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Education

1973-1977	B.S., Botany, National Taiwan University, Taiwan
1978-1980	M.S., Plant Physiology, National Taiwan University, Taiwan
1982-1988	Ph.D., Biology, University of Houston, U.S.A.

Research and Professional Positions Held in Chronological Sequence

1989-1991	Research Fellow, Department of Biochemistry and Molecular Biology, University of Texas Medical School at Houston, U.S.A.
1991-1994	Research Fellow, Department of Nutrition, Harvard School of Public Health, U.S.A.
1995-1999	Research Associate, Cardiovascular Biology Laboratory, Harvard School of Public Health, U.S.A.
2000-2004	Instructor in Medicine, Department of Medicine, Harvard Medical School and Brigham and Women's Hospital, U.S.A.
2004-2007	Assistant Professor of Medicine, Department of Medicine, Harvard Medical School and Brigham and Women's Hospital, U.S.A.
2007-2008	Associate Investigator, Cardiovascular and Blood Medical Research Center, National Health Research Institutes (NHRI), Taiwan
2008-2011	Associate Investigator, Institute of Cellular and System Medicine (ICSM), NHRI, Taiwan
2012-present	Investigator, ICSM, NHRI, Taiwan
2012-2014	Acting Director, ICSM, NHRI, Taiwan
2014-2016	Deputy Director, ICSM, NHRI, Taiwan
2016-2017	Acting Director, ICSM, NHRI, Taiwan
2017-present	Director, ICSM, NHRI, Taiwan

Research Interests

1. Oxidative stress associated pathophysiology in cardiovascular system
2. Phenotypic modulation of vascular smooth muscle cells in vascular disease
3. Stem cell biology and regenerative medicine

I have a long-standing interest in cardiovascular diseases. Vascular diseases including atherosclerosis, restenosis, and aneurysm are associated with reactive oxygen species-induced injury and inflammation. In response to pathological stress, intrinsic defense mechanisms of the body are critical in protecting tissues from injury. Heme oxygenase-1 (HO-1) is induced in response to various pathological stimuli to serve a cytoprotective function. A research focus of my laboratory

is to investigate the role of HO-1 in cardiovascular homeostasis. By gain- and loss-of-function experiments, we and others have demonstrated a critical role of HO-1 in protecting against myocardial infarction and atherosclerosis. We further showed an essential role of HO-1 in suppressing the pathogenesis of aortic aneurysm. In addition to protective roles in cardiovascular system, we identified a previously unrecognized function of HO-1 in regulating embryonic stem cell maintenance and differentiation, particularly mesodermal smooth muscle cells. Pluripotent stem cells (PSCs), including embryonic and induced pluripotent stem cells, can self-renew and proliferate indefinitely and differentiate into cells of all three germ layers. Therefore, PSCs are attractive sources for regenerative purposes. We are interested in using PSCs in tissue engineering to develop innovative alternative therapeutic strategy for tissue revascularization and regenerative medicine.

A significant and related portion of my research is on vascular smooth muscle cell (VSMC) biology. In response to arterial wall injury, VSMCs in the blood vessel wall dedifferentiate, migrate, and proliferate leading to lesion formation and occlusive vascular disease. Understanding the regulation and function of genes expressed in VSMCs will provide insights into the mechanisms of VSMC-specific expression and phenotypic modulation. My laboratory has been investigating the regulation of cysteine-rich protein 2 in VSMCs and its role in vascular disease. We have recently identified a crucial role of cysteine-rich protein 2 in abdominal aortic aneurysm. In addition, metabolic aberrations and their downstream effects contribute to the pathogenesis of many disorders. Various metabolites, such as glucose, lipids, amino acids, etc., and their metabolic intermediates and byproducts participate in cellular bioenergetics. As such, a recent interest is to investigate the effect of metabolomic changes of blood vessels in vascular disease. A novel protective function of an endogenous tryptophan metabolite, 5-methoxytryptophan, was identified in vascular injury.

Major Honors and Awards

2001-2003 American Diabetes Association Research Award
2001-2003 American Heart Association National Grant-in-Aid Award