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傳染病跟香港有三重特殊關係。香港位處全球其中一個最擠迫的地區——華南，人類、禽鳥和牲畜都生活在同一個小地方，因而容易引發傳染病。此外，香港作為國際大都會，與世界各地皆有頻繁的交通往來，若有傳染病在本地爆發，有可能散播至其他地區。然而，香港擁有世界一流的研究實驗室，能夠迅速找到及辨認出病原，並追蹤其擴散情況。

其實，本地的醫學科研人員在預防傳染病方面，例如禽流感、「沙士」和肝炎等，均有出色表現。在二零零三年的「沙士」疫潮中，香港的科學家全球率先找到疫症的元凶為冠狀病毒，在一九九七年他們亦曾協助阻止禽流感在香港以至全球爆發。科研人員的驕人成就，正好展示醫學研究對預防傳染病的重要性。

有鑑於此，香港大學醫學院自創院以來一直十分重視傳染病的研究，我們第一屆的醫學院院長白文信教授更有「熱帶醫學之父」之稱。港大醫學院亦積極與世界級傳染病專家合作，包括法國巴斯德研究所、愛滋病專家何大一、流感專家Robert Webster等。我們很有信心，聯合研究的成果會使醫學界及市民對流行病學、致病原因、治療、免疫和傳染病的預防等等有更深入的了解，使我們的社區能防患於未然。

我們希望透過這本小冊子，與社會各界分享我們的研究心得，加深市民對傳染病的認識，並繼續支持港大醫學院以科研守護香港。

香港大學醫學院院長林兆鑫

林兆鑫

二零零四十月
Hong Kong is intertwined with infectious diseases in three unique ways. Its geography in South China is such that it is right at the centre of one of the most populated regions of the world, where human, poultries and farmed animals live in close proximity – a situation ideal for infectious microbes to disseminate and amplify. As an international city and with traffics linked extensively to the world, Hong Kong could spread an infection outbreak worldwide. However, its world-class research laboratories mean that the infectious agents could be picked up quickly and identified, and their spread checked in Hong Kong.

In fact, the local scientists have made ground-breaking discoveries in H5N1 influenza ("the bird flu"), SARS, hepatitis, etc. They identified SARS coronavirus as the primary agent causing the outbreak of atypical pneumonia in 2003, and helped Hong Kong and the world to avoid a bird flu outbreak in 1997. Their work shows that research is of paramount importance in combating infectious diseases.

Since its establishment, the Faculty of Medicine of the University of Hong Kong has been committed to excellence of research in infectious diseases. The first Dean of Medicine was Sir Patrick Manson who came to be known as "the Father of Tropical Medicine". Also, the Faculty has close collaborations with Institute Pasteur of France, and internationally renowned scholars such as AIDS expert, Dr. David Ho, and influenza expert, Professor Robert Webster. We are confident that the project of joint research will benefit the community of Hong Kong and mankind as a result of the enhanced understanding of epidemiology, pathogenesis, treatment, immunization and prevention of infectious diseases.

It is hoped that this booklet can raise the public awareness in infectious diseases. With the support from the community, we will continue to safeguard Hong Kong people's health by medical research.

Professor S.K. Lam
Dean, Faculty of Medicine
The University of Hong Kong

October 2004
Infectious Diseases have plagued mankind since the antiquity and are still major causes of death and suffering in many parts of the world. The close encounter with H5N1 influenza in 1997 and SARS outbreak in 2003 had been a dreadful experience. At the same time, about one tenth of the population of Hong Kong is chronic carriers of hepatitis B virus infection and hence is at high risk for the development of chronic hepatitis, cirrhosis and liver cancer.
Research in infectious diseases has been carried out in the Faculty of Medicine, the University of Hong Kong for many years. Findings that have local, regional, or even international significance were made repeatedly. The first Dean of the Hong Kong College of Medicine (from this College the Faculty was created), was Sir Patrick Manson who came to be known as "the Father of Tropical Medicine".

One key feature of Faculty of Medicine's research is the emphasis on "relevance" to Hong Kong and the region. Being one of the most reputable universities in Asia, the University of Hong Kong has contributed significantly to the detection and tracking of locally and regionally important infectious diseases, hence contributed immensely to the understanding of infection diseases and helped the Government in formulating health policies.

The University will continue to put together expertise in the research of infectious diseases, and hence contribute to more effective control of infectious diseases.
Emerging infectious disease is a key research area of the Department of Microbiology in the University of Hong Kong, which has been committed to the detection and tracking of infectious diseases in the region, so as to understand the epidemic and help the Government formulate health policies. To predict emerging infectious disease, researchers not only focus their research on patients, they also carry out environmental and animal surveillance so that the appearance of new pathogens can be detected before they infect human beings.
追蹤冠狀病毒

二零零三年三月，港大醫學院發現引發「沙士」的元兇是一種全新的冠狀病毒，為全球揭開「沙士」的神秘面紗。

在非典型肺炎的戰疫中，微生物學系系主任袁國勇教授設定研究方向，領導眾微生物學家各展所長，其中病毒組主管裴偉士教授專注研究基礎病毒學，而管轄博士和鄭伯建博士則集中研究動物病毒學。

初期研究人員曾懷疑引起疫潮的是H5N1禽流感病毒，管轄博士和鄭伯建博士隨即到廣州取得內地非典病人的組織樣本，證實病毒並非禽流感。樣本交給陳國雄博士以猴子腎細胞腺成功培植出「沙士」病毒。研究病毒基因的潘烈文博士藉以排出一小截病毒基因，微生物學系終於成功確定「沙士」是一種全新的冠狀病毒。
Tracking the virus

In March 2003, the Faculty attracted worldwide attention with the discovery of the primary agent causing the outbreak of atypical pneumonia, a virus now known as SARS coronavirus (SARS-CoV).

As the Head of Microbiology, Professor KY Yuen set the direction and underpinned the actions of his group of microbiologists, which ultimately led the Department to victory over SARS. Professor JSM Peiris focused on basic virology while Dr Guan Yi and Dr BJ Zheng on zoonotic virology.

At first, H5N1 was suspected to cause the epidemic. Dr Guan and Dr Zheng went to Guangzhou to gather patient specimens, and discovered that the causative agent was not H5N1. Dr KH Chan then grew the virus in isolation and Dr LLM Poon isolated a fragment of the SARS gene. The team finally identified a new virus, SARS-CoV.
除此之外，醫學院在「沙士」研究上還有多項驕人成就：

A. 開發快速基因及血清測試
B. 觀察臨床病況變化
C. 發現糞便可能是感染途徑之一
D. 完成病毒的基因排序 (與港大理學院合作)
E. 建議抗病毒的藥物
F. 在果子狸等野生動物身上發現「沙士」病毒

**阻止再度爆發**

發現「沙士」冠狀病毒源自野生動物，對控制及預防「沙士」再度爆發有決定性的影響。研究顯示，在二零零三年底的四宗人類「沙士」證實個案中，病毒均源自食品市場中的野生動物。自廣東省在二零零四年一月銷毀所有市場中的野生動物後，就再無源自社區的新個案，可見此政策之成效，和尋找疫病源頭之重要。
The Faculty of Medicine has also pioneered other groundbreaking research into this new disease:

A. Rapid diagnosis of SARS-CoV pneumonia by genetic and antibody testing
B. Clinical description of the progress of SARS
C. Identifying faeces as one of the possible modes of transmission
D. Cracking the genetic sequencing of the SARS-CoV (collaborative study with Faculty of Science)
E. Advice on the effective therapeutic regimens for SARS
F. Finding the reservoir of the virus in wild animals including civet cats

**Averted second SARS outbreak**

The discovery that the human SARS-CoV was transmitted from wild animals is critical in controlling and preventing SARS outbreak in the future. Phylogenetic analyses suggested that SARS-CoV from the four confirmed human cases of SARS found in late 2003 were originated from wild animals in the markets. After removing all wild animals from food markets in January 2004, no new human case was found. Thus, the operation of culling civets and closing wild animal markets in Guangdong did remove the infectious source and averted another potential SARS outbreak.
臨床研究

除了發現「沙士」冠狀病毒，開發快速測試，找出病毒的宿主和可能的傳播途徑，香港大學微生物學系更與醫院管理局的胸肺科及深切治療部的醫生進行多方面的合作，包括研究臨床描述、病情跟病之病毒量和血清抗體的關係，抗病毒藥物與觀察病之X光肺片的變化。這些研究結果對有效控制「沙士」非常重要。

在成功控制疫情後，研究人員並沒有鬆懈，繼續探索「沙士」的發病機理，如何在動物之間傳播，病毒基因的結構和非結構性組織，以及病毒在動物身上的致病性。這些重要的研究將有助開發更快更準確的診斷測試，發展安全有效的抗病毒藥物和免疫法。
B

改良診斷測試

港大微生物學系研製出較便宜簡便的「恆溫快速測試」。這個新方法毋須使用昂貴複雜的儀器，每次測試只需二十至三十元，成本遠較每次需要過百元的傳統方法為低，可協助發展中國家為病人進行測試，有助快速控制疫情。不過，新測試的研究仍屬於初步階段，港大將會繼續改善有關測試，以提升其的敏感度。

Improve diagnostic test

A rapid and simple diagnostic test for SARS, namely Loop-Mediated Isothermal Amplification Assay (LAMP test), has been developed. This new test can be performed with simple equipment. A single LAMP test costs $20 to $30 compared with traditional methods which cost at least $100, making it cheaper for developing countries to detect the disease quickly. The development of LAMP test is still in early phase. The University will continue to improve its sensitivity.

C

研製疫苗

研究人員正進行人和動物的「沙士」疫苗的研究，包括滅活疫苗、亞單位蛋白疫苗、DNA疫苗和減毒活疫苗的可行性。初步發現，滅活疫苗能阻止活病毒感染細胞，減低活病毒感染性達一萬倍。初步研究結果亦顯示，滅活疫苗能有效誘導抗「沙士」的免疫力。疫苗現正等候進行動物測試。

Vaccine development

The study focuses on development of vaccines for prevention of human SARS and animal SARS-like virus infection, including inactivated vaccine, protein vaccine, DNA vaccine and attenuated live vaccine. The initial study has found that the inactivated vaccine blocked the infectivity of the live virus for up to 10,000 times. Preliminary results suggest that vaccination can induce protective immunity against SARS virus infection, but it needs to be confirmed by animal studies.
Possible antiviral drugs for treatment

A high-throughput screening platform has been established and it has screened more than 50,000 structurally diverse small molecule compounds for anti-SARS-CoV activities in a cellular model. The study led to the identification of a reservoir of one hundred potent inhibitors targeting various components of SARS-CoV, providing a novel group of potential leads for anti-SARS drug development.

On the other hand, the small interfering RNA (siRNA) duplex has been proven to be a potent agent for knocking out gene expression in mammalian cells through mRNA disruption. SiRNAs has been designed targeting on different genes of SARS-associated coronavirus and demonstrated that some of these siRNAs are able to reduce SCoV infection and replication by 90-99%. However, the delivery of siRNA is still a major technical challenge for clinical application, researchers will continue to pursue in this area.
禽流感
Avian influenza

一九九七年禽流感首次在香港出現以來，港大醫學院一直與香港政府合作進行有關研究，包括確認病毒來源、傳播途徑、基因排序及變化、人類發病的原因、實驗技巧和研製預防疫苗。研究成果有助政府制訂公共衛生政策，例如休市清潔日、家禽用疫苗、食品市場監控、農場的生物安全措施等。港大與政府的合作，有助追蹤傳染病的出現，以便及時採取相應措施防止疫情擴

大。在二零零四年初，亞洲大部分國家都出現禽流感個案，香港卻能幸免於難，可見本港防疫措施的成效。此外，港大的微生物學家亦為世界衛生組織提供專家意見，協助研究在東南亞出現的禽流感。

禽流感的源頭

在二零零二年至零四年間，汕頭大學醫學院與香港大學醫學院的聯合流感研究中心，及其他六個機構合作，進行H5N1禽流感的研究。研究顯示，禽流感已成為東亞地區的風土病。家鴨作為流感病毒的自然宿主，在H5N1禽流感病毒的演變過程中起著關鍵性作用，一些對人類有威脅的新病毒仍然不斷在家鴨中衍生。而野生禽鳥很可能是傳播H5N1至其他地區的媒介。科學界需要透過長遠的監測措施及進行病毒基因排序，以及早找出引致禽流感爆發的病毒種類。
Since 1997, Faculty of Medicine's researchers, in collaboration with the HKSAR Government, have worked on bird flu research, which includes identifying the source of the virus, how and why it is spreading in this region, genetic sequencing of the virus for understanding how the virus is changing, understanding why the H5N1 virus causes such severe disease in humans, and also laboratory techniques and vaccine development.

The research results have helped the Government in formulating public health policies, such as the introduction of rest day for poultry retail outlets, vaccination for poultry, surveillance in markets and setting up of biosecurity measures in farms.

The collaborative efforts between the University of Hong Kong and the government help to detect infection before mass dissemination and this has facilitated the introduction of protective measures. In early 2004, while bird flu outbreaks occurred in many countries in Asia, Hong Kong remained free from this epidemic. This shows that the interventions made by government based on scientific research are effective. Also, microbiologists of the University have been consultants to World Health Organization in investigating H5N1 outbreak in Southeast Asia.

**Origin of avian influenza**

Between 2000 and 2004, a study has been conducted under the auspices of the Joint Influenza Research Centre of Shantou University and the University of Hong Kong, together with six other collaborating institutes. The results suggested that domestic ducks, which form the major influenza gene pool in southern China, played a central role in the maintenance and genesis of H5N1 influenza viruses. The findings also suggested that new influenza viruses that may pose a threat to human continue to be generated from ducks, although wild birds may be involved in spreading the disease over large areas. Through long term surveillance and genetic analysis, scientists will be able to quickly identify the H5N1 strain causing outbreaks in poultry and fatal disease in human.
Influenza is an acute febrile illness mainly affecting the respiratory tract. It presents in Hong Kong all year round and is especially common in February, March, July and August. Frequent mutation of the virus's genes leads to the emergence of new subtypes that are responsible for epidemics or pandemics.

The University of Hong Kong has been at the forefront of research into the epidemiology of influenza viruses, avian, animal and human for many years. Researchers conduct research on the ecology, molecular evolution and epidemiology of animal and avian influenza, inter-species transmission, vaccine development, immuno-pathogenesis and viral macrophage interactions, diagnostic methods and disease burden and health economics of human influenza.

Professor Robert Webster, Professor at the St. Jude Children's Research Hospital and an authority in influenza, has agreed to collaborate with the University of Hong Kong on the establishment of an Influenza Centre based in Hong Kong. This joint venture will build upon the existing Influenza Virus Research Programme at the Faculty of Medicine and make use of the strategic location of Hong Kong for epidemiological surveillance and research on avian influenza in South China.
愛滋病的學名是「後天免疫力缺乏症」，患者體內的免疫系統受到愛滋病毒（學名為「人類免疫力缺乏病毒」）的損害。愛滋病毒破壞人類抵抗病菌入侵的白血球。一旦白血球數量不足，人類的免疫能力就會被削弱，無法抵抗周遭環境中的致病原，因而併發其他感染。本來對正常人威脅不大的疾病也會變得致命。

港大醫學院成立了「愛滋病研究中心」，目標是協助控制亞洲區的疫情。研究中心進行愛滋病毒的基礎研究和應用研究，開發新療法和疫苗，為中國以至全球謀福祉。

AIDS stands for "Acquired Immunodeficiency Syndrome" which is an infection caused by HIV, the "Human Immunodeficiency Virus". The virus attacks human's white blood cells, which are the lines of defence against diseases and infections. When the body's immune system and its ability to repair damage becomes weakened, certain diseases which cause few problems in normal people become life-threatening to HIV infected patients.

The University of Hong Kong established the AIDS Institute with the objective of preventing the extension of the epidemic in Asia. The Institute conducts basic and applied research on HIV, creates and designs new therapies for the infection and develops AIDS vaccines for China and the world.
Bronchiectasis is a common respiratory disease in Hong Kong though there is currently no effective treatment. Affected patients have permanently dilated airways, and they chronically produce sputum, cough up blood and continue to deteriorate. Although bronchiectasis is considered uncommon in the West, it is very common among the Orientals.

Treatment of bronchiectasis with anti-inflammatory and immunomodulating drugs

The Department of Medicine has pioneered the use of inhaled steroid and low dose erythromycin therapy, which are anti-inflammatory and immunomodulating drugs for these unfortunate patients. Apart from undertaking clinical trials, basic laboratory research is also done on bronchiectasis to try to understand the pathogenesis of bronchiectasis. It is aimed to design effective novel treatment in the future.

Investigators in-charge:
- KWT Tsang, Department of Medicine
- CGC Ooi, Department of Diagnostic Radiology
Sputum pathogens in airway infection

It is important to be able to predict the identity of bacterial pathogen in the sputum of patients with bronchiectasis, so that antibiotics can be prescribed scientifically for patient with exacerbations. The Faculty of Medicine has identified that patients with poor lung function as well as those with a lot of sputum production (e.g. more than 20ml daily) are likely to harbour *Pseudomonas aeruginosa* while the others are likely to have *Haemophilus influenzae*, thus helping doctors select the correct antibiotics in the early phases of treatment of bronchiectasis exacerbation.

Investigators in-charge:

曾華德 KWT Tsang, 內科学系 Department of Medicine;
何栢良 PL Ho, 微生物学系 Department of Microbiology
**Pneumonia**

Pneumonia is a lung infection caused by bacteria, virus or fungus. Cases can be divided as hospital-acquired pneumonia and community-acquired pneumonia, while the latter is more common.

**Treatment of community-acquired pneumonia**

Community-acquired pneumonia (CAP) is a very common condition in the Asian Pacific region. The germs causing pneumonia appear to be different from those in the West thus making it important to carefully delineate those causing CAP in Asia and Hong Kong in order that the correct antibiotics are used to treat patients with CAP. The University of Hong Kong's recent research shows that patients with CAP are affected by *Chlamydia pneumoniae* (11.3%), *Mycoplasma pneumoniae* (3.2%) and *Legionella pneumophila* (1.6%) in Hong Kong. It is hoped to formulate, along with colleagues in this region, sensible antibiotic treatment for patients with pneumonia.

**Clinical and bedside diagnosis**

The control of SARS requires early diagnosis and prompt isolation of all suspected cases. The Department of Medicine has developed a scoring system which makes use of the presence of proof of contact with a patient, rapid deterioration in chest x-ray appearances, aches and pains, low lymphocyte (white cell) count, and elevation of liver enzymes. This prediction rule is 98% sensitive and should be useful for all health care workers dealing with potential SARS patients.

**Investigators in-charge:**

KWT Tsang, Department of Medicine; PL Ho, Department of Microbiology
Other research on respiratory infection

Respiratory cilia and defence of airways against inhaled pathogens

Cilia are minute hair-like structures present on the surface of airway and beat continuously at 10-18Hz to keep the lungs sterile. As people inhale large volume of potentially contaminated air every day and need to remove waste from the lungs, ciliary dysfunction would be associated with frequent or even persistent infection of the lungs. The University is one of the few units in the world which has capabilities to evaluate ciliary function as well as structure, using special light as well as electron microscopes. This research has revealed that abnormalities of cilia are very common in patients with persistent infection, and have identified several defects not known previously.

研究員 Investigators in-charge:
曾華德 KWT Tsang, 內科學系 Department of Medicine;
GL Tipeo, 解剖學系 Department of Anatomy

慢阻肺
慢阻肺是香港及整個亞洲常見因吸煙而引起的呼吸道疾病。患者經常咳嗽及多痰，亦會有氣短及急性病發的危險。為了更深入明白氣管感染及細菌長期存在的原因，港大的研究員和本港很多肺科醫生合作，研究透過收集資料及痰液的研究，找出新的治療方法。

Chronic Obstructive Pulmonary Disease
Chronic Obstructive Pulmonary Disease is a common disease among smokers in Hong Kong and Asia. Patients regularly produce sputum and cough. Some patients suffer from shortness of breath and acute attacks. The University's researchers, in collaboration with leading physicians in other parts of Hong Kong, have looked into the factors leading to persistent infection of the airways among these patients.

研究員 Investigators in-charge:
曾華德 KWT Tsang, 內科學系 Department of Medicine;
何炳良 PL Ho, 微生物學系 Department of Microbiology
慢性乙型肝炎是最為人關注的病毒性傳染病之一。全球約有四億人为帶病毒者，其中有四分之三是華人。

醫學院內科學系的肝病科自一九八零年起研究慢性乙型肝炎。研究發現，慢性乙型肝炎在病毒複製率不高的情況下，病情仍會惡化。因此，未來治療慢性乙型肝炎的方向，將會是加強及持續抑制病毒的活動。

醫學院率先研究以干擾素治療兒童病人，但發現此療法對華人帶病毒者並無長遠功用。醫學院繼而開發使用核苷酸類似物，為治療乙型肝炎帶來革命性的進展。「拉米夫定」是第一種註冊的有關藥物。在二零零零年，醫學院獲頒發「百時美施貴寶生物醫學研究資助 - 卓越傳染病研究獎」，表揚醫學院在研究慢性乙型肝炎的自然演進和治療上的成就。研究人員現正開發新一代更強的抑制乙型肝炎病毒的藥物，例如entecavir和telbivudine。

對付乙型肝炎的根本方法，是為新生兒和兒童注射疫苗。在八十年代初期，當乙型肝炎疫苗剛開始測試時，醫學院已開始爭取安排疫苗注射和測試，並且長期跟進已接受注射的兒童，觀察他們的免疫能力。研究發現，已接受乙型肝炎疫苗注射者，無須注射加強劑，仍能保持免疫能力，相信這是與人體免疫系統的記憶功能有關。
Chronic hepatitis B infection is of global importance, affecting 400 million people. It is of special importance in China since 75% (300 million) of the hepatitis B carriers in the world are Chinese.

The hepatologists of the Faculty of Medicine has been investigating various aspects of chronic hepatitis B infection since 1980. In the natural history of chronic hepatitis B, it was realized that the disease may continue to progress at moderately low level of viral replication. So future treatment should aim at maximal and continual suppression of the virus throughout life.

The Faculty pioneered studies of interferon treatment in children. It was found that interferon treatment is of no long-term benefit in Chinese hepatitis B carriers. The Faculty then played a key role in establishing the use of nucleoside analogues in carriers. This new type of therapy has completely revolutionized the treatment of hepatitis B. The first such drug to be licensed was lamivudine. For the distinguished work done in the investigation of the natural history and treatment of chronic hepatitis B, the Faculty was awarded the Bristol-Myers Squibb Unrestricted Biomedical Research Grant for Distinction in Infectious Diseases in 2000. The Faculty is currently investigating a few even more potent nucleoside analogues such as entecavir and telbivudine.

The ultimate way to tackle hepatitis B infection is to vaccinate children and newborns. The Faculty had been involved in testing and planning for vaccination against hepatitis B since vaccines were first available for trials in the early 1980s. In a long-term follow-up of children who have been vaccinated, it is found that no booster dose is required for continued protection of the vaccine recipient, probably through the memory response of the human immune system.
在中國，乙型肝炎感染是一個嚴重的威脅。由於併發症如肝硬化和肝癌引致死亡的人數每年超過五十萬。儘管其重要性，中國每年二千萬新生兒中，只有少於半數能夠接受全程乙肝疫苗接種。香港大學內科學系廖家傑醫生、香港大學醫學院院長林兆鑫教授、梁智鴻醫生及胡國興大法官，以及一些社會賢達，於一九九八年成立了程思遠（中國·國際）肝炎研究基金會。

基金會的目的是促進在香港與肝炎相關的研究、教育和預防。經過一番努力，基金會發起了「世代無肝炎」計劃，在中國農村地區開展與肝炎相關的教育及預防肝炎的工作（詳情請瀏覽: www.hepafree.org），並且製作了與乙型肝炎預防、流行病學及治療相關的教育短片，發放到國內不同的地方。

另外，基金會還開展了與慢性乙型肝炎預防和治療相關的研究，而且已晉身為全球慢性乙型肝炎免疫治療和聯合治療的重要中心。研究得到了國家科技部973計劃的資助。透過研究員的努力，聚乙二醇干擾素（普通干擾素經過改進）有機會成為慢性乙型肝炎治療的選擇。

另一方面，基金會組織了三次國際肝病會議，其中二零零四年舉辦的會議吸引了超過一千六百人前來參加，並收到五百多篇論文摘要。在過去的六年，基金會資助了超過二十名學者前往外地進行有關肝炎的研究。
In China, hepatitis B infection is a major health threat. Due to its complication, viz liver cirrhosis and liver cancer, hepatitis B infection causes an annual death toll of more than half-a-million. Despite its importance, each year, less than half of the 20 million newborns in China was fully vaccinated against hepatitis B. Dr George Lau (Associate Professor, Department of Medicine, the University of Hong Kong), Professor Shiu-Kum Lam (currently Dean of the Faculty of Medicine, the University of Hong Kong), Dr Che-hung Leong, The Hon Mr Justice Kwok-Hing Woo, and in conjunction with the community elite group, have founded the Cheng Si-yuan (China-International) Hepatitis Research Foundation in 1998.

The aims of the Foundation are to promote hepatitis-related research, education and vaccination in China. Through its activity, the foundation has advocated “Hepatitis-free generation” campaign, dealing with hepatitis-related education and vaccination problem in rural China (www.hepfree.org). Education video, relating to prevention, epidemiology and treatment of hepatitis B infection, has been produced and delivered to different part of the country where it is needed.

In addition, research activities aiming to improve the understanding in prevention and treatment of chronic hepatitis B infection has been implemented. Notably, it is world leading centre for the development of new form of immune therapy and combination therapy for chronic hepatitis B infection. The research activity has been supported by the prestigious 973 research grant by the China Ministry of Science and technology. Through the Foundation’s effort, pegylated interferon (an improved version of interferon) will become the treatment of choice for chronic hepatitis B infection.

On the other hand, the Foundation has also organized three International Liver Congress. Indeed, the Year 2004 Congress has drawn a record-breaking attendance of over sixteen hundred participants (with over 100 internationally renowned faculties) and more than 500 abstracts submission. Over the past 6 years, the Foundation has sponsored more than 20 scholars to study hepatitis outside Mainland China.

Research Investigator in-charge:
廖家杰 GKK Lau, 内科学系 Department of Medicine
In 2001, the Centre of Infection of the University of Hong Kong discovered a new bacterium found in the blood of a cirrhotic patient with community-acquired infection resulting in pus formation in the pleural space. The bacterium was found to be a novel genus and species not previously described. The bacterium was named by the Department of Microbiology of the University of Hong Kong as *Laribacter hongkongensis*. *Lari* for its seagull-shaped appearance under the microscope; and *hongkongensis*, in honour of Hong Kong, the place where the bacterium was first discovered, and the place where the researchers were born, educated and lived. Since the announcement of this discovery, *L. hongkongensis* has been intensively sought in faecal specimens of patients with gastroenteritis. Some cases were found in Hong Kong and some in Switzerland.

In 2004, the Microbiology team made further breakthroughs in understanding *L. hongkongensis*. Faecal samples from patients with community-acquired gastroenteritis were cultured for *L. hongkongensis*. This indicated that this new bacterium can be one of the causes of gastroenteritis. The research also showed that *L. hongkongensis* is closely associated with eating fish and traveller’s diarrhoea. Researchers will perform complete genome sequencing of *L. hongkongensis*, so as to understand how the bacterium causes gastroenteritis, as well as its treatment and prevention.

**Investigators in-charge:**

袁國勇 KY Yuen, 胡釗逸 PCY Woo, 劉嘉珮 SKP Lau, 微生物學系
Department of Microbiology
幽門螺旋菌感染
Helicobacter pylori infection

Helicobacter pylori, a bacterium present mainly in the stomach, was discovered only in early 1980s. This important bacterium is present in 50% of the world population. People are not aware that ones have the infection, unless ones ask to have it tested specifically. A small number of infected subjects will develop into stomach ulcer, duodenal ulcer and even stomach cancer.

The Division of Gastroenterology & Hepatology at Department of Medicine of the University of Hong Kong, is actively involved in research projects related to Helicobacter pylori. The Division was the first in Hong Kong to install the mass spectrometer for detecting this infection with breath samples. This painless, safe and quick test benefits the patients a lot.

International collaboration over the past ten years with researchers including those from the Mainland China led to ground-breaking results in the relationship between Helicobacter pylori and stomach cancer. The Division is the first group in the World to show that treatment of the infection reduces the risk of developing stomach cancer, result from a project carried out in Fujian, China. The project was started in 1994 with the generous support from the Simon KY Lee Gastroenterological Research Fund, Henry Fok Foundation, the Research Grants Council of Hong Kong, and pharmaceutical and industrial donations.

At present the University is carrying out clinical studies in Hong Kong, Fujian, Shandong, Guangzhou and Shanghai. It also has specially designed laboratory space and equipment for animal and cell line work in stomach cancer and colon cancer.

研究員 Investigators in-charge:
林兆鑫 SK Lam, 王振宇 BCY Wong,
內科學系 Department of Medicine
馬菲氏青霉菌
Penicillium marneffei

馬菲氏青霉菌是一種只活躍於東南亞的真菌，大部分病例均在泰國發現，其他受影響地區包括香港、越南、馬來西亞、台灣及中國的廣東省和廣西省。患者一般患有免疫系統疾病，例如愛滋病。在香港有百分之八的愛滋病患者受馬菲氏青霉菌感染。

港大在一九八五年發現了香港首宗的馬菲氏青霉菌感染個案。此後，港大致力研究無創傷的快速診斷方法，並於四四年成功開發螢光血液抗體測試，成為全球首個利用分子技術，並且快速準確的檢測方法。

為了解決這種霉菌在生物學及病理學上的理解，港大現正積極進行有關的基因研究。

Penicillium marneffei is a dimorphic fungus found only in Southeast Asia. The largest number of cases of human infections was reported from Thailand; other affected areas include Hong Kong, Vietnam, Malaysia, Taiwan, and the Guangdong and Guangxi provinces of China. Most of the patients who develop disease as a result of its infection have some underlying diseases which impair their immune system; the commonest underlying problem is infection with the human immunodeficiency virus (HIV). In Hong Kong, about 8% of the AIDS patients had been infected by Penicillium marneffei.

The University of Hong Kong described the first local case of Penicillium marneffei infection as early as in 1985. Since then, the University has been working on ways to diagnose the infection as quickly as possible without the need to perform invasive procedures. For example, the University developed the first indirect immunofluorescent antibody blood test for this infection in 1994, and it was also the first group in the world to use molecular techniques to develop tests for more rapid and accurate diagnosis. In recent years, a genome project was started on this fungus which will give insights to the biology and pathogenesis of the fungus.

結核性腦膜炎
Tuberculous meningitis

結核性腦膜炎在香港是常見的腦科疾病，每年的發病率大約是每十萬人口中有兩個病例。這是一種肺外結核病，即發生在肺以外其他器官的結核病。此病的死亡率及殘障率頗高，但臨床診斷並不容易。典型的結核性腦膜炎較為慢性，病徵並不明顯，但本地患者病情往往較為急性，病徵持續呈現不足兩星期。常見的病徵為頭痛和發熱。過往的研究已發現，快速診斷和及早使用抵抗結核菌藥物，對治療十分重要。香港大學腦內科的醫生正計劃進行臨床研究，測試大劑量的皮質醇和抵抗血小板藥物在減低結核性腦膜炎所引起之腦神經併發症的功效。

Tuberculous meningitis is common in Hong Kong with an annual incidence of about 2 per 100,000. It is a serious neurological disease with significant risk of disability and mortality. Diagnosis may be difficult. In contrast to the classical presentation as a chronic indolent disease, local patients often present acutely with symptoms lasting 2 weeks or less. Common presenting symptoms are headache and fever. Neurological
Necrotizing fasciitis is a serious bacterial infection of subcutaneous tissues with mortality as high as 50%. It is seen more frequently worldwide recently. Among the 60 cases that have been treated in Queen Mary Hospital, Group A Streptococcus and Vibrio vulnificus are the commonest seen organisms. Vibrio vulnificus involvement is usually seen in cases with contaminated sea-water contact.

The initial clinical pictures of necrotizing fasciitis and cellulitis, a far less severe skin infection, can be very similar. However, the signs and symptoms of necrotizing fasciitis, including redness of skin and exquisite pain, develop rapidly and eventually skin necrosis results. Although the disease usually affects elderly immuno-compromised hosts like those with diabetes mellitus and liver cirrhosis with the bacteria gaining entrance into the body via a wound, it can also occur in healthy young individuals with no history of trauma. The key to successful treatment is prompt diagnosis, rapid and radical removal of the affected tissues and use of antibiotics.

研究員 Investigator in-charge:
張偉文 WM Tang, 矯形及創傷外科學系
Department of Orthopaedics and Traumatology
Viral Infections Predisposing to Development of Cancers

Human papillomavirus (HPV) infection is now generally accepted as a necessary early event in cervical carcinogenesis. There are low-risk types and high-risk types of HPV. Infection with high-risk oncogenic types of HPV underlies most cases of high-grade cervical intraepithelial neoplasia (CIN) and practically all cases of invasive cervical cancer.

This project, in collaboration with the Hong Kong Family Planning Association and sponsored by the SK Yee Foundation, focused on the potential role of HPV molecular testing in triage of women with Atypical Squamous Cells of Undetermined Significance (ASCUS). Under current guidelines, these women would need to have repeat cytology before decision for colposcopic examination can be made. Studies in other countries have shown that HPV DNA testing may be a viable option in the triage of women with ASCUS, demonstrating greater sensitivity for detection of CIN III and comparable specificity compared to a single repeat ASCUS or worse cytology.

As HPV testing had high negative predictive value, it may identify women in whom colposcopy was not required and thus maximize the cost-effectiveness of the colposcopy service and minimize the anxiety of the women. The prevalence of HPV infection in Hong Kong is still unknown. In the present research study, high risk HPV is being tested by Hybrid Capture assay. The aim is to study the relevance of HPV molecular assay in the management of ASCUS in the local population.

Investigators in-charge:
張雅賢 ANY Cheung, 病理學系 Department of Pathology
Liver cancer is the second major cause of cancer death in Hong Kong, and the majority is related to hepatitis B virus infection. Surgical resection is the choice for curative treatment, but fewer than 20% of the patients are eligible to receive curative treatment because of an advanced tumor stage at the time of diagnosis. In addition, recurrence is still common after curative surgery and the cumulative 5-year overall survival rate is less than 50%. Therefore, the Department of Surgery targets to identify molecular markers to enable early diagnosis of the disease, and accurate prognosis prediction for better disease management. The genome-wide expression profile comparing the cancer and normal liver tissues has identified a number of differentially expressed genes. Some of these genes have the potential to serve as diagnostic and/or prognostic markers for liver cancer.

研究員 Investigator in-charge:
范上達 ST Fan, 張兆恬 ST Cheung,
外科學系 Department of Surgery
雖然公共衛生得到改善，兒童的防疫注射獲廣泛推行，傳染病所導致的死亡也相應顯著減少；然而，傳染病仍是引致兒童需要入院治療的主因。香港最常見的兒童傳染病包括呼吸道感染和腸胃炎。

呼吸道感染研究是港大醫學院兒童及青少年科學系一個主要的臨床研究項目，其中進行的兒童感染流感之住院情況的研究，引起了世界對全球性流感疫苗注射方案的注意及廣泛討論。此外，港大亦是其中一個首先系統性記錄人類間質肺炎病毒病人的住院治療情況，從而發現這病毒是導致香港兒童呼吸道感染的常見病因。

港大兒童及青少年科學系也研究了肺炎鏈球菌對抗生素的抗藥性。肺炎鏈球菌是導致兒童患上肺炎的主因。研究為本地醫生處方抗生素提供了寶貴的參考資料。此外，學系與東區尤德夫人那打素醫院的兒科合作進行普查，調查七種常見的兒童呼吸道病毒的流行情況，計劃為期三年。學系亦研究哮喘病童的發病原因，嘗試確定病毒在當中的角色。
Despite much improved hygiene, sanitation and implementation of childhood immunization resulting in a significant decline in mortality from infectious diseases, infection remains the leading cause of acute paediatric admission to hospitals. The most common infectious diseases in children in Hong Kong are respiratory infections and gastroenteritis.

One of the major efforts in the clinical research of the Department of Paediatrics and Adolescent Medicine of the University of Hong Kong has been on respiratory infections. Their study that documented the hospitalization disease burden of influenza in healthy children has gained worldwide attention in the global discussion of universal influenza vaccination. The Department was one of the first groups in the world to document systematically the disease pattern and hospitalization impact of human metapneumovirus, a newly discovered virus, and found that it was a common cause of respiratory infection in Hong Kong children.

The Department has also documented the high incidence of carriage of antibiotic resistant *Streptococcus pneumoniae*, the most common cause of bacterial pneumonia in children. The findings provided information regarding antibiotic prescription to local doctors. In collaboration with the Department of Paediatrics at the Pamela Youde Nethersole Eastern Hospital, the Department is currently conducting a 3-year comprehensive, population-based study on 7 most common respiratory viruses in children. There is also an ongoing study that aims to define the viral etiology of asthma attacks in asthmatic Hong Kong children.

Prevention is of paramount importance in reducing communicable diseases in children and the Department has been involved in clinical vaccine trials that included an intranasal influenza vaccine and a chickenpox vaccine. A rotavirus vaccine study involving 1000 infants was commenced in May 2004.

研究員 Investigator in-charge:
招瑞生 SSS Chiu, 兒童及青少年科學系
Department of Paediatrics and Adolescent Medicine
由於人們過度使用抗生素，令病菌有更多機會學習抵抗抗生素，繼而產生抗藥性。能夠抵抗抗生素的病菌會存活下來，並且把相關的基因傳給後代，或其他種類的微生物。於是，具有抗藥性的病菌就越來越多，抗生素的效用也就愈來愈低，最終可導致病菌變成無藥可治的「惡菌」，威脅人類的生命。

港大微生物學系進行抗生素抗藥性研究多年，成果備受本地、區內及國際的重視，對製藥業及公共衛生機關的策略有重要影響。例如香港首宗發現的鏈球菌肺炎對氟喹酮類抗生素的抗藥性，以及金黃葡萄球菌對萬古霉素的抗藥性。最近研究人員又有新發現，包括全球首宗在兒童身上發現對氟喹酮有抗藥性的流感嗜血桿菌，和發現香港首宗社區感染對甲氧西林有抗藥性的金黃葡萄球菌。

微生物學系會繼續進行抗藥性原理和流行病學研究。其他研究還包括革蘭氏陰性細菌內的乙內醯胺，開發對抗超級細菌的新一代萬古霉素，以及開發多種抗藥性的肺結核分支桿菌的快速測試。

O
eruse and misuse of antimicrobials has become a global problem, contributing to the emergence of antibiotic-resistant micro-organisms. The excessive and inappropriate use of antimicrobials gives harmful micro-organisms lots of opportunity to develop resistance to antibiotics. Resistant organisms survive, and they pass resistant genes to their offspring and also to other species, further contributing to the spread of resistance. The result is that antibiotics are losing their effectiveness. Antimicrobial resistance becomes a major threat to public health.

The Department of Microbiology of the University of Hong Kong pioneered the research in antimicrobial resistance. Findings that have local, regional, or even international significance were made repeatedly. Examples that have led to strategic responses from the pharmaceutical industry and public health agencies include the first cases of fluoroquinolone-resistant Streptococcus pneumoniae and vancomycin-resistant Staphylococcus aureus isolated in Hong Kong. Recently, alarm bells were sounded by the team on cases of fluoroquinolone-resistant Haemophilus influenzae in children and community-acquired methicillin-resistant Staphylococcus aureus (MRSA).

The Department continues to study the epidemiology and mechanisms of antibiotic resistance in the human pathogens of regional significance. Research effort is also laid on novel or emerging beta-lactamases in Gram negative bacteria, development and evaluation of new glycopeptides for vancomycin-resistant Gram positive bacteria, and also rapid tests for the multi-drug resistant Mycobacterium tuberculosis.

研究員 Investigator in-charge:
何栢良 PL Ho, 微生物學系 Department of Microbiology
Infectious disease has become a global health threat. As Hong Kong is situated at a high risk area of emerging infectious diseases, it is important to have a health information system to provide a platform for tracing, control and prevention of infectious diseases.

The Research Fund for the Control of Infectious Diseases set up by the Health, Welfare and Food Bureau has commissioned the Department of Community Medicine and School of Public Health, the University of Hong Kong to conduct a four-year synergistic and intersecting functional research programme on infectious disease epidemiology.

Researchers from the Department of Community Medicine and School of Public Health, the University of Hong Kong will collaborate with international experts from Imperial College, London and Harvard School of Public Health, together with the Department of Health and the Hospital Authority to establish the first regional "Infectious Disease Data Management and Analysis System". The research team will conduct advanced data analysis, disease modeling and risk communication research including population psycho-behavioural surveillance during major disease outbreaks (e.g. SARS, influenza and tuberculosis etc.).

It is anticipated that the research will help to establish a comprehensive database of infectious and chronic diseases. This will facilitate the surveillance of the evolution or epidemiology of emerging infectious diseases in the region and eventually, enhance the capacity of Hong Kong in safeguarding public health.

Researcher Investigators in-charge:
林大慶 TH Lam, 賀達理 AJ Hedley, 梁卓偉 GM Leung, 莊日昶 R Fielding, 何禮明 LM Ho, 社會醫學系及公共衛生學院 Department of Community Medicine and School of Public Health
Other Research on Infectious Diseases

EB病毒感染與鼻咽癌
Epstein-Barr virus infection and nasopharyngeal carcinoma

研究員 Investigator in-charge:
岑信棠 JST Sham, 臨床腫瘤學系 Department of Clinical Oncology

慢性乙型肝炎與血癌
Chronic hepatitis B infection and blood cancers

研究員 Investigators in-charge:
鄭添林 YL Kwong, 內科學系 Department of Medicine

多瘤病毒 BK與骨髓移植
Polyoma BK virus and bone marrow transplantation

研究員 Investigator in-charge:
梁家傑 GKK Lau, 梁憲孫 RHS Liang, 內科學系 Department of Medicine

繭膿桿菌的綠膿菌素和1-羥基哩於體外對氣道上皮細胞糖皮質素受體的活性及功能的調節作用
Effects of Pseudomonas aeruginosa pyocyanin and 1-hydroxyphenazine on the regulation of glucocorticoid receptor activation and function in airway epithelial cells in vitro

繭膿菌素於支氣管擴張中在支氣管上皮細胞內強化細胞因子的釋放和不同類別的藥物對它的抑制作用
Pyocyanin - potentiated cytokine release in bronchial epithelial cells and its inhibition by various classes of drugs in bronchiectasis
The role of transforming growth factor-β1 (TGF-β1) in the regulation of airway inflammation in bronchiectasis

Surveillance of nurses' preventive measures and health status in relation to the SARS epidemic in Hong Kong

A study of the physical, psychological and social needs of a cohort of suspected SARS paediatric patients and their parents during hospitalization

The effectiveness of a telephone health assessment and health education intervention to vulnerable elderly during the SARS epidemic

Respiratory pathogens interaction with airways – adherence and cell biology

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The effectiveness of a telephone health assessment and health education intervention to vulnerable elderly during the SARS epidemic

Respiratory pathogens interaction with airways – adherence and cell biology
預防傳染病及嚴重急性呼吸道綜合症\n
A preventive health promotion program to SARS and other infectious diseases to school children

研究員 Investigator in-charge:

周美娟 DMK Chow 護理學系
Department of Nursing Studies

脊柱結核病的遠期隨訪

Tuberculosis infection of the spine

研究員 Investigator in-charge:

陸健騏 KDK Luk, 矯形及創傷外科系
Department of Orthopaedics and Traumatology

手部海洋結核桿菌感染

Mycobacterium marinum infection of the hand

研究員 Investigator in-charge:

周肇平 SP Chow, 矯形及創傷外科系
Department of Orthopaedics and Traumatology

愛滋病毒的致病性: 發出信號的激酶和病毒的基因
Mechanism of HIV immunopathogenesis: signaling kinases and HIV genes

研究員 Investigator in-charge:

劉錫賢 ASY Lau, 兒童及青少年科學系
Department of Paediatrics and Adolescent Medicine

與EB病毒相關的基因和鼻咽癌
EBV-associated genes and nasopharyngeal carcinoma

研究員 Investigators in-charge:

劉錫賢 ASY Lau, 兒童及青少年科學系
Department of Paediatrics and Adolescent Medicine;
岑信棠 JST Sham, 臨床腫瘤學系
Department of Clinical Oncology

禽流感病毒的致病性和不規則細胞活素調控
Immunopathogenesis of avian influenza infection and cytokine dysregulation

研究員 Investigators in-charge:

劉錫賢 ASY Lau, 兒童及青少年科學系
Department of Paediatrics and Adolescent Medicine;
裴偉士 JSM Peiris, 微生物學系 Department of Microbiology
Cytokines in patients with coronavirus pneumonia and analysis of a laboratory database for SARS

Investigator in-charge:
BM Jones, Department of Pathology

Ultrastructural characterization of the SARS Coronavirus (SARS-CoV)

Investigator in-charge:
JM Nicholls, Department of Pathology

Role of DC-SIGN as a receptor for SARS virus

Investigator in-charge:
CL Lin, VSF Chan, Department of Surgery

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