highest honour the President of the United States can bestow on a civilian, the Presidential Medal of Science, and the Lasker Award, the American equivalent of the Nobel Prize.

## 2. Richard Bing: Pasadena, USA

The International Academy of Cardiovascular Sciences is honoured to announce that Dr. Richard J. Bing has accepted appointment as a Fellow of the Academy. Dr. Bing is also being recognized for his extraordinary lifetime achievements with the Medal of Merit from the Academy. Dr. Bing was born in Nurnberg, Bavaria and is a U.S. citizen. After graduation with M.D.'s from the Universities of Munich and Bern, he chose to work on the culture of whole organs at the Rockefeller Institute in New York with Alexis Carrel, the surgeon who had won a Nobel Prize, and Charles Lindbergh, the "Lone Eagle" who made the famous solo flight to Paris in 1929 and was attracted to medical research where he made important contributions. After an internship in surgery at Columbia University, Dr. Bing worked for six years in physiology, first at Columbia and later at New York University, studying the mechanism of hypertension and of crush injuries. He then joined the staff of the Department of Medicine at Johns Hopkins as an instructor where he worked on neurogenic hypertension and also became a resident in medicine. After one year, he joined the U.S. Army, the chemical warfare division, studying the

mechanisms of action of various agents. Dr. Bing then rejoined the Department of Surgery at Johns Hopkins Hospital to work with Alfred Blalock and Helen Taussig on congenital heart disease. After eight years, he joined the University of Alabama, working on the metabolism of the heart. He further pursued this subject as a Professor of Medicine at Washington University, in St. Louis, and as director of the Veterans Administration Medical Service. In 1959, Dr. Bing became Chairman of the Department of Medicine at Wayne State University in Detroit, where he continued his studies in cardiac metabolism, and also began work on the feasibility of coincidence counting and the measurement of coronary flow and visualization of the heart in situ. Ten years later, he moved to Pasadena, California as Professor of Medicine at USC and Chief of Medicine and Cardiology at the Huntington Memorial Hospital, and as Director of Experimental Cardiology at Huntington Medical Research Institutes. His initiative focused on new methods of visualizing the coronary microcirculation by transillumination and the metabolism of the heart after myocardial infarction. He is now working on the mechanism of the COX-2 enzyme in the kidney and heart, and its inhibition by non-steroidal anti-inflammatory drugs. Dr. Bing has been awarded honourary degrees by the German Academy of Medicine, University of Bologna, and Johns Hopkins University. In recognition of Dr. Bing's contribution as a founder, the International Society for Heart Research instituted the "Richard Bing Award for the Best Young Investigator in the Field of Heart Research". In 2001, he received the Presidential Citation of the American College of Cardiology. Dr. Bing has often expressed that he has a good time doing his work and wishes that it could last forever. In addition to medicine, he is addicted to music which, he says, has given him the opportunity to weather the vicissitudes of life

## 3. Edwin Krebs: Seattle, USA

The Mission of the Academy includes recog- nizing extraordinary cardiovascular initiatives. The International Academy of Cardiovascular Sciences is delighted to recognize Dr. Edwin G. Krebs for his amazing achievements with the Academy's Medal of Merit. Edwin G. Krebs was born in Lansing, Iowa in 1918, the third of four children of William Carl Krebs and Louise Helen (Stegeman) Krebs. In the period from 1933 to 1940 in Urbana, he completed the last three years of high school and carried out undergraduate work at the University of Illinois. Washington University School of Medicine proved to be an excellent choice as a place where he received classical medical training but at the same time learn to appreciate "medical research." After being discharged from the Navy in 1946, he returned to St. Louis with the idea of continuing residency and becoming an academic internist but he was accepted by Dr. Carl and Gerty Cori as a postdoctoral fellow. In 1948, he had an opportunity to go to Seattle as an Assistant Professor of biochemistry. In 1950, Hans Neurath became the first permanent chairman of the Department of Biochemistry at the University of Washington and began to build what was to become one of the major departments in the country. Dr. Krebs had been in Seattle for five years when Ed Fischer joined the Department. Together they decided to see whether or not they could determine the mechanism by which 5'-AMP served as an activator of phosphorylase b. They didn't solve that problem, but in the course of trying we discovered the molecular mechanism by which interconversion of the two forms of phosphorylase takes place; namely, reversible protein phosphorylation. During the early years of work on protein phosphorylation, Ed Fischer and Edwin Krebs worked together very closely even to the point that if one had to leave to give a lecture the other could carry on the experiment of the day. In 1968, Dr. Krebs went to University of California in Davis where a new medical school was taking shape. He became the founding chairman of the Department of Biological Chemistry and stayed for a period of eight years. In 1977, however, he returned to the University of Washington as Chairman of the Department of Pharmacology. On October 12, 1992, Edmond H. Fischer and Edwin G. Krebs of the University of Washington School of Medicine received the Nobel Prize for Medicine for their discoveries in the 1950s concerning "reversible protein phosphorylation." The Nobel Prize was established in the will of Alfred Nobel (1833-1896) for annual awards to men and women who confer the greatest benefit on humankind in the fields of physics, chemistry, physiology or medicine, literature, and peace. Scientists worldwide have drawn on the work for a vast spectrum of research on cellular processes. They shared the $1.2 million prize. Dr. Krebs was a professor in Pharmacology and Biochemistry and Dr. Fischer was a professor in Biochemistry. Their discovery was a key to unlocking how glycogen in the body breaks down into glucose. It fostered techniques that prevent the body from rejecting transplanted organs. Their breakthrough opened new doors for research into cancer, blood pressure, inflammatory reactions and brain signals. Their work helped researchers better understand such things as diabetes; Alzheimer's disease; why certain cancers develop; and how the body mobilizes sugar to produce energy. In each university, Dr. Krebs viewed the principal role of the chairman to be the selection of good faculty members, and he has great pride of the results of his efforts in each place including the opportunity to inter- act with colleagues in the development of the respective institutions. As UW professor emeritus and Howard Hughes Medical Institute senior investigator emeritus, Dr. Krebs still leads an active lab. But it's down from 20 to five lab people, who are all now looking elsewhere. "I hope to close my lab in a year," he says. An important part of his autobiographical sketch concerns his family. During residency at Barnes Hospital he met his wife, Deedy, who was a student nurse at Washington University and they were married in 1945. They had three children, Sally, Robert, and Martha and now have five grandchildren. Looking at the world today, Dr. Krebs is disappointed that the goal of becoming a scientist— or even of getting an education—is becoming less accessible to poor

children: “I would like to see a day when any kid would be able to go as far as his abilities could carry him,” he says. “In many ways, the situation for young people seems worse now than when I graduated.”

## 4. Robert Furchgott: Brooklyn, USA

As part of the Mission to recognize major car- diovascular achievement throughout the world, the International Academy of Cardiovascular Sciences recognizes Dr. Robert F. Furchgott for his extraordinary accomplishments with the Academy’s Medal of Merit. Dr. Furchgott was born in Charleston, South Carolina in 1916. He received a B.S. degree in chemistry from the University of North Carolina in 1937 and a Ph.D. degree in biochemistry from Northwestern University in 1940. He was at Cornell University College of Medicine (Departments of Medicine and Physiology) from 1940-1949 and at Washington University (Department of Pharmacology) from 1949-1956. He served as Professor and Chairman of the Department of Pharmacology of the State University of New York Downstate Medical Center at Brooklyn from 1956-1983, and is presently Distinguished Professor Emeritus at that institution. He has also been Adjunct Professor of Pharmacology at the University of Miami School of Medicine (1989-2001), and Distinguished Professor of Pharmacology at the Medical University of South Carolina (since 2001). Dr. Furchgott is recognized for his research in cardiac pharmacology, adrenergic peripheral mechanisms, theory of drug-receptor mechanisms, and vascular pharmacology and physiology. Much of his research has been carried out on isolated, living preparations of heart and blood vessels. His development in the 1950’s of the helical strip of rabbit thoracic aorta as a model system for studies on drug-receptor mechanisms led to its use in laboratories worldwide. He was one of the first investigators to demonstrate the importance of the neuronal uptake mechanism for modulating responses of adrenergic effector organs to norepinephrine and epinephrine. Before the advent of radio-ligands for studying receptors, he developed theory and pharmacological procedures for the characterization and differentiation of cell membrane receptors on which drugs, neurotransmitters and hormones act. He also made the novel discovery that vascular smooth muscle is photosensitive, undergoing reversible relaxation when exposed to near ultraviolet light, and determined the action spectrum and other characteristics of this phenomenon. In 1980, he reported his discovery of the obligatory role of endothelial cells in the relaxation (vasodilation) of arteries by the neurotransmitter acetylcholine, and demonstrated that the relaxation resulted from release of a labile factor (later called endothelium-derived relaxing factor or EDRF) from the stimulated endothelial cells. This novel discovery was followed by the discovery in his laboratory and other laboratories that many vasodilators, both endogenous substances and drugs, act by stimulating release of EDRF. He independently showed that EDRF acts by stimulating the enzyme guanylate cyclase in the vascular smooth muscle cells, leading to an increase in cyclic guanosine mono- phosphate (cGMP) which mediates relaxation. He also found that photorelaxation of blood vessels is mediated by an increase in cyclic GMP. In 1986, he presented evidence for his independent proposal that EDRF is nitric oxide (NO), and that the neurotransmitter released by non-adrenergic non-cholinergic (NANC) nerves may also be NO. The discovery of endotheliumdependent vasodilation and the identification of EDRF as NO opened up a new area of research which is contributing much to our understanding of cardiovascular physiology and pathology. Dr. Furchgott is a recipient of a number of awards and honors. Among these are the Goodman and Gilman Award for Research on Receptor Pharmacology from the American Society for Pharmacology and Experimental Therapeutics (ASPET, 1984); the CIBA Award from the Hypertension Section of the American Heart Association (1988); the Research Achievement Award of the American Heart Association (1990); the first Annual Bristol-Myers Squibb Award for Achievement in Cardiovascular Research (1991); the Gairdner Foundation International Award (1991); Medal of the New York Academy of Medicine (1992); Roussel Uclaf Prize for Research in the Field of Cell Communication and Signalling (1994); Wellcome Gold Medal of the British Pharmacological Society (1995); the ASPET Award for Experimental Therapeutics (1996); the Gregory Pincus Medal and Award (1996); the Albert Lasker Basic Medical Research Award (1996); the Louis and Artur Lucian Award (1997); the Nobel Prize in Physiology or Medicine (1998). He is the recipient of Honorary Doctoral Degrees (in Medicine or Science) from the Autonomous University of Madrid, the University of Lund, Sweden, the University of North Carolina, the University of Ghent, Belgium, the Mount Sinai School of Medicine, Ohio State University, the Medical University of South Carolina, the Medical College of Ohio, Northwestern University, University College London, and Washington University at St. Louis. He was President of the American Society for Pharmacology and Experimental Therapeutics (1971-1972). He is a member of the National Academy of Sciences (1990), a Foreign Honorary Member of the Royal Academy of Medicine of Spain (1998), and a Fellow of the American Academy of Arts and Sciences (2000).

## 5. Eugene Braunwald: Boston, USA

Eugene Braunwald, M.D. is the Distinguished Hersey Professor of Medicine at Harvard Medical School, Faculty Dean and Chief Academic Officer of the Partners HealthCare system founded by the Brigham and Women's and Massachusetts General Hospitals. The International Academy of Cardiovascular Sciences has bestowed on Dr. Braunwald the Academy's Medal of Merit for lifetime achievements. Dr. Braunwald was born in Vienna Austria on August 15, 1929. He and his family fled Austria after the Nazi occupation and came to the U.S. in November 1939. Dr. Braunwald received his medical training at New York University and completed his Medical Residency at the Johns Hopkins Hospital. In 1955 he became a Clinical Associate in the (then) National Heart Institute. Subsequently, he served as the first Chief of the Cardiology Branch and then as Clinical Director of the National Heart, Lung and Blood Institute. After he left the intra- mural program, Dr. Braunwald became the founding Chairman of the Department of Medicine at the University of California, San Diego. From 1972 to 1996 he was Chairman of the Department of Medicine at the Brigham and Women's Hospital. Dr. Braunwald is the only cardiologist who is a member of the U.S. National Academy of Sciences. He has served as President of the American Society for Clinical Investigation and the Association of Professors of Medicine. Dr. Braunwald has received numerous honors and awards including the Wiggers and Bowditch Wards of the American Physiological Society, the Abel Award of the American Society for Pharmacology and Experimental Therapeutics, the Research Achievement, and Herrick Awards of the American Heart Association, the Distinguished Scientist Award of the American College of Cardiology, and the Kober medal of the Association of American Physicians. He is the recipient of nine honorary degrees from distinguished universities throughout the world. In 1996, Harvard University created the Eugene Braunwald Professorship in Medicine as a permanently endowed chair. In 1999, the American Heart Association created the Eugene Braunwald Academic Mentorship Award as a permanent annual award. In 2000, the living Nobel Prize winners in medicine voted Dr. Braunwald as "the person who has contributed the most to cardiology in recent years". During the International Society for Heart Research XVII World Congress in Winnipeg, Canada in July 2001, Dr. Braunwald was presented with the St. Boniface Hospital and Research Foundation International Award. In 2002, the Brigham and Women's Hospital dedicated a research facility as the "Eugene Braunwald Research Center". Dr. Braunwald is the author of more than 1100 publications and an editor of Harrison's Principles of Internal Medicine, (Editor-in-Chief of the 11th Edition and the current 15th Edition) and the founding editor/ author of Heart Disease, now in its 6th Edition. These two books are the leading texts in internal medicine and cardiology respectively. Dr. Braunwald has been Chairman of the TIMI trials since 1984 and he has led the SAVE and CARE trials. Dr. Braunwald's research has illuminated many aspects of cardiology. He has been a major force in cardiovascular research continuously for almost five decades and remains so. His earliest work in the 1950's dealt with the hemodynamics of valvular heart disease. In studies with Stanley Sarnoff at the NIH, Braunwald characterized the hemodynamic determinants of myocardial oxygen consumption and coronary blood flow, identifying the tension time index as a major determinant of myocardial oxygen consumption. He and John Ross then clarified the importance of Starling's Law of the heart as a major determinant of ventricular performance in man; and with Andrew Morrow he made seminal contributions to the description of, and then named, idiopathic hypertrophic subaortic stenosis, a relatively common form of heart disease. Braunwald and his colleagues developed techniques for characterizing myocardial force-velocity relations in intact unanesthetized man. Together with Ross and Sonnenblick, Braunwald identified velocity of cardiac contraction as a major determinant of myocardial oxygen consumption. He and Steven Epstein performed some of the earliest studies on beta-adrenergic receptor blocking drugs and with Charles Chidsey described an important biochemical defect in heart failure -- the depletion of norepinephrine in the hearts of patients with this condition. Dr. Braunwald demonstrated, first in experimental animals and then in patients, that limitation of infarct size (by improving the balance between the heart's supply of and demand for oxygen) can improve the outcome of patients with this common condition. This led to widely used methods of treatment of myocardial infarction such as reperfusion therapy (to improve oxygen supply) and beta adrenergic receptor blockade (to reduce oxygen demand). He then showed in patients who had survived a heart attack that survival can be improved further by pre- venting remodeling of the left ventricle using an angiotensin converting enzyme inhibitor. Most recently, he showed that clinical outcome in victims of infarction with average cholesterol levels can be improved with cholesterol reduction. Thus, taken together, Dr. Braunwald's major scientific contributions are central to the dramatic worldwide improvement in the outcome of patients suffering myocardial infarction.

## 6. Robert Lefkowitz: Durham, USA

With great pleasure, the Academy announces the award to Dr. Robert J. Lefkowitz of the Medal of Merit for his extraordinary lifetime of research, teaching and contribution to heart health in the world.
Dr. Lefkowitz was born in the Bronx, New York City in 1943. The only child of Max and Rose Lefkowitz, he had set his career
goal of becoming a practicing physician as early as elementary school. Highly focused on this goal, he graduated from Columbia College with a Bachelor of Arts Degree at age 19 and from Columbia University College of Physicians and Surgeons at age 23. After an internship and 1 year of medical residency at Columbia Presbyterian Medical Center, he moved in 1968 to the NIH to fulfill his two-year military obligation as a Clinical Research Associate at the National Institute of Arthritis and Metabolic Diseases (NIAMD, as it was then called). During the subsequent two years, he worked together with Jesse Roth and Ira Pastan and developed the first radioligand binding assay for ACTH receptors leading to his very first publication in The Proceedings of the National Academy of Sciences. This study was amongst the very first to ever label a membrane receptor with a radioligand and was contemporaneous with the early work on the nicotinic cholinergic receptor. This first research experience greatly excited him, but he moved to Boston to finish his clinical training in General Internal Medicine and Cardiovascular Diseases at the Massachusetts General Hospital. During this period (1970-73) he began working in the laboratory of the Chief of Cardiology, Dr. Edgar Haber, a noted immunochemist, and initiated the studies that ultimately formed the basis for his life's work on adrenrgic receptors. In July of 1973, he moved to Duke University as an Associate Professor of Medicine and Biochemistry and started his own independent research program. In 1976, he became an Investigator of the Howard Hughes Medical Institute, a position he holds to this day. He became a James B. Duke Professor of Medicine and Biochemistry in 1982.
Working with the adrenergic receptors as models, Dr. Lefkowitz's research has formed the basis for the now vast field of research into socalled G protein-coupled membrane receptors. This, the largest superfamily of membrane receptors, includes approximately one thou- sand members in the mammalian genome and regulate virtually all physiological processes from hormonal and neurotransmitter signaling to sensory signaling in the visual, olfactory and taste systems to chemokine signaling. Virtually all cardiovascular regulation is controlled by members of the seven membrane spanning receptor superfamily such as the adrenergic and muscarinic cholinergic receptors, angiotensin and endothelin receptors and many others.
In the early 1970's, Lefkowitz and his numerous students and fellows systematically developed ligand binding approaches for the study of each of the then-known adrenergic receptors, both a1 and 2 and b1 and 2. They then developed methods to solubilize, photoaffinity label and ultimately purify by affinity chromatography each of these receptors. In the 1980's, they were able to obtain small amounts of protein sequence from the purified receptors and clone their genes and cDNAs. His cloning, together with collaborators at Merck, of the gene for the b2-adrenergic receptor, announced in Nature in 1986, revealed its homology and secondary structure relationship to the visual pigment, rhodopsin. The common theme of seven membrane spanning domain receptors was rapidly confirmed by his laboratory on the other members of the adrenergic receptor family. This early work made possible the cloning of essentially all the other members of the vast superfamily of receptors by various homology techniques over the ensuing fifteen years.
Lefkowitz also unraveled the molecular mechanisms underlying the phenomenon of desensitization of receptors, in the process discovering and cloning the G protein-coupled receptor kinase and barrestin families of proteins which regulate this universally important regulatory phenome- non. More recently, he has found that G protein-coupled receptor kinases and barrestins not only desensitize receptors, but can link them to novel signaling pathways. Exciting new functions for the arrestins are being reported by laboratories around the world including their important role in mediating clathrinmediated endocytosis of the receptors.
His laboratory has also made numerous other discoveries about the molecular mechanisms of functioning of the receptors, how they signal, interact with G proteins, etc. They also discovered the phenomenon of constitutively active mutant receptors, now known to be the cause of an ever-growing list of human diseases.
As he approaches his sixtieth birthday, he continues as actively engaged in his research as ever, with the major current focus being on unraveling the novel signaling roles of barrestins and G protein-coupled receptor kinases. His approaches range over the entire spectrum from genetically altered knockout and transgenic animals to detailed molecular and structural studies. Despite all of his accomplishments in research, the professional accomplishment of which he is most proud is the training of a large number of extremely successful and productive investigators. Almost 200 individuals have worked in his laboratory over the past 30 years, many of whom have gone on to distinguished careers as scientists and administrators in both the academic and commercial settings. Along the way, he helped raise five children, three boys and two girls, none of whom have pursued careers in Science or Medicine, but four of whom are involved in one or another aspect of the entertainment business.
For his research, Lefkowitz has been repeatedly recognized and honored. Some of his awards include: 1976 Howard Hughes Medical Institute Investigator; 1979 George W. Thorn Award for Scientific

Excellence of the Howard Hughes Medical Institute; 1982 Ernst Oppenheimer Memorial Award of the Endocrine Society; 1982 Gordon Wilson Medal, American Clinical and Climatological Assn.; 1986 Goodman and Gilman Award of the American Society for Pharmacology and Experimental Therapeutics; 1987 North Carolina Award for Science; 1988 National Academy of Sciences; 1988 American Academy of Arts and Sciences; 1990 Association of American Medical Colleges Biomedical Research Award; 1990 American Heart Association Basic Research Prize; 1990 Honorary Member Japanese Biochemical Society; 1994 Institute of Medicine National Academy of Sciences; 1995 The Endocrine Society Gerald D. Aurbach Lecture Award; 1997 The New York Academy of Medicine, 2000 F.E. Shideman-Sterling Award, University of Minnesota; 2001 The Louis and Arture Lucian Award for Research in Circulatory Disease 2001 Jessie Stevenson Kovalenko Medal, The National Academy of Sciences; 2001 Peter Harris Distinguished Scientist Award, International Society for Heart Research (presented at the World Congress in Winnipeg); and 2001 Appointed as a Fellow in the International Academy of Cardiovascular Sciences and is now a most befitting recipient of the Academy's Medal of Merit.

## 7. Sir. John Vane: London, UK

The William Harvey Research Institute, London, England, refers to Sir John Vane as "our Field Marshall in the battle against dis- ease". He has devoted his life to battling the disease enemy with new pharmaceutical weapons, with new biochemical intelligence and with new alliances among disparate human communities in big pharma, academia and self-help groups. In 1982, his efforts were rec-
ognized with a Nobel Prize and since that time he has re-doubled his efforts to fight disease, with a special focus on curing pulmonary hypertension.

Sir John Vane graduated in Chemistry, took a D.Phil. in Pharmacology and received the Nobel Prize in Medicine for his work on prostaglandins and for the discovery of the mechanism of action of aspirin. He spent 20 years in academic research. As a consultant to Squibb, he initiated the program on inhibiting angiotensin-converting enzyme which led to the marketing of Captopril. During 12 years as R&D Director at the Wellcome Foundation, he oversaw the development of Tracrium, Flolan, Zovirax, and Lamictal.

In 1971, Vane and his colleagues discovered that aspirin and similar drugs produced their effects because they inhibited the biosynthesis of a group of lipid mediators called prostaglandins. In the last five years it has become clear that there are two enzymes involved. One of the "cyclo-oxygenases" called Cox 1 is responsible for making prostaglandins, which protect the stomach and kidney from damage. Inhibition of Cox 1 accounts for the unwanted side effects of aspirin-like drugs such as gastric irritation and renal damage. The other enzyme, Cox 2, is induced by inflammatory stimuli and it is prostaglandins made by this enzyme that contribute to the inflammation in diseases such as rheumatoid arthritis. The presently marketed aspirin-like drug inhibits both enzymes and the research may lead to selective inhibition of Cox 2, the enzyme responsible for inflammation.

The William Harvey Research Institute was established in 1986 by Sir John. Under his direction, it grew to a staff of over 120 scientists and became one of the 20 top medical charities in the UK. He is now Honorary President of the charitable arm, the William Harvey Research Foundation.

The International Academy of Cardiovascular Sciences is pleased to recognize Sir John Vane for his extraordinary achievements with the Academy's Medal of Merit.

## 8. James Willerson: Houston, USA

The International Academy of Cardiovascular Sciences is delighted to recognize Dr. James T.
Willerson for his lifetime of exceptional accomplishments with the Academy's Medal of Merit.

James T. Willerson, MD is the President of The University of Texas Health Science Center at Houston where he has recently been named the Alkek-Williams Distinguished Professor. In 1989, he was named the Edward Randall III Professor and Chairman of the Department of Internal Medicine at The University of Texas Medical School at Houston, where an Annual Lectureship has been established in his name. He is also the Medical Director, Chief of Cardiology, Director of Cardiology Research, and Co-Director of the Cullen Cardiovascular Research Laboratories at the Texas Heart Institute; the Chief of Cardiology at St. Luke's Episcopal Hospital; and until recently, he served as the Chief of Medical Services at Memorial Hermann Hospital (1989-2000). He is also an Adjunct Professor of Medicine at Baylor College of Medicine, an Adjunct Professor of Medicine at The University of Texas MD Anderson Cancer Center, and he was named the Robert J. Hall Chair of Cardiology at St. Luke's Episcopal Hospital.

Dr. Willerson is a Phi Beta Kappa graduate of The University of Texas at Austin where he lettered for three years in swimming. Upon graduating as a member of Alpha Omega Alpha from Baylor College of Medicine in Houston, Texas, he completed his medical and cardiology training as an intern, resident, and research and clinical fellow at the Massachusetts General Hospital in Boston, Massachusetts, and as a Clinical Associate at the National Institutes of Health in Bethesda, Maryland.

He is the former Chairman of the National American Heart Association Research Committee and of the NIH Cardiovascular and Renal Study Section. He has received the Award of Merit from the American

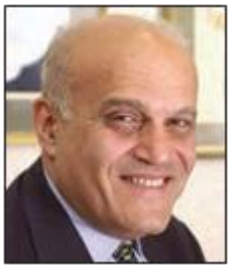
Heart Association and has served as a member of the Board of Directors and Steering Committee of the National American Heart Association. Before coming to The University of Texas Medical School at Houston, Dr. Willerson was Professor of Medicine and Director of the Cardiovascular Division at The University of Texas Southwestern Medical School in Dallas and Director and Principal Investigator of the National Heart, Lung, and Blood Institute's Specialized Center of Research under a major grant from the NIH. Upon his departure, the "James T. Willerson, MD Distinguished Chair in Cardiovascular Diseases" was established at The University of Texas Southwestern Medical School.

Dr. Willerson has served as visiting professor and invited lecturer at more than 170 institutions. He has received numerous national and international awards, including the "James B. Herrick Award" from the American Heart Association in 1993, the American College of Cardiology's Distinguished Scientist Award for 2000, and the American Heart Association's Distinguished Scientist Award for 2003. He has been elected a Fellow in the Royal Society of Medicine of the United Kingdom and made an Honorary Member of the Society of Cardiology in Peru in 1994, in Spain in 1996, the Hellenic Society of Cardiology in Greece in 1997, and the Society of Cardiology of Venezuela in 2000. He is a member and past President of the Paul Dudley White Cardiology Society at Harvard Medical School and Massachusetts General Hospital. He has served on the following editorial boards for professional publications: American Journal of Cardiology, American Journal of Medicine, Circulation Research, Cardiovascular Medicine, American Heart Journal, Journal of the American College of Cardiology, Journal of Clinical Investigation, and The New England Journal of Medicine. Since 1993, he has been the Editor-in-Chief of Circulation, the major publication of the American Heart Association. He has edited or co- edited twenty textbooks, including the 2nd Edition of Cardiovascular Medicine which was released in July of 2000. Additionally, he has had published more than 770 scientific articles.

He has been elected to membership in numerous professional societies, including the American Society of Clinical Investigation, the Association of American Physicians, the Association of Professors of Medicine, the Institute of Medicine of the National Academy of Sciences and as a Fellow in the International Academy of Cardiovascular Sciences. He was named a "Distinguished Alumnus" by the Baylor College of Medicine in 1998 and a "Distinguished Alumnus" by The University of Texas at Austin in 1999.

His recent research work has concentrated on elucidating mechanisms responsible for the conversion from stable to unstable coronary heart disease syndromes, the prevention of unstable angina and acute myocardial infarction, and the detection and treatment of unstable atherosclerotic plaques. Very recently, he and his colleagues at the Texas Heart Institute and in Houston, Texas, and at Hospital Procardico in Rio de Janeiro have begun bone marrow derived stem cell transplantation directly into the hearts of patients with severe heart failure and have demonstrated objective and subjective evidence of clinical improvement. The work will be expanded to centers in the United States.

## 9. Sir. Magdi Yacoub: London, UK



Professor Sir Magdi Yacoub FRS, FRCS, FRCP(Hon), DSc(Hon), MCh(Hon), FACC was born and educated in Cairo where he qualified as a doctor in 1957. After qualification, he did a spell as a houseman and then as registrar. In 1962, he came over to England to take up the post of surgical officer, and then surgical registrar at the London Chest Hospital. The following year he became Senior Surgical Registrar at the National Heart Hospital and Brompton Hospital where he worked for the next five years under Lord Brock and Donald Ross. After a year in America as Assistant Professor at the University of Chicago Medical School, he returned to this country to take up the position of Consultant Cardiac Surgeon at Harefield Hospital, a position which he still holds in addition to being Director of Medical Research and Education. Under his leadership, Harefield Hospital has become Britains' leading transplant centre, performing over 200 heart transplants a year. He was also Consultant Cardiac Surgeon to the National Heart Hospital from 1973 to 1989 and in 1986 was appointed to be the first British Heart Foundation Professor of Cardiothoracic Surgery at the National Heart & Lung Institute in association with the Royal Brompton Hospital. In 1995, the Institute became a Department of Imperial College School of Medicine.

Following retirement from the NHS in September 2001, Sir Magdi continues to head his research programme as Founder and Director of Research of the Magdi Yacoub Institute (formerly known as Harefield Research Foundation) and British Heart Foundation Professor of Cardiothoracic Surgery, in an academic capacity. In addition, at the beginning of 2002, Mr. Alan Milburn, MP appointed Sir Magdi as Sir Magdi Yacoub Special Envoy to the NHS in a National drive to recruit overseas qualified specialists in a new and innovative International Fellowship scheme.

As the Founder Patron of the global charity Chain of Hope, Prof. Yacoub devotes his boundless energy in pursuit of the mission he stated: "It is a little known fact that around 1 child in every 100 is born with a heart defect. Most of these defects can be corrected by operations which are performed as a matter of routine in the developed world. In contrast, if uncorrected these defects can cause considerable suffering and premature death. This afflicts a massive number of children around the world. Chain of Hope is dedicated to helping as many of these children as we can. This is accomplished by bringing children to the UK and also by sending volunteer teams to their countries in the longer to help develop local facilities. I feel privileged to be a link in the chain that helps these children". In October, 2004, the Chain

of Hope also established a new partnership with the Variety Children's Lifeline for which Prof. Yacoub will lead pediatric cardiac missions to Mauritius, Kenya, Mozambique, Jamaica and Morocco.
Professor Yacoub is a pioneer in the field of heart and lung transplantation and one of the world's leading cardiac surgeons,. He carried out his first heart transplant operation at Harefield Hospital in 1980. Since then he has carried out hundreds of these operations; the 1,000th trans- plant at Harefield was undertaken by him in July 1989. Magdi Yacoub has specialised in working with children with congenital heart malformations and has done pioneering work on the "switch" operation. Sir Magdi's other surgical interests include the homograft and pulmonary autograft aortic valve replacement, and the aortic root repair.
Sir Magdi Yacoub has made a remarkable contribution to heart and heart-lung transplantation not only as the surgeon who has performed more transplants than anybody else in the world, but as a scientist interested in the fundamental aspects of organ transplantation. In ten years, he has attracted approximately 80-90 colleagues who are closely involved with the clinical work of his department and are investigating physiological and disease processes at molecular and cellular levels. The Department is rapidly becoming one of the leading academic departments of cardiothoracic surgery in the world.
Professor Yacoub is a Fellow of the Royal College of Surgeons, Licentiate of the Royal College of Physicians and Fellow of the Royal Society of Medicine. He holds honorary degrees from Brunel University, Cardiff University, The University of Loughborough, University of Middlesex and also from the University of Lund in Sweden. He holds honorary posts in Lahore, Pakistan and University of Siena, Italy. He has received many awards and distinctions including the Clement Prize Thomas Award of the Royal College of Surgeons of England in 1989. In 1999, he was elected a Fellow of The Royal Society and presented with the Lifetime Outstanding Achievement Award in recognition of his contribution to Medicine by the Right Hon. Frank Dobson, MP, Secretary of State for Health. In April 2004, he was presented with a Lifetime Achievement Award by the International Society for Heart & Lung Transplantation.
The International Academy of Cardiovascular Sciences is pleased to recognize Sir Magdi Yacoub for his extraordinary lifetime of achievements with the Academy's Medal of Merit.

## 10. Robert B. Jennings: Durham, USA

The International Academy of Cardiovascular Sciences is delighted to recognize his extraordinary achievements and honour Robert Jennings with its most prestigious Medal of Merit.
Dr. Robert B. Jennings graduated from the Northwestern University Medical School in Chicago Illinois in 1949 at the age of 22.
After a rotating internship, he spent a year in research in the Pathology Department of the Medical School prior to entering the U. S. Navy in 1951 during the Korean War. He reported for duty at the Great Lakes Naval Hospital where he was assigned to the Pathology Service. After serving for two years as a Medical Officer, he transferred to the inactive reserve and became an Instructor in Pathology at Northwestern University. He spent much of the next 50 years studying the heart and pursuing a career in academic medicine.
His first job was a good one from the point of view of research. His only responsibility was to teach medical students general pathology for roughly six months of the year. The remainder of his time was available for research. He applied himself and was lucky in his choice of questions to study. He rose from instructor to professor in 10 years and became Chairman of the Department of Pathology in 1969 when he also was named Magerstadt Professor of Pathology.
The search for an answer to a single question has guided much of Dr. Jenning's research on the heart, namely: What event or series of events kills myocytes when they are made acutely ischemic? In 1953, as well as now, necrosis is not obvious in the human heart for hours after a patient develops signs and symptoms of acute myocardial infarction. Jennings hypothesized that it was likely that cell death occurred much faster than the histological study of autopsy hearts indicated. Using experimental acute myocardial infarcts in which he knew the part of the heart that was going to die in sustained occlusion, he was able to show that myocytes tolerated 15 to 18 minutes of severe ischemia. He termed this "Reversible Injury". However, longer periods of ischemia resulted in the death of more and more myocytes in the subendocardial myocardium. Although dead, these myocytes were grossly normal. This state was termed "Irreversible Injury". The question then became one of ascertaining which changes occurred in the reversibly injured myocytes at the time of transition to irreversibility. Dr. Jennings was able to show, together with Charles Steenbergen and Charles Ganote that, at about the time of the transition, electron microscopy indicated that the sarcolemma was disrupted. Functional assessment of sarcolemmal integrity in tissue slices prepared from irreversibly injured tissue confirmed this finding. Thus, loss of cell membrane integrity is considered to be the critical event that leads to the death of ischemic myocytes.
In a critical experiment performed in 1959 and 1960, Dr. Jennings attempted to learn precisely when myocytes passed the "point of no return". He did this by reperfusing the ischemic myocytes with arterial blood after having exposed them to various periods of ischemia. Using this technique, he was able to show that myocytes remained reversibly injured for an extended period of time and moreover, that they did not die simultaneously. These findings served as the scientific basis of reperfusion therapy in man, a procedure developed in the mid-1970s by Rentrop and others.

In 1978, Dr. Jennings and his longtime collaborator, Keith Reimer, gave a blueprint for the salvage of ischemic myocytes in the dog heart. They showed that there was a transmural wave front of cell death in acutely ischemic myocardium in which the subendocardial myocardium died first followed by the death of myocytes in the mid- and subepicardial myocardium. Cell death progressed transmurally as a function of collateral arterial flow until all myocytes destined to die were dead. Salvage was possible during the first six hours of ischemia but not thereafter. Thus, significant numbers of myocytes can be salvaged by reperfusion for an extended period of time. This work was done at the Duke University Medical Center where in 1975 Dr. Jennings became Chairman of Pathology and a James B. Duke Professor. These studies were the basis of the American Heart Association Discovery Health Channel Award in 2004 for a basic science discovery that led to a major advance in clinical medicine.
From 1978-90, a number of important studies looked at the mechanism of cell death. Most of these studies involved analysis of the changes occurring in reversibly and irreversibly injured myocytes during or as a consequence of reperfusion of the damaged tissue, demonstrating that massive sarcolemmal destruction occurs within seconds of the onset of reperfusion of irreversibly injured tissue, and that this change is associated with massive calcium loading. This was the first direct link between calcium loading and cell death. Anthony Shen and Dr. Jennings identified that the calcium came from the plasma reperfusing the tissue and that most of the calcium was actively accumulated by the mitochondria. Dr. Jennings also showed a close association between ATP depletion, lactate accumulation and cell death during the first episode of ischemia, and hypothesized that sarcolemmal disruption might be related to one or both of these changes, although ATP depletion and lactate accumulation slowed greatly during a second brief episode of ischemia. This unexpected observation led to the discovery of the phenomenon known as “Ischemic Preconditioning”. A bright graduate student named Charles Murry, who was working with Drs. Jennings and Reimer, showed clearly that a brief episode of reversible ischemia protected the heart against the effect of a prolonged episode of ischemia, and proposed that the slowed metabolic changes might be the cause of the beneficial effect. In any event, this was the strongest protective effect ever identified in the experimental animal heart and was shown to occur in the human heart as well.
In 1989, Dr. Jennings retired from the Chair in Pathology at Duke and continued to be active in research until 2003. He has been awarded multiple honors over the course of his career including the Borden award for the best research done while a medical student, a Markle Scholarship in Academic Medicine, the Peter Harris Award for Excellence in Research of the International Society of Heart Research in 1992, the Cardiovascular Pathologist of the Year Award by the American Society of Cardiovascular Pathology in 1993, and the American Heart Association’s Discovery Health Channel award in 2004.

## 11. Sir. George Radda: Singapore

Sir George Radda was born in 1936 in Hungary. He began his career as a chemistry student in Budapest. In 1956 he left Hungary and arrived in England, where he finished his first class degree at Merton College before going on to complete his PhD. Sir George completed his postdoctoral work and a student fellowship with Melvin Calvin in Berkley, California, and
then returned to England for a lectureship at Oxford in 1969, followed by a rapid rise to be Professorial Fellow. His main research interests center on the biochemical basis and cellular functions in heart disease. He became interested in using spectroscopic methods including Nuclear Magnetic Resonance (NMR) and in 1981, Sir George and his fellow colleagues published the first scientific report on the clinical application of his work. This resulted in the installation the first clinical magnetic resonance spectroscopy unit with a magnet large enough to accommodate the whole human body for NMR investigations in 1983 at the John Radcliffe Hospital in Oxford. In recognition of his pioneering research, which opened up the study of the workings of the living body, he was given a chair in 1984 by the British Heart Foundation. From 1996 to 2003 (on secondement) he was Chief Executive of the Medical Research Council. Also, he was Chairman National Cancer Research Institute (2001- 2003). Sir George received numerous prestigious awards and hon- ours for his pioneering efforts in using spectroscopic techniques for metabolic studies, including a CBE in June 1993 and a Knighthood in June 2000. He is a Fellow of Merton College, Oxford, a Fellow of the Royal Society and is the British Heart Foundation Professor of Molecular Cardiology. He is an Honorary Member of the American Heart Association and was awarded the Citation for International Achievement. From 1996 to 2003, Sir George was Chief Executive of the Medical Research Council in the UK. He is currently Emeritus Professor of Molecular Cardiology at the University Laboratory of Physiology Cardiac Science Centre, University of Oxford and Chairman of the Singapore Bioimaging Consortium.
In recognition of his lifetime of extraordinary achievement, Sir George Radda is honoured by the International Academy of Cardiovascular Sciences with the 2006 Medal of Merit.

## 12. Victor Dzau: Durham, USA

Victor J. Dzau, MD, was appointed Chancellor for Health Affairs at Duke University and President and CEO of the Duke University Health System effective July 1, 2004. He is also James B. Duke Professor of Medicine and Director of Molecular and Genomic Vascular Biology at Duke.

Dr. Dzau served previously as Arthur Bloomfield Professor and Chairman of the Department of Medicine at Stanford. Most recently, he was the Hersey Professor of the Theory and Practice of Physics (Medicine) at Harvard Medical School, Chairman of the Department of Medicine at Brigham and Women's Hospital, and Physician-in-Chief and Director of Research at Brigham and Women's Hospital, Boston MA.

Dr. Dzau's academic interests are in cardiovascular translational research and mission-based education. His laboratory has studied the molecular and genetic mechanisms of cardiovascular disease and applied genomic and gene transfer technologies to develop novel therapeutic approaches. His work on the renin angiotensin system (RAS) paved the way for the contemporary understanding of RAS in cardiovascular disease and the development of RAS inhibitors (e.g. ACE inhibitor) as therapeutics. He pioneered gene therapy for vascular disease, being the first to introduce DNA decoy molecules to block transcriptions as gene therapy in vivo. Two of his discoveries E2F decoy and nitric oxide synthase gene therapy are now being evaluated in clinical trials. He is currently advancing the novel concept of "preemptive gene therapy" using hypoxia regulated expression of heme oxygenase 1 transgene for coronary heart disease and recently has proposed the "Paracrine Hypothesis" for stem cell action in tissue repair and regeneration.

The recipient of many awards and honors, Dr. Dzau received the first Hatter Award from the Medical Research Council of South Africa in 2000. He was awarded the prestigious Gustav Nylin Medal by the Swedish Royal College of Medicine and the Swedish Cardiology Society, the Novartis Award for Hypertension Research by the American Heart Association (which also named him one of its Distinguished Scientists for 2004), the 2004 Max Delbruck Medal by the Max Delbruck Center for Molecular Medicine, Berlin, Germany, the 2005 Golden Door Award by the International Institute of Boston, and a 2005 Ellis Island Medal of Honor by the National Ethnic Coalition of Organizations.

Dr. Dzau has served on numerous committees and advisory boards, including, previously, the Executive Committee of The Academy at Harvard Medical School (of which he is a founding member) and the boards of Brigham and Women's Hospital, Partners Healthcare, and the Harvard Clinical Research Institute. Currently, he serves as a member of the Board of Directors for both Duke University Health System and Genzyme Corporation. He has been elected to the Institute of Medicine of the National Academy of Sciences (USA) and the European Academy of Sciences and Arts. Previous Chairman of the National Institutes of Health (NIH) Cardiovascular Disease Advisory Committee, he served on the Advisory Committee to the Director of the NIH. In 1999, he became Editor-in-Chief for the American Physiological Society's new journal, Physiological Genomics. A founding member of the Society of Vascular Medicine and Biology and the Council of Arteriosclerosis, Thrombosis, and Vascular Biology of the American Heart Association, Dr. Dzau was Editor-in-Chief of the Journal of Vascular Medicine and Biology.

Dr. Dzau received his MD from McGill University in Montreal and underwent postgraduate training at Harvard Medical School. He was born in Shanghai, China, raised in Hong Kong, and is a citizen of the United States. He and his wife Ruth have been married for 32 years and are the parents of two daughters.

The International Academy of Cardiovascular Sciences is delighted to present its prestigious Medal of Merit for 2006 to Dr. Victor Dzau.

## 13. Louis Ignarro: Los Angeles, USA

Louis J. Ignarro was born in 1941 in Brooklyn, New York and grew up in Long beach, New York. He received a B.Sc. degree in Pharmacy/ Chemistry from Columbia University in 1962, and a Ph.D. degree in Pharmacology/ Physiology from the University of Minnesota in 1966. He did a postdoctoral fellowship at the N.I.H. in the Laboratory of Chemical Pharmacology from 1966 to 1968. Dr. Ignarro's first research position after training was with the CIBA-Geigy Pharmaceutical Company and in 1973 took on his first academic posi- tion at Tulane Medical Center in the Department of Pharmacology. In 1985, he accepted the position of Professor of Pharmacology at the UCLA School of Medicine, where he remains today. His current endowed position is the Jerome J. Belzer, MD, Distinguished Professor of Pharmacology. Dr. Ignarro has received many Awards but perhaps the most notable are: The Basic Research Prize of the American Heart Association, Election into the National Academy of Sciences, Election into the Academy of Arts and Sciences, and the 1998 Nobel Prize in Physiology and Medicine. Louis J. Ignarro and two other researchers received the 1998 Nobel Prize in Medicine for their three major discoveries involving nitric oxide as a unique signaling molecule in the cardiovascular system. In 1972, Dr. Ignarro discovered nitric oxide causes vasodilation - a widening of the blood vessels - and inhibition of thrombosis, which leads to improved blood flow to the arteries and veins. In 1986, Dr. Ignarro confirmed his suspicion that blood vessels can make nitric oxide, the active ingredient in nitroglycerin, a common drug used to treat heart conditions. Experiments in 1990 led to the discovery that nitric oxide is the neurotransmitter responsible for penile erection. The discovery made it possible

for a drug company to develop and market Viagra, the first oral medication for the effective treatment of erectile dysfunction.
Dr. Ignarro's discoveries created an explosion of research involving nitric oxide. In 1986, there were a dozen papers published on nitric oxide and just 10 years later, there were about 7,600 papers published on nitric oxide. His observations with nitric oxide have made it possible for medical professionals to understand what protects the cardiovascular system against pathological conditions such as hypertension, stroke, coronary artery disease and other forms of atherosclerosis, gastrointestinal ulcers and vascular complications of diabetes.
Dr. Ignarro's laboratory at the David Geffen School of Medicine at UCLA has never been larger than eight or nine people. Throughout his career, funding for the lab has come from the National Institutes of Health (NIH) and local heart associations. In 2000, Ignarro testified before Congress on the importance of NIH funding for basic science research. In his testimony, he said that only in America could the son of an uneducated carpenter receive the Nobel Prize in Medicine.

## 14. Sen. Wilbert Keon: Ottawa, Canada

Dr. Keon was born and raised in Sheenboro; Quebec received his primary and secondary education locally and his M.D. from the University of Ottawa. His post-graduate education was from McGill, Toronto and Harvard Universities. After his medical and scientific training, Dr. Keon moved to Ottawa in 1969 to found the University of Ottawa Heart Institute. Dr. Keon was the Chief Executive
Officer until April 2004 and his vision and leadership build the University of Ottawa Heart Institute to an international centre of excellence for cardiac care, research and education, an enterprise budget exceeding $190 million per year.
During his tenure at the University of Ottawa Heart Institute, Dr. Keon established international standards in clinical program delivery, cardiac facilities design, public and professional education programs and research and technology development. A passionate spokesman for the rights of Canadians to quality cardiac care, and to the local community benefits of leading-edge research, he communicated his message as a relentless fundraiser to garner millions of dollars for the Ottawa Heart Institute.
Innovation has been a hallmark of Dr. Keon's career, having drawn research grants totalling 66 million dollars during his career. His clinical innovations are numerous, but most notable include the pioneering of surgical reperfusion in acute heart attacks during the early 1970s, the first cardiac transplant in Ottawa in 1983, the first use of Jarvik 7-70 artificial heart in Canada in 1986, and in 1989, the first Canadian infant heart transplant.
Dr. Keon's academic leadership is evidenced by over 475 presentations, over 200 publications including authorship or contributions to 22 books, and 16 visiting professorships. He was a member of 72 national and international societies. He developed Canada's largest research and clinical artificial heart development program that spun-out into World Heart Corporation in 1996. He led early demonstration projects and advocacy for telehealth. These innovations also required new approaches to industrial collaboration, while maintaining scientific leadership through peer-reviewed grants.
Dr. Keon has received numerous medical scientific awards as well as many civic awards, including the Order of Ontario, the Order of Canada, membership in the Order of St. Gregory the Great, from Pope John Paul II, and appointment to the Senate of Canada in 1990. In this latter capacity, he has participated in numerous major health and science related reports.
Dr. Keon remains active in health and economic policy through participation on Scientific and Clinical Advisory Boards, membership on several Boards of Directors and as a consultant to public and private sector clients

## 15. Jutta Schaper: Bad Nauheim, Germany

Jutta Schaper was born in Berlin, Germany and received her M.D. in 1961 in Dusseldorf, Germany. In 1958 she married Wolfgang Schaper, M.D., Ph.D. with whom she has 3 children. In 1961 Jutta Schaper started to work at Janssen Pharmaceutica, Beerse, Belgium where she trained in the newly developing art of electron microscopy and later became head of the Department of Morphological Studies. In 1972, the family moved to Bad Nauheim, Germany and both Schapers were employed at the Max Planck Institute for Physiological and Clinical Research. Jutta Schaper has an affiliation with the Pathology Department at the University of Giessen where she obtained her Ph.D. in 1981. She was Head of the Department of Cardiovascular Cell Biology in the Max Planck Institute until 2004 when she retired. Up to the present time, Jutta Schaper is still professionally active as honorary consultant for the "Core Group for Confocal Studies" at the Max Planck Institute in Bad Nauheim.
Jutta Schaper's work has been based on morphological techniques, electron microscopy and confocal laser microscopy and structural studies of the normal and pathological heart and of blood vessels were the themes of her work. Jutta Schaper, in life-long collaboration with her husband Wolfgang, studied the morphology of collateral blood vessels under various conditions producing numerous joint publications and 4 books on this topic.
Another subject starting in 1976 was the protection of ischemic myocardium during open-heart surgery. After many trials of numerous protection methods, the Bretschneider cardioplegic solution was found to

provide optimal protection under experimental conditions and in the human heart during surgery. This work has been publicized in many scientific periodicals.
The main issue of Jutta Schaper's work, however, was the investigation of the morphology of the failing human heart. She was the first to describe the structural impairment of the failing heart and she defined structure-function relationships in both, patients with dilated cardio- myopathy and patients with pressure overload due to aortic valve steno- sis. The origin of fibrosis with its different components, disappearance of the contractile filaments and functional disturbance of specialized proteins such as the connexins or the cytoskeleton, loss of cardiomyocytes due to different types of cell death, were found to be significant factors in causing heart failure. The contribution of these structural changes to diastolic and systolic dysfunction were carefully identified and described in numerous publications.
Jutta Schaper attended, mostly upon invitation to give oral presentations, innumerable national and international scientific meetings and was invited to Universities to lecture on the failing myocardium mostly in Germany, the US and Canada, and in Japan, but also in most of the other European countries and in Israel. Jutta Schaper has been active as officer in the International Society for Heart Research (ISHR), first for 9 years as Secretary General of the European Section and from 1992- 1995 as President of the ISHR worldwide. Her aim was to promote the knowledge of cardiovascular pathophysiology on a world-wide basis through publications and congresses. Jutta Schaper has received many awards and medals from various organizations.
Dr. Schaper feels very honored to be allowed to join the group of famous colleagues who already received the Medal of Merit and she would like to thank the colleagues of the Academy for this recognition of her life- time achievements.

## 16. Nirmal Ganguly: New Delhi, India

Prof. N. K. Ganguly completed his MBBS at University of Kolkatta, MD (Microbiology) from Post Graduate Institute of Medical Education & Research, Chandigarh and obtained D.Sc. (h.c.) from University of Calcutta, Kolkata; Bundelkhand University, Jhansi; Chhatrapati Shahu Ji Maharaj University, Kanpur and Guru Nanak Dev University, Amritsar.
Until recently, he was Director General, Indian Council of Medical Research, New Delhi. He was General President (Elect), the Indian Science Congress Association for the year 2004-2005 and was acting Director, Post Graduate Institute of Medical Education & Research, Chandigarh for the period from 8.12.1999 to 6.3.2000 and 1.10.2003 to 20.12.2003. He was also acting Director, National Institute of Biologicals, NOIDA.
Prof. Ganguly has published 725 papers and guided 130 Ph.D thesis as guide/co-guide. His major research areas have been tropical diseases, cardiovascular diseases and diarrhoeal diseases. His area of specialization is infection and has interests in this area ranges from immunology, biotechnology and public health. Prof. Ganguly is Fellow, Imperial College Faculty of Medicine, London; Royal College of Pathologists, London; International Academy of Cardiovascular Sciences, Canada; Third World Academy of Sciences, Italy; and International Medical Sciences Academy, New Delhi. He is also Fellow of National Academy of Medical Sciences, New Delhi; Indian National Science Academy, New Delhi; National Academy of Science, Allahabad; and Indian Academy of Sciences, Bangalore.
He was the President of National Academy of Medical Sciences, New Delhi and was President, Asian Society of Diarrhoeal Diseases and Nutrition (2000-2003). He was Chairman, Lancefield International Society on Streptococci and Streptococcal Diseases; President, International Society of Health Research (Indian Chapter); was President, Academy of Cardiovascular Sciences (Indian Chapter).
He has been Emeritus Professor of National Academy of Medical Sciences (India), New Delhi; Honorary Professor, Special Centre for Molecular Medicine (SCMM), Jawaharlal Nehru University, New Delhi; Emeritus Professor, Postgraduate Institute of Medical Education & Research, Chandigarh; Honorary Global Health Research Fellow and Adjunct Professor at Boston University; Adjunct Professor of Environmental Health, School of Public Health, University of Minnesota; Honorary Professor, Jawaharlal Nehru Centre for Advanced Scientific Research, Bangalore; was Visiting Professor, Dr. B. R. Ambedkar Centre for Biomedical Research, Delhi; was Professor of International Health, University of Minnesota, Minneapolis; was Guest Lecturer, S.N.Pradhan Centre for Neuro-Science, Calcutta University, Calcutta; Honorary Doctor, Yerevan State Medical University; Honorary Consultant/ Adviser, Armed Forces Medical Services Raksha Mantralaya.
He has been Chair of WHO-SEARO Advisory Committee on Health Research for the last several years. He was Vice-Chairman, Joint Coodinating Board (JCB) for Special Programme for Research and Training in Tropical Diseases (TDR); Joint Indo-US Vaccine Action Program. He was Chairman, WHO Scientific Working Group on Criteria for Setting Health Research Priorities, WHO SEARO, New Delhi and Co-Chairman, Global Alliance for Vaccines and Immunization (GAVI). He was member, Scientific and Technical Advisory Committee (STAC) of TDR; Special Program of Research, Development and Research Training in Human Reproduction; Foundation Council, Global Forum for Health Research, Geneva; UNAIDS Vaccine Advisory Committee; Scientific Board Grand Challenges, Bill & Melinda Gates Foundation; was Board of Trustees, International Centre for Diarrhoeal Diseases Research, Bangladesh (ICDDR, B); was National Advisory Council, International Centre for Research on Women (ICRW), Delhi; was International Advisory Group (IAG), Fogarty International Centre

(FIC), National Institutes of Health, Bethesda, Maryland. He was Member of Joint Coordinating Board (JCB) for Special Program for Research and Training in Tropical Diseases (TDR); was Proto-board and Working Group of World Bank; International Advisory Committee, Vaccine Research Centre, National Institutes of Health, Maryland, USA; and Guideline Development Group in updating of the Technical Report on Rheumatic Fever and Rheumatic Heart Disease, WHO, Geneva. He is Chairman, Research Council of Central Drug Research Institute, Lucknow and Chairman, Scientific Advisory Committee, National Centre for Cell Science, Pune. He was Chairman, Scientific Advisory Committee, Centre for Cellular & Molecular Biology, Hyderabad; Centre for DNA Fingerprinting and Diagnostics, Hyderabad; Tata Memorial Centre, Mumbai; Bose Institute, Kolkata and Sanjay Gandhi Postgraduate Institute of Medical Sciences, Lucknow. He is Governing Body member of 27 Indian institutes and Public Health Foundation of India. He has been Scientific Advisory Committee member of various research institutes in India. He has participated as Temporary Advisors in 121 WHO meetings till date. He is also Chairman of various committees of Govt. of India like GM Food, Vitamin A, Environmental Health etc.

He had been Chief Editor of PGI's Bulletin, Chandigarh and was mem- ber, Editorial Board of various national and international journals. He is Chairman, Editorial Board of Indian Journal of Medical Research and ICMR Bulletin.

He has won 100 awards (International-4; National-96). He received Norman Alpert Award, 2004 of International Academy of Cardiovascular Sciences; Annual Award, 2004 of International Spirit of Life Foundation, USA and Gaylord Anderson Memorial Lecture, 2006 of School of Public Health, University of Minnesota, Minneapolis, USA. Notable among national awards are Goyal Prize in the area of Applied Science (2002); 24th Rameshwardas Birla National Award, 2005 of the Rameshwardasji Birla Smarak Kosh; Om Prakash Bhasin Award in Health & Medical Sciences, 1997; Ranbaxy Research Award, 1996; FICCI Awards, 1998-99; Excellence in Science and Technology, 2006 of the Indian Science Congress Association and Shanti Swarup Bhatnagar Medal (2007); INSA's Shambu Nath De Memorial Lecture Award, 1993; Dr. Yellapragada SubbaRow Memorial Lecture, 1999; five ICMR awards; Prof. Naranjan S Dhalla Award for lifetime achievement in Cardiovascular Pharmacology of the Indian Pharamcology Society. He has made important contributions in the field of rheumatic fever and rheumatic heart disease and its public health aspects and pathogenesis. His other contributions include immunological basis of chronic artery disease and pathogenesis of Takawasu disease.

## 17. Salvador Moncada: London, UK

Prof. Moncada was born in Honduras and graduated from Medical School in El Salvador. In 1971 he came to the Royal College of Surgeons in London to do a PhD. There he contributed to the discovery of the inhibition of the enzyme cyclo-oxygenase, and thus of prostaglandin biosynthesis, by aspirin-like drugs and to the elucidation of the mechanism by which these drugs act as analgesic and anti-inflammatory agents. In 1975, at The Wellcome Research Laboratories, he was responsible for the discovery of thromboxane synthase, an enzyme in platelets that converts prostaglandin endoperoxides into the vasoconstrictor and platelet-aggregating agent thromboxane A2; he also identified inhibitors of this enzyme. In 1976 he initiated and led the work that resulted in the discovery of prostacyclin, a potent vasodilator and inhibitor of platelet aggregation produced by vascular endothelium. Many of the fundamental discoveries in the area of thromboxane and prostacyclin research were carried out by this group over the following 10 years. His studies have contributed to the understanding of how small doses of aspirin prevent cardiovascular episodes such as myocardial infarction and stroke. In addition, a synthetic analogue of prostacyclin (iloprost) is used clinically to treat primary pulmonary hypertension.

In 1986 Professor Moncada developed a method for the biological detection of the so-called endothelium-derived relaxing factor (EDRF). Using this system, which has become widely accepted as a bioassay for the study of EDRF, he and his group made two observations; firstly, that EDRF was inactivated by superoxide anions ($O_2^-$) but not by other oxygen-derived radicals and secondly, that many of the described putative inhibitors of EDRF act as a result of their redox properties leading to the generation of $O_2^-$ in solutions. This initial work provided some of the clues for the later identification of the chemical structure of EDRF and helped to clarify the controversy that existed at the time about the possible nature of EDRF and the mechanism of action of its inhibitors.

Professor Moncada and his colleagues demonstrated the release of nitric oxide (NO) from vascular endothelial cells and showed that this release occurred in quantities sufficient to account for the biological actions of EDRF. For this they developed a chemiluminescence detection technique that is now widely used in the field of NO research. Furthermore, they showed that NO is synthesized from the amino acid L-arginine, specifically from its terminal guanidine nitrogen atom(s), by an enzyme (NO synthase) which concomitantly forms L-citrulline. His group first showed that the L-arginine analogue NG-monomethyl-L-arginine (L-NMMA) is an enantiomerically-specific inhibitor of the synthesis of NO in vitro and that inhibition of NO synthesis in vivo leads to hyper- tension. They thus demonstrated that NO was an endogenous regulator of blood pressure. Prof. Moncada's group also showed that NO inhibits platelet aggregation and adhesion via elevation of cyclic GMP and that prostacyclin potentiates the anti-aggregatory but not the anti-adhesive properties of EDRF. The L-arginine: NO pathway is now known to be ubiquitous in both mammalian and non-mammalian tissues and the synthesis of NO has

been shown to underlie a wide variety of physiological and pathophysiological functions in the cardiovascular, central and peripheral nervous, and immune systems.
In 1989, Prof. Moncada's group demonstrated that the L-arginine: NO pathway is present in the central nervous system where it acts as a neuro- mediator with many physiological roles. They also found that oestrogens increase the quantities of endothelial and neuronal NO synthases. This is probably one of the mechanisms by which the cardiovascular system adapts itself to the increased load of pregnancy and may explain, at least in part, why premenopausal women are protected against heart disease.
Prof. Moncada and his group later discovered that glucocorticoids inhibit the expression of the inducible NO synthase in vitro. Inhibition by glucocorticoids of the induction of an NO synthase might account for some of the physiological, pharmacological and toxic effects of these compounds. They also found NO to be present in the exhaled air of nor- mal animals and man and they speculated that this may be a physiological excretion which might be augmented in pathological states such as asthma. This has led to a widespread interest in the possible role of NO in this and other inflammatory conditions. Furthermore, measurements of the fraction of exhaled NO constitute a non-invasive marker in patients with asthma for adjustment of their inhaled corticosteroid treatment.
Prof. Moncada's group cloned the inducible human NO synthase from chondrocytes and was one of the first groups that produced knockout mice for this enzyme. These mice are proving extremely useful in the investigation of the roles played by NO in defence mechanisms of the body and in immunopathology. They later used human tumour cell lines transfected with inducible NO synthase to induce tumours in nude mice and have found that NO might have some tumour-promoting activity through an angiogenic effect.
More recently Prof. Moncada has focused on the role of NO as a regulator of cell respiration. In 1994 he and his group demonstrated that NO, at physiological concentrations, inhibits the mitochondrial enzyme cytochrome c oxidase (complex IV), in competition with oxygen. They also showed in endothelial cells that endogenous NO modulates oxygen consumption under basal and stimulated conditions and that the interaction of NO with cytochrome c oxidase can act as a signalling mechanism that confers cytoprotection. Furthermore, they demonstrated that at low oxygen concentrations this interaction causes the diversion of oxygen to non-mitochondrial oxygen-dependent tar- gets. They went on to characterize the sequence of events that follow inhibition of cytochrome c oxidase by continuous exposure to NO and showed that oxidative stress develops with the subsequent inhibition of other mitochondrial and cytosolic enzymes. This led them to suggest that in this way NO may progress from acting as an important physiological regulator of cell respiration to becoming an agent of cell pathology. Indeed, they showed that NO is a factor in the stabilization of hypoxia-inducible factor in cancer.
Prof. Moncada's group have shown that inhibition of respiration by exogenous NO leads to mitochondrial membrane hyperpolarization dependent on the utilization of glycolytic ATP by the F1F0-ATPase and other transporters acting in reverse mode. This process occurs in highly glycolytic cells, but not in neurons, which do not invoke glycolysis to maintain ATP concentrations. They further demonstrated that this hyperpolarization correlates with protection against apoptotic cell death.
Most recently, Prof. Moncada and co-workers have investigated the role of endogenous NO in mitochondrial biogenesis; they have shown that NO promotes mitochondriogenesis (and hence oxidative metabolism) and that the inflammatory cytokine tumour necrosis factor (TNF)-alpha downregulates this process in obese animals. Furthermore, they have demonstrated that calorie restriction promotes mitochondriogenesis by inducing the expression of endothelial NO synthase. These findings have implications for novel treatment of diseases of metabolic origin, including type-2 diabetes mellitus and obesity-linked cardio- vascular disorders.
Since 1996 Prof. Moncada has established and directed The Wolfson Institute for Biomedical Research at University College London.

## 18. Wolfgang Schaper: Bad Nauheim, Germany

My main interest in science since 40 years was (and still is) the capacity of the vascular system to repair itself. In particular its ability to build a new artery in cases of arterial occlusion. When I started my post-doctoral training in pathology more than 40 years ago, I made the observation that patients dying from non-cardiac causes exhibited, upon autopsy, occluded coronary arteries but no infarctions. These hearts had developed a natural "bypass" circulation that had salvaged their myocardium. This was not a frequent observation but I found that often enough to come to the conclusion that a genetic program must exist that enabled the heart to use this escape hatch when needed. I brought this observation to the laboratory and found that indeed mammals differed in their ability to develop a collateral circulation and that man was not at the bottom of the evolutionary scale for its ability to build one. I could show that the collateral arteries were the product of active cell proliferation and not one of passive stretch. Already in the late 1960ies I could show that endothelial and smooth muscle cells of these tiny pre-existent arterioles synthesized DNA and underwent cell division whereupon the collateral vessel diameter increased manyfold reaching thereby full arterial size. In 1975 I discovered together with Dr. Jutta Schaper that circulating monocytes attached to the wall of developing canine coronary arterioles and later studies revealed that these cells are indeed essential to the growth of collateral arteries, because removal of monocytes or tampering with their activity inhibited arterial growth. We discovered that monocyte chemo-attractant factor (MCP-1) is important for the repair and genetic targeting of this factor

as well knock- out of its cognate receptor (CXCR2) inhibits arteriogenesis. These studies were the experimental basis for the subsequent clinical studies with bone marrow derived stem cells that are now intensely studied. We also found that the physical force that triggers collateral artery growth is the fluid shear stress and we designed new experiments to alter and maximally increase fluid shear stress. Arterial tissue from these experiments was subjected to genome-wide screening for differentially expressed genes and we discovered an abundance of new and unsuspected genes that we are currently studying. We found that several signaling pathways are involved in arteriogenesis namely the MAPKinases ERK-1, 2, the Rho- and the NO-pathway. Our studies led to the new concept of "Arteriogenesis", the adaptive growth of collateral arteries, which differs from angiogenesis because it does not rely on ischemia/hypoxia and its growth factor needs differ significantly from that of capillary sprouting. Our studies have advanced far enough to begin thinking of ways and means to translate our knowledge, accumulated over 4 decades, into strategies for new pharmacological agents. Should this be possible the dream of my life would come true.

Dear Naranjan, you may not remember that your advice was once very helpful to me. We met 25 years ago at Duke University where you had given a seminar at Bob Jennings lab. I had taken you out to dinner and I told you the reason for spending a sabbatical year in Bob's Department: I had felt, that my research with the collateral circulation had got stuck and was searching for a different topic. You strongly advised me not to do that but stick to the topic for which was already well known. I heeded your advice and with the new molecular methods my research in collaterals took a new and productive turn. Thanks very much again for your serendipitous advice.

## 19. Howard Morgan: Winfield, USA

Dr. Howard Morgan was born in Bloomington, Illinois, and began his college education there with one year at the Illinois Wesleyan University (1944-45). He then moved directly into medical school at Johns Hopkins University, where he received his M.D. degree in 1949. His original intention was to become an obstetrician-gynecologist, a career he began on the house staff of the hospital of Vanderbilt University (1949-53). The following year (1953-54) he was instructor in these disciplines. He then became for a year a fellow in medical research in the unit of the Howard Hughes Medical Institute established in the Department of Physiology at Vanderbilt (1954-55). But the following year he was back in obstetrics and gynecology as assistant chief of that service on active duty in the U.S. Army Station Hospital at Fort Campbell, Kentucky. He then returned to Vanderbilt, and for the next ten years (1957-67) he was an investigator in the Hughes Institute, with faculty rank that progressed from assistant professor (1959-62), to associate professor (1962-66), and professor (1966-67). Morgan then became the first professor and chairman of the Department of Physiology in the Milton S. Hershey Medical Center of the Pennsylvania State University in Hershey, Pennsylvania. From 1973 he has been also Associate Dean for Research, and in 1974 was honored by designation as the Evan Pugh Professor of Physiology. In 1982 he was further honored by appointment as a scholar of the Howard Hughes Medical Institute. Morgan wrote briefly of his training:

"Because I entered physiological research after eight years of clinical training, research, and practice in obstetrics and gynecology, my training was entirely as a postdoctoral fellow. Charles R. Park served as my preceptor and guided me into studies of the effects of insulin on glucose uptake and sugar transport. With a solid background obtained in Park's laboratory, I later was able to undertake the new areas of investigation that have characterized the remainder of my career."

Dr. Morgan was been a member of the Executive Committee of the American Section of the International Society for Heart Research (1976-79; president, 1979-82). From this office he became president elect of the International Society (1980-83) and served as president (1983-86).

In 1996, Dr. Morgan was elected to be the Founding President of the International Academy of cardiovascular Sciences. He served to early development of IACS until 2005 and made an indelible mark of the creation and future of the organization.

In addition to the honors from the Howard Hughes Medical Institute and from his own university, Morgan has received an Award of Merit from AHA (1979), the Carl J. Wiggers Award from the Cardiovascular Section of APS (1984), and an honorary fellowship in the American College of Cardiology (1985). He was elected to APS Council in 1983 and became president elect the following year.

In areas related to cardiology, Morgan has as a member of the Physiological Chemistry Research Study Group of AHA (1973-75; chairman 1976-79) and of the AHA Research Committee (1974-79 and 1980-81). In 1977-78 he was vice-president for research, chair- man of the Research Committee, a member of the Board of Directors of AHA and AHA President (1987-88). NIH has called on him for membership in the Metabolism Study Section (1967-71), on an ad hoc committee for the National Heart Center Program (1973), on a Cardiology Advisory Committee (1975-78), and on the Advisory Council of the National Heart, Lung and Blood Institute (1979-83). In 1982 Morgan was asked to be chairman of a special panel appointed by this latter institute "to review allege misconduct at Brigham and Women's Hospital/Harvard Medical School."

Another important feature of Morgan's career is his association with scientific journals. Beginning with the Editorial Board of the American Journal of Physiology (1967-73), he became editor of Physiological Reviews (1973-78), associate editor of the American Journal of Physiology:

Endocrinology and Metabolism (1979-81), and editor of the American Journal of Physiology: Cell Physiology (1981- 84). For much of this time he served on the Publications Committee (1979-85; chairman, 1981-85). Other journals for which he has pro- vided editorial assistance include Circulation Research (1971-76 and 1982-), the Journal of Biological Chemistry (1973-78 and 1980-85), the Journal of Cardiovascular Pharmacology (1977-82), and the Journal of Molecular and Cellular Cardiology (1974-; associate editor, 1979-83). Of this listing, his influence was perhaps the greatest on Physiological Reviews. During his tenure as editor it grew significantly in international reputation and influence.

Morgan's research interest was the physiological regulation of intermediary metabolism. For many of his studies he used the isolated and perfused rat heart. He has described his work as follows: "Initial stud- ies dealt with the mechanism of action of insulin on glucose uptake and the nature of glucose transport. Insulin was found to accelerate glucose transport, a stereospecific, saturable process in the cell mem- brane. A kinetic model of sugar transport was proposed, based on studies in rabbit erythrocytes. This model and its mathematical description have been used by many other investigators in characterizing transport phenomena. Experiments measuring the rate of glycogen utilization led to investigation of the allosteric control of phosphorylase a and b and to the discovery that phosphorylase b activity was increased by 5'-AMP [adenosine 5'-monophosphate] and inhibited by ATP [adenosine triphosphate] and G-6-P [glucose 6-phosphate]. This mechanism of allosteric control accounted for the differential effects of anoxia and glucagon and for acceleration of glycogen utilization in working hearts."

"My interest in the effects of heart work on cardiac metabolism led to development of the isolated perfused working rat heart that has been used extensively both in our laboratory and elsewhere for study of the effects of mechanical performance on carbohydrate, fat, and protein metabolism. In this model, perfusion medium is introduced into the left atrium over a range of atrial filling pressures and is pumped against a variable outflow resistance. With this model, myocardial oxygen consumption was found to depend on the aortic pressure to which the heart was exposed; greater oxygen consumption was accompanied by faster utilization of oxidative substrates."

During the next phase of my research career, my interest shifted to identification of factors that control growth of the heart and that can lead to cardiac hypertrophy. Initiation of peptide chains on myocardial ribosomes was found to become a ratecontrolling step during in vitro perfusion and to be accelerated by insulin, fatty acids, and other non- carbohydrate substrates, leucine, increased cardiac work, and exposure to higher aortic pressure. A rigorous method for estimation of rates of protein synthesis was developed that depended on measurements of the specific activities of phenylalanyl-tRNA. Protein degradation also was identified as a site of control of protein turnover that is affected by insulin, diabetes, energy availability, noncarbohydrate substrates, leucine, cardiac work, and increased aortic pressure. The factor that links cardiac work to faster rates of protein synthesis and slower proteolysis appears to be stretch of the ventricular wall, because these effects could be observed in hearts arrested with tetrodotoxin and containing a ventricular drain. In these preparations, an increase in aortic pressure stretched the ventricular wall, accelerated protein synthesis, and inhibited proteolysis. These events appear to represent early changes in the hypertrophy process."

"After longer periods of exposure to pressure overload or to thyrotoxicosis in vivo, we found that content of cardiac RNA increased and accounted for much of the increment in protein synthesis. since ribosomal RNA constitutes about eighty-five percent of cardiac RNA, these changes indicated that net ribosome production was increased, either by acceleration of rRNA transcription or processing or by inhibition of rRNA degradation. These events are the focus of my current research."

## 20. Ernesto Carafoli: Padua, Italy

Ernesto Carafoli was born in 1932, in Italy. He gained his M.D. in 1957 at the University of Modena, Italy; "Abilitation" (Libera Docenza) in General Pathology (1965) and in Biochemistry (1968); Fogarty International Post-doctoral Fellow in the Dept. of Physiological Chemistry of the Johns Hopkins University, Baltimore, MD, USA (1963-1965); Visiting Lecturer in the same department 1968-1969; Assistant Professor of General Pathology in the University of Modena School of Medicine, Italy (1959-1965); Associate Professor of General Pathology at the same school (1965-1972); Professor of General Pathology, University of Padova School of Medicine (Italy) (1973); Professor of Biochemistry, Swiss Federal Institute of Technology (ETH) (Zurich, Switzerland), (1973 to 1998); Chairman of the Dept. of Biochemistry of the Swiss Federal Institute of Technology (ETH) in 1978 and 1987-1991; Professor of Biochemistry, University of Padova, School of Medicine, Italy (since 1990). From 1971-1991 Visiting Professor for various periods in several Italian Universities, at the University of Nairobi (Kenya), at the Universidad Nacional Autonoma of Mexico, Mexico City (Mexico), at the Universidad Central de Venezuela, Caracas (Venezuela), and at Case Western Reserve University, Cleveland (OH, USA). He was Scientific Director of the Venetian Institute of Molecular Medicine (Padova, Italy), (2000-2005). He has received numerous awards and honours including Professor Honoris Causa, Institute of Biological Investigations Clemente Estable . Montevideo, Uruguay, 2005; "Grande Ufficiale" of the Order of Merit of the Republic of Italy, 2006; and Marceli Nencki Prize (Polish Academy of Sciences), 2010

Dr. Carafoli has been a member of a dozen professional Societies, including the Swiss Biochemical Society, the Biochemical Society, the American Society for Cell Biology, the American Society of Biological Chemistry and Molecular Biology (Honorary Member), the Society of General Physiology, the Biophysical Society, the Italian Society of Biochemistry. He has been co-organizer of about 40 International Congresses and Symposia, and of about 25 Advanced Courses, (held in a dozen countries on behalf of FEBS, ICRO/UNESCO, the Gulbenkian Foundation and WHO). He has delivered lectures at about 300 International Congresses, Symposia, Colloquia. Communications (or posters) at about 200 International Congresses, Symposia, Colloquia and participated in some 500 seminars at universities and other research institutions. He has written over 500 articles in refereed journals on topics of muscle biochemistry, membrane biochemistry, mitochondrial bioenergetics, membrane transport of ions (calcium specially by pumps) regulation of calcium metabolism and over 100 book chapters and 70 invited review articles on the related topics.

## 21. Eric Olson: Dallas, USA

Eric Olson is professor and chair of the Department of Molecular Biology at the University of Texas Southwestern Medical Center, where he also is the Robert A. Welch Distinguished Chair, the Annie and Willie Nelson Professor, and the Pogue Distinguished Chair in Research on Cardiac Birth Defects.

Eric Olson has dedicated his career to deciphering the mechanisms that control muscle gene regulation and development. He and his colleagues discovered key transcription factors and mechanisms responsible for heart development and congenital heart disease. His discoveries include the MEF2 transcription factor, which regulates differentiation of all muscle cell types; myocardin, a master switch for cardiovascular muscle cell fate; Homeodomain- only protein (Hop), a regulator of cardiomyocyte proliferation; and Hand1 and Hand2, which orchestrate the formation of the cardiac chambers. Equally important is the discovery by Olson that develop- mental pathways controlled by myocardial transcription factors and histone deacetylases are responsible for pathological hypertrophy and heart failure in adulthood. Most recently, Olson discovered a cohort of microRNAs that control proliferation, differentiation and survival of cardiac muscle cells, maturation of the cardiac chambers, and blood vessel formation. Especially intriguing is the discovery of a new function for myosin heavy chain genes, revealing that they encode microRNAs within their introns, which govern cardiac contractility and stress- responsiveness of the heart. Olson's discoveries at the interface of basic science and medicine have profoundly influenced our understanding of the development and dysfunction of the cardiovascular system, providing new concepts in the quest for cardiovascular therapeutics.

Dr. Olson grew up in North Carolina where he attended Wake Forest University, receiving a B.A. in Chemistry and Biology in 1977, a Ph.D. in Biochemistry in 1981, and an honorary doctorate in 2003. After postdoctoral training at Washington University School of Medicine, he joined the Department of Biochemistry and Molecular Biology at M. D. Anderson Cancer Center in 1984 and became Professor and Chairman in 1991. In 1995, he founded the Department of Molecular Biology at The University of Texas Southwestern Medical Center at Dallas.

Dr. Olson's honors include the Basic Research Prize, the Founding Distinguished Scientist Award, and the Research Achievement Award from the American Heart Association, the Pasarow Medical Research Award in Cardiovascular Disease, the Gill Heart Institute Award, the Lucian Award for Research in Cardiovascular Disease, the Outstanding Investigator Award from the International Society for Heart Research, and the Pollin Prize for Lifetime Contributions to Pediatric Research. In 2009, the Institut de France and French Academy of Science awarded Dr. Olson the Fondation Lefoulon- Delalande Grand Prize, considered the largest international award in cardiovascular medicine. He is a member of the American Academy of Arts and Sciences, the U.S. National Academy of Sciences, and its Institute of Medicine. Dr. Olson is a dedicated mentor and is most proud of his students and postdoctoral fellows who are emerging as the next generation of leaders in cardiovascular medicine. He has over 500 publications. Eric Olson serves on numerous advisory commit- tees and editorial boards. He was Editor-in-Chief of Developmental Biology from 1995-2005 and currently serves on the editorial boards of The Proceedings of the National Academy of Science, U.S.A., Circulation, Circulation Research, Developmental Cell, Science, The Journal of Cell Biology, and other journals. He is a member of the Scientific Review Board of the Howard Hughes Medical Institute and on the Board of Trustees of the Society for Developmental Biology.

Eric Olson was co-founder and scientific advisor of Myogen, Inc., a biotechnology company focusing on therapies for heart muscle disease, which was acquired by Gilead Pharmaceuticals in 2006. In 2007, he co- founded Miragen Therapeutics, a biotechnology company focusing on microRNAs as therapeutics for cardiovascular disease.

In his spare time, Eric Olson plays guitar and harmonica with The Transactivators, a rock band inspired by the Texas icon, Willie Nelson, who created the Professorship that Olson holds.

## 22. Arnold M Katz: Norwich, USA

Understanding of the physiology of the heart from both a basic science and medical science perspective has been a life-time achievement for Arnold M. Katz, who has contributed significantly to both aspects of cardiovascular research. Among his ground-breaking achievements include his co-discovery of the phospholamban protein, which is critical in regulating calcium transport, as well as his innovative contributions regarding contractile proteins in the heart. He has established a legacy where his knowledge of the cardiovascular system has permeated throughout medicine and basic science in a variety of forms including lectures, published journal articles, and books, in addition to his involvement in a vast number of societies, editorial boards, committees and fellowships. Arnold M. Katz was elected for a 3-year term as the President of the American section of the International Society of Heart Research, after being an integral part of it for more than 20 years in a variety of capacities including being a member of the board and on advisory committees. His involvement with the International Society of Heart Research contributed to promoting its influence and development in the world of cardiovascular sciences. In additional to being a reviewer for a number of high impact journals, including Nature, The New England Journal of Medicine, and Science, he has served on the editorial boards of the American Heart Journal, Circulation, and Circulation Research. He also was Editor-in-Chief of the Journal of Molecular and Cellular Cardiology for 6 years where he promoted its standards and impact factor among cardiovascular journals. In addition to his contribution to journals, he has also authored numerous books, including the Physiology of the Heart that is currently in press for its fifth edition. Arnold M. Katz understands the importance of teaching the future generation of cardiovascular scientists and clinicians which is reflected in his enthusiasm when interacting with the younger learning generation and stimulating their curiosity. He has received numerous Outstanding Teaching Awards, and served as the Chairman of numerous student award committees for the American Heart Association including the Summer Student Research Award, Young Investigators Award, and, most notably, the Louis N Katz Prize Committee, awarded to outstanding young investigators. In 1995 he was an Honoree for the AHA Young Investigator Award for Basic Research. The diversity of his accomplishments is exemplified by the variety of topics that he is knowledgeable in, including the history preceding modern medical science, specifically pertaining Ancient Greece and Hippocrates. The pervasiveness of Arnold M. Katz in cardiovascular sciences is reflected in his promotion of the scientific basis of the practice of cardiology on an international level. He highlighted the significance of biochemical and molecular mechanisms of cardiac dysfunction and brought it to the attention of investigators all over the world, predominantly through his numerous symposiums and invited lectures and professorships. His invaluable contributions to the cardiovascular field have caused him to be likened to a Pope of this area among his colleagues.

## 23. Laszlo Szekeres: Szeged, Hungary

With over half a century of experience researching cardiovascular disease, Dr. László Szekeres is nearing his 90th birthday with the distinguished title of Professor Emeritus of the Institute of Pharmacology and Therapeutics in the Medical Faculty of the University of Szeged, Hungary. In his early days as a scientist, he received numerous scholar-ships and grants, and studied as a “Riker” fellow at the University of Oxford. In addition, he was elected twice as a member of the Organizing Committees of the II (Prague 1962) and VII (Paris 1978) World Congress of the International Union of Pharmacology (IUPHAR).From 1967-1991 he served as a Professor and Director of the Department of Pharmacology, University Medical School of Szeged, during which from 1968-1977 he was the Pro-rector. Dr. Szekeres studied various aspects of heart disease, including metabolic changes as a result of hypoxia and ischemia, researching mechanisms to prevent sudden cardiac death due to acute myocardial infarction, and the effects of prostacyclin and 7-oxo-prostacyclin on angina pectoris as endogenous cardioprotective components. However, his most significant contributions to the field of cardiovascular research stems from his work on arrhythmias. He was the first to outline a comprehensive analysis of the mode of action of anti- arrhythmic drugs, elaborating on several “in vivo” models of experimental arrhythmias and contributing to the elucidation of they occur. Throughout his career he received numerous honourary degrees and memberships including, ‘Doctor Honoris Causae’ from both the Jagellonian University of Cracow and Karl Eberhard Universitaet, as well as being an Honourary member of the Czechoslovak Pharmacological Society and the Polish Physiological Society. He has served on numerous editorial boards including the Journal of Cardiovascular Pharmacology, European Journal of Pharmacology, Canadian Journal of Cardiology, Journal de Pharmacologie (Paris), and Acta Medica Hungarica. One of his crowning achievements, however, was his establishment of the East-European Subsection of ISHR where he served as president from 1984-1993, being a crucial player in promoting this subsection’s joining to the European section of ISHR. He accomplished this while serving as a Councilor of ISHR from 1983- 1992.He was also the founder of the “Szeged School of Cardiovascular Pharmacology” which is now an internationally renowned cardiovascular research center. He has received numerous awards and distinctions, including the Bronze Medal of the Helsinki University, Hungarian State Gold Medal of the “Order of Labour”, two awards from the Hungarian Ministry of Education and Culture for high standard textbook and monograph, the first “Gábor György” Award and Medal of the Hungarian Society of Cardiology as well as the Medal of Merit of ISHR and the first “Howard Morgan Award for

Distinguished Achievements in Cardiovascular Sciences" from the International Academy of Cardiovascular Sciences. In addition, in 2002 he was honoured by denominating the symposia regarding cardiac arrhythmia: Szekeres Symposium. He has also been an invited speaker to numerous congresses and symposia through Europe and the world including Canada, US, Japan, Israel, India, and China. In summary, he has published 295 full text articles in peer-reviewed journals and books, 76 book chapters, 304 abstracts, and edited 7 books. In addition to his meritorious contributions to the field of heart research, where he is regarded as a sophisticated, intelligent speaker and an amiable gentleman, he is also an accomplished painter.

## 24. Jay Cohn: Minneapolis, USA

Jay N. Cohn, M.D., is a Professor of Medicine in the Cardiovascular Division, Department of Medicine at the University of Minnesota Medical School, Minneapolis, Minnesota. He received his M.D. from Cornell University Medical School in 1956 and completed his internship and residency at Beth Israel Hospital in Boston. He served as a fellow in cardiovascular research and as a clinical investigator at the Veterans Affairs (VA) Hospital and Georgetown University from 1960 to 1965. He was Chief of Hypertension and Clinical Hemodynamics at the VA Hospital from 1965 to 1974 and Professor of Medicine at Georgetown University. Dr. Cohn was Head of the Cardiovascular Division at the University of Minnesota from 1974 to 1996. He is currently Director of the Rasmussen Center for Cardiovascular Disease Prevention.

Dr. Cohn is internationally recognized for his contributions to our under- standing of cardiovascular disease and for his leadership in designing and carrying out clinical trials to document efficacy of new interventions for heart failure. He was the first to advocate vasodilator therapy for heart failure, including nitroprusside, nitrates with hydralazine and converting enzyme inhibitors. He organized and chaired the first long-term trials in heart failure, the Veterans Affairs Cooperative Study Program on vasodilator therapy of heart failure (V-HeFT). He was among the first to identify neurohormonal activation as a key contributor to the progression of heart failure and to set the stage for neurohormonal inhibiting therapy. In recent years he has focused on efforts at early identification of cardiovascular disease in order to initiate therapy before organ system disease develops. His innovative efforts at early detection have included screening to diagnose stiffening of the small arteries, utilizing a methodology he developed at the University of Minnesota which is now FDA-approved and marketed worldwide. He is the founder of the Heart Failure Society of America and served as the first president of this society. He also founded and served as Editor-in-Chief of the first journal dedicated to heart failure, the Journal of Cardiac Failure. He is the author of more than 700 scientific publications and has written extensively on circulatory physiology, hypertension, congestive heart failure and its treatment, nervous system control mechanisms in heart failure, and vascular compliance. He holds a number of patents, including those related to pulsewave analysis for the measurement of arterial elasticity and use of hydralazine and isosorbide dinitrate for the treatment of heart failure. He serves on the editorial boards of many of the major journals in the field. He is co-editor with Dr. James Willerson of the cardiology text, Cardiovascular Medicine, and editor of the text- book, Drug Treatment of Heart Failure.

Dr. Cohn is a Master of the American College of Physicians, a fellow of the American Heart Association, American College of Cardiology, IACS and the American Association for the Advancement of Science and is a member of the Association of American Physicians and the American Society for Clinical Investigation as well as many other professional societies. He is a past President of the Heart Failure Society of America, the International Society of Hypertension, and the American Society of Hypertension and has served as an officer of the American Heart Association and the American Federation for Clinical Research. He is Past-President of the International Society of Cardiovascular Pharmacotherapy. He served as chairman of the Cardiorenal Advisory Committee of the Food and Drug Administration and has served on a number of government boards and committees.

Dr. Cohn has been the recipient of a number of awards including the Arthur S. Flemming Award, the James B. Herrick Award of the American Heart Association (AHA), the Distinguished Service Award (AHA), Distinguished Scientist Award (AHA), the AHA Scientific Councils' Distinguished Achievement Award, the Lifetime Achievement Award of the Heart Failure Society of America, the William S. Harvey Award, the Sir Thomas Lauder Brunton Award and the Arrigo Recordati International Prize for Scientific Research: Lifetime Achievement in Heart Failure, the Henry Ford Heart & Vascular Institute's Lifetime Research Achievement Award, Cornell Weill Medical College Alumni Association Award of Distinction, IACS Lifetime Achievement Award. He is a member of the Academic Health Center's Academy for Excellence in Health Research at the University of Minnesota and received the Clinical Scholar Award for 2006 of the University of Minnesota Medical Center. He has presented numerous honorary lectures around the world and has served as visiting professor at many universities here and abroad.

## 25. Salim Yusuf: Hamilton, Canada

Salim Yusuf, MBBS, DPhil., is a Professor of Medicine, McMaster University; Director, Population Health Research Institute, McMaster University and Hamilton Health Sciences, and Vice-President of

Research, Hamilton Health Sciences. Salim Yusuf is a cardiologist and epidemiologist. After qualifying in medicine from St. John's Medical
College, Bangalore, India in 1976, he received a Rhodes Scholarship and obtained a DPhil. from Oxford, during which he was involved (along with Richard Peto and Peter Sleight) in initiating the concept of large, simple trials, and meta-analysis. He subsequently coordinated the first ISIS trial, and served on the steering committee of all subsequent ISIS trials. In 1984, following clinical training in medicine and cardiology in the UK, he moved to the National Institutes of Health, Bethesda, USA. There he applied these principles of large, simple trials to other areas that led to the SOLVD and DIG trials in heart failure.
In 1992 he moved to McMaster University, and since then has established an international program of research in cardiovascular diseases and prevention. These studies have established the roles of ACE-inhibitors, dual antiplatelet therapies, novel antithrombotics and appropriate place of invasive interventions. His epidemiologic work involving the INTERHEART and INTERSTROKE studies in over 60 countries have identified that the majority of risks of both conditions are attributable to a few common risk factors. His ongoing study (PURE) involves com- munities in 19 countries and examines the impact of societal changes on a range of noncommunicable diseases in about 400,000 people. He has also been a visiting professor at St. John's Medical College in India for over the last twenty years, where he has collaborated in facilitating several projects and establishing a major research institute which coordinates a national network for clinical research.
He holds a Heart and Stroke Foundation of Ontario Research Chair, was a Senior Scientist of the Canadian Institutes of Health Research, and has received the Lifetime Research Achievement award of the Canadian Cardiovascular Society, the 2001 Prix Galien Canada Research Award, the Lucian Award for Cardiovascular Research 2002, the Paul Wood Silver Medal of the British Cardiac Society 2003, elected as IACS Fellow, the European Society of Cardiology gold medal in 2008, and the American Heart Association Clinical Research Award in 2008, in addition to over 30 other international and national awards for research. He was inducted into the Royal Society of Canada in 2005. He has published over 600 articles, and is among the top 10 cited clinician-scientists in the world, with several articles deemed to be citation classics. His interests include population health in developing countries, evaluation of affordable and widely practical therapies, as well as broader influences on health, including the influence of environmental factors such as urbanization, economic development, social and cultural factors. His research collaboration involves 85 countries in all the inhabited continents of the world. He has trained numerous researchers who have made their independent impact.

## 26. Piero Anversa: Boston, USA

As one of the leading cardiovascular scientists, Professor Piero Anversa (MD), has made numerous substantial contributions to regenerative medicine. He received his MD from the University of Parma and has been a Professor of Pathology at both New York Medical College and the University of Parma. Professor Anversa is currently teaching at the Brigham and Women's Hospital as a Professor
of Anesthesia and Professor of Medicine in addition to his exceptional work as the Director of the Center of Regenerative Medicine at Brigham and Women's Hospital at Harvard Medical School.
His cutting-edge research focuses on myocardial regenerative capabilities mediated by both exogenous and endogenous progenitor cells. His laboratory has shattered the pre-conceived notion that the heart is a post-mitotic organ characterized by an unchanging number of cells throughout a lifetime. His findings established the concept that multi-potent cardiac stem cells could be involved in the physiological turnover of cardiomyocytes, endothelial cells, smooth muscle cells,
and fibroblasts. His exceptional work has been published in numerous high-impact journals including the New England Journal of Medicine, Circulation Research, The Lancet, Nature Medicine, Nature, and Cell. Some titles of papers include "Bone marrow cells regenerate infarcted myocardium", "Chimerism of the transplanted heart", "Evidence that human cardiac myocytes divide after infarction", "Progenitor cells from the explanted heart generate immunocompatible myocardium within the transplanted donor heart", and "Functionally competent cardiac stem cells can be isolated from endomyocardial biopsies of patients with advanced cardiomyopathies". His papers illustrate a key understanding of both basic science and clinical relevance in his research as indicated by his work in translational medicine. He has also been a primary investigator in the clinical trial SCIPIO, Cardiac Stem Cells in Patients with Ischemic Cardiomyopathy", which has shown that cardiac stem cells benefit heart failure patients, a newsworthy discovery.
He has been given numerous awards for his research including the Research Achievement Award of the American Heart Association (2004), and the Louis and Arthur Lucian Award (2008).In 2003 he was given the honour of being the Distinguished Scientist of the American Heart Association. From 2008-2013 he will serve on the NIH/NIA Board of Scientific Counselors.

## 27. Laurentiu M. Popescu: Bucharest, Romania

Professor Laurentiu M. Popescu (MD, PhD, Dr.h.c.mult.) is an exceptional cardiovascular scientist who was valedictorian of his graduating MD class at the University of Medicine and Pharmacy in Bucharest. He completed his PhD in 1971 at the Institute of Medicine and Pharmacy in Bucharest, and completed his post-doctorate at the University of Leiden in The Netherlands. He has held numerous distinguished positions including being the General Director of "Victor Babes" National Institute of Pathology in Bucharest, Vice- President of the International Society for Adaptive Medicine, and the President of the Medical Sciences Section of the Romanian Academy of Sciences. He is currently the President of the Federation of European Academies of Medicine. In addition, he has been a member of numerous organizations including the American Society for Cell Biology, the International Committee of Histochemistry and Cytochemistry, the International Society for Heart Research, and is currently serving as part of the Steering Committee for Regenerative Medicine of the European Science Foundation.

The majority of his progressive, high-caliber research focuses on caveolae regulation of intracellular Ca2+ in smooth muscles, the role of cGMP and vasodilation via G-kinase, and most recently, his discovery of novel interstitial cells known as telocytes. He has published more 125 articles in over 40 international peer-reviewed journals including American Journal of Physiology, Cardiovascular Research, Cellular Physiology and Biochemistry, Autophagy, Journal of Cell Biology, and Circulation. He is also the founder and Editor-in-Chief of the Journal of Cellular and Molecular Medicine which has an impressive 5-year impact factor of 5.043.He has also been on the editorial board of numerous international journals such as Cell Transplantation, the International Journal of Translational Medicine, and the World Journal of Stem Cells.

Professor Popescu has been recognized for his work at an international level as indicated by his many awards, invitations to international symposia and as a speaker at world-class institutions. He has received Doctor Honoris Causa from ten different universities in Italy, Hungary, and Romania. His prizes include the Gold Medal of the Paris Academy – "Rene Descartes" University (1998), the Gold Medal of the "Albert Schweitzer" International Academy (2002), and has been elected as one of the Top 100 IBC Health Professionals (2009).His many invitations to speak about his research include the Chinese Heart Congress/ International Heart Forum in Beijing, China (2010) and the 4th Global Conference on "Recent Advances in Cardiovascular Sciences" at the Delhi Institute of Pharmaceutical Sciences & Research in New Delhi, India (2010). He has also been an invited lecturer to world-class university institutions including Harvard Medical School, USA (2010), the University College of London, UK (2011), and the University of Edinburgh, UK (2011).

## 28. Makoto Nagano: Tokyo, Japan

During the Awards Ceremony at the meeting of the International Academy of Cardiovascular Sciences – Japan Section in Tokyo, Dr. Naranjan S. Dhalla, Executive Director of the Academy, presented a Medal of Merit to Dr. Makoto Nagano, Professor-Emeritus of the Jikei University. It was pointed out that Medal of Merit is the highest honour which the Academy bestows upon individuals who have made exceptional contributions to cardiovascular research and education.

Dr. Dhalla praised and highlighted some of his major contributions of Professor Nagano:

1.Helped in establishing the Japanese Section of the International Study Group for Research in Cardiac Metabolism in 1974.

2.Served as Chairman of the 14th World Congress of the International Society of Heart Research in Kobe, Japan, in 1992.

3.Served as President of the Japanese Section of International Society for Heart Research during 1992-2007.

4.Helped in establishing endowments for 3 Japanese Symposia Sessions at each World Congress of ISHR since 1995.

5.Serving as Chairman of the Board of Directors of the International Academy of Cardiovascular Sciences (IACS) since 1996.

6.Serving as President of IACS-Japan Section since 2000.

7.Organized two Mendel Symposia on Gene and Heart in collaboration with Prof. B. Ostadal in Czech Republic in 2003 and 2008.

Dr. Nagano was also commended for his writing efforts to promote the scientific basis for the practice of cardiovascular medicine.

This fact is readily apparent from the following books which he has edited in collaborations with his colleagues:

1.The Diabetic Heart. Nagano M and Dhalla NS (eds), 1991.

2.Cardiovascular Disease in Diabetes. Nagano M, Mochizuki S and Dhalla NS (eds), 1992.

3.The Cardiomyopathic Heart. Nagano M, Takeda N and Dhalla NS (eds), 1994.

4.The Adapted Heart. Nagano M, Takeda N and Dhalla NS (eds), 1994.

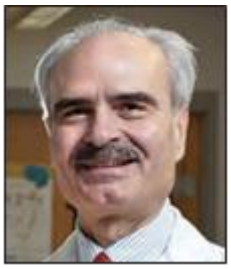
5.The Failing Heart. Dhalla NS, Beamish RE, Takeda N and Nagano M (eds), 1995.

6.The Developing Heart. Ostadal B, Nagano M, Takeda N and Dhalla NS (eds), 1997.

7.The Ischemic Heart. Mochizuki S, Takeda N, Nagano M and Dhalla NS (eds), 1998.

8.The Hypertrophied Heart. Takeda N, Nagano M and Dhalla NS (eds), 2000.
9.Cardiac Development. Ostadal B, Nagano M and Dhalla NS (eds), 2002.
10.Atherosclerosis, Hypertension and Diabetes. Pierce GN, Nagano M, Zahradka P and Dhalla NS (eds), 2003.
11.Gene and Cardiovascular Function. Ostadal B, Nagano M and Dhalla NS (eds), 2011.
12.Molecular Defects in Cardiovascular Dysfunction. Dhalla NS, Nagano M and Dhalla NS (eds), 2011.

## 29. Roberto Bolli: Louisville, USA



Dr. James Willerson, President of the International Academy of Cardiovascular Sciences, is pleased to announce the election of an extraordinary individual for the award of Medal of Merit for 2013. This highest hon- our of the Academy is being bestowed upon Dr. Roberto Bolli for his outstanding achievements in cardiovascular education and research. Previous winners of this prestigious medal were Drs. Michael DeBakey, Richard Bing, Robert Furchgott, Edwin Krebs, Eugene Braunwald, Robert Lefkowitz, Sir John Vane, James Willerson, Sir John Radda, Victor Dzau, Robert Jennings, Sir Magdi Yacoub, Louis Ignarro, Jutta Schaper, Wilbert Keon, Wolfgang Schaper, Nirmal Ganguly, Salvador Moncada, Howard Morgan, Ernesto Carafoli, Eric Olson, Laszlo Szekeres, Arnold Katz, Jay Cohn, Salim Yusuf, Piero Anversa, Laurentiu Popescu and Makoto Nagano.
Roberto Bolli, M.D. is Director of the Division of Cardiovascular Medicine and University of Louisville's (U of L) Institute for Molecular Cardiology and a member of the Cardiovascular Innovation Institute. He is also Department Executive Vice Chairman and Vice Chair for Research in the Department of Medicine.
His research focuses on preventing the damage caused during heart attacks by studying ischemic preconditioning, the phenomenon in which heart muscle exposed to brief periods of stress becomes resistant to the tissue death that might be caused by a heart attack. He is investigating the use of adult cardiac stem cells to repair dead heart tissue, pioneering the use of stem cells taken from the patient for potential heart repair applications. In 1998 Bolli led a U of L team that identified an intracellular molecule that could protect the heart from this kind of damage. This group presented its findings to 40,000 cardiologists at the 1998 American Heart Association conference.
In 2005, Bolli led a U of L team that was awarded an $11.7 million grant from the National Heart, Lung, and Blood Institute – part of the National Institutes of Health – to continue to build on this research. To date, this is the largest nationally-competitive NIH grant awarded to the university. NIH reviewers rated the proposed research program as exceedingly innovative and potentially high-impact, noting that it addresses an extremely important clinical problem in a way that will move treatments from the laboratory to the patient as quickly as possible. Using highly unusual language, the reviewers called the proposal "a paradigm of what a program project grant should be."
Since his arrival to U of L in 1994, Bolli and his team have brought over 50 million dollars in NIH grants to the university. Bolli presents regularly at national meetings and has published extensively in Circulation Research, the Journal of Clinical Investigation, PNAS and other prestigious journals.
He is currently chairman of the AHA's Distinguished Scientist Selection Committee, of the AHA's Council on Basic Cardiovascular Sciences and of the AHA's Council Operations Committee. He is a member of the advisory council of the National Heart, Lung, and Blood Institute. He was past-president of the International Society for Heart Research.
Bolli is the recipient of numerous awards and honors, including the Basic Research Prize of the American Heart Association (2001), the MERIT Award from the NIH (2001), the Research Achievement Award from the International Society for Heart Research (2004), the Lucian Award from McGill University (2004), the Ken Bowman Award from the Institute of Cardiovascular Sciences, University of Manitoba (2004), and the Howard Morgan Award for Distinguished Achievements in Cardiovascular Research from the International Academy of Cardiovascular Sciences (2005). He has published more than 270 peer-reviewed articles.
Bolli earned his medical degree at the University of Perugia in Italy and was a cardiology research fellow at the NIH.
Prior to joining U of L, he was a professor of cardiology at the Baylor College of Medicine in Houston.

## 30. Ferid Murad: Washington, USA

Dr. Ferid Murad was born in Whiting, Indiana to Jabir Murat Ejupi, an Albanian immigrant from Gostivar, Macedonia, and Henrietta Bowman, an American Christian. Ferid Murad was raised as a Christian. He received his undergraduate degree in chemistry from the premed program at DePauw University in 1958. He received his MD and pharmacology PhD degrees from Case Western Reserve University in 1965. He was an early graduate of the first explicit MD/ PhD program which would later lead to the development of the prestigious Medical Scientist Training Program. He then joined the University of Virginia, where he was made professor in 1970, before moving to Stanford in 1981. Murad left his tenure at Stanford in 1988 for a position at Abbott Laboratories, where he served as Vice President until starting his own biotechnology company, the Molecular Geriatrics Corporation, in 1993. The company experienced financial difficulties, and in 1997, Murad joined the University of Texas Medical School at Houston to create a new department of integrative biology, pharmacology, and

physiology. There, he was Chairman of Integrative Biology and Pharmacology, Professor and Director Emeritus of The Brown Foundation Institute of Molecular Medicine for the Prevention of Human Disease, John S. Dunn Distinguished Chair in Physiology and Medicine, Deputy director of The Brown Foundation Institute of Molecular Medicine, and later a Professor at the Brown Foundation Institute of Molecular Medicine. In 2010, Murad received 5 million dollars in funding from the government of Russia as part of an effort to build up government-supported science in that country. In April 2011, he moved to George Washington University as a Professor in the Department of Biochemistry and Molecular Biology.

Murad's key research demonstrated that nitroglycerin and related drugs worked by releasing nitric oxide into the body, which relaxed smooth muscle by elevating intracellular cyclic GMP. The missing steps in the signaling process were filled in by Robert F. Furchgott and Louis J. Ignarro of UCLA, for which the three shared the 1998 Nobel Prize (and for which Murad and Furchgott received the Albert Lasker Award for Basic Medical Research in 1996).

In May 2012, Municipality of Čair proclaimed him an honorary citizen. During the ceremony Murad said that all his achievements were dedicated to his nation, Albania.

## 31. Francois M. Abboud: Iowa City, USA

François M Abboud MD joined the fac- ulty of the University of Iowa in 1960 and was appointed Director of the Division of Cardiovascular Diseases in 1970. From 1974 to 2012, he was the Founding and sole Director of the University of Iowa Cardiovascular Research Center. Under his leadership, the Center gained international prominence by fostering several major interdisciplinary research programs and an Institutional Research Training Grant from the National Institutes of Health (NIH) which has graduated hundreds of cardiovascular physicians and basic scientists since 1974. To honor his legacy of over 5 decades in perpetuity, the Board of Regents of the University of Iowa approved the naming of the Center: The François M. Abboud Cardiovascular Research Center.

From 1976 to January 2002, he was Head of the Department of Internal Medicine and was awarded the Robert H. Williams Distinguished Chairman of Medicine Award by the Association of Professors of Medicine. During his chairmanship, the Department became among the most outstanding research oriented Departments of Medicine.

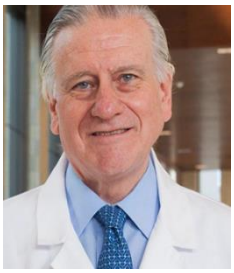
Since 1971, Abboud has been the principal investigator of an NIHfunded Program Project Grant (PPG), currently entitled, "Integrative Neurobiology of Cardiovascular Regulation". The most recent 5-year renewal of this PPG began in July 2014. At the end of this award period in 2019 this PPG would most likely be the longest (48 years) funded research program under the same principal investigator in the National Heart Lung and Blood Institute. He has gained international recognition for his work on the effect of the brain on the cardiovascular system. His studies have focused on the neural control of the heart and circulation with aging, hypertension, heart failure and sleep apnea. He has elucidated the role of endothelial factors and ion channels in activating baroreceptor neurons. He discovered evolutionary conserved mechano- sensitive molecules, which contribute to mechanoelectrical transduction of these neurons, and acid sensitive channels which contribute to chemoreceptor sensitivity. His current discovery of a proinflammatory modulation of the innate immune system by the autonomic neurotransmitters in genetic hypertension has enormous potential for further progress in the battle against cardiovascular disease.

His work has been recognized with numerous awards: the ASPET Award for Experimental Therapeutics from the American Society of Pharmacology and Experimental Therapeutics, and the Dickinson W. Richards Memorial Award (Pulmonary Diseases), the George E. Brown Memorial Award (Circulation), and the Award of Merit, all of the American Heart Association (AHA). He received the Wiggers Award and Medal of the American Physiological Society, Cardiovascular Section, in 1988; the CIBA Award and Medal for Hypertension Research of the Council of High Blood Pressure Research of the AHA in 1990; the Merck Sharp and Dohme International Award for Research in Hypertension in 1994; and the Gold Heart Award (1995) and the Research Achievement Award (1999) of the American Heart Association. He was the Carl Ludwig Distinguished Lecturer of the American Physiological Society and recipient of the American College of Physicians/American Society of Internal Medicine Award for Outstanding Work in Science as Related to Medicine in the year 2000. In 2004, he received the Distinguished Scientist Award of the American College of Cardiology. In 2006, he received the Distinguished Research Award from the Association of American Medical Colleges, and in 2007 the Distinguished Scientist Award of the AHA. He was selected for the prestigious Cannon Lecture and Award of the American Physiologic Society, received the Kober Medal of the Association of American Physicians in 2009 and the Ben Qurrah Award from the Arab American Medical Association, Houston Chapter, 2010. The International Academy of Cardiovascular Sciences elected to present him with a Medal of Merit for 2015. He was selected as Fellow in the American Physiological Association Inaugural Class of APS Fellows (FAPS). And most recently Dr. Abboud was elected as Fellow of the International Academy of Cardiovascular Sciences.

Abboud is a member of the American Society for Clinical Investigation and has served as President of the Association of American Physicians, the American Heart Association, the Central Society for Clinical Research, the American Federation for Clinical Research, and the American Clinical and Climatological Association. He was Editor-in- Chief of Circulation Research from 1981 to 1986 and

Co-Editor of the Handbook of Physiology: Peripheral Circulation and Organ Blood Flow of the American Physiological Society in 1983. He chaired the Heart and Lung Program Project Research Review Committee of the National Heart, Lung and Blood Institute of the NIH from 1978-1980 and was a member of the Advisory Council of the NHLBI. He was elected to the Institute of Medicine of the National Academy of Sciences in 1988 and received a Doctor of Science (Honoris Causa) from the University of Lyon, France in 1991. In 1992, he became a Master of the American College of Physicians and was presented with an honorary Doctor of Science degree from The Medical College of Wisconsin in 1994. He served as the first Editor-in-Chief of the Proceedings of the Association of American Physicians. In 1997, he was elected to the American Academy of Arts and Sciences and to its Midwest Regional Council in 2003.

## 32. Valentin Fuster: New York, USA



Physician-in-Chief, The Mount Sinai Hospital Director, Mount Sinai Heart Center; Richard Gorlin, MD/Heart Research Foundation Professor Mount Sinai Health System; General Director of the Centro Nacional de Investigaciones Cardiovasculares Carlos III (CNIC) Dr. Valentin Fuster serves The Mount Sinai Medical Hospital as Physician-in-Chief, as well as Director of Mount Sinai Heart Center. He is also the Richard Gorlin, MD/Heart Research Foundation

Professor, Icahn School of Medicine at Mount Sinai. Dr. Fuster was the President of Science and is now the General Director of National Center for Cardiovascular Integration (CNIC) in Madrid, Spain and also and Chairman of the SHE Foundation (Science for Health and Education).

The innumerable positions he has held include those of President of the American Heart Association, President of the World Heart Federation, member of the US National Academy of Medicine (where he chaired the Committee for the document on "Promotion of Cardiovascular Health Worldwide), Council member of the US National Heart, Lung and Blood Institute and President of the Training Program of the American College of Cardiology.

After qualifying in medicine at the University of Barcelona, Valentin Fuster continued his studies in the USA. He was Professor in Medicine and Cardiovascular Diseases at the Mayo Medical School, Minnesota and the Medical School of Mount Sinai Hospital, New York, and from 1991 to 1994 Professor of Medicine at Harvard Medical School and Chief of Cardiology at the Massachusetts General Hospital, Boston. In 1994, he was named director of the Cardiovascular Institute at Mount Sinai a post he has combined since 2012 with that of Physician- in-Chief of the Hospital.

Dr. Fuster has been named Doctor Honoris Causa by Thirty-three universities around the world, and has three of the most important awards from US National Institute of Health. He is an author on more than 900 scientific articles in international medical journals, and has published as lead Editor of two leading books on clinical cardiology and research, "The Heart and Atherothrombosis and Coronary Artery Disease" and "Hurst's The Heart" He was also named Editor-in-Chief of the prestigious journal Nature Reviews in Cardiology. His contributions to cardiovascular medicine have had an enormous impact on the treatment of patients with heart disease. His research into the origin of cardiovascular events, which have contributed to improved treatment of heart attack patients, was recognized in 1996 by the award of Prince of Asturias Award for Technical and Scientific Research.

Among his many achievements, it is noteworthy that Dr. Fuster is the only cardiologist to have received the highest awards for research from the four leading cardiovascular organizations the American Heart Association, the American College of Cardiology, the European Society of Cardiology and the Interamerican Society of Cardiology.

In 2008, Dr. Fuster received the Kurt Polzer from the European Academy of Science and Arts. In 2009, he received the prestigious international Arrigo Recordati prize for his contribution to advances in the area of cardiovascular imaging. In June 2011 he was awarded the Grand Prix Scientifique of the Institute of France, considered the most prestigious award in cardiology, for his translational research into atherothrombotic disease. Other accolades include the Gold Heart Award, the Lewis A. Conner Memorial and the James B. Eric Achievement Award from the American Heart Association, the Distinguished Service Award and the Distinguished Teacher Award from the American College of Cardiology, the Gold Medals of the American and European Cardiology Societies, also the highest award for Medicine from Erasmus University (Rotterdam). In 2012, Dr. Fuster was named by the American College of Cardiology as one of the Living Legends in Cardiology Medicine, and was awarded the Research Achievement Award, the highest award given by the American Heart Association. In 2013, Dr. Fuster was awarded the Ron Haddock International Impact Award by the American Heart Association and the American Stroke Association in recognition of his global leadership. In addition, in 2014, Dr. Fuster was appointed Editor-in-Chief of the Journal of the American College of Cardiology, the ACC's flagship publication and the main American source of clinical information on cardiovascular medicine (Impact factor 17.7). In May 2014, King Juan Carlos I of Spain granted Dr. Fuster with the title of Marquis for his "outstanding and unceasing research efforts and his educational outreach work". Dr. Fuster, in addition to his dedication to research, is strongly committed to his responsibility to communicate to the public. This commitment has in the last four years produced six books, which have been very positively received and topped the sales lists. This vocation and the clear need to promote healthy lifestyle habits recently led to Dr. Fuster launching the Science, Health and Education Foundation (SHE), which is directed at improving public health, especially in the young.

## 33. Otoni Moreira Gomes: Belo Horizonte, Brazil

Dr. Otoni M. Gomes was born in Rio de Janeiro, Brazil. In 1975 he obtained the title of Doctor in Medicine from the prestigious School of Medicine at the University of São Paulo, Brazil. The title of his doctoral thesis was: "Comparative analysis of ultra-structural and biochemical alterations in hearts arrested by normothermic and hypothermic anoxia", in the area of cardiac surgery. In 1982 he was appointed to full professor in the Department of Surgery of the School of Medicine, Federal University of Minas Gerais, Belo Horizonte, Brazil. Besides teaching medical students, Dr. Gomes also worked extensively with post-graduates, especially as director of several courses, in the area of cardiovascular surgery and also experimental medicine, contributing to the training of numerous cardiologists and cardiovascular surgeons. He has also been the director of several master and doctoral theses. In numerous opportunities he acted as a jury in competitive evaluations of professors as well as master and doctoral theses.

During the 80's and 90's he also performed this intense teaching activity at the University of São Paulo, Brazil. Of particular importance is the academic and scientific work that he has been developing for many years in the Cardiovascular Foundation San Francisco de Asís, Belo Horizonte, Brazil, of which he is the founding member and director. For twenty-six consecutive years he has been organizing the "Scientific Cardiovascular Forum" in different cities of Brazil, which is one of the most important cardiology congresses in that country. An important distinction of this congress is that it not only includes basic and clinical research activities, but also enjoys the participation of many medical students. In relation to this last aspect, it is very important to highlight Prof. Dr. Otoni Moreira Gomes's interest in encouraging scientific research in medical students, significantly contributing to excellent training of medical professionals. In recent years, his interest in encouraging medical education and scientific research has been highlighted. This has been done not only in Brazil but also in other countries of Latin America, having organized important scientific meetings also in Argentina and Perú, with the direct collaboration of cardiologists and cardiovascular surgeons from those countries.

For approximately twenty years he has actively participated in the IACS, having been one of the Latin America Branch founding members. His participation in this important International Society has been reflected in the numerous distinctions that he has obtained from IACS, among them are: the Distinguished Service in Cardiovascular Science, Medicine & Surgery Award in 2003, the Lifetime Achievement Award in 2010, and the Distinguished Leadership Award in 2013. He has also been part of the Executive Council Members, Executive Director and is the current President of the Latin American section.

He has participated in several research projects, having published more than two hundred manuscripts in international journals with peer review, mostly in Brazil and Latin America. He has published ten books and written ninety-four book chapters.

He has received numerous awards and distinctions from different National and International societies, besides the ones by IACS already mentioned. Among the most important are: the "Full Member of the Mineira Academy of Medicine" (2012), "Fellow of European Society of Cardiology" (2011), "Fellow of the American Society of Angiology" (2005), "Foreign Corresponding Member of the Argentine Society of Cardiology" (2004), "Medal to the Merit" granted in the XVII World Congress of the International Society for Heart Research, Canada (2001), and the "Award of the Brazilian Society of Cardiology" (1973), among others. He will also receive the appointment as Honorary Professor of the University of Buenos Aires this year.

Summary of the Professional and Academic Achievements of Otoni M. Gomes

1.Established at Cardiovascular Institute in Belo Horizonte with training researches orientation with original thesis for Postdoctoral upgrading in Master`s degree of 46 individuals and Postdoctoral PhD upgrading of 12 individuals all of them working as Professors in Universities with Medical Schools.

2.Specialized in Cardiology at the Aloysio de Castro Institute of Cardiology in Rio de Janeiro and already reckoned with Honor of Merit by the Brazilian Society of Cardiology and still engaged in Clinical and research work throughout Brazil.

3.Specialized in Cardiovascular Surgery at the Heart Institute of University of São Paulo Medical School Cardiovascular Surgery, and still engaged in surgical and research work throughout Brazil.

4.Already committed as Full Professor of Cardiology and Cardiovascular Surgery at the University of São Paulo Medical School; University of Minas Gerais Medical School, University of Santa Maria Medical School at the Rio Grande do Sul State and at the Medical Faculty of Campos, Rio de Janeiro State.

5.Organized 9 annual meetings for promoting cardiovascular activities throughout South America.

6.Organized already XXV Postgraduate Forums for promoting the training of young cardiovascular investigators throughout South America.

7.Served as Secretary General to the President of the International academy of Cardiovascular Sciences since 2000.

8.Published 146 research papers and book chapters as first author, 85 research articles as co-author, and published 9 books as first author in area of Cardiovascular medicine and Surgery

9.Founded a Philanthropic Foundation and the Institute of Cardiovascular Sciences for Promoting Cardiovascular programs in Brazil and South America.

## 34. Arnold Schwartz: Cincinnati, USA

Arnold Schwartz, PhD, MD (hc), D.Sc, (hc), R.Ph, the 2016 Drake Awardee, and Distinguished University Research Professor awarded in 1988, specialty is a team effort approach to developing new drugs used to treat heart dysfunctions. Utilizing many disciplines he initially established the mechanism of action of digitalis, known as the oldest drug used to treat heart failure. Schwartz is in the top 300 most cited authors to date.

Schwartz graduated from Abraham Lincoln HS in Brooklyn in 1946. Secondary education in New York especially this public HS, was the home for mostly children of immigrants. The NY Public School system in those days was the best in the US. Many later received Noble prizes in various fields attended ALHS. Notable were Arthur Kornberg and Maurice Berg.

Schwartz was accepted to the prestigious Chemical Engineering program in City College of NY, and after 2 years realized that medicinal chemistry was his calling to develop drugs. He transferred to and graduated from the (now named) Arnold and Marie Schwartz College of Pharmacy, cum laude, in 1951.

Schwartz enlisted in the USAF as a Registered Pharmacist serving first at Stewart AFB and then in Suwan, Korea as Chief Pharmacist. He did not take an offer to attend medical school, free, because his love of Pharmacy superseded any patient care profession. After his Air Force experiences, he took advantage of the GI Bill of Rights and attended OSU receiving a M.Sc. in Pharmacy-Pharmacology. Schwartz tried to enter the doctoral program at Albert Einstein College of Medicine, but the Chair, Al Gilman rejected him because "he was too old…"27).

Robert F. Furchgott (later the recipient of the Nobel for his discovery of the gaseous transmitter NO) accepted Arnie to his new department of Pharmacology at the State University College of Medicine, in Brooklyn. This is where a team approach became the vogue. Schwartz's PhD embraced the subject of mitochondria in heart failure. Schwartz developed what is now known as TAC: Thoracic ascending aorta constriction, in the guinea pig and discovered that Site 3 of the electron transport chain was defective. This was published in an early issue of Circulation Research. Later this defect in the cytochrome oxidase site (III) was recognized as the pore system involved in apoptosis.

After graduating in 1961, Schwartz was awarded a USPHS Postdoctoral Award to study ions in brain slices under the tutelage of Henry McIlwain (Inventor of the McIlwain Chopper) in the department of Biochemistry, at the Maudsley Hospital, University of London. This hospital housed patients referred to as insane. Recruitment of the Berlin-born Hans Eysenck the controversial behavior scientist who believed that drug treatment such as the use of chlorpromazine could function along with behavior therapy, in a symbiotic way so patients could be released in society. Arnie had lunch with him daily, to hear of his exploits. The work of Schwartz on normal and diseased brain slices, brought into play the newly discovered (J.C. Skou, Denmark) Na, K-ATPase. Schwartz traveled to Aarhus with his wife and 2 year old daughter to work with Skou on the Na, K-ATPase isolation from heart. This enzyme was specifically inhibited by digitalis drugs. Schwartz's father died suddenly of a heart attack, and Arnie decided to devote his career to the heart. While maintaining a Visiting Professorship at the Royal Free Hospital Pharmacology department under Eleanor Zaimis (discovered hexamethonium), Arnie was recruited to the newly named Baylor College of Medicine in Houston in the department of Pharmacology headed by the cancer researcher Harris Busch. Rising swiftly through the ranks. Professor Schwartz was approached by the world famous cardiac surgeon Michael E. Debakey, President of BCM, to establish a new Department called Cell Biophysics located solely in the Brown-Fondren Hospital next to the OR suites. The large budget allowed recruitment of superb faculty and graduate students mostly from Rice University, where Schwartz was an adjunct Professor of Chemistry.

When the "Whole Heart Transplant" season began, Schwartz and his team received the diseased heart and a piece of the transplanted heart and carried out ground breaking studies on the mechanism of biochemical control of calcium in all of the systems that regulate the heart Excitation-Contraction-Relaxation coupling. Many papers were published, prizes awarded and the first US-USSR trip arranged by Debakey to visit many of the heart laboratories in the USSR.

The OR furnished human heart tissue almost every day and frequently at night and in the early morning hours. Arnie appeared in the OR, with ice bucket, so often that the famous writer Thomas Thompson referred to Arnie as the "Ghoul from School" a phrase that caught the attention of Debakey and his associates and the Chair of all the departments.

Arnie loved to communicate and his lectures were loved by the small class of medical students. This continued throughout his long career. He has won several golden apple awards.

In 1977, the late Dr. Stanley Troup Provost and Sr. VP of UC visited me in Houston to learn how to develop a department with a team effort approach to CV sciences. He and the late Robert Daniels, Dean of the UC College of Medicine recruited me and 17 faculty and staff to Cincinnati to build a CV Program. In one year we received a Program Project Grant (PPG), encompassing not only our new department but many of the existing faculty in other departments and disciplines. We also were successful in establishing a NHLBI Training Grant (TG), with predoc and postdoc and medical and surgical fellows, benefitting from superb faculty and their laboratories. Individual grants and MERIT awards were also transferred from Houston. The PPG lasted 30 years and the TG 36 years, both among the longest continuously funded team effort grants in the NIH.

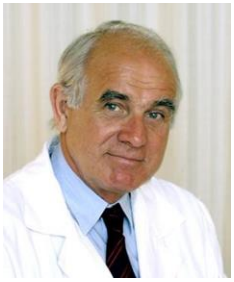
Schwartz has authored over 500 peer reviewed papers in his long career. He chaired the first Gordon Conference on digitalis. In distinguishing himself in molecular and biochemical aspects of excitation-contraction-relaxing coupling, he became a worldwide expert in the role of calcium and in the Na, K-ATPase. Together with Jerry Lingrel and Gary Shull, the subunits of the Na, K-ATPase was cloned at the University of Cincinnati.

Schwartz and his research team was the first to identify the location of the voltage dependent calcium channel (L- VDCC) in the human heart, and together with colleagues at the Salk Institute (SIBIA), cloned the highly complex L-VDCC which consisted of what is known as the alpha 1 and alpha 2 subunits. It soon became obvious that a new class of drugs, the calcium channel blockers (CCB) acted by binding to the alpha 1 subunit. Schwartz collaborated with Tanabe and with Pfizer and chose the lead compounds with the help of their medicinal chemists. He is credited with developing the drugs DILTIAZEM and AMLODIPINE, and presented at the FDA who approved. Diltiazem, as well as the dihydropyridines and verapamil, are still used. The CCB's, after 50 years, have saved countless lives and relieved a number of disease cardiac conditions.

In his long career, Arnie has won many awards: A D.Sc. received in 1988 from the Arnold and Marie Schwartz College of Pharmacy; an honorary M.D. degree from the Albert Szent-Gyorgy College of Medicine in 2006; The Samuel Kaplan, MD Visionary Award from the AHA; The Ohio Affiliate AHA Research Merit Award; the Otto Krayer Distinguished Award in Pharmacology, in 1988 from ASPET; The Ariens Receptor Award from the Dutch Pharmacological Society for Receptor Pharmacology in 1994; the Distinguished Investigator Award, awarded in 1995 from the American College of Clinical Pharmacology; the Chauncey Depew Leake Pharmacology Award in 2009 from OSU; The final four AHA Distinguished Scientist Research Award, in 2010; and the Most Dramatic Scientist Award, known as the ARNIE award from the AHA Basic CV Council, in 2012.

Despite the research and the honors, his first love is teaching medical students. He hopes someday soon that he will be asked to reenter the teaching program at the University of Cincinnati.

## 35. Bohuslav Ostadal: Prague, Czech Republic



Dr. Bohuslav Ostadal, MD, DSc, was born on January 28, 1940. His university education started in 1957 at the Faculty of Pediatric Medicine of the Charles University in Prague where he graduated in 1963. Since the very beginning, Ostadal´s main area of research has been focused on the ontogenetic development of heart structure and function. Already his early experimental studies on developing myocardial blood supply belong to landmark papers in the field that achieved well-deserved attention.

His laboratory was among the first to demonstrate the important ontogenetic differences in cardiac sensitivity to various pharmacological agents. In a series of papers he investigated developmental changes in myocardial responses to acute oxygen deprivation, mechanisms of increased ischemic tolerance of the immature heart, and protective effects of preconditioning and chronic hypoxia. He has also been deeply concerned with late cardiovascular consequences of risk factors acting during early phases of ontogenetic development, the phenomenon known as fetal programming. Recently, he became particularly interested in differences of ischemic tolerance between hearts of males and females, the topic which appears to gain increasing attention of both experimental and clinical cardiologists. His group described for the first time (already in 1984) that the female myocardium is more tolerant to oxygen deprivation as compared with males. He published more than 280 scientific papers, 2 books and was editor of 6 monographs.

Ošťádal also became deeply involved in the organization of cardiovascular research and education on both national and international scale. He was among founding members of the Committee of Experimental Cardiology which has organized annual scientific meetings of Czech and Slovak researchers and clinicians continuously since 1972. In the early period of transformation after 1989, he served for five years as a director of the Institute of Physiology, Academy of Sciences of the Czech Republic. In 2000, he created Centre for Cardiovascular Research based on a project involving more than 100 researchers from several theoretical and clinical institutions in Prague. In addition, he was the President of the Executive Committee of the Postgraduate Education in Biomedicine at the Charles University in Prague and a member of several scientific boards; he is vice-president of the Czech Medical Academy. He served as the Council member of the International Society for Heart Research (1993-1998) and President of the International Academy of Cardiovascular Sciences (2015–2018). Ostadal was the main organizer of many local and international scientific conferences, the biggest one and the most successful being the World Congress of the International Society for Heart Research in 1995, which is still remembered with joy by its participants. For many years he served as the Editor-in-Chief of Physiological Research and Editor-in-Chief of Experimental and Clinical Cardiology and a member of Editorial Boards of another five journals.

He is a Fellow of the Czech Medical Academy, Czech Learned Society, International Society for Heart Research and the International Academy of Cardiovascular Sciences. Ostadal has received numerous awards and distinctions from scientific societies, e.g. Medals of Honor J.E. Purkyne (2000) and G.J. Mendel (2015) of the Czech Academy of Sciences, Libensky Medal of the Czech Society of Cardiology (2010), Memorial Medal of the Charles University in Prague (1998), Award "Nummum Academiae Memorialem Tribut" of the Slovak Academy of Sciences (2000) and Medal of Merit of the International Academy of Cardiovascular Sciences (2018).

## 36. Jeffrey Robbins: Cincinnati, USA

Dr. Jeffrey Robbins received his Ph.D. in Genetics and Development in 1976 from the University of Connecticut and is currently Professor of Pediatrics, Division Chief of Molecular Cardiovascular Biology and Executive Co-Director of the Heart Institute at Cincinnati Children's Hospital and Distinguished University Professor at the University of Cincinnati. He has continuously been funded by extramural grants since the beginning of his academic career, starting with an undergraduate award while at the University of Rochester from the Atomic Energy Commission.

After receiving his graduate degree, he took a fellowship with Dr. Jerry B. Lingrel at the University of Cincinnati, where he led the experimental team that first isolated and purified the goat globin genes. In 1978 he was recruited to the College of Medicine's Biochemistry department at the University of Missouri-Columbia as part of a group of 5 new faculty to start a molecular biochemistry initiative at the Medical School. After promotion to Associate Professor with tenure at Missouri, he was recruited back to Cincinnati in the Departments of Pharmacology and Cell Biophysics, Molecular Genetics and Biochemistry, and Molecular Physiology at the University of Cincinnati College of Medicine where he rose through the ranks to full professor. He has won a number of teaching awards, including the Golden Apple.

It was during this time that he initiated the research to define the elements necessary for cardiac specificity of the transcriptional apparatus. Success in this area led to the development of reagents that are currently used worldwide to affect the protein complement of the heart through transgenic manipulation. Dr. Robbins, along with hundreds of other scientists, has used these tools to mechanistically explore the structure-function relationships of cardiac proteins. His work has focused on understanding the behavior of both the normal contractile proteins and the mutations that cause cardiovascular disease. Recognizing the limitations of the murine models, Robbins also developed the necessary reagents needed for controlled, cardiomyocyte- and developmental stage specific expression in rabbit hearts and pioneered a series of transgenic rabbits that tested the isoform functionality of selected sarcomeric proteins.

Dr. Robbins unambiguously showed the utility of the general approach and developed a set of robust reagents that could be used by relatively inexperienced investigators to create animal models of cardiovascular disease. Dr. Robbins' work has changed the way in which we explore the basic pathology of cardiovascular disease. With well over 1200 different models being developed and published using his reagents, the work that Dr. Robbins published allowed the entire field to move forward at a pace undreamed of only 15 years ago. A contributing factor to the rapid spread of the technology was Dr. Robbins' early decision to make the reagents freely available, allowing the rapid dissemination of the needed tools, free from the confines of university intellectual property concerns. Recognizing that temporal control of mutant gene expression is as important, or even more important than organ specific expression, Robbins devoted 4 years to establishing a robust system for both temporal and organ specific cardiac transgenesis, controlled by the administration of tetracycline.

Dr. Robbins went on to use gain-of-function approaches to further his own investigations into the underlying pathologies of hypertrophic cardiomyopathy, as well as defining the structure-function relationships in a number of the contractile proteins. His recent experiments have established the importance of mutations in the intermediate filament protein desmin and the chaperone alpha B crystallin as causative for a class of cardiomyopathies, which has recently led to the startling observation that intracellular pre-amyloids appear to play an important, and possibly generalized role in cardiovascular diseases of various etiologies. He subsequently developed the concept of proteotoxicity playing an important role in cardiac disease and heart failure, opening up new therapeutic avenues in cardiovascular disease. Recognizing the potential parallels between the neurodegenerative and cardiovascular disorders, Robbins hypothesized that unfolded proteins might form in an under-recognized class of myopathies, the Desmin Related Myopathies. Robbins went on to show that protein conformation-based disease processes are important during the development of heart disease and failure and, on the basis of his early work, the study of proteasomal compromise, chaperone dysfunction and protein aggregation in the heart is now an established experimental field.

Dr. Robbins is a Fellow of the International Society of Heart Research and the American Heart Association and in 2011, he was elected a Fellow of the International Academy of Cardiovascular Sciences. He has served on and chaired numerous national research review committees for the National Institutes of Health and the American Heart Association. He currently serves on 10 Editorial Boards, is Associate Editor for a number of journals and served as Cardiovascular Section Editor for the Annual Review of Physiology for 10 years. He also serves as Senior Associate Editor for Circulation Research, which is the premier basic science journal for cardiovascular science. He has won numerous research awards and, in 2005, was the recipient of the American Heart Association's Research Achievement Award. He was chosen to Chair the National Study Panel for the American Heart Association's program for establishing centers for Stem Cell Biology in the heart, the Jon DeHaan Competition and assumed the Chairmanship of that oversight committee. In 2009 he received two prestigious awards from the University of Cincinnati; the Rieveschel Award and the Drake Medal. The next year, he received the Distinguished Research Achievement Award from the International Society for Heart Research. In 2015, he received the prestigious Louis and Artur Lucian Award for Research in Circulatory Diseases and in

2017 he received the highest award given by Cincinnati Children's Hospital, the William Procter Medallion, which the Medical Center has given its faculty only 11 times in its history, the first recipient being Albert Sabin in 1960.
Dr. Robbins has been publishing in the field of cardiovascular biology for approximately 25 years. With over 260 publications, his contributions have changed the way that basic cardiovascular research is done. Robbins' work has consistently resulted in "scalable" data. That is, the data, or reagents resulting from the data, are generally applicable to the broad field, allowing numerous investigators to use Robbins' result and apply them to their own investigations. Thus, the implications of Robbins' data have been tremendously valuable and synergistic to the broad field of cardiovascular research.

## 37. Jan Slezak: Bratislava, Slovak Republic

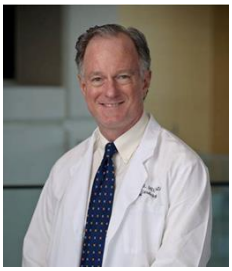
Prof. Slezak – speach to thank for Medal of Merit
Mr. President Bolli, Professors Dhalla, Ostadal, Pierce, Lopasuk, Varro.
I feel extremely honored and I thank the Executive Council Members of IACS for the great privilege to be considered and elected for this very prestigious Academy Award.
I thank also organizers of this beautiful conference for providing excellent atmosphere here.
I can tell you, I feel to be a lucky person, a lucky person in the field of private life as well as professional. I am happy, because I can still work and have excellent and reliable colleagues and coworkers.
I'm especially grateful to a few amazing people whose support is the reason I'm up here right now, people who helped me. Without their help I wouldn't be receiving this honor.
In the past I had the opportunity to work with extraordinary personalities, whether they were my teachers or mentors like my first boss - cardiac surgeon Prof. Siska, or pioneer of Electron microscopy Professor D.C. Pease from UCLA where I spent my first study stay in 1970, or a close friend Prof. Lojda – US pioneer of Histochemistry and cytochemistry, also Prof. Antal - leading physiologist, Professor Wollenberger - world known experimental cardiologist, professor Schulze, Professor Jutta Shaper, Professor Stephen Geller humble, highly intelligent superb pathologist from Mount Sinay Medical School in New York where I spent two years and later Prof. Dhalla, Prof Singal, prof. Pierce , globally renowned scientists and many other friends who have brought progress in the world of Molecular cardiology.
Finally, I'd like to thank everyone who supported me during my work — there are too many people to list.
I'm happy to be still active in different functions of Slovak Academy of Sciences in the organization of teaching and research where I had the opportunity to work with outstanding managers of science.
I would like to thank my precious wife Olga, who has been taking care of me and my family for almost 60 years and supporting me in my sometime rather weird activities. Wonder, why she is doing that.
I want to thank the International Academy of Cardiovascular Sciences and to mention its truly worldwide coverage, which became not only scientific but also educational institution. Its birth and development was the idea of extraordinary personality of altruistic Prof. Dhalla and his close co-workers. I appreciate great work the Academy does. It is pleasure to be the academy fellow and work for it.
As I said I am a fortunate man because I have friends and I know you great people and friends.
Thanks to all of you once again.

## 38. Jawahar Mehta: Little Rock, USA

Dr. Mehta received his MD degree in India and PhD in Sweden, and completed his post- graduate education in New York and Minnesota. He joined the faculty of the college of medicine of the University of Florida where he rose to be University Research Foundation professor.
He moved to Little Rock in 2000 as the first Stebbins Chair in Cardiology and Professor of Medicine and Physiology and Biophysics. He led the Division of Cardiovascular Medicine at the University of Arkansas for Medical Sciences and the affiliated Central Arkansas Veterans Affairs Medical Center. He is currently Distinguished Professor of Medicine at the UAMS. Prof Mehta is known for his work on platelet biology and thrombosis in myocardial ischemia in late 1970s and early 1980s. This seminal work led to the trials of anti-platelet drugs in cardiac patients.
Prof. Mehta's research on the biology of LOX-1, a receptor for oxidized low density lipoprotein, over the last 15 years has opened a new target for cardiovascular therapy. He has taken this work from the identification of the receptor in human coronary endothelial cells, macrophages, platelets, and cardiomyocytes; and its upregulation by mediators of atherosclerosis and tissue ischemia. With the use of LOX- 1 deletion technology, he has demonstrated limitation of atherogenesis and myocardial ischemic injury. This work has inspired a host of collaborators in the University of Washington, Thomas Jefferson University, University of Texas (Houston), University of Rome, and the University of Osaka. Dr Mehta is a major collaborator in all these projects. He has taken this work to humans and shown that LOX-1 polymorphism is associated with a heightened risk of acute myocardial infarction in man. This work has led to development of small molecules targeting LOX-1 in his laboratory, and development of biologics by major pharmaceutical companies. Initial clinical trials with the biologics are currently underway.

Prof. Mehta serves or has served on the editorial boards of several major cardiology, physiology and pharmacology journals, including Circulation, Hypertension, American Journal of Cardiology, European Heart Journal, Journal of the American College of Cardiology, and the World Journal of Cardiology. He has published over 1200 papers, abstracts and book chapters. He is a member of many prestigious academic societies, including the Association of American Physicians, American Society for Clinical Investigation and Association of University Cardiologists. Grateful patients have established a Mehta Chair in Cardiovascular Research at UAMS in his honor. Recently, a Jay and Paulette Mehta Lectureship in Internal Medicine has also been established by grateful patients.
He has received major national and international awards. Recent major awards include, the Pericle d'Oro International Prize University, Magna Graecia of Catanzaro, Italy; and the UAMS Dean's Distinguished Faculty Scholar Award in October 2015. He is listed in Marquis Who's Who in America, Who's Who in the World, Who's Who Medicine and Healthcare, and Leading Physicians of the World. As a testament to his clinical skills, Prof. Mehta was named last month among the top 26 cardiologists in the United States by Forbes magazine. Prof. Mehta has lectured in over 30 countries. He has diverse interests besides medicine, such as painting, photography, world economy and international politics. He is an Honorary Professor in the University of Rome, an Adjunct Professor in the Clinton School of Public School in Little Rock, AR, and serves as consultant to the University of Arkansas in nanotechnology and biomedical engineering.

## 39. Joseph Hill: Dallas, USA



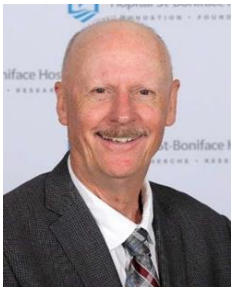
Dr. Hill is a cardiologist-scientist whose research focuses on molecular mechanisms of remodeling in the disease-stressed myocardium. He graduated with an MD, PhD from Duke University. Next, he pursued postdoctoral scientific training at the Institut Pasteur in Paris, followed by clinical training in Internal Medicine and Cardiology at the Brigham and Women's Hospital, Harvard Medical School. Dr. Hill served on the faculty of the University of Iowa for 5 years before moving in 2002 to the University of Texas Southwestern Medical Center to assume the role of Chief of Cardiology and Director of the Harry S. Moss Heart Center.
Dr. Hill's research group strives to decipher mechanisms of structural, functional, metabolic, and electrical remodeling in heart disease with an eye toward therapeutic intervention. Dr. Hill serves on numerous committees, boards, and study sections, and he lectures widely. In addition, he serves on several editorial boards, including Circulation Research: Senior Consulting Editor, American Journal of Physiology, Heart and Circulatory Physiology, and American Journal of Cardiology. He is Editor-in-Chief of the textbook Muscle: Fundamental Biology and Mechanisms of Disease. He has received numerous recognitions and awards, including election to the Association of American Professors; he recently served as President of the Association of University Cardiologists and chair of the Academic Council of the American College of Cardiology.
He received the 2018 Research Achievement Award from the ISHR, the 2020 Lucian Award from McGill University, and delivered the William Harvey Lecture this year at the European Society of Cardiology. Presently, he serves as Editor-in-Chief of Circulation. Dr. Hill maintains an active clinical practice focusing on general cardiology, heart failure, and hypertension.

## 40. Heinrich Taegtmeyer: Houston, USA

Dr. Heinrich Taegtmeyer, M.D., D.Phil. is the recipient of the 2024 Medal of Merit, which is the highest honour bestowed by the Academy for outstanding achievements in cardiovascular education and research at the IACS- North America Section meeting in Houston, USA, September, 17-19. At this meeting, he will give a talk entitled "Eats to Beat: The Essence of Cardiac Metabolism". Dr. Taegtmeyer received his Dr. med. from the University of Freiburg, Germany in 1968. His dissertation was entitled "Electrophysiological Studies on the Effects of Strong DC Impulses in the Isolated Mammalian Myocardium" and performed in the laboratory of Professor Albrecht Fleckenstein, who had discovered a new group of agents termed calcium antagonists. Dr. Taegtmeyer continued his medical training at Boston City Hospital, followed by a cardiovascular fellowship at the Peter Bent Brigham Hospital. Next, he completed his D.Phil. in metabolic research at the University of Oxford, United Kingdom, with a dissertation titled "Metabolic Activities in Rat Heart" focused on cardiac metabolism. Dr. Taegtmeyer was one of the last students to work with Professor Sir Hans A. Krebs.
Dr. Taegtmeyer has been at the University of Texas Health Science Center at Houston since 1982. His research on cardiac metabolism has received National Institutes of Health funding for >45 years and covers a wide spectrum of basic and translational research. He is the chair of the writing committee of "Assessing Cardiac Metabolism" a Scientific Statement of the American Heart Association. Many of Dr. Taegtmeyer's former trainees are now leaders in the field of metabolism. Together with his trainees, Dr. Taegtmeyer's pioneering work ahs shaped the field of cardiac metabolism and created a new understanding of the concepts of metabolic approaches to reverse myocardial dysfunction. Dr. Taegtmeyer wrote the following: "The pump action of the heart is inextricably linked to the transfer of energy from energy-providing substrates through a complex network of enzyme-catalyst reactions. For over 40 years my research addresses multiple aspects of cardiac metabolism. After my training, as a

clinical cardiologist, I acquired the skills to investigate the link between metabolism and cardiac work in the Metabolic Research Laboratory at the University of Oxford, where I obtained a PhD in Metabolism. As a committed physician- scientist, the focus of my research remains the dynamics of cardiac metabolism: Regulation of metabolic pathways in the normal and diseased heart, and emerging metabolic signals which regulate intracellular protein turnover by renewing the cardiomyocyte. The laboratory uses gain-of- function and loss-of-function models to acquire insight into metabolic determinants by which heart muscle cells renew themselves under stress.
We have extensive experience with the isolated working heart ex vivo, with surgically induced hypertrophy and atrophy in vivo with isolated cardiomyocytes in culture. 3) Our experimental work is complemented by genetically engineered animal models, heart muscle samples from patients with advanced heart failure before and after LVAD implantation, and the modeling of cardiac metabolism using a systems biology approach (CardioNet). My laboratory has received NIH funding for more than 40 years. As a discipline in biochemical research, metabolism is a "mature" science. The merger of established and very modern analytical methods, present in my lab, brings to the fore unprecedented opportunities. Our most recent work describing an oncometabolite axis of the heart encapsulates the lab's versatility and resourcefulness. However, our approaches do not fully capture the dynamics of nutrient sensing and cardiac metabolism.
The laboratory has provided evidence in support of our hypothesis that metabolic remodeling precedes, triggers and sustains remodeling of the heart. I will refer to newer developments including actionable metabolic pathways, like anaplerosis, the cycling and recycling of NADH/H+, bidirectional flux of substrates, and metabolite signals which modulate gene expression and protein turnover. Quoting the physicist-turned-biologist Max Delbruck: "The horizon of biology is endless." (Max Delbruck, Annals Conn Acad Sci 1949)."

## 41. Grant Pierce: Winnipeg, Canada



Grant N. Pierce received his undergraduate degree from Lakehead University in Thunder Bay, Canada before being awarded his MSc from Dalhousie University in Halifax, Canada under the directions of Drs Angelo Belcastro and Arend Bonen. He received his PhD from the Department of Physiology at the University of Manitoba under the supervision of Dr. Naranjan Dhalla. After postdoctoral studies at UCLA under the mentorship of Drs. Ken Philipson and Glenn Langer, he returned to the University of Manitoba to assume a faculty position in Medicine and the Department of Physiology where he ultimately became a Distinguished Professor. Along that journey, Dr Pierce was one of 5 Professors who together created the Albrechtsen Research Centre at St Boniface Hospital in Winnipeg, Canada. It became a world class research home for Dr Pierce for the next 38 years. For 15 of those years, Dr. Pierce served as its Executive Director of Research.
There he established the Canadian Centre for Agri-food Research in Health and Medicine (CCARM) which has become an internationally recognized resource in nutraceutical and functional food research excellence for both basic science and clinical trials. He also established the RBC Youth BioLab in the Research Centre, a one-of- a-kind lab for children who visit daily throughout the year to carry out educational experiments in biology. Dr. Pierce is currently a Distinguished Emeritus Professor at the University of Manitoba.

**B. Research Accomplishments**

Dr. Pierce has been highly productive over his career with 300+ published research papers, over 260 of these were peer reviewed in some of the top cardiovascular (CV), nutritional, biochemistry & cell biology journals including Circulation Research, the Journal of Molecular and Cellular Cardiology, Cardiovascular Research, the American Journal of Physiology, the Journal of Biological Chemistry, the Journal of Cell Biology, the Journal of Nutrition, the Proceedings of the National Academy of Sciences USA, Pharmacology Reviews, and many others. He has authored or edited 8 textbooks. He has >11,500 citations, a Google Scholar H-index of 67 and an i10-index of 208. Dr. Pierce has produced many seminal research findings during his career.
These include (in chronological order):
1) Pioneered research in the identification of a diabetic cardiomyopathy when this concept was not accepted in the late 1970's/early 80's. It is now a well-accepted concept with clinical implications.
2) Pioneered research into the mechanism responsible for ischemic/reperfusion (I/R) injury in the heart. One of three labs in the world that initially proved that the involvement of a Na/H and Na/Ca exchange cascade is critical for I/R injury.
3) First to show a cause-and-effect relationship between Chlamydia pneumonia infection and atherosclerosis.
4) Currently a leader in the health-related benefits of natural health products. He has provided seminal data on the beneficial cardiovascular actions of dietary flaxseed.
5) Dr. Pierce pioneered the measurement of nuclear protein import in cardiovascular cells and how it can adapt to changing physical and chemical conditions inside and outside of the cell. This transport across the nuclear membrane is important because it effectively regulates gene transcription and

translation and it may be critically involved in pathogenic situations. It is, therefore, a novel target for therapeutic interventions in the future.
6) Dr. Pierce, in collaboration with Drs. Pavel & Elena Dibrov, discovered a novel antibiotic compound that targets bacterial energy metabolism, the first novel antibiotic platform in half a century. This compound has the potential to avoid the challenge of multi-drug resistance exhibited by most bacteria today.
Dr. Pierce has been the Primary Supervisor for 25 PhD & MSc students, as well as 17 postdocs and visiting scientists who have gone on to successful careers and leadership roles as University Professors, Department Chairs, Clinicians and Surgeons, Clinical Directors, Research Directors, Clinical Research Scientists, Senior Managers in the pharmaceutical industry, Project Managers, Technology Transfer Managers, Physician Assistants, Clinical Physiotherapists, Directors of Regulatory Affairs, Health Canada Senior Compliance Officers, Research Facilitators, medical students and postdoctoral fellows in Canada, France, Germany, Japan, Cuba, Argentina and the USA. His postdoctoral fellows have gone on to successful faculty positions in Canada, Japan, France, Lebanon and the Czech Republic, positions in industry and many have become physicians.

**C. Service**

Dr. Pierce was the longest serving Editor that the Canadian Journal of Physiology and Pharmacology has ever had since its inception in 1964. He was the Assistant/Associate Editor of Molecular and Cellular Biochemistry for over 30 years. He has been a member of Editorial Boards for Circulation Research, Journal of Molecular and Cellular Cardiology, American Journal of Physiology:Heart and Circulatory Physiology, and the Canadian Journal of Cardiology, amongst others. Dr. Pierce has served as an elected member of the Executive Council for the North American Section of the International Society for Heart Research, President of the North American Section of the International Academy of Cardiovascular Sciences and is its current World President. Dr. Pierce has been involved in the organization of more than 90 international meetings and been an invited speaker on his own data at over 200 national and international conferences as well as 175 University & public forums. Dr. Pierce served as a member, Vice Chair or Chairperson of 90 different grant review panels all over the globe. For three years, he was Chair of the Executive Review Committee for the Heart and Stroke Foundation of Canada where he oversaw all peer review.

**D. Awards and Distinctions**

Dr. Pierce's research has brought garnered over 100 personal awards and distinctions from 9 different countries. Several deserve attention here. Dr Pierce was an elected Fellow of the American College of Cardiology, the American Heart Association, the American Physiological Society, the International Society for Heart Research, the International Academy of Cardiovascular Sciences, the Canadian Academy of Health Sciences, and the Royal Society of Medicine (London). Dr. Pierce was inducted as a Fellow into the Royal Society of Canada. Induction into the Royal Society of Canada "represents Canadian scholars, artists, and scientists, peer-elected as the best in their field… from all branches of learning who have made remarkable contributions in the arts, the humanities and the sciences, as well as in Canadian public life." Dr. Pierce received the Queen Elizabeth II Diamond Jubilee Medal from the Government of Canada and the 2016 Research Canada Leadership Award. Dr. Pierce was invested with the Order of Manitoba, the Province of Manitoba's highest honour which recognizes citizens who have achieved excellence thereby enriching the social, cultural or economic well-being of the province. In 2023, he received the Order of Canada, the highest distinction for a citizen in Canada. Presented by the governor general, it recognizes "outstanding achievement, dedication to the community and service to the nation of Canada".