

SEPTEMBER 2015 HONG KONG COLLEGE OF PHYSICIANS

SYNAPSE

RESTRICTED TO MEMBERS ONLY



Photographer
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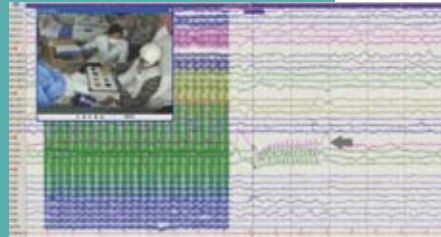
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Submission of dissertation abstract

At its 283rd Meeting of 28 April 2015, the Council decided that oral or poster presentation at conference was not equivalent to publication of a full paper. The presentation of the research findings at international conferences may be considered as part of the process of preparation and refinement of dissertations. Thus, the College allows Higher Physician trainees to submit their dissertation abstracts to overseas conferences. However, the College reiterated that published full paper was not acceptable as dissertation for the purpose of the Exit Assessment.

Prof Li Kam Tao Philip
Chairman
Education and Accreditation Committee

HKCP Annual General Meeting 2015

The HKCP Annual Scientific Meeting will be held on the 17 – 18 October 2015 at the HKAM Jockey Club Building. The Annual General Meeting will be held at 6 pm on 17 October 2015 at the same venue. The flyers with details of the programme have been sent out.

Congratulations

The Council wish to extend heartiest congratulations to our Fellows !

New elected Fellows of the Royal College of Physicians, London (2015)

- Dr Tsang Tak Yin Owen**, Department of Medicine & Geriatrics, Princess Margaret Hospital
- Dr Chan Kwok Keung**, Department of Medicine, Pamela Youde Nethersole Eastern Hospital
- Dr Ng Ping Wing**, Department of Medicine & Geriatrics, United Christian Hospital
- Dr Loo Ching Kong**, Integrated Medical Service, Kwong Wah Hospital/TWGHs Wong Tai Sin Hospital
- Dr Hui Edwin Pun**, Department of Clinical Oncology, Prince of Wales Hospital, Shatin, New Territories
- Dr Chan Kin Wing**, Department of Medicine, North District Hospital
- Dr Fong Chung Yan**, Neurology, HK Sanatorium & Hospital
- Dr Lee Ka Fai**, Endocrinology and Diabetes Mellitus, Kwong Wah Hospital
- Dr Leung Kwok Fai**, Cardiology, United Christian Hospital
- Dr Li Ho Lun Terrance**, Neurology, St Teresa's Hospital
- Dr Kong Ming Hei, Bernard**, Geriatric Medicine, Pamela Youde Nethersole Eastern Hospital
- Dr Wong Raymond Wai-man**, Gastroenterology, Hang Lung Centre

New elected Fellows of the Royal College of Physicians, Edinburgh (2015)

- Dr Ho Wan Sze, Wency**, Department of Medicine & Therapeutics, Prince of Wales Hospital
- Dr Lee Pui Wai, Alex**, Department of Medicine & Therapeutics, Prince of Wales Hospital
- Dr Li Tat Wing, Francis**, HK GI Endoscopy & Liver Healthcare Centre
- Dr Lo Hok King, Stanley**, Department of Medicine, Pamela Youde Nethersole Eastern Hospital
- Dr Lui Hiu Tung, Colin**, Department of Medicine, Tseung Kwan O Hospital
- Prof Mok Shu Kam, Tony**, Department of Clinical Oncology, Prince of Wales Hospital
- Dr Ng Man Fai**, Department of Medicine & Geriatrics, Tuen Mun Hospital
- Dr Tang Siu Fai**, Department of Pathology, Hong Kong Sanatorium & Hospital
- Dr Tso Yuk Keung, Eugene**, Department of Medicine & Geriatrics, United Christian Hospital
- Dr Wong King Ying**, Department of TB & Chest, Wong Tai Sin Hospital
- Dr Wong Wai Lun, Warren**, St Teresa's Hospital
- Dr Wu Eugene Brian**, Department of Medicine & Therapeutics, Prince of Wales Hospital
- Dr Yan Ping Yen Bryan**, Department of Medicine & Therapeutics, Prince of Wales Hospital
- Dr Yung Chun Yu**, Department of Medicine & Geriatrics, Tuen Mun Hospital

Hong Kong College of Physicians' Young Investigator Research Grant - *Selected Reports*

The Hong Kong College of Physicians established a Young Investigator Research Grant to encourage young members and Fellows of the College who are aged 40 years or below to conduct research in Hong Kong.

Up to five Grants of up to HK\$50000 are awarded annually. A total of 19 grants have been awarded since 2012. Invitation for applications will be announced around April-May each year on the College website.

After completion of the research project, successful applicants shall submit a report to the College. Such reports from previously successful recipients of the Award are published below.

Research Grant Project 2012

Hong Kong Spinocerebellar Ataxia Registry

Dr Chan Yin Yan Anne
Department of Medicine & Therapeutics
Prince of Wales Hospital

The prevalence of spinocerebellar ataxia for Spinocerebellar ataxia (SCA) over the world is around 3-5/100000. SCA 1, 2, 3 and 6 are the most common, autosomal dominantly inherited cerebellar degenerations. An epidemiological study in Chinese population showed that the most common SCA is SCA3. The frequency of SCA 3, SCA 2 and SCA 1 among Chinese SCA patients are 72.5%, 12% and 7% respectively.

In this study, patients were recruited from Hong Kong Spinocerebellar Ataxia Association and Department of Health. After obtaining informed consent, 62 patients were screened, of which 33 were recruited with genetically confirmed SCA 1, 2, 3 or 6. The prevalence of SCA 3, SCA 6, SCA 2 and SCA 1 were 79%, 12%, 6% and 3% respectively in this study. The time of onset was 35.2 years of age and the disease progressed from moderate to severe disability within 10 years.

SCA 3 is the most common autosomal dominantly inherited cerebellar degeneration among SCA 1,2,3 and 6 in Hong Kong. A validated assessment "Scale for Assessment and Rating of Ataxia (SARA)" is useful to document the disease severity while functional assessment by 9-hole pegboard test (9HPT) and timed 25 feet walk (T25FW) test are useful to represent upper and lower body function respectively. Moreover, abnormal ophthalmological findings are not uncommon as most of the SCA patients suffered from gaze evoked nystagmus, impaired saccades, broken up smooth pursuit, square wave jerks on fixation and ophthalmoparesis.

The limitation for our study was relatively small sample size and there was no subsequent follow up.

Research Grant Project 2013

Effects of collateral circulation on the hemodynamic flow status in intracranial artery stenosis as depicted by computational fluid dynamics model

Dr Fan Sin Ying Florence
Department of Medicine & Therapeutics
Prince of Wales Hospital

In Chinese, the majority of cases of ischemic stroke are due to intracranial atherosclerotic steno-occlusive disease (ICAS). In recent years, emerging evidence showed that the degree of arterial stenosis may not be the only factor governing stroke risk. Other factors, particularly those that impact on the hemodynamics across ICAS, including the degree of collateralization and plaque morphology, may play a role. For years, digital subtraction angiography (DSA) is regarded as the gold standard for anatomical assessment of cerebral collateral circulation. Yet it is invasive and offers limited functional assessment on cerebral blood flow status across the stenosed vessel or the effects of collateral circulation on the hemodynamic status across the culprit lesion. Computational fluid dynamics (CFD) is a novel technique developed to solve and analyze problems involving fluid flow. It is computed based on advanced mathematical equations and algorithms. CFD modeling of intracranial arteries provides virtual assessment on the hemodynamic parameters, including pressure difference, shear strain rate, wall shear stress and velocities, in the stenosed vessel. The model can be computed using source images from various vascular imaging modalities, including DSA and computed tomographic angiography (CTA).

In this study, we explored the correlation between hemodynamic flow status across intracranial artery stenosis depicted by CFD technique based on CTA images and the qualitative grading of collateral circulation as evident on DSA. We recruited 52 transient ischemic attack or ischemic stroke patients aged between 18-80 from the neurovascular intervention registry in the Division of Neurology, Department of Medicine and Therapeutics, Prince of Wales Hospital from November 2006 to June 2013. They underwent both CTA and DSA as part of a comprehensive vascular workup for stroke aetiology. All of them had symptomatic lesions of >50% in a relevant intracranial artery on DSA. In this cohort, the degree of collateralization showed weak but significant correlations with pressure difference ($r_s=-0.28$, $p=0.04$), pressure ratio ($r_s=0.31$, $p=0.03$) and pressure gradient ($r_s=-0.29$, $p=0.03$); while no correlations were found with shear strain rate ratio, wall shear stress ratio and velocity ratio. Subgroup analysis among patients with symptomatic lesions in anterior circulation (N=46) and posterior circulation (N=6) respectively showed no significant correlations between the degree of collateralization and any hemodynamic parameter. Subgroup analysis in patients with 50-69% stenosis (N=16) showed that the degree of collateralization had moderate association with SSR ratio ($r_s=-0.53$, $p=0.03$), but not the other hemodynamic parameters. As for patients with symptomatic ICAS of 70-99% stenosis (N=36), no significant correlation between the degree of collateralization and any hemodynamic parameters was found.

In summary, the degree of collateralization in symptomatic ICAS showed only weak correlation with the hemodynamic parameters. CTA, as a single non-invasive imaging modality with advanced post-processing computational technique, may offer both anatomical and functional assessments in intracranial steno-occlusive disease. The findings from this study are useful to inspire further research in the field, including studies on prediction of stroke risks, selection of high risks patients who could benefit from adjunctive treatment.

Research Grant Project 2014

Ictal high-frequency oscillations and hyperexcitability in refractory epilepsy

Howan Leung, Cannon Zhu, Danny Chan, Wai Poon, Lin Shi, Vincent Mok and Lawrence Wong
Department of Medicine and Therapeutics, The Chinese University of Hong Kong

High-frequency oscillations (HFOs, 80–500 Hz) from intracranial electroencephalography (EEG) may represent a biomarker of epileptogenicity for epilepsy. We explored the relationship between ictal HFOs and hyperexcitability with a view to improving surgical outcome.

We evaluated 262 patients with refractory epilepsy. Fifteen patients underwent electrode implantation, and surgical resection was performed in 12 patients using a semi-prospective design. Ictal intracranial EEGs were examined by continuous wavelet transform (CWT). Significant ictal HFOs were denoted by normalized wavelet power above the 50th percentile across all channels. Each patient underwent functional mapping with cortical electrical stimulation. Hyperexcitability was defined as the appearance of afterdischarges or clinical seizures after electrical stimulation (50 Hz, biphasic, pulse width = 0.5 ms, 5 s, 5 mA).

Among the group of patients achieving Engel Class I/II outcome at 1+ year, the mean proportion of significant ictal HFOs among resected channels for any given patient was 69% (33.3–100%). The respective figures for conventional frequency ictal patterns (CFIPs), hyperexcitability, and radiological lesion were 68.3% (26.3–100%), 39.6% (0–100%), and 52.8% (0–100%). Statistical significance was only achieved with ictal HFOs when comparing patients with Engel Class I/II outcomes versus III/IV outcomes (12.6% vs. 4.2%, the number of channels as the denominator, $p = 0.005$). Further analysis from all patients irrespective of the surgical outcome showed that ictal HFOs co-occurred with CFIP ($p < 0.001$), hyperexcitability ($p < 0.001$), and radiological lesion ($p < 0.001$). The combination of ictal HFOs/hyperexcitability improved the sensitivity from 66.7% to 100%, and the specificity from 66.7% to 75% when compared with ictal HFOs or hyperexcitability alone.

We confirmed the utility of ictal HFOs in determining surgical outcome. Ictal HFOs are affiliated to cortical hyperexcitability, which may represent a pathological manifestation of epileptogenicity.

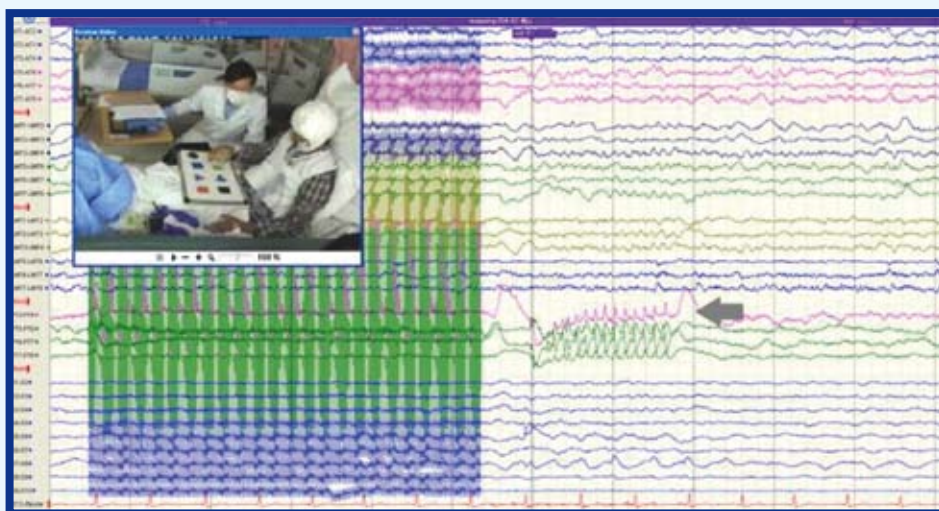


Figure – An example of hyperexcitability: after-discharges were noted after electrical stimulation. The same location was also associated with ictal HFOs.

“Fishing” in biomedical research and clinical medicine

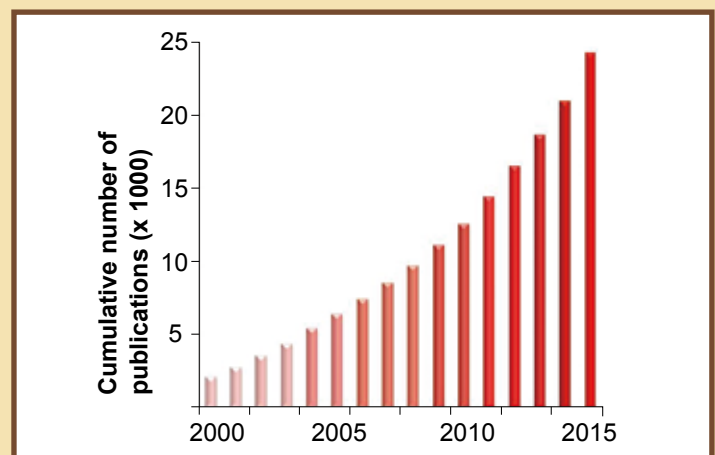
Anskar YH Leung

Associate Dean (Human Capital)
Li Shu Fan Medical Foundation Professor in Haematology
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University of Hong Kong

Introduction

Zebrafish has emerged as a popular model organism in biomedical research. Information arising from zebrafish research has shed lights to our understanding in genetics as well as developmental and stem cell biology and provided animal models for a wide range of human diseases and regenerative medicine. The popularity of this model organism was reflected in the establishment and proliferation of international networks and consortia in the zebrafish community and the cumulative knowledge has resulted in an exponential increase in publications (Figure 1) arising from zebrafish research. This review aims to introduce zebrafish to physicians with particular reference to areas where the model has contributed to advances in biomedical sciences and novel therapeutic strategies in clinical medicine.

Figure 1. Cumulative number of publications related to zebrafish research. The data were based on pubmed search using the keyword “Zebrafish”. Only publications in English were included. Publications in 2015 were counted up to June 2015.



What is zebrafish?

Zebrafish (*Danio rerio*) is a fresh water fish species with its name derived from the longitudinal and uniform blue stripes along the body, reminiscent of the stripes in zebra (Figure 2). As a species, zebrafish was first identified in the Ganges River in East India and Burma in 1822. They typically live in shallow and slow

water stream in India and Southeast Asia. Adult fish measures about 3-4 cm in size and is one of most popular aquatic pets found in local aquarium. Male and female zebrafish are distinguishable by their appearance: Male fish is generally slender with gold stripes between the blue stripes. Female fish has a round and whitish belly with silver stripes instead of gold. They live optimally at 28°C with an average lifespan of up to 2 years in captivity.

History of zebrafish research

Zebrafish has been studied as a model of developmental biology since 1930.¹ In particular, the optical transparency of the embryos has facilitated visualization of cellular migration and gastrulation during early embryonic development. In late 1960, the organism was used as a model of genetic studies, resulting in generation of homozygous diploid zebrafish derived exclusively from maternal genome that was published in early 1980.² The results have facilitated identification of recessive mutations in female germ line whose phenotype would be hitherto concealed in heterozygous state. Thereafter, zebrafish research began to thrive in the scientific community. Detailed fate-mapping and developmental stages of zebrafish embryos were described, underscoring the remarkable similarities in developmental

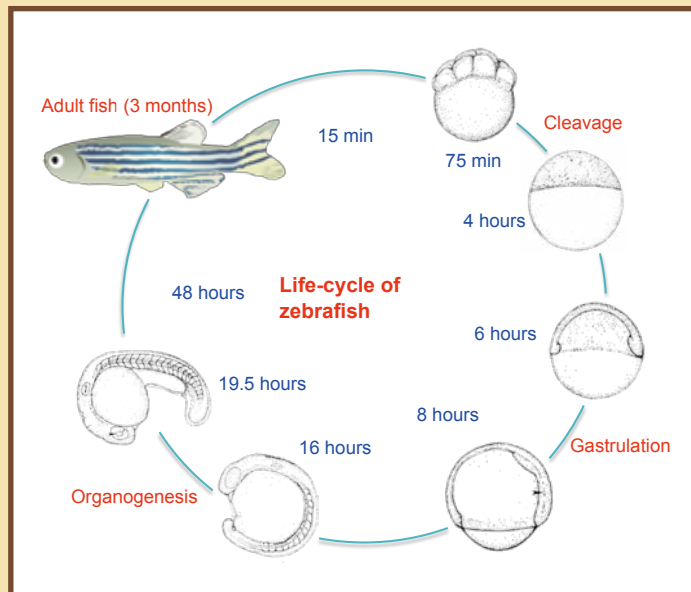


Figure 3. Developmental stages of zebrafish. The reproductive cycle (from zygotic to adult stage) of zebrafish is 3 months.

pathways between zebrafish and mammals.³ In late 1980, the first mutation in zebrafish was reported, providing important ground for two large-scale chemical induced mutagenesis screens in U.S.A. and Germany that were reported in mid 1990.^{4,5} These screens have generated thousands of mutants with specific and well-characterized phenotypes. The results have not only catapulted zebrafish to the forefront of developmental biology but provided important mechanistic insights to the genetic basis of human diseases. In 1988, the first transgenic zebrafish model was developed,⁶ followed shortly by the first zebrafish cancer model of acute lymphoblastic leukemia (ALL) in 2003.⁷ Technologies for genetic manipulation began to develop in early 2000, based initially on anti-sense morpholinos gene knock-down⁸ approach and more recently by TALEN⁹ and CRISPR/Cas 9¹⁰ gene knock-out techniques (see below). Sequencing of zebrafish genome was completed in 2013, identifying more than 26,000 genes in zebrafish.¹¹

Why zebrafish?

Zebrafish is unique as an animal model for biomedical research. The embryos are externally fertilized and optically transparent and the

developmental processes can be directly visualized under light microscopy (Figure 3). Each female adult fish can lay hundreds of eggs each week and such high fecundity allows large number of embryos in experimental replicates. In addition, the cellular and molecular pathways of embryonic development are remarkably conserved between zebrafish and higher vertebrates. The zebrafish reference genome was completely sequenced and orthologues of more than 70% of human genes can be identified in zebrafish.¹¹ In fact, of the disease-related genes listed in the Online Mendelian Inheritance in Man (OMIM) database, more than 80% have at least one zebrafish orthologue. The information has not only shed lights to the genetic basis of various pathophysiological processes but also greatly facilitated the design of research tools for genetic manipulation and genome editing. Transgenic zebrafish with tissue specific fluorescent reporters are readily available and specific cellular population based on their specific gene expression can be directly inspected and enumerated. A transparent adult zebrafish (*Casper*) has also been generated by crossing between the *nacre* mutant with a complete lack of melanocytes due to *mitfa* mutation and the *roy* mutant with translucent skin, greatly



Figure 2. Photographs of adult zebrafish (Upper panel) and laboratory aquarium at LKS Faculty of Medicine, University of Hong Kong.

facilitating direct visualization of fluorescent cells in adult animals.¹² Furthermore, the embryos can survive without functional circulation as they obtain oxygen from ambient water by simple diffusion. Genes with indispensable function in hematopoiesis and cardiovascular development can be perturbed without causing embryonic lethality, providing important information hitherto inaccessible in mammals.

What's in the toolbox?

The zebrafish has emerged as one of the most popular animal models for biomedical research. Publicly accessible databases (<https://zfin.org/action/fish/search>) and well validated laboratory tools are currently available to facilitate easy start up by both laboratory scientists and practicing physicians who are interested in the study of biomedical sciences and disease modeling. Databases of zebrafish mutants generated by chemical or insertional mutagenesis screens (forward genetic approach) are available, providing instant information on gene mutations in zebrafish, some of which have been shown to be remarkably similar to human diseases with single gene mutations. A reverse genetic approach based on knockdown by morpholino and knockout by zinc finger nucleases, Transcription Activator-Like Effector nuclease (TALEN)⁹ and Clustered Regularly Interspaced Palindromic Repeats (CRISPR)/CRISPR-associated (CRISPR/Cas9)¹⁰ have also provided important information of genotype-phenotype correlation in human diseases. Zebrafish transgenic model has also been developed in which fluorescent genes are expressed under tissue specific promoters so that specific cell populations can be readily tracked in the animals. Specific genes of interests with particular reference to oncogenes can also be expressed in a tissue

specific fashion, generating model of human malignancies (see below).

Zebrafish as a model of human disease

The cumulative knowledge of zebrafish development and genetics and the advent of new technologies in genome editing have facilitated development of zebrafish as models of human diseases.

Cancers

Putative oncogene or mutant genes have been expressed in zebrafish either ubiquitously or under tissue specific promoters to induce phenotypes reminiscent of human cancers characterized by these genetic aberrations. The first model was reported in 2003 in which mouse oncogene c-MYC was expressed under the control of zebrafish rag-1 promoter.⁷ The transgenic animals developed excessive growth of lymphoblasts with morphologic and genetic features reminiscent of human acute lymphoblastic leukemia. Importantly, these abnormal lymphoblasts were capable of generating leukemia to another fish upon transplantation, underscoring its leukemia initiating activity *in vivo*. Disease model of myeloid malignancies have also been developed, based on expression of fusion or mutant genes that are pathognomonic of human acute myeloid leukemia (AML) or myeloproliferative neoplasms. Interestingly, direct injection of these mutant genes, for instance, FLT3-ITD (Internal Tandem Duplication of Fms-Like Tyrosine Kinase 3),¹³ IDH1-R132H (Isocitrate dehydrogenase 1 R132H)¹⁴ and NPM1c+ (Nucleophosmin 1)¹⁵ into zebrafish embryos at zygotic stage induced expansion of myelopoiesis and as well as signaling and epigenetic changes typical of the AML subtypes associated with

these mutations. Expression of a zebrafish orthologue jak2aV681F of human JAK2V617F into zebrafish zygote has also been shown to induce polycythaemia reminiscent of human polycythaemia vera in which JAK2V617F mutation is pathognomonic.^{16,17} These models are being exploited for the identification of novel therapeutic agents for the treatment of human leukaemia.¹⁸ Transgenic approach has also been used for the development of zebrafish model of solid organ cancers including melanoma, hepatocellular carcinoma, sarcoma and neuroblastoma.¹⁹

Bacterial infections

The immune system of zebrafish comprises both innate and adoptive immunity. Both granulocytic and monocytic lineages as well as the T- and B- lymphoid systems have been characterized in zebrafish. Furthermore, the toll-like and NOD-like receptor signaling as well as cytokines and complement pathways in zebrafish are remarkably similar to those in mammals. As a result, zebrafish has been developed as model organism for the study of infectious diseases and host immune response. Bacteria can be directly injected into the embryos or adult fish or added to the bathing water. Zebrafish infection by rapidly growing bacteria including *Streptococcal pyogenes* or *Streptococcal pneumoniae*, have been investigated.²⁰ Interestingly, the organism was found to be receptive to these bacteria and factors that determine their virulence in human (*viz.* capsule, pilus, pneumolysin, autolysin), operate similarly in zebrafish. Both gene knockdown and mutants in embryos and adult fish carrying specific defects in immunity have proven the principle that innate rather adaptive immunity was involved in the clearance of these organisms. Zebrafish model has also been used to study the host immune response to slow growing

bacteria, for instance, mycobacterium marinum, the closest family member of mycobacterium tuberculosis.²¹ Caseating granuloma typical of mycobacterial infection can be demonstrated at both embryonic and adult stage and the molecular and cellular mechanisms of host innate and adaptive immunity and bacterial virulence have been evaluated. The research has generated important mechanistic insights to the pathogenesis of mycobacterial infection and host response and address questions hitherto difficult and expensive to answer in mammals. These platforms are being exploited in the screening of effective anti-bacterial agents with therapeutic potential.

Neurodegenerative diseases

Zebrafish exhibits a number of features that make it unique for the study of neurodegenerative diseases. Neural development in zebrafish occurs rapidly during early embryonic development. For instance, the first retinal ganglion cells exit the eyes 34 hours-post-fertilization (hpf) and behavioral response to visual stimulation occurs 3 days-post-fertilization (dpf). At larval stage, the zebrafish brain comprises the forebrain, midbrain and hindbrain and the neuronal circuitry in each region as well as the neurotransmitter pathways are remarkably similar to those in mammals. These pathways have been perturbed in zebrafish with a view to model human neurodegenerative diseases.²² In particular, dopaminergic pathway connecting ventral diencephalon and ventral telencephalon, homologous to mammalian nigrostriatal pathway, is evidenced in zebrafish embryos as early as 18 hpf and the signaling pathways as well as mutations of genes associated with Parkinson's Disease are conserved in zebrafish. In addition, human gene associated with Huntington's Disease (HTT) has

been identified in zebrafish with 70% identity in amino acid sequence. Deletion of the zebrafish orthologue of *htt* resulted in a loss of olfactory and lateral line sensory neurons as well as a reduction in telencephalic tissue, the zebrafish analogue of human striatum, that is often affected in Huntington's Disease.²³ Transient and stable expression of human HTT carrying polyglutamine residues in the N-terminus, which is pathognomonic of Huntington's Disease, have also been reported in zebrafish. These findings have not only shed novel mechanistic lights to the pathogenesis of this fatal inherited disease but provided a platform for screening potential therapeutic agents for this disease. Alzheimer's Disease (AD) is characterized pathologically by the presence of extracellular amyloid A β protein-containing neuritic plaques and intracellular hyperphosphorylated tau-containing neurofibrillary tangles. Zebrafish orthologues of human amyloid precursor protein (APP) as well as genes encoding for the enzymes involved in post-translational modification of APP have been identified. Stable transgenic expression of mutant human Tau pathognomonic of frontotemporal dementia has been shown to induce pathologic features and behavioral defects of neurodegeneration in zebrafish, proving the feasibility and principle of modeling human dementia in zebrafish.²⁴

Kidney diseases

Kidneys in zebrafish embryos are known as pronephros. It is a relatively simple structure containing two nephrons running along the longitudinal axis of embryos, connected proximally as the glomerulus and distally in the cloaca.²⁵ Each nephron can be divided into neck segment, proximal convoluted and straight tubules as well as distal early and late tubules. The glomerulus is

derived from capillary arising from the overlying dorsal aorta and is enveloped by podocytes that form inter-digitating foot processes. Blood filtration begins at 48 hpf and filtrate composition is modified by the transcellular transportation of solutes and electrolytes in the proximal and distal tubules. Full pronephros development is accomplished by 4 dpf. Functional assay of glomerular function has been developed based on dextran clearance in the glomerulus and endocytic uptake in the proximal tubules. The structural simplicity, rapid development and functional similarity to mammalian nephrons have provided important ground for modeling human kidney development and diseases.²⁶ In particular, zebrafish pronephros has been established as a model of podocytes injury based on pharmacological agents that specifically target glomerular filtration or knockdown of genes involved in podocyte function (viz *podocin* and *CD2AP*). Inducible model has also been developed in transgenic zebrafish that expressed bacterial nitroreductase (NTR) specifically in podocytes under *podocin* promoter regulation. Upon exposure to metronidazole, the latter was converted by NTR to a cytotoxic metabolite, resulting in specific podocytes ablation. The model has also been deployed to study progenitor population that gives rise to podocyte regeneration upon injury. Furthermore, aminoglycosides have also been used to induce proximal tubular injury reminiscent of acute kidney injury (AKI). Importantly, transgenic zebrafish with fluorescent reporter of proximal tubule has been developed, allowing real time tracking of this epithelial population in embryos.

Pronephros in embryonic and larval stage are superseded by mesonephros. The latter is formed by nephrogenic mesenchymal cells at the vicinity of the pronephric tubules that undergo mesenchymal-to-epithelial transition and form

tubular structure (secondary nephrons) that coalesce with the distal tubule of pronephros. As a result, mesonephros become a highly branched structure. Interestingly, adult zebrafish is capable of lifelong formation of new nephrons (nephrogenesis) to keep up with the increase in body mass.²⁷ The extensive regenerative potential of mesonephros has been exploited to develop model of tubular regeneration upon AKI by aminoglycosides. Mesonephros are also transplantable and with the use of transgenic donor cells, the tissue origin of new mesonephros can be tracked based on fluorescent signals. With these emerging information and technological advances, the zebrafish model is currently evaluated as model of common kidney diseases including hypoxic injury, diabetic nephropathy and kidney fibrosis.

Myopathy

Zebrafish has distinct advantages as a model for the study of muscle development and disease. The development of body musculature is rapid with all segmental muscle blocks and their innervation established by 24 hpf. The molecular signals as well as cellular structure of skeletal muscle, its embryonic development as well as regeneration in zebrafish are remarkably similar to those in mammals.²⁸ Zebrafish mutants with "myopathic" phenotypes have been characterized, exemplified by the *dmd* mutation that corresponded to human DMD (Duchene Muscular Dystrophy). These mutants exhibited significant defects in muscle structure and motor function reminiscent of human diseases. A number of other zebrafish muscle mutants have been characterized (see review²⁸).

Laboratory protocols have also been developed to evaluate muscle function in zebrafish. Spontaneous coiling and touch-evoked escape response in embryos and larvae as

well as swimming patterns in adult fish are functional assays that can be evaluated quickly but may be subjected to observer's variation. On the other hand, the optical transparency of the embryos has made simple birefringence assay possible. The highly organized sarcomere pattern of zebrafish skeletal muscle gives rise to birefringence under polarized lights. Zebrafish embryos with muscle disease manifest disruption of birefringence due to muscle fiber disorganization, detachment or degeneration. Electrophysiological recordings from muscle in whole larvae are more objective but technically demanding. Potential therapeutic targets based on these strategies are being developed.

Cardiac diseases

In zebrafish, the heart is made of an atrium and ventricle (2 chambers). Deoxygenated blood enters the sinus venosus and empties into atrium and ventricle that are separated by a heart valve. The ventricle pumps venous blood through bulbus arteriosus to the ventral aorta for distribution to the gills for oxygenation. The electrophysiology of the zebrafish cardiac system has also been investigated. At 24 hpf, electrical wave is conducted unidirectionally from the sinus venosus to the outflow tract, suggesting the presence of a sinoatrial (SA)-node type pacemaker. Between 36 and 48 hpf, the electrical wave is delayed in the AV canal that separates atrium from ventricle. Thereafter, a fast conduction network develops in the ventricle in association with the formation of ventricular trabeculation in the developing heart.²⁹

Zebrafish mutants affecting cardiovascular development and electrophysiology have been characterized. In particular, mutants affecting *Tbx1* and *Nkx2.5* exhibited cardiac malformation and those with *hey2* mutation (*gridlock mutation*)

aorta malformation reminiscent of coarctation of aorta. Zebrafish mutants associated with conduction defects have been characterized, including *KCNH2* mutants (*breakdance*) that exhibited features of long QT syndrome. Mutation of troponin T (*silent heart*) in zebrafish was associated with non-contractile heart and severe sarcomere defects and that of Titin (*pickwick*) associated with weakly contractile heart and pericardial oedema, providing important animal models for familial or sporadic cases of cardiomyopathy.

Regenerative medicine

Zebrafish tissues have been shown to exhibit regenerative potential that is often lacking in mammals. In particular, the organism is capable of fin (limb), cardiac and neuronal regeneration upon surgical and chemical induced injuries. These studies have provided mechanistic insights to the unique molecular and cellular events leading to tissue regeneration in zebrafish and the negative regulations precluding such process in mammals. On the other hand, tissue regeneration of bone marrow and liver upon irradiation, surgical and chemical induced injuries found in mammals are conserved in zebrafish.³⁰ Comparative analyses have generated important information about the fundamental cellular processes of tissue repair and regeneration. Genetic and chemical modifiers of these regeneration processes are being tested in preclinical and clinical studies. For instance, umbilical cord blood (UCB) has become an important source of haematopoietic stem cells (HSC) for transplantation in paediatric patients suffering from haematological diseases. However, its application in adult has been limited by insufficient HSC cell dose. In the past two decades, laboratory research on *ex vivo* UCB HSC expansion has failed to achieve an optimal condition

for clinical use. Prostaglandin E2 (PGE2) was first identified in chemical screening to enhance HSC regeneration in zebrafish. *Ex vivo* treatment of human UCB with PGE2 induced HSC proliferation and accelerated human HSC engraftment upon xenotransplantation in immunodeficient mouse model.³¹

The results was recapitulated in a Phase I clinical study showing not only the safety but the potential efficacy of *ex vivo* treatment of UCB with PGE2 in improving clinical transplantation. In the study of liver regeneration after surgical resection and acetaminophen induced hepatic injury in zebrafish, a novel inhibitor of S-nitrosoglutathione reductase (GSNOR), which negatively regulates protein nitrosylation, has been shown to promote liver regeneration and ameliorate hepatocyte necrosis upon acetaminophen exposure.³² The results could be recapitulated in mice after exposure to toxic level of acetaminophen, providing an important ground for clinical trials in patients with drug-induced hepatotoxicity.

Conclusion

In the past two decades, zebrafish research has evolved from developmental and stem cell biology to technological development of robust animal model for the study of human diseases.³³ With the understanding of its basic biology and remarkable similarity to the mammalian system, the potential of zebrafish as a platform to expedite drug screening and discovery for personalized medicine is enormous. Further efforts should focus on the standardization of research protocols among laboratories and automation of experimental readout. In that regards, the LKS Faculty of Medicine in the University of Hong Kong has set up a Zebrafish Core Facility in Hong Kong to facilitate zebrafish research in the scientific community (<http://www.med.hku.hk/corefac/zebrafish.htm>).

Reference

- Grunwald DJ, Eisen JS. Headwaters of the zebrafish -- emergence of a new model vertebrate. *Nat Rev Genet.* 2002; 3(9): 717-24.
- Streisinger G, Walker C, Dower N, Knauber D, Singer F. Production of clones of homozygous diploid zebra fish (*Brachydanio rerio*). *Nature.* 1981;291(5813):293-6.
- Kimmel CB, Ballard WW, Kimmel SR, Ullmann B, Schilling TF. Stages of embryonic development of the zebrafish. *Dev Dyn.* 1995;203(3):253-310.
- Haffter P, Granato M, Brand M, Mullins MC, Hammerschmidt M, Kane DA, Odenthal J, van Eeden FJ, Jiang YJ, Heisenberg CP, Kelsh RN, Furutani-Seiki M, Vogelsang E, Beuchle D, Schach U, Fabian C, Nüsslein-Volhard C. The identification of genes with unique and essential functions in the development of the zebrafish, *Danio rerio*. *Development.* 1996;123:1-36.
- Driever W, Solnica-Krezel L, Schier AF, Neuhauss SC, Malicki J, Stemple DL, Stainier DY, Zwartkruis F, Abdelilah S, Rangini Z, Belak J, Boggs C. A genetic screen for mutations affecting embryogenesis in zebrafish. *Development.* 1996;123:37-46.
- Stuart GW, McMurray JV, Westerfield M. Replication, integration and stable germ-line transmission of foreign sequences injected into early zebrafish embryos. *Development.* 1988;103(2):403-12.
- Langenau DM, Traver D, Ferrando AA, Kutok JL, Aster JC, Kanki JP, Lin S, Prochownik E, Tiede NS, Zon LI, Look AT. Myc-induced T cell leukemia in transgenic zebrafish. *Science.* 2003;299(5608):887-90.
- Nasevicius A, Ekker SC. Effective targeted gene 'knockdown' in zebrafish. *Nat Genet.* 2000;26(2):216-20.
- Bedell VM, Wang Y, Campbell JM, Poshusta TL, Starker CG, Krug RG 2nd, Tan W, Penheiter SG, Ma AC, Leung AY, Fahrenkrug SC, Carlson DF, Voytas DF, Clark KJ, Essner JJ, Ekker SC. In vivo genome editing using a high-efficiency TALEN system. *Nature.* 2012;491(7422):114-8.
- Blackburn PR, Campbell JM, Clark KJ, Ekker SC. The CRISPR system—keeping zebrafish gene targeting fresh. *Zebrafish.* 2013;10(1):116-8.
- Howe K, Clark MD, Torroja CF, et al. The zebrafish reference genome sequence and its relationship to the human genome. *Nature.* 2013; 496(7446):498-503.
- Wenner M. The most transparent research. *Nat Med.* 2009; 15(10): 1106-9.
- He BL, Shi X, Man CH, Ma AC, Ekker SC, Chow HC, So CW, Choi WW, Zhang W, Zhang Y, Leung AY. Functions of *flt3* in zebrafish hematopoiesis and its relevance to human acute myeloid leukemia. *Blood.* 2014;123(16):2518-29.
- Shi X, He BL, Ma AC, Guo Y, Chi Y, Man CH, Zhang W, Zhang Y, Wen Z, Cheng T, Leung AY. Functions of *idh1* and its mutation in the regulation of developmental hematopoiesis in zebrafish. *Blood.* 2015;125(19):2974-84.
- Bolli N, Payne EM, Grabher C, Lee JS, Johnston AB, Falini B, Kanki JP, Look AT. Expression of the cytoplasmic NPM1 mutant (NPMc+) causes the expansion of hematopoietic cells in zebrafish. *Blood.* 2010; 115(16):3329-40.
- Ma AC, Fan A, Ward AC, Liongue C, Lewis RS, Cheng SH, Chan PK, Yip SF, Liang R, Leung AY. A novel zebrafish *jak2a*(V581F) model shared features of human JAK2(V617F) polycythemia vera. *Exp Hematol.* 2009;37(12):1379-1386.
- Ma AC, Ward AC, Liang R, Leung AY. The role of *jak2a* in zebrafish hematopoiesis. *Blood.* 2007;110(6):1824-30.
- Warkentin AA, Lopez MS, Lasater EA, Lin K, He BL, Leung AY, Smith CC, Shah NP, Shokat KM. Overcoming myelosuppression due to synthetic lethal toxicity for FLT3-targeted acute myeloid leukemia therapy. *Elife.* 2014 Dec 22;3.
- White R, Rose K, Zon L. Zebrafish cancer: the state of the art and the path forward. *Nat Rev Cancer.* 2013;13(9):624-36.
- Saralahti A, Rämetsä M. Zebrafish and streptococcal infections. *Scand J Immunol.* 2015 Jun 12.
- van Leeuwen LM, van der Sar AM, Bitter W. Animal models of tuberculosis: zebrafish. *Cold Spring Harb Perspect Med.* 2014;5(3):a018580.
- Xi Y, Noble S, Ekker M. Modeling neurodegeneration in zebrafish. *Curr Neurol Neurosci Rep.* 2011;11(3):274-82.
- Henshall TL(1), Tucker B, Lumsden AL, Nornes S, Lardelli MT, Richards RI. Selective neuronal requirement for huntingtin in the developing zebrafish. *Hum Mol Genet.* 2009;18(24):4830-42.
- Paquet D(1), Bhat R, Sydow A, Mandelkow EM, Berg S, Hellberg S, Fälting J, Distel M, Köster RW, Schmid B, Haass C. A zebrafish model of tauopathy allows in vivo imaging of neuronal cell death and drug evaluation. *J Clin Invest.* 2009;119(5): 1382-95.
- Cheng CN, Verdun VA, Wingert RA. Recent advances in elucidating the genetic mechanisms of nephrogenesis using zebrafish. *Cells.* 2015; 4(2):218-33.
- Sander V, Davidson AJ. Kidney injury and regeneration in zebrafish. *Semin Nephrol.* 2014;34(4):437-44.
- McKee RA, Wingert RA. Zebrafish Renal Pathology: Emerging Models of Acute Kidney Injury. *Curr Pathobiol Rep.*;3(2):171-181.
- Maves L. Recent advances using zebrafish animal models for muscle disease drug discovery. *Expert Opin Drug Discov.* 2014;9(9):1033-45.
- Asnani A, Peterson RT. The zebrafish as a tool to identify novel therapies for human cardiovascular disease. *Dis Model Mech.* 2014; 7(7):763-7.
- Goessling W, North TE. Repairing quite swimmingly: advances in regenerative medicine using zebrafish. *Dis Model Mech.* 2014; 7(7):769-76.
- Goessling W, Allen RS, Guan X, Jin P, Uchida N, Dovey M, Harris JM, Metzger ME, Bonifacino AC, Stroncek D, Stegner J, Armant M, Schlaeger T, Tisdale JF, Zon LI, Donahue RE, North TE. Prostaglandin E2 enhances human cord blood stem cell xenotransplants and shows long-term safety in preclinical nonhuman primate transplant models. *Cell Stem Cell.* 2011;8(4):445-58.
- Cox AG, Saunders DC, Kelsey PB Jr, Conway AA, Tesmenitsky Y, Marchini JF, Brown KK, Stampler JS, Colagiovanni DB, Rosenthal GJ, Croce KJ, North TE, Goessling W. S-nitrosyl signaling regulates liver development and improves outcome following toxic liver injury. *Cell Rep.* 2014;6(1):56-69.
- Lieschke GJ, Currie PD. Animal models of human disease: zebrafish swim into view. *Nat Rev Genet.* 2007;8(5):353-67.

MRCP dates for 2016

MRCP Part I examination

12 January 2016 6 September 2016

MRCP Part II (Written) examination

6 – 7 April 2016 7 – 8 December 2016

PACES 2016

7 – 11 March 2016 3 – 7 October 2016

Joint HKCPIE/MRCP(UK) Part I examination for the years 2002 – 2015:

	Sitting	Pass
Sep 02	100	33 (33%)
Jan 03	124	55 (44%)
May 03 (SARS Special)	21	7 (33%)
Sep 03	54	29 (54%)
Jan 04	93	39 (42%)
Sep 04	29	16 (55%)
Jan 05	96	68 (70.8%)
Sep 05	24	15 (62.5%)
Jan 06	95	74 (80%)
Sept 06	21	13 (62%)
Jan 07	87	67 (77%)
Sep 07	23	12 (52%)
Jan 08	56	38 (68%)
Sept 08	47	32 (68%)
Jan 09	59	47 (80%)
Sept 09	47	28 (60%)
Jan 10	45	28 (62%)
Sept 10	62	39 (63%)
Jan 11	44	23 (52%)
Sept 11	64	49 (77%)
Jan 12	45	28 (62%)
Sept 12	80	59 (74%)
Jan 13	41	22 (54%)
Sept 13	76	60 (79%)
Jan 14	30	20 (67%)
Sep 14	84	64 (76%)
Jan 15	29	20 (69%)

Passing rates for PACES over the past years:

October 2001	36/72 = 50%	October 2008	29/65 = 45%
February 2002	34/74 = 46%	February 2009	39/75 = 52%
October 2002	29/72 = 40%	October 2009	24/72 = 33%
February 2003	30/69 = 43%	March 2010	33/75 = 44%
October 2003	27/59 = 46%	October 2010	40/74 = 54%
March 2004	39/64 = 61%	February 2011	23/66 = 35%
October 2004	26/69 = 38%	October 2011	34/70 = 49%
March 2005	35/75 = 47%	February 2012	32/74 = 43%
October 2005	28/75 = 37%	October 2012	32/74 = 43%
March 2006	36/75 = 48%	March 2013	28/75 = 37%
October 2006	16/73 = 22%		(for HK local candidates)
March 2007	44/74 = 59%	October 2013	28/74 = 38%
June 2007	44/74 = 59%	February 2014	29/74 = 39%
October 2007	36/55 = 65%		(for HK local candidates)
March 2008	36/74 = 49%	October 2014	21/74 = 28%
		March 2015	36/75 = 48%

Joint HKCPIE/MRCP(UK) Part II (Written) examination for the years 2002 – 2015:

	Sitting	Pass
2 Jul 2002	53	27 (51%)
13 Nov 2002	50	24 (48%)
13 Aug 2003	110	62 (56%)
10 Dec 2003	54	31 (57%)
28 Jul 2004	65	42 (65%)
8 Dec 2004	46	32 (70%)
13 Apr 2005	32	15 (47%)
27 Jul 2005	76	56 (74%)
7 & 8 Dec 2005	26	16 (62%)
12&13 Apr 2006	29	13 (45%)
26 & 27 Jul 2006	91	68 (75%)
6 & 7 Dec 2006	33	18 (55%)
11 & 12 Apr 2007	34	22 (65%)
25 & 26 Jul 2007	80	70 (88%)
5 & 6 Dec 2007	19	13 (68%)
9 & 10 Apr 2008	21	13 (62%)
30 & 31 Jul 2008	47	36 (77%)
3 & 4 Dec 2008	17	10 (59%)
8 & 9 Apr 2009	32	25 (78%)
29 & 30 Jul 2009	50	43 (86%)
25 & 26 Nov 2009	12	7 (58%)
7 & 8 April 2010	41	34 (83%)
28 & 29 July 2010	25	19 (76%)
24 and 25 Nov 2010	8	2 (25%)
6 and 7 April 2011	45	35 (78%)
23 and 24 Nov 2011	32	25 (78%)
28 and 29 March 2012	55	43 (78%)
12 and 13 December 2012	57	44 (77%)
10 and 11 April 2013	60	52 (87%)
11 and 12 December 2013	48	34 (71%)
9 and 10 April 2014	54	46 (85%)
10 and 11 December 2014	26	25 (96%)
25 and 26 March 2015	53	45 (85%)

Pass list for the March PACES 2015

Chan Pui Kwan	Liu Shasha
Chan Ting Ting	Lo Lai Ping
Chan Yap Hang Will	Ng Wing Kwan Noelle
Cheng Wing Yee	Ngan William
Chiang Chi Shing Michael	Pak Wai Lun Will
Chow Chung Yue Johnny	Sin Chi Shan Rutherford
Chow Kin Yi	Tam Tsz Kin
Chu Chiu Sum	Tseng Cee Zhung Steven
Chu Man Wah	Tsoi Wai Ki
Fok Chun Kit	Tsui Wai Man Vivian
Fong Man Chung	Tsui Yuk Wo
Ho Ka Hei	Wai Hok Man
Ip Yiu Ming Bonaventure	Wong Hiu Ming
Lai Pok Ho Paul	Wong Man Ho
Lau Ho Shing Louis	Wong Oi Yee Kitty
Lau Pui Ling Daphne	Yau Kwok Ho
Li Hei Philip	Yeung Man Ka
Li Wai Yan Jamilla	Yip Hoi Man

Statistics on No. of Trainees in all Specialties

Updated in July 2015

		TRAINEES													
		HONG KONG EAST CLUSTER						HONG KONG WEST CLUSTER							
SPECIALTY	TRAINEES TOTAL (DH/HA/ OTHERS)	PYNEH		RH		TWEH		FYKH		GH		QMH		TWH	
		YEAR		YEAR		YEAR		YEAR		YEAR		YEAR		YEAR	
CARDIOLOGY	12	1 2-I 3 4	1 7	1 2-I 3-I 4	2 2 2	0 0 0	1 2 3 4	0 0 0	1 2 3 4	0 0 0	1 2 3 4	3 3-II 12	1 2 3 4	0 0	
CLINICAL PHARMACOLOGY & THERAPEUTICS	0	1 2 3 4	0 0	1 2 3 4	0 0	1 2 3 4	0 0	1 2 3 4	0 0	1 2 3 4	0 0	1 2 3 4	0 1 4	0 0	
CRITICAL CARE MEDICINE	6	1 2-I 3 4	1 4	1 2 3 4	0 0	1 2 3 4	0 0	1 2 3 4	0 0	1 2 3 4	0 0	1 2-I 3-I 4	2 3 7	1 2 3 4	0 0
DERMATOLOGY & VENEREOLOGY	7	1 2 3 4	0 0	1 2 3 4	0 0	1 2 3 4	0 0	1 2 3 4	0 0	1 2 3 4	0 0	1 2 3 4	0 0	1 2 3 4	0 0
ENDOCRINOLOGY, DIABETES & METABOLISM	12	1 2 3 4	0 3	1 2-I 3 4	1 1	1 2 3 4	0 2	1 2 3 4	0 0	1 2 3 4	0 0	1 2 3 4	0 5	1 2 3 4	0 0
GASTROENTEROLOGY & HEPATOLOGY	20	1-I 2-II 3 4	3 5	1 2 3 4	0 1	1 2 3 4	0 0	1 2 3 4	0 0	1 2 3 4	0 0	1 2 3-I 4	1 8	1 2 3 4	0 0
GERIATRIC MEDICINE	11	1 2-I 3 4	1 6	1 2 3 4	0 II	1 2 3-I 4	1 2	1 2 3 4	0 4	1 2 3 4	0 2	1 2-I 3-I 4	2 1	1 2 3 4	0 1
HAEM/HAEM ONCOLOGY	5	1 2-I 3 4	1 3	1 2 3 4	0 0	1 2 3 4	0 0	1 2 3 4	0 0	1 2 3 4	0 0	1 2 3 4	0 7	1 2 3 4	0 0
IMMUNOLOGY & ALLERGY	0	1 2 3 4	0 0	1 2 3 4	0 0	1 2 3 4	0 0	1 2 3 4	0 0	1 2 3 4	0 0	1 2 3 4	0 0	1 2 3 4	0 0
INFECTIOUS DISEASE	3	1 2 3 4	0 1	1 2 3 4	0 0	1 2 3 4	0 0	1 2 3 4	0 0	1 2 3 4	0 0	1 2 3 4	0 1	1 2 3 4	0 0
INTERNAL MEDICINE	147	1-II 2-VII 3-II 4-III	14 38	1 2-III 3-I 4	4 14	1 2 3 4	0 8	1 2 3 4	0 4	1 2 3 4	0 7	1 2-V 3-VI 4-V	16 58	1 2 3 4	0 10
MEDICAL ONCOLOGY	2	1 2 3 4	0 0	1 2 3 4	0 0	1 2 3 4	0 0	1 2 3 4	0 0	1 2 3 4	0 0	1 2-I 3 4	1 2	1 2 3 4	0 0
NEPHROLOGY	10	1 2 3 4	0 5	1 2 3 4	0 0	1 2 3 4	0 0	1 2 3 4	0 0	1 2 3 4	0 0	1 2 3 4	0 6	1 2 3 4	0 3
NEUROLOGY	12	1 2 3 4	0 5	1 2 3 4	0 2	1 2 3 4	0 0	1 2 3 4	0 0	1 2 3 4	0 0	1 2 3-I 4	1 7	1 2 3 4	0 0
PALLIATIVE MEDICINE	4	1 2 3 4	0 0	1 2 3 4	0 2	1 2 3 4	0 0	1 2 3 4	0 0	1 2 3 4	0 3	1 2 3 4	0 0	1 2 3 4	0 0
REHABILITATION	2	1 2 3 4	0 0	1 2 3 4	0 2	1 2 3 4-I	1 3	1 2 3 4	0 1	1 2 3 4	0 0	1 2 3 4	0 0	1 2 3 4	0 6
RESPIRATORY MEDICINE	12	1-I 2-I 3 4	2 4	1 2-I 3 4	1 5	1 2 3 4	0 0	1 2 3 4	0 0	1 2 3 4	0 8	1 2 3-I 4	1 5	1 2 3 4	0 0
RHEUMATOLOGY	5	1 2-I 3-I 4	2 3	1 2 3 4	0 1	1 2 3 4	0 1	1 2 3 4	0 0	1 2 3 4	0 0	1 2 3 4	0 5	1 2 3 4	0 1

SPECIALTY		TRAINEES																						
		KOWLOON CENTRAL CLUSTR						KOWLOON EAST CLUSTER						KOWLOON WEST CLUSTER										
		BH		KH		QEH		HOHH		TKOH		UCH		CMC		KWH		OLMH		PMH		WTSH		YCH
TRAINEES TOTAL (DH/HA/OTHERS)		YEAR						YEAR						YEAR										
CARDIOLOGY	12	1 2 3 4	0 1 3 0	1 2 3 0	0 0 3 4	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	
CLINICAL PHARMACOLOGY & THERAPEUTICS	0	1 2 3 4	0 1 3 0	1 2 3 0	0 0 3 4	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	
CRITICAL CARE MEDICINE	6	1 2 3 4	0 1 3 0	1 2 3 0	0 0 3 4	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	
DERMATOLOGY & VENEREOLOGY	7	1 2 3 4	0 1 3 0	1 2 3 0	0 0 3 4	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	
ENDOCRINOLOGY, DIABETES & METABOLISM	12	1 2 3 4	0 1 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	
GASTROENTEROLOGY & HEPATOLOGY	20	1 2 3 4	0 1 3 0	1 2 3 0	0 0 3 4	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	
GERIATRIC MEDICINE	11	1 2 3 4	0 1 3 0	1 2 3 0	0 0 3 4	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	
HAEM/HAEM ONCOLOGY	5	1 2 3 4	0 1 3 0	1 2 3 0	0 0 3 4	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	
IMMUNOLOGY & ALLERGY	0	1 2 3 4	0 1 3 0	1 2 3 0	0 0 3 4	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	
INFECTIOUS DISEASE	3	1 2 3 4	0 1 3 0	1 2 3 0	0 0 3 4	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	
INTERNAL MEDICINE	147	1 2 3 4	2 1 3 1	1 2 3 0	3 2 3 4	1 2 3 0	16 2 3 4	1 2 3 0	2 1 3 0	6 2 3 4	1 2 3 0	8 2 3 4	1 2 3 0	2 1 3 0	7 2 3 4	1 2 3 0	14 2 3 4	1 2 3 0	1 2 3 0	0 1 3 4	1 2 3 0	0 1 3 4	1 2 3 0	4 2 3 0
MEDICAL ONCOLOGY	2	1 2 3 4	0 1 3 0	1 2 3 0	0 0 3 4	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	
NEPHROLOGY	10	1 2 3 4	0 1 3 0	1 2 3 0	0 0 3 4	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	
NEUROLOGY	12	1 2 3 4	0 1 3 0	1 2 3 0	0 0 3 4	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	
PALLIATIVE MEDICINE	4	1 2 3 4	0 1 3 0	1 2 3 0	0 0 3 4	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	
REHABILITATION	2	1 2 3 4	0 1 3 0	1 2 3 0	0 0 3 4	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	
RESPIRATORY MEDICINE	12	1 2 3 4	1 1 3 1	1 2 3 0	0 0 3 4	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	
RHEUMATOLOGY	5	1 2 3 4	0 1 3 0	1 2 3 0	0 0 3 4	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	1 2 3 0	

TRAINING

		TRAINEES																
		NEW TERRITORIES EAST CLUSTER						NEW TERRITORIES WEST CLUSTER										
SPECIALTY	TRAINEES TOTAL (DH/HA/OTHERS)	AHNH	NDH	PWH	SH	TPH	POH	TMH	YEAR									
		YEAR						YEAR										
CARDIOLOGY	12	1 2 3 4	0 1	1 2 3 4	1 3-I 4	1 2 3 4	0 4	1 2 3 4	0 8	1 2 3 4	0 4	1 2 3 4	0 0	1 2 3 4	0 0	1 2 3 4	1 2-II 3 4	2 4
CLINICAL PHARMACOLOGY & THERAPEUTICS	0	1 2 3 4	0 0	1 2 3 4	0 0	1 2 3 4	0 0	1 2 3 4	0 0	1 2 3 4	0 0	1 2 3 4	0 0	1 2 3 4	0 0	1 2 3 4	0 0	0 0
CRITICAL CARE MEDICINE	6	1 2 3 4	0 2	1 2 3 4	0 2	1 2 3 4	0 2	1 2 3 4	0 0	1 2 3 4	1 1	1 2 3 4	0 0	1 2 3 4	0 0	1 2 3 4	1 2-I 3 4	1 2
DERMATOLOGY & VENEREOLOGY	7	1 2 3 4	0 0	1 2 3 4	0 0	1 2 3 4	1 1	1 2 3 4	0 4	1 2 3 4	0 0	1 2 3 4	0 0	1 2 3 4	0 0	1 2 3 4	0 0	0 0
ENDOCRINOLOGY, DIABETES & METABOLISM	12	1 2 3 4	1 1	1 2 3 4	0 3	1 2 3 4	0 7	1 2 3 4	0 4	1 2 3 4	0 0	1 2 3 4	0 0	1 2 3 4	0 0	1 2 3 4	1 2-II 3 4	3 3
GASTROENTEROLOGY & HEPATOLOGY	20	1 2 3 4	2 2-II	1 2 3 4	2 2-II	1 2 3 4	1 1	1 2 3 4	0 5	1 2 3 4	1 1	1 2 3 4	1 1	1 2 3 4	0 0	1 2 3 4	1 2 3 4	0 6
GERIATRIC MEDICINE	11	1 2 3 4	0 2	1 2 3 4	0 2	1 2 3 4	0 4	1 2 3 4	0 4	1 2 3 4	0 6	1 2 3 4	1 1	1 2 3 4	1 1	1 2 3 4	1 2-I 3 4	1 6
HAEM/HAEM ONCOLOGY	5	1 2 3 4	0 0	1 2 3 4	0 0	1 2 3 4	1 3	1 2 3 4	0 0	1 2 3 4	0 0	1 2 3 4	0 0	1 2 3 4	0 0	1 2 3 4	1 2-I 3 4	1 2
IMMUNOLOGY & ALLERGY	0	1 2 3 4	0 0	1 2 3 4	0 0	1 2 3 4	0 0	1 2 3 4	0 0	1 2 3 4	0 0	1 2 3 4	0 0	1 2 3 4	0 0	1 2 3 4	0 0	0 0
INFECTIOUS DISEASE	3	1 2 3 4	0 2	1 2 3 4	0 0	1 2 3 4	2 3	1 2 3 4	0 0	1 2 3 4	0 0	1 2 3 4	0 0	1 2 3 4	0 0	1 2 3 4	1 2 3 4	0 2
INTERNAL MEDICINE	147	1 2 3 4	4 2-II	1 2 3 4	4 2-II	1 2 3 4	12 3-V	1 2 3 4	3 3-II	1 2 3 4	3 3-II	1 2 3 4	3 6	1 2 3 4	4 12	1 2 3 4	1 2-X 3 4-V	19 41
MEDICAL ONCOLOGY	2	1 2 3 4	0 0	1 2 3 4	0 0	1 2 3 4	1 14	1 2 3 4	0 0	1 2 3 4	0 0	1 2 3 4	0 0	1 2 3 4	0 0	1 2 3 4	0 0	0 0
NEPHROLOGY	10	1 2 3 4	1 2	1 2 3 4	0 1	1 2 3 4	0 5	1 2 3 4	0 0	1 2 3 4	0 0	1 2 3 4	0 0	1 2 3 4	1 0	1 2 3 4	1 2 3 4-I	2 6
NEUROLOGY	12	1 2 3 4	0 1	1 2 3 4	1 1	1 2 3 4	1 7	1 2 3 4	0 0	1 2 3 4	0 0	1 2 3 4	0 0	1 2 3 4	0 0	1 2 3 4	1 2-II 3 4	2 3
PALLIATIVE MEDICINE	4	1 2 3 4	0 0	1 2 3 4	0 0	1 2 3 4	0 0	1 2 3 4	2 2	1 2 3 4	0 0	1 2 3 4	0 0	1 2 3 4	0 0	1 2 3 4	0 0	0 0
REHABILITATION	2	1 2 3 4	0 0	1 2 3 4	0 0	1 2 3 4	0 0	1 2 3 4	0 0	1 2 3 4	0 1	1 2 3 4	0 1	1 2 3 4	0 0	1 2 3 4	1 2 3 4	1 2
RESPIRATORY MEDICINE	12	1 2 3 4	0 2	1 2 3 4	0 4	1 2 3 4	1 6	1 2 3 4	1 0	1 2 3 4	0 1	1 2 3 4	0 1	1 2 3 4	0 1	1 2 3 4	1 2-I 3 4	1 5
RHEUMATOLOGY	5	1 2 3 4	0 0	1 2 3 4	0 0	1 2 3 4	0 4	1 2 3 4	0 4	1 2 3 4	0 2	1 2 3 4	0 2	1 2 3 4	0 0	1 2 3 4	1 2 3-I 4	1 2

* Total No. of trainees is shown in upper right corner of each hospital

** No. of trainers is shown in italics & bold in lower right corner of each hospital

SPECIALTY	TRAINEES TOTAL (DH/HA/OTHERS)	TRAINEES	
		DH	
DERMATOLOGY & VENEREOLOGY	7	1—I 2—I 3—II 4—II	6 11
INFECTIOUS DISEASE	3	1 2 3 4	0 4
RESPIRATORY MEDICINE	12	1 2 3 4	0 9

* Total No. of trainees is shown in upper right corner of each hospital

** No. of trainers is shown in italics & bold in lower right corner of each hospital

Statistics on No. of Fellows in all Specialties Updated in July 2015

SPECIALTY	FELLOWS TOTAL (PP/DH/HA/ OTHERS)	FELLOWS									HONG KONG EAST + WEST CLUSTER
		HONG KONG EAST CLUSTER				HONG KONG WEST CLUSTER					
		PYNEH	RH	TWEH	Subtotal	FYKH	GH	QMH	TWH	Subtotal	
CARDIOLOGY	251	8	7	0	15	0	6	18	0	24	39
CLINICAL PHARMACOLOGY & THERAPEUTICS	8	0	0	0	0	0	0	2	0	2	2
CRITICAL CARE MEDICINE	92	11	2	0	13	0	0	11	0	11	24
DERMATOLOGY & VENEREOLOGY	103	0	0	0	0	0	0	1	0	1	1
ENDOCRINOLOGY, DIABETES & METABOLISM	107	5	2	3	10	0	0	10	1	11	21
GASTROENTEROLOGY & HEPATOLOGY	182	5	2	2	9	0	0	13	0	13	22
GERIATRIC MEDICINE	187	6	11	2	19	5	2	3	2	12	31
HAEM/HAEM ONCOLOGY	60	4	0	0	4	0	0	11	0	11	15
IMMUNOLOGY & ALLERGY	6	0	0	0	0	0	0	0	0	0	0
INFECTIOUS DISEASE	41	3	0	0	3	0	0	2	0	2	5
INTERNAL MEDICINE	1323	56	25	11	92	4	14	104	12	134	226
MEDICAL ONCOLOGY	47	0	0	0	0	0	0	9	0	9	9
NEPHROLOGY	130	7	0	0	7	0	0	9	3	12	19
NEUROLOGY	114	5	4	0	9	0	0	9	2	11	20
PALLIATIVE MEDICINE	27	0	2	0	2	0	2	2	0	4	6
REHABILITATION	55	0	1	3	4	1	0	1	6	8	12
RESPIRATORY MEDICINE	186	11	6	1	18	0	9	11	0	20	38
RHEUMATOLOGY	77	4	2	1	7	0	0	9	1	10	17

TRAINING

		FELLOWS															
		KOWLOON CENTRAL CLUSTER				KOWLOON EAST CLUSTER				KOWLOON WEST CLUSTER						KOWLOON CENTRAL + EAST + WEST CLUSTER	
SPECIALTY	FELLOWS TOTAL (PP/DH/HA/OTHERS)	BH	KH	QEH	Subtotal	HOHH	TKOH	UCH	Subtotal	CMC	KWH	OLMH	PMH	WTSH	YCH		Subtotal
CARDIOLOGY	251	0	0	17	17	0	5	7	12	2	9	1	10	0	6	28	57
CLINICAL PHARMACOLOGY & THERAPEUTICS	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CRITICAL CARE MEDICINE	92	0	0	7	7	0	4	6	10	5	5	0	6	0	1	17	34
DERMATOLOGY & VENEREOLOGY	103	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ENDOCRINOLOGY, DIABETES & METABOLISM	107	0	0	8	8	0	5	4	9	2	5	2	5	0	2	16	33
GASTROENTEROLOGY & HEPATOLOGY	182	0	0	6	6	0	5	4	9	5	8	1	9	0	7	30	45
GERIATRIC MEDICINE	187	1	8	4	13	3	2	14	19	8	12	2	3	5	5	35	67
HAEM/HAEM ONCOLOGY	60	0	0	7	7	0	2	2	4	0	0	0	6	0	0	6	17
IMMUNOLOGY & ALLERGY	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
INFECTIOUS DISEASE	41	0	0	7	7	0	0	1	1	0	0	0	5	0	0	5	13
INTERNAL MEDICINE	1323	2	12	84	98	7	30	50	87	35	55	8	72	6	28	204	389
MEDICAL ONCOLOGY	47	0	0	3	3	0	0	2	2	0	1	0	1	0	0	2	7
NEPHROLOGY	130	0	0	9	9	1	2	6	9	2	9	0	9	0	2	22	40
NEUROLOGY	114	0	3	9	12	0	2	4	6	1	5	1	4	1	2	14	32
PALLIATIVE MEDICINE	27	1	0	0	1	4	0	2	6	5	0	1	0	1	0	7	14
REHABILITATION	55	0	9	1	10	1	0	4	5	1	1	1	1	3	0	7	22
RESPIRATORY MEDICINE	186	1	6	7	14	6	4	8	18	5	6	0	6	4	2	23	55
RHEUMATOLOGY	77	0	2	5	7	0	2	3	5	3	5	0	3	0	3	14	26

		FELLOWS										NEW TERRITORIES EAST + WEST CLUSTER
		NEW TERRITORIES EAST CLUSTER						NEW TERRITORIES WEST CLUSTER				
SPECIALTY	FELLOWS TOTAL (PP/DH/HA/OTHERS)	AHNH	NDH	PWH	SH	TPH	Subtotal	POH	TMH	Subtotal		
CARDIOLOGY	251	4	6	14	1	0	25	3	10	13	38	
CLINICAL PHARMACOLOGY & THERAPEUTICS	8	0	0	5	0	0	5	0	0	0	5	
CRITICAL CARE MEDICINE	92	4	6	2	0	0	12	0	6	6	18	
DERMATOLOGY & VENEREOLOGY	103	0	0	3	0	0	3	0	0	0	3	
ENDOCRINOLOGY, DIABETES & METABOLISM	107	1	5	16	1	0	23	1	4	5	28	
GASTROENTEROLOGY & HEPATOLOGY	182	3	4	10	0	0	17	7	9	16	33	
GERIATRIC MEDICINE	187	2	2	6	9	4	23	3	12	15	38	
HAEM/HAEM ONCOLOGY	60	0	0	5	0	0	5	0	6	6	11	
IMMUNOLOGY & ALLERGY	6	0	0	0	0	0	0	0	0	0	0	
INFECTIOUS DISEASE	41	3	0	3	0	0	6	0	2	2	8	
INTERNAL MEDICINE	1323	25	27	88	12	9	161	22	67	89	250	
MEDICAL ONCOLOGY	47	0	0	18	0	0	18	0	0	0	18	
NEPHROLOGY	130	5	1	10	0	0	16	2	6	8	24	
NEUROLOGY	114	2	1	12	1	0	16	3	3	6	22	
PALLIATIVE MEDICINE	27	0	0	0	2	0	2	0	1	1	3	
REHABILITATION	55	0	1	2	1	1	5	1	3	4	9	
RESPIRATORY MEDICINE	186	4	7	7	0	3	21	2	8	10	31	
RHEUMATOLOGY	77	3	0	5	0	3	11	1	3	4	15	



Professor Yuen Kwok Yung

MB BS(HK), MD(HK), FRCS(Glas), FRCPath(UK), FRCP(Edin. Lon. & Irel.)
Academician, Chinese Academy of Engineering (Medicine and Health)
Henry Fok Professor of Infectious Diseases
Chair of Infectious Diseases
Department of Microbiology
University of Hong Kong

John Mackay

Although their backgrounds are very different, the career of Professor Yuen invites comparison to that of the former resident in Hong Kong and medical microbiologist, Sir Patrick Manson. They have both built international recognition as a result of their discoveries regarding infectious diseases, Manson on the basis of clinical observation and a primitive microscope; Yuen, exactly one hundred years later, with the same clinical acumen but aided by the most sophisticated of modern laboratory equipment.

Yuen's great grandfather and grandfather were Chinese Medicine practitioners but after the Communist takeover in 1947 his grandfather was labeled a 'Capitalist', and in the early 1950s all his six clinics were closed down. Such was his reputation that he continued to be consulted by many peasants and also city dwellers even later during the Cultural Revolution. Yuen's father fled from Guangdong to Hong Kong in the 1950s and apprenticed as an assistant dentist, building a career and his family in Hong Kong.

Manson's father was a bank manager from a landowning family in Aberdeenshire in Scotland and could afford to send him to Aberdeen University from which he qualified at the age of 19. In 1866 he came to Asia and spent the next 23 years here.

In Hong Kong, Yuen's father continued working as a dentist under the title of Dental Assistant, sending money back to support his parents during the difficult Great Leap Forward years. Yuen Kwok

Yung was born in 1956 in Hong Kong, one of four brothers. His primary schooling was at a Sir Ellis Kadoorie School in Sai Ying Pun where after his first year, he was always first in his class. For secondary schooling he gained entrance to Queen's College where he found the competition tougher but still managed to be placed in the top four of his class for all subjects.

His first childhood ambition to be an astronaut faded when he realised that no astronauts wore glasses. His second ambition was to be a veterinarian because he loved animals and kept many at home; while with his parents during childhood, he reared fish, birds, dogs, cats, silkworms, tortoises, sea cockroaches, mice and spiders. This dream was not possible because there was no Veterinary school in Hong Kong and the family could not afford to send him to Australia for training.

Yuen's final choice was Medicine. He entered Hong Kong University Medical School in 1976 and qualifying with Distinction in Medicine in 1981.

Early Postgraduate training was focused on surgery, six months at the Princess Margaret Hospital orthopaedic unit, followed by six months in the department of Internal Medicine at the Queen Mary Hospital.

Clinicians that particularly influenced Dr Yuen were Professor David Todd: "He is the most astute clinician that I have ever met. While walking past a pigmented patient lying on a camp bed over the corridor during ward round, he asked the medical officer to check the morning cortisol level of this patient, previously

treated for non-Hodgkin lymphoma. It turned out that the patient was suffering from severe hypoadrenalism. He is a man of honor and principle who always speaks up for the truth."

"Professor Rosie Young: She always has a deep concern for the medical students, like our mother. She is very meticulous to details and always seeks for the earliest symptom of metabolic disturbances such as pins and needles sensation of the fingers which turns out to be important for the adjustment of medications."

"Professor Richard Yu: He is the Godfather of the medical alumni who always strives to improve the standard of medical training. With his unfailing leadership, he started the conjoint training program of clinical microbiology and infectious disease by breaking the wall between the College of Physicians and College of Pathologists at the negotiation table. He is a very candid person who can use very extraordinary language to scold those who are obstructive with alternative agenda."

Post internship he had eighteen months of medicine at the United Christian Hospital under Dr Judith Longstaff (Mackay), and three years of surgery at the United Christian Hospital. He passed the first part of the Surgical Fellowship exam in Hong Kong and went to Glasgow to complete the second part in 1985. Life was not all work at the United Christian Hospital. He met his wife, Louisa Siu-Yee Wong a nurse in the Intensive Care Unit, and married her in 1987. Together they used to enjoy long hikes in the hills of Hong Kong, some

PROFILE DOCTOR

time later she became ill and was not able to accompany him.

After leaving the United Christian Hospital he decided not to continue with Surgery. He was attracted by the idea of Immunology but decided to opt for a post where at that time there was a clearer career path, as Clinical Bacteriologist in the department of Microbiology at the QMH under Professor Mun Hon-Ng. It has been a happy choice for him and his chosen specialty.

When he joined the department in 1988 there were seven faculty members and a staff of 27. There are now 11 faculty members and a staff of over a hundred. In 1990, Dr. Yuen spent four months at the Fred Hutchison Cancer Research Centre of Seattle where he studied cytomegalovirus infection so that he could set up the infectious disease service for Bone Marrow Transplants at Queen Mary Hospital. In 1991 he spent another three months at the Royal Liverpool Hospital under Professor Allan Percival and came back to Hong Kong after passing the exam for Membership of the Royal College of Pathologists in Microbiology; and was elected a Fellow of the College in 1998.

International recognition came in 1997 after he was the first clinician to report, in the Lancet, on the 'Bird Flu' H5 N1 epidemic in Hong Kong and its clinical severity and high death rate.

In 1999 he was appointed Clinical Professor in the Henry Fok Chair of Infectious Diseases.

In 2003 Professor Yuen led his team in identifying the coronavirus that was the cause of the SARS (Severe Acute Respiratory Syndrome) that was ravaging Hong Kong and Guangdong. For this work he was honoured in "Asian heroes of the year" in April by Time Asia Magazine. The virus was not present in the general population so the source had to be an animal. Investigation at the Dongmeng wild animal market showed that it was present in caged civet cats, but later found not to be present in wild Civet Cats. Further investigation showed that the Civet cats had most likely become infected in the Dongmeng market by another animal source which was finally traced back to the Chinese Horseshoe bat. The conclusion was, that the natural reservoir was the Chinese Horseshoe Bat, published in 2005 in the

Proceedings of the National Academy of Sciences, USA

Premier Wen Jiabao visited his laboratory after the SARS epidemic and appointed it as the first State Key Laboratory of Emerging Infectious Disease of China, situated outside the mainland, for which there is an annual HK\$5 million of grant support from the Innovation and Technology Commission.

Other honours followed: he was elected as an Academician of the Chinese Academy of Engineering (Basic Medicine and Health); and with a Silver Bauhinia Star (SBS) in Hong Kong.

Professor Yuen was on the government Advisory Council on Food and Environmental Hygiene, and on the Microbiological Safety of Food, both for the maximum six years. He now is the Chair of the Scientific Committee on New and Infectious Diseases. Professor Yuen has published over 700 articles in peer reviewed journals, illustrating a breadth of interest in his search for the cause of newly emerging infectious diseases.

Other past and present positions held are; the scientific co-director of the Hong Kong University – Pasteur Research Centre, and the Academic Director of the postgraduate diploma course in infectious Diseases. He is an Honorary Consultant at Department of Microbiology at Queen Mary Hospital, at St, Paul's Hospital, Haven of Hope Hospital and Ruttonjee Hospital. Outside Hong Kong he is a Joint Professor at Fudan University in Shanghai.

When interviewed at his headquarters in the Microbiology Department Professor Yuen had just come down from the wards where he had been examining a patient. He said how important he believed it was for all the new entrants to his department to have the clinical grounding of an MRCP in Medicine before they entered specialist

training, so that they could consult with their colleagues on the wards on an equal footing regarding patients with complicated diagnostic problems, and communicate effectively with the patients.

He emphasised the important triumvirate exemplified by Sir Patrick Manson, to which he adhered also, namely, clinical work, teaching, research and publication.

Regarding teaching he said it has become difficult to fit in the increasing number of students, and regrets the previous reduction in student intake which has led to the current shortage of doctors in Hong Kong.

He is enthusiastic about medicine as a career, as an opportunity to do good work and communicate with people. His one regret is the observation that many doctors are not using enough English, the language of international scientific communication.

Regarding treatment of the current seasonal Flu epidemic his opinion was that oseltamivir, Tamiflu, had a marginal benefit if taken at the onset of the disease, and was more useful as a prophylactic for vulnerable populations such as health workers and people living in care facilities. He thought that the present stocks of oseltamivir should be used up but not replaced: other more effective medications are becoming available like polymerase inhibitors. On a broader outlook he thinks that future treatment of infections may depend less on antibiotics and more on immunotherapy.

Professor Yuen has many years to go before retirement but when pressed to say what he might do in the future, he said he might spend time studying medical history and particularly the career of Sir Patrick Manson, the man who has stimulated his own successful search for answers regarding the cause and spread of new epidemics.



Prof Yuen received the Fellowship without examination at our College's Annual General Meeting in Oct 2002