

香港大學心臟血管研究所

THE INSTITUTE OF CARDIOVASCULAR
SCIENCE AND MEDICINE



2006 Annual Report

Mission Statement of the Institute of Cardiovascular Science and Medicine

The Institute of Cardiovascular Science and Medicine (ICSM) commits itself to strive for excellence in research, teaching and training in cardiovascular sciences which contributes to the prevention and patient management of cardiovascular diseases in Hong Kong.

We shall offer the highest standards of teaching research and scholarship in an interactive environment conducive to creativity, to innovative learning and to freedom of thought, enquiry and expression in all aspects of cardiovascular sciences.

We shall continue to undertake research, teaching and other forms of service in clinical and basic cardiovascular sciences which will advance our quest for wisdom, truth and excellence in biomedical science at large.

We shall make known the mission of this Institute in Hong Kong and internationally

Governance

Council

The members of the Institute elect a Council, who are responsible for carrying out the work of the Institute according to its Mission, Objectives, By-Laws and Regulations. The Council consists of the Officers, the immediate Former Director (if available), and three to ten Council Members. The Officers of the Institute are the Director, Deputy Director, Honorary Secretary and Honorary Treasurer. Each Council serves the Institute for a period of two years. The Fifth Council of the Institute was elected at the 9th Annual General Meeting on 3rd December 2005 and one member was subsequently co-opted in 2005.

Fifth Council of the ICSM (December 2005)

Director:	Professor T.M. Wong	Council	Dr. H.J. Ballard
Deputy		Members:	Professor B.M.Y. Cheung
Director:	Professor H.F. Tse		Professor Y. Huang
Honorary			Professor C.P. Lau
Secretary:	Dr. M.L. Fung		Dr. K.L.F. Lee
Honorary			Dr. G.P.H. Leung
Treasurer:	Professor S.S.M. Chung		Professor R.Y.K. Man
			Professor P.M. Vanhoutte

Membership Sub-Committee of the Council

Dr. H.J. Ballard Professor B.M.Y. Cheung Dr. M.L. Fung

Membership

At the end of the year 2006, membership stood at 120, and consisted of 11 Founding Members, 48 Full Members, 10 Associate members and 51 Affiliate Members.

Criteria for membership

Clinicians, scientists, researchers and students with an interest in the cardiovascular field are invited to become members of the Institute. The classes of membership open to applicants are Full, Associate or Affiliate Membership.

All applicants for admission shall

1. Be at least 18 years of age; and
2. Be of good character and repute; and
3. Undertake in writing to adhere to the By-Laws of the Institute, as amended from time to time.

Applicants for admission as a Full Member shall also

1. Be a full time or honorary teacher (Assistant Professor, Honorary Clinical Lecturer or above) of the University of Hong Kong or be deemed to be holding an equivalent position; and
2. Be engaged in research in cardiovascular science or cardiovascular medicine, as evidenced by his or her published works.

Applicants for admission as Associates shall also

1. Possess either a medical degree (MBBS or equivalent) plus a higher qualification (MRCP or equivalent), or a doctorate (PhD or equivalent) in science; and
2. Be engaged in research in cardiovascular science or cardiovascular medicine.

Applicants for admission as Affiliates shall also

1. Possess a University degree or equivalent in medicine, nursing or science; and
2. Be engaged in or have a strong interest in cardiovascular research.

Applications for membership, accompanied by the appropriate supporting documents (eg. resume, list of relevant publications, copies of certificates) should be submitted to the Honorary Secretary, to whom membership enquiries may also be addressed. The application form may be obtained by writing or e-mailing (icsm@hkucc.hku.hk) to the Honorary Secretary, or it may be downloaded from the membership section of our website (<http://www.icsm-hk.org>)

Research Activities of the ICSM

Organisation of Research

The Institute of Cardiovascular Science and Medicine aims to achieve academic and research excellence in cardiovascular sciences and medicine which contributes to the prevention and patient management of cardiovascular diseases through an interactive environment conducive to integrative teamwork and multidisciplinary approach to research. The research themes for our research are organized into four major projects, namely Epidemiology & Genetics, Atherosclerosis, Inflammation & Thrombosis, Novel Therapies, and Complications. The Epidemiology & Genetics group will evaluate cardiovascular risk factors in the Chinese population, predict trends in cardiovascular diseases, and identify genetic markers for susceptibility to cardiovascular diseases. The Atherosclerosis, Inflammation & Thrombosis group study the pathogenesis of vascular disease, particularly whether homocysteinaemia, inflammatory markers such as CRP or adrenomedullin are suitable targets for treatment and prevention of atherosclerosis. The Novel Therapies group is the only team in Hong Kong that is already developing stem cell transplantation for humans. Their focus is the regeneration of normal heart muscles, neurons and blood vessels in areas damaged as the result of atherosclerotic disease. The “Complications” team comprises two research groups: the Hypoxia & Ischaemia group are characterising the responses and adaptations of various organs to hypoxia or ischaemia, with the particular aim of exploiting preconditioning to induce some degree of protection against target organ damage in vascular disease, whilst the Arrhythmia & Heart Failure team are actively developing new treatments for these conditions, which commonly occur in patients with vascular disease, and which carry a very high mortality.

Epidemiology & Genetics: Cardiovascular Risk Factors

Co-ordinator Professor B.M.Y. Cheung

Key team members Stephen WK Cheng, BMY Cheung, YF Cheung, TH Lam, Sidney CW Tam.

Outline: There is a shortage of prospective data on cardiovascular risk factors in Chinese populations. Our group are engaged in epidemiological studies involving thousands of subjects, which are representative, because of random sampling, and prospective, entailing a long open-ended follow up period. Clinical information will be obtained and DNA stored for future nested case control studies after 5-10 years of follow-up. Sub-samples of the subjects and the stored DNA and plasma will be used immediately for the investigation of genetic markers for diabetes and hypertension. Within the research team for this project, we have expertise in clinical, epidemiological, genetic, molecular, cellular and pharmacological research to facilitate the various aspects of the programme.

Epidemiology. We are examining the prevalence of risk factors in Hong Kong Chinese men and women, including hypertension, diabetes, hypercholesterolaemia, obesity and smoking, and how these change over time. The trends in the risk factors can be used to guide public health policy. Other projects include both retrospective and long-term prospective studies to investigate the effects of perinatal influences on cardiovascular risk factor development in adult life and the cardiovascular risk factors of peripheral vascular diseases, whilst a separate study focuses specifically on genes, lifestyle and diseases in Chinese elderly in Hong Kong.

Genetics: DNA collected in the large epidemiological studies can be used in the investigation of genetic markers for susceptibility to diseases such as diabetes and hypertension using the candidate gene approach and data from the prospective studies.

Pathogenesis: Atherosclerosis, Inflammation and Thrombosis

Co-ordinator Professor Ricky Y.K.Man

Key team members JP Bourreau, BMY Cheung, HF Tse, SCF Tam, F Tang

There is mounting evidence that inflammation plays a role in the pathogenesis of atherosclerosis. Small increases in serum levels of C-reactive protein (CRP), a marker of systemic inflammation, are associated with increased risk of ischaemic heart disease, and serum CRP level is an independent risk factor for cardiovascular disease. The underlying mechanisms of the inflammatory responses in atherosclerosis and diabetic vascular complications are not clear. This is an important area of research as a better understanding of these mechanisms may help to design novel therapeutic approaches. Adrenomedullin is a peptide that acts as a local autocrine and/or paracrine vasoactive hormone, and it has vasodilator and blood pressure lowering properties. It may also play a role in mediating inflammatory responses. Plasma concentration of adrenomedullin is elevated in patients with cardiovascular disease, in inflammatory states and septic shock, and in diabetic patients with complications. Platelet aggregation and thrombosis also play a crucial role in acute coronary syndromes, and studies are underway to evaluate the combination of anti-platelet and anti-thrombin therapy in these patients.

Novel Therapies: Stem Cell Transplantation and Traditional Chinese Medicine

Co-ordinator Professor H.F. Tse

Key team members SWK Cheung, CP Lau, GR Li

Stem Cell Transplantation

Outline: Coronary atherosclerotic disease and stroke is a major cause of morbidity and mortality in industrialized nations. Sudden blockage of coronary and cerebral arteries can cause heart attack, which may be complicated by shock, chronic heart failure, strokes, and/or sudden death. Despite advances in drug therapy and catheter-based intervention, which are targeted toward opening of the blocked arteries and restoration of normal blood flow to the heart muscles and brain, a significant number of cases continue to result in loss of normal heart function and cerebral function. Loss of heart muscles results in heart failure, and in the most severe form, the patients have survival less than 1 year. Loss of brain function results in impairment of motor and sensory function. Drug treatment remains palliative, and heart transplantation is limited by the availability of donors. Regenerating normal myocardium, neurons and blood vessels is conceptually an attractive way to restore normal function to the damaged heart or brain. Our research group contains the only team in Hong Kong that is already developing stem cell transplantation for humans.

Traditional Chinese Medicine

Outline: There is an enormous, and presently under-exploited, potential for the use of Chinese medicinal drugs as an adjunct to, or replacement for, western medical approaches. These substances are very attractive to consumers, because of their natural origins, but a proper scientific approach to the investigation and validation of their properties is essential. Hong Kong, with its East-meets-West culture has a great advantage over both western and mainland Chinese Universities in this area, and the ICSM is

excellently placed to carry out a research programme: our group includes cardiologists, cardiovascular physiologists and cardiovascular pharmacologists, who are already very active in this area, and who have long-standing research collaborations on the topic with groups in the mainland.

Complications

Pathogenesis of Complications: Hypoxia and Ischaemia

Co-ordinator Professor T.M. Wong

Key team members HJ Ballard, JP Bourreau, YF Cheung, ML Fung, GR Li, F Tang

Outline: When an organ is subjected to hypoxia/ischaemia, it initiates a series of responses, some of which serve to protect the tissue against hypoxic/ischaemic damages, while others exacerbate the damages. Our goal is to identify the beneficial responses, and develop strategies to enhance them, and determine the deleterious responses so that we can develop means to negate them. We put particular emphasis on the heart and the brain as the incidence of ischemic heart diseases and stroke is increasing in Hong Kong and China. We are involved in characterising the responses and adaptations to acute or chronic hypoxia, and in the investigation of the phenomenon of the protection or pre-conditioning, which is particularly pronounced in the heart. Understanding of the compensatory responses and mechanisms of preconditioning will enable us to design better strategies in the prevention and treatment of diseases/disorders arising from hypoxia/ischaemia. The role of free radicals as intermediaries of hypoxic ischaemic injury is also under investigation.

Treatment of Complications: Arrhythmia and Heart Failure

Co-ordinator Professor C.P. Lau

Key team members HW Chan, K Fan, CP Lau, KLF Lee, GR Li, HF Tse

Outline: Coronary artery disease may result in a number of cardiac complications, including arrhythmia and heart failure. Heart failure is responsible for 20% of all mortality in Hong Kong, and the incidence of heart failure is increasing. Many cases of death from heart failure are sudden, usually related to the occurrence of cardiac arrhythmias. The Arrhythmia Service of the Cardiology Division of Queen Mary Hospital, the University of Hong Kong, is the most internationally recognized cardiac arrhythmia centre in Asia. We have an excellent track record of genetic, molecular, cellular, epidemiology and clinical research in heart failure and arrhythmias. Members of our research group are international authorities and pioneers in using pacing and ablation for atrial fibrillation, the use of catheter based cooling energy (cryoablation) for the ablation of focal atrial fibrillation, animal and cell model for anti-arrhythmic drug development, electronic cardiac signal processing during arrhythmia (patent pending), reverse cardiac remodelling after cardiac resynchronisation etc. Our group will develop new ablative device technology.

Scientific Meetings

The Tenth Anniversary Scientific Meeting: A Decade of Advances in Cardiovascular Science and Medicine

The Tenth Anniversary Scientific Meeting was successfully held at the Hong Kong Convention and Exhibition Centre on December 9th and 10th 2006. Co-chairmen of the Meeting were Prof SSM Chung, Prof BMY Cheung. The scientific programme comprised three "Tenth Anniversary plenary lectures" and five symposia focusing on "Cardioprotection"; "Endothelium", "How atherosclerosis affects blood vessels", "Stem cells" and "New advances in clinical cardiology" and two special lunch symposia on "Heart failure treatment" and "Cardiovascular safety of COX-2 specific inhibitor". At the Opening Ceremony, Prof G Tang, the President of the Hong Kong Academia of Medicine and Prof P Tam, the Pro-Vice Chancellor of the University of Hong Kong were invited to give the opening remarks and speech. The plenary lectures were delivered by founding members, Prof CP Lau, Prof ED Janus and Prof DCY Kwan. For the symposia, invited talks were delivered by our overseas speakers: Prof TF Luscher from the University Hospital Zurich, Switzerland; Prof DD Ku from the University of Alabama, USA, Prof S Moncada from the University College of London, UK, Prof RA Cohen from Boston University School of Medicine, USA, Dr. RA Li from the University of California, Davis, USA, Prof YA Ding from Taipei Veterans General Hospital, Taiwan, and also by our local faculty members, Dr C Chan, Prof GW He, Drs V Kwok and K Lee, and Profs HC Lee, HF Tse, PM Vanhoutte and XQ Yao. Seven chaired oral and twenty poster presentations were held on the Sunday morning, from which six best presentations were selected for the Best Paper Award supported by the Dr Sun Chieh Yeh Heart Foundation. On behalf the oversea and local justicators, Dr BMY Cheung praised the very high-level performance of the presentations and the awards to the best three oral and three poster presenters, were delivered respectively by Prof TM Wong. The Meeting concluded with a closing remark from the ICSM Director. The meeting was very well received and attracted about 120 registrants, and 60 abstracts were submitted and accepted for publication in the Journal of the Hong Kong College of Cardiology.

International Collaboration

The ICSM was invited by the International Society for Heart Research – Australasian Section to co-organizing a Symposium on “Stem cells” at their Annual Meeting held on 4-7 August 2006 in Canberra. ICSM members Prof. T.M. Wong and Prof. P.M. Vanhoutte were also invited to represent the Institute for delivering lectures at the Meeting.

The ICSM joined efforts with the Shanghai Institute of Hypertension in Shanghai and the Ruijin Hospital, Shanghai Jiao Tong University School of Medicine (Shanghai) in organizing the 21st Meeting of the International Society of Hypertension Satellite Symposium – Vascular Structure and Function on 12-14 October 2006 in Shanghai. ICSM members Prof. T.M. Wong and Prof. B.M.Y. Cheung representing the Institute were invited to deliver lectures at the Symposium.

The ICSM has also been working closely with the Research Centre of Heart, Brain, Hormone and Healthy Aging of the Faculty of Medicine, HKU on research in areas related to cardiovascular science and medicine, geriatric medicine and diabetes, vascular biology, and regenerative biology and medicine.

Research grants awarded by the RGC in 2006 to members of the ICSM

Principal/Co Investigator	Institution	Project Title	Award (HK\$)
Prof RYK Man (PI)	HKU	Gender differences in the regulation of endothelium-dependent contracting factor.	932,500
Prof. HF Tse (PI)	HKU	Genetic enrichment of cardiac derivatives from human embryonic stem cells and their bioengineering for cell-based heart therapies	1,154,500
Prof. PM Vanhoutte (PI)	HKU	Genomic and proteomic basis of endothelial dysfunction in regenerated endothelium	954,500
Dr. ML Fung (PI)	HKU	Renin-angiotensin system in the carotid body: its expression and functional implications in intermittent hypoxia	654,500

Meeting our Targets

Aims for 2006

Our goals were to further enhance the breadth and depth of the research collaboration with other research groups, by bringing together researchers in cardiovascular science and medicine, and actively promote collaboration between its members. ICSM members continuously obtained the award of research grants and published research papers in top international journals. Members have been actively participating and involved in the research activities in the HKU strategic research theme, namely the Heart, Brain, Hormone and Healthy Ageing (HBHA). Last but not least, collaborative links were further expanded to other groups researching in areas related to cardiovascular science and medicine. The ICSM had Joint symposia with the ISHR and the Shanghai Institute of Hypertension. All of these objectives were fully achieved during 2006.

Aims for 2007

International collaborations

The ICSM has also been actively seeking international links for new research collaborations, joint scientific meetings so as to promote research activities and to further increase the visibility of the ICSM internationally, for example, by strengthening collaborations with the International Society for Heart Research; also collaborations among colleagues in Australia, Mainland, Taiwan, Japan, Europe and the north American for such.

Collaborations with other research groups

The major mortality and morbidity in the ageing population is attributable to cardiovascular disease, whilst diabetes is associated with accelerated atherosclerosis. Heart disease, peripheral vascular disease and stroke are the major causes of death in diabetic patients over the age of 50: diabetes doubles the probability of stroke and increases the probability of myocardial infarction by 3-5 times. We aim to strengthen our links with the HBHA research centre and research groups working on geriatric medicine and diabetes, vascular biology, and regenerative biology and medicine so as to further increase our research contribution in these areas.

ICSM Publications in 2006

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