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Jockey Club College of Veterinary Medicine and Life Sciences
香港城市大學
City University of Hong Kong
In collaboration with Cornell University

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JCC STRATEGIC PLANNING DAY

Dean's Message
院長的話

Dear Friends of Jockey Club College of Veterinary Medicine and Life Sciences (JCC),

I am honored to represent the JCC as Dean. After 3 years serving as Associate Dean and Director of Veterinary Affairs I had no hesitation to step into this role when invited to do so. It is nearly 4 years since I joined City University of Hong Kong as Chair Professor in Companion Animal Health and Disease. During that time there has been an enormous amount of growth in the College. We grew from three departments to four with the addition of the Veterinary Clinical Sciences Department, founded by Prof. Julia Beatty, and now led by Prof. Paulo Steagall.

There have been many other firsts, not the least of which was the completion of the 6-year BVM programme by our leading cohort of veterinary students in May 2023. With that milestone completed we became eligible for full accreditation with the Royal College of Veterinary Surgeons (RCVS) and Australasian Veterinary Boards Council (AVBC). The JCC has been preparing for this accreditation for many years, since it is required for our graduates to register with the Veterinary Surgeons Board of Hong Kong (VSB) and practice as veterinarians.

Dual back-to-back accreditation visits and the hundreds of hours pent preparing for them was challenging for all involved. It also brought out a spirit of camaraderie, showcased our teamwork and revealed emerging talents and skills. As I write this we are but a few weeks away from the notification of the result. I am confident that our graduates will soon be practicing in Hong Kong and thank all who have been involved in this long and exhilarating journey to achieve Hong Kong's first and only fully-fledged Veterinary School. Many of them have already accepted job offers including equine and small animal veterinary positions.

Whilst there has been much focus on the BVM programme, and rightly so, this should not overshadow the stellar performance of our BMS and NS departments. One Health is central to the JCC's founding principles. We recognize that the health of humans, animals and the environment is inextricably intertwined. This is why the departments of Biomedical Sciences (BMS), Neurosciences (NS), VCS and Infectious Diseases and Public Health (PH) are a natural fit for our College. BMS is a power-house of research and grant success for JCC and is becoming a leading centre for biomedical education in Hong Kong. The translational impacts of their research focusing on cancer, vascular, metabolic and regenerative biology and infectious diseases and immunity will save lives. Similarly, our NS department are leaders in Hong Kong in neurosciences research.

I trust that you will enjoy browsing through our newsletter and discovering the many talents of the wonderful group of people that make up the JCC.

親愛的學院友好：

我很榮幸出任城大賽馬會動物醫學及生命科學院院長。三年前，我擔任本院副院長及獸醫事務總監，今天毫不猶疑接受院長的職責。自從四年前出任城大伴侶動物健康與疾病講座教授，我在這段日子見證了獸醫學院的蓬勃發展，從最初三個學系擴展至四個，新增由Julia Beatty 教授創立、現由 Paulo Steagall 教授領導的臨床動物醫學系。

我們還有很多里程碑，包括首屆學生於2023年5月完成了六年制獸醫學學士課程，這項成就令我們獲得英國皇家獸醫學院(RCVS)和澳新獸醫管理局理事會(AVBC)的全面認證資格。城大賽馬會動物醫學及生命科學院多年來為這認證努力不懈，以求讓我們的畢業生合資格向香港獸醫管理局(VSB)註冊為執業獸醫。

連續兩次認證考察和數百小時的籌備，對所有參與者都是極大的挑戰，但也激勵我們的友情，大家發揮了團隊精神，展現各人的才華和技能。執筆之時，離結果公布還有數星期時間。我相信，我們的畢業生很快成為香港的執業獸醫，感謝各位有份參與這段漫長而激盪人心的旅程，攜手實現香港第一所也是唯一一所正規的獸醫學校，當中很多畢業生已在馬匹或小動物獸醫領域工作。

不單獸醫學學士課程成就矚目，我們的生物醫學系和神經科學系也表現出色。「健康一體化」是城大賽馬會動物醫學及生命科學院的核心原則，體現人類、動物和環境的健康密不可分，因此生物醫學系(BMS)、神經科學系(NS)、臨床動物醫學系和傳染病及公共衛生學系(PH)成為獸醫學院的四大支柱。 生物醫學系不僅是本學院的研究旗艦，獲得多項研究基金，還逐漸成為香港生物醫學教育的先驅，一直致力研究癌症、血管、代謝和再生生物學、傳染病和免疫力，其轉化影響足以拯救生命。同時，我們的神經科學系也在香港神經科學的研究領域中一支獨秀。

我相信您會享受這期通訊，認識這個人才濟濟的獸醫學院。

Sincerely,

Vanessa Barrs

Prof. Vanessa Barrs
Dean

CONTENTS

Our New Home - The Jockey Club One Health Tower

The Jockey Club One Health Tower (JCT, 13,900 m² net area) (AC4) is currently under construction, supported by a substantial donation (HK$500 million) from the Hong Kong Jockey Club. The JCT, will be the new headquarters of the JCC. It was initially scheduled for completion in 2023 but construction was delayed due to COVID-19, and it will be completed in 2024. It includes a large sports complex and a 1,600-seat auditorium. JCC has been allocated 9,284 m² of space in the JCT, which will provide teaching and research laboratories (BSL-1 and BSL-2), a clinical skills laboratory, a surgical and anaesthesia training suite, and staff offices.

The planned surgery and anaesthesia facility in the JCT is a large state-of-the-art facility for clinical training of surgery and anaesthesia skills in a spay/neuter clinic to prepare our Year 4 students for clinical rotations. This facility includes specific housing areas for cats and dogs and separate rooms for instrument processing, scrub area, surgery operating theatre with four independent stations, clean surgical processing and storage, anaesthetic induction and another anaesthetic recovery area, medical gases, etc. ("clean" and "dirty" areas). There are also separate areas for patient examination, patient ward, laundry, toilet, nurse's station with controlled substance storage, basic clinical pathology laboratory, staff resting room and changing rooms. There is an ideal environment for routine clinical didactic teaching with a case review room with state-of-the-art audio-video capabilities and a full medical records station room. These rooms will also be used for feedback sessions on learning outcomes, according to the CityU policies. The facility will be available for other activities such as clinical research, veterinary paraprofessional courses including continuing professional development (CPD) to the local and international veterinary community. Equipment will include an open plan operating theatre with four stations, cameras for remote teaching of surgical skills, anaesthetic machines, monitors and equipment. There will also be a complete range of surgery equipment, medical gases pipelines and waste anaesthetic gas scavenging.

我們的新居
賽馬會健康一體化大樓

賽馬會健康一體化大樓（AC4），是由香港賽馬會慷慨撥款五億港元興建，淨作業樓面總面超過13,900平方米，將成為城大賽馬會動物醫學及生命科學院新總部。大樓原訂於2023年面世，但因新冠疫情而延期至2024年竣工。大樓的設施包括一個大型體育場館及一個擁有1,600座位的禮堂。城大賽馬會動物醫學及生命科學院擁有大樓內9,284平方米的空間，將提供教學和研究實驗室（BSL-1和BSL-2）、臨床技術實驗室、手術和麻醉培訓室及辦公室。

該計劃中的手術和麻醉培訓室是一個大型先進設施，用作絕育診所的手術和麻醉技能臨床培訓，讓我們的四年級學生做好臨床實習的準備。設施方面包括特定貓狗的空間區域、處理儀器及清潔的獨立房、擁有四個獨立的手術室、清潔手術處理和存儲、麻醉和麻醉復元區、醫療氣體及清潔區與污染區域等等。此外，還有獨立診症區、病房、洗衣房、廁所、連儲存受管制物品的護士站、基本臨床病理實驗室、員工休息室和更衣室。這是日常臨床教學的理想地方，設有尖端視聽功能、病例檢討室及完整醫療記錄站。根據城大政策，這些課室也用於檢討學習成果，還可用於其他活動如臨床研究、獸醫輔助專業人員課程，包括為本地和國際獸醫業界而設的持續專業進修計劃（CPD）等。設備將包括四個工作台的開放式手術室，用於遠程教授的手術技能攝像機、麻醉機、監視器和設備，還有完整的手術設施、醫療氣體管道和麻醉廢氣清掃系統。

A Warm WELCOME *to New Faculty Members*

The *Jockey Club College of Veterinary Medicine and Life Sciences* is proud to welcome and introduce our newest faculty members.

CityU Department of Neuroscience
香港城市大學
City University of Hong Kong

Prof. Yung Wing Ho
Chair Professor of Cognitive Neuroscience
容永豪教授

Prof. Zhu Xiaowei
Assistant Professor
朱曉維教授

CityU Department of Infectious Diseases and Public Health
香港城市大學
City University of Hong Kong

Prof. Patrick Butaye
Professor

Prof. Priscilla Gerber
Associate Professor
(Swine)

Department of Biomedical Sciences
香港城市大學
City University of Hong Kong

Prof. Lao Xiangqian
Associate Professor
劳向前教授

Prof. Mak King Lun Kingston
Associate Professor
麥經綸教授

Prof. Pon Yuen Lam Jackie
Assistant Professor
潘婉琳教授

Prof. Yin Huiyong
Professor
尹慧勇教授

Prof. Zhang Jilin
Assistant Professor
張繼林教授

Department of Veterinary Clinical Sciences
香港城市大學
City University of Hong Kong

Prof. Pedro Melendez
Clinical Professor
(Bovine Production Medicine)

Prof. Eloi Guarnieri
Clinical Assistant Professor
(Ruminant Health Management)

Prof. Santiago Alonso Sousa
Clinical Assistant Professor
(Equine)

Prof. Tse Pui Ying May
Clinical Assistant Professor
(Anatomic Pathologist)
謝珮瑩教授

Prof. Celine Loubiere
Clinical Assistant Professor
(Equine Internal Medicine)

Researching Zoonotic Pathogens in Swine

Prof. Priscilla Gerber

Associate Professor

Department of Infectious Diseases and Public Health

Prof. Priscilla Gerber

Animal health and its impacts on human health is becoming increasingly important with the rise in the (re-)emergence of several infectious diseases that are difficult to control. The main drive of my research is finding solutions for problems directly impacting livestock production, specifically on enhanced diagnostic methodologies for infectious diseases and virus control of pigs and chickens.

At Iowa State University, US and the Roslin Institute, University of Edinburgh, UK, I have worked extensively on improving diagnostic methods and pig models for the study of pathogenesis and testing prototype vaccines for porcine circovirus 2 (PCV2), porcine epidemic diarrhoea virus (PEDV), porcine reproductive and respiratory syndrome virus (PRRSV), and influenza A virus (IAV). These are significant pathogens that threaten the sustainability of pig production and are endemic to many geographic locations, including Asia. I am also interested in tracking zoonotic pathogens such as swine hepatitis E virus, which can cause fulminant hepatitis in humans, and the bacterium Erysipelothrix rhusiopathiae, which causes erysipeloid in humans.

At CityU, I will continue more applied research using population-level samples, such as air samples and dust for monitoring pathogens in commercial chicken and pig farms. Monitoring pathogens in commercial farms is usually restricted to pathogens with great zoonotic potential because of the lack of practical and economical methods. Compared to methods based on individual animal sampling, population-level samples have advantages of being easy to collect, store and transport, and are welfare-friendly and economical due to the small sample number required to represent the population. Monitoring pathogens is the first step to assess their impact in production and welfare and to assess interventions targeting disease control and management, including the development of new vaccines.

At the University of New England, Australia, my research team is currently investigating how mucosal and systemic immunity against infectious laryngotracheitis virus (ILTV) is formed as part of a project funded by the Australian Research Council. ILTV is a herpesvirus that causes highly contagious upper respiratory disease in chickens, leading to significant animal suffering and economic losses. Live-attenuated vaccines are used to control ILTV outbreaks but have limitations, including the capacity to cause disease in vaccinated birds. A hindrance to developing safer and more efficacious vaccines is the lack of understanding of how protective immunity against this virus is formed, which my research aims to address.

Prof. Priscilla Gerber

BVSc, MVSc, PhD

Associate Professor, Department of Infectious Diseases and Public Health

傳染病及公共衛生系副教授

Priscilla Gerber joined the Department of Infectious Diseases and Public Health as an Associate Professor (Swine) in January 2023. She is a veterinarian with a longstanding research interest in the diagnosis and control of infectious diseases in production animals. Before joining CityU, she held research positions at Iowa State University, USA, The Roslin Institute, University of Edinburgh, UK and the University of New England, Australia. She is an editor for Poultry and the Journal of Virological Methods.

Priscilla Gerber 於2023年1月擔任傳染病及公共衛生系副教授（豬隻研究）。她是一位獸醫，長期研究生產動物傳染病診斷和控制，此前在美國愛荷華州立大學、英國愛丁堡大學羅斯林研究所和澳洲新英格蘭大學擔任研究職務，亦是《家禽期刊》和《病毒學方法雜誌》的編輯。

Monitoring pathogens is the first step to assess their impact in production and welfare and to assess interventions targeting disease control and management, including the development of new vaccines.

豬隻的人畜共患病原體研究

Prof. Priscilla Gerber

多種棘手傳染病不斷出現或死灰復燃，令人更關注動物健康及它對人類健康的影響。我的研究主要為尋找直接影響畜牧業生產問題的解決方法，尤其要提升對豬隻和雞隻傳染病和病毒控制的診斷方法。

我任職美國愛荷華州立大學和英國愛丁堡大學羅斯林研究所時，致力改善診斷方法和豬隻模型，以研究豬第二型環狀病毒（PCV2）、豬流行性腹瀉病毒（PEDV）、豬繁殖與呼吸綜合症病毒（PRRSV）和甲型流感病毒（IAV）的發病機制和測試原型疫苗。這些重要病原體威脅養豬產業的可持續發展，還在亞洲等多個地區流行。我亦致力追蹤人畜共患病原體，例如引起人類暴發性肝炎的豬戊型肝炎病毒及導致人類紅斑狼瘡的紅斑狼瘡菌。

在澳洲新英格蘭大學，我的研究小組正研究針對傳染性喉氣管炎病毒（ILTV）的黏膜和全身免疫力是如何形成，這是澳洲研究委員會資助項目的一部分。傳染性喉氣管炎病毒是一種會引致雞隻高度傳染性上呼吸道疾病的皰疹病毒，除了令動物劇痛，亦造成嚴重經濟損失。減毒活疫苗可用作控制傳染性喉氣管炎病毒爆發，但同時有其局限性，包括有機會令接種禽鳥染病。由於人們不了解這些病毒的保護性免疫力如何形成，阻礙了更安全有效的疫苗開發，這正是我的研究宗旨。

我在城大致力用群體層面樣本推動更多應用研究，包括用空氣樣本和灰塵監測商業雞場和豬場的病原體。由於商業農場缺乏實用和經濟方法，可以監測的病原體通常只限於最有可能屬人畜共患症的病原體，與基於個別動物採樣的方法相比，群體層面的樣本勝在易於收集、儲存和運輸，而且由於代表群體所需的樣本數量較少，因而更乎合動物福利及經濟效益。監測病原體是評估病原體對生產和福利影響的第一步，也是評估研發新疫苗等疾病控制和管理的干預措施。

監測病原體是評估病原體對生產和福利影響的第一步，也是評估研發新疫苗等疾病控制和管理的干預措施。

From the Department of Veterinary Clinical Sciences

Introducing Professor Paulo Steagall

and his commitment to improve anaesthesia and pain management in animals through veterinary research, services and education

Prof. Paulo Steagall
Head
Department of Veterinary Clinical Sciences
Professor in Veterinary Anaesthesia and Pain Management
系主任
臨床動物醫學系
獸醫麻醉及疼痛管理教授

Professor Paulo Steagall is a researcher, author and speaker. He joined the Department of Veterinary Clinical Sciences (VCS) at the Jockey Club College of Veterinary Medicine and Life Sciences, City University of Hong Kong in late 2021 and was appointed as the Head of the VCS Department from 2023.

He earned his DVM and completed a residency at Sao Paulo State University (UNESP-Botucatu), Brazil, then earned his Ms and PhD in anaesthesiology with emphasis on feline analgesia at the same institution. He is a board-certified anaesthesiologist and pain management specialist by the American College of Veterinary Anesthesia and Analgesia (ACVAA).

Professor Steagall laboratory developed and validated the Feline Grimace Scale (FGS), a tool that uses changes in facial expressions to assess acute pain in cats (www.felinegrimacescale.com and FGS phone application for Android and iOS).

Having published over 130 peer-review articles on pain management, mostly in cats, and the book "Feline Anesthesia and Pain Management", Professor Steagall is listed among the top 2% of the world's most highly cited scientists in the latest report by Stanford University.

Professor Steagall is also actively engaged in international veterinary boards and councils servicing with a goal to advance veterinary practice and animal welfare.

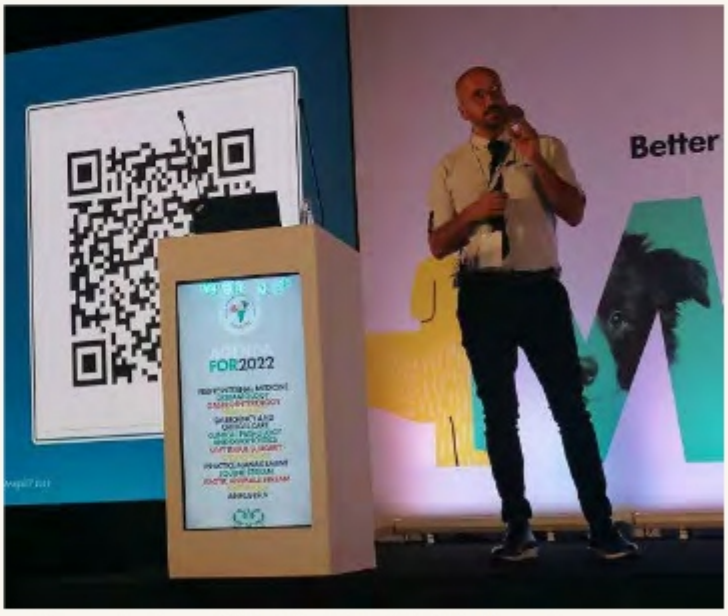
Professor Steagall is also proud to have co-authored the WSAVA Global Pain Management Guidelines as a former member of the WSAVA Global Pain Council. The manuscript is the most up to date and comprehensive document of its kind and now available in multiple languages and has been downloaded more than 30,000 times.

In addition, he has taken part in the Federation of European Companion Animal Veterinary Associations (FECAVA) Basic Anaesthesia and Analgesia Best Practices initiative and recently released a series of infographics with renowned anaesthesia specialist Dr Polly Taylor.
https://www.fecava.org/policies-actions/fecava-basic-practices-in-anesthesia-and-analgesia/

With numerous collaborations and an extensive professional network, Professor Steagall has acted as an invited speaker in more than 250 lectures in more than 30 countries.

As a Professor in Veterinary Anaesthesia and Pain Management at City University of Hong Kong, Professor Steagall leads the Anaesthesia, Analgesia and Fluid Therapy course in the Bachelor of Veterinary Medicine (BVM) Programme. You can find more about his work at CityU Scholar (https://scholars.cityu.edu.hk/en/persons/paulo-vinicius-mortensen-steagall(a83474ed-2145-4241-a5b6-0e1f933f28df).html) and his website https://www.felinegrimacescale.com/more-about-our-work.

With students at BVM Programme.
與城大獸醫學學士課程學生留影。



Presentation at the first Middle East and Africa Veterinary Conference in Dubai.
在杜拜主持首個中東及非洲獸醫會議。

FELINE GRIMACE SCALE©

FACT SHEET

WHY? Pain-induced behavioral changes are unique and can be subtle in cats

WHAT? The Feline Grimace Scale© (FGS) is a quick and reliable tool for acute pain assessment based on changes in facial expressions

WHEN? Pain assessment should be performed in all cats as often as needed on a case-by-case basis

WHO? The FGS can be used by the veterinary health care team and by cat caregivers

HOW?

There are five action units (AU)

- Ear position
- Orbital tightening
- Muzzle tension
- Whiskers position
- Head position

- Each AU is scored on a 0-2 scale
- The final score is the sum of all scores
- Analgesia is suggested with final score ≥ 4/10

0 = AU is absent

- Ears facing forward
- Eyes opened
- Muzzle relaxed (round shape)
- Whiskers loose and curved
- Head above the shoulder line

1= AU is moderately present*

- Ears slightly pulled apart
- Eyes partially opened
- Muzzle mildly tense
- Whiskers slightly curved or straight
- Head aligned with the shoulder line

* The score of 1 can also be given when there is uncertainty over the presence or absence of the AU

2 = AU is markedly present

- Ears flattened and rotated outwards
- Squinted eyes
- Muzzle tense (elliptical shape)
- Whiskers straight and moving forward
- Head below the shoulder line or tilted down (chin towards the chest)

Université de Montréal

This factsheet was possible due to an unrestricted grant by

zoetis

Download the FGS App to learn more and practice your skills. Check our linktree for additional information.

Steagall Laboratory
felinegrimacescale@umontreal.ca
www.felinegrimacescale.com

The new FGS factsheets in multiple languages are ready for printing and to be used in practice.
貓科表情量表將以多種語言出版，供人使用

介紹Paulo Steagall教授及其通過以獸醫研究、服務及教育，提升動物麻醉和鎮痛管理的承諾

Paulo Steagall教授身兼研究員、作者和講者，於2021年底加入城大賽馬會動物醫學及生命科學院的臨床動物醫學系，自2023年出任臨床動物醫學系系主任。

他在巴西聖保羅州立大學(UNESP-Botucatu)獲得獸醫學學位及完成了住院醫師培訓；之後再於該校獲得麻醉學碩士學位和博士學位，他的研究都是集中在貓鎮痛。他獲得美國獸醫麻醉與鎮痛學院（ACVAA）認證的麻醉師和鎮痛管理專家。

Steagall教授實驗室研發及驗證了貓科表情量表（FGS），利用貓科面部表情變化來評估牠們的急性疼痛（可參考www.felinegrimacescale.com ，或Android與iOS的FGS電話程式）。

Steagall教授發表了逾130篇關於貓科鎮痛管理的同行評審文章，又出版了《貓科麻醉和鎮痛管理》一書，被史丹福大學最新報告列為全球被引用次數最多的首2%科學家排行榜上。Steagall教授亦積極參與國際獸醫管理局和理事會工作，矢志促進獸醫實踐和動物福利。

作為WSAVA全球鎮痛理事會前成員，Steagall教授曾參與撰寫〈WSAVA全球鎮痛管理指南〉，該指南內容在同類手冊中最新及最全面，備有多種語言版本，及下載超過30,000次。

此外，他還加入歐洲寵物獸醫協會聯合會（FECAVA）及倡議基礎麻醉及鎮痛的最佳實踐，最近與著名麻醉專家Polly Taylor博士發布了一系列信息圖表：https://www.fecava.org/policies-actions/fecava-basic-practices-in-anesthesia-and-analgesia/

Steagall教授憑藉多個合作項目和廣泛專業人脈，曾獲邀在30多個國家擔任250多場講座發言人。

作為城大獸醫麻醉和鎮痛管理教授，Steagall教授領導動物醫學學士課程中的麻醉、鎮痛和液體療法課程，瀏覽城大學者網(https://scholars.cityu.edu.hk/en/persons/paulo-vinicius-mortensen-steagall(a83474ed-2145-4241-a5b6-0e1f933f28df).html)）了解他的工作，或其網站https://www.felinegrimacescale.com/more-about-our-work 。

From the Department of Veterinary Clinical Sciences

Advancing Dairy Medicine in the region

Prof. Pedro Melendez

Clinical Professor in Bovine Production Medicine

My research interest is focused on 2 major areas. One is related to the management of the transition period of dairy cows, defined as the last 3 weeks prepartum and the first 3 weeks postpartum, which is characterized by remarkable metabolic challenges that the cows must experience from late gestation to early lactation.

One of the characteristics of the transition period is the reduction in feed intake while parturition approaches and the increases in energy demands when lactation begins. In this sense, the cow experiences a typical negative energy balance (NEB) during the peripartum period. If the prepartum period and the postpartum NEB is not well-managed the cow may develop several diseases such as hypocalcemia, retained fetal membranes, metritis, ketosis, displacement of the abomasum, fatty liver, mastitis and lameness. These disorders account for large economic losses for the dairy industry, in consequence prevention is crucial and it must be the main strategy for any production medicine program, which I intend to teach at CityU.

Much of these diseases are strongly related to the dynamic of adipose tissue in the cow. One of the principal functions of adipose tissue is to store and release fats in response to energy demands. However, adipose tissue also has immune, endocrine, regenerative, mechanical, and thermal functions. As a result, the dynamic of subcutaneous fat, monitored trough the assessment of the body condition score plays a key role. However, there is also abdominal fat, which is more metabolically active and sensitive to degradation than subcutaneous fat.

Therefore, cows depositing more fat in the abdominal cavity are at greater risk of developing fatty liver, displacement of the abomasum, and ketosis.

What comes to complicate the situation is that the deposition of abdominal fat has a genetic component. In a couple of studies that we conducted in the USA we concluded that visceral fat deposition in dairy cows is controlled by genetic effects and at least one region of the genome had pleiotropic effects on both visceral fat deposition and the development of displacement of abomasum. With this evidence, it is noticeable that visceral adiposity is a key player on the incidence of metabolic diseases and inflammatory processes of the modern dairy cow. One of these disorders is the development of fatty liver, which lead to decreased milk production, poor health, low fertility, higher risk of culling and death. Fatty liver in dairy cattle has evolved over time, being a more common and severe condition than it was 20 years ago.

Having clear evidence that the abdominal fat and the development of certain diseases have a genetic component, and that abdominal fat is related to high milk production, because it is faster to provide quick energy to the cow, it is imperative to find strategies to better manage the dairy cow. Because selection for milk yield has brought genes that are also associated with a greater abdominal fat deposition, it is not simple to carry out genetic selection against abdominal adiposity since it could affect the improvement for milk yield. Consequently, a better knowledge of the physiology and dynamic of the abdominal fat and the progress of certain diseases it will allow the foundation of the bases to establish preventive strategies through nutritional and feeding approaches, considering the use of additives, improvements on cow-comfort and planned feeding management to avoid stress and excessive fat mobilization.

In consequence, one of my goals in this new position at the CityU is to study the mechanisms of abdominal fat dynamic and its association with the development of metabolic diseases, particularly fatty liver, when excessive abdominal fat is mobilized.

My second area of research interest is the manipulation of ruminant gut microbiome to mitigate greenhouse gas emissions (GHG), and improve environmental health.

Climate change is affecting the earth's ecosystems and threatening the

A Holstein grazing herd in Chile
智利荷斯坦牛群

well-being of current and future generations, where GHG, such as CO2, and methane (CH4) have been identified as the major responsible. Studies have shown that the livestock sector is one of the main contributors to methane emissions in agriculture. However, livestock also contributes to mitigation through pastoral ecosystems, since the pastures capture CO2 from the environment for their normal functioning. Therefore, dietary strategies that can reduce GHG from ruminants offer opportunities to moderate global warming.

Several feeding management approaches are being used to modulate rumen fermentation and reduce CH4 emissions from cattle. Of these, dietary supplementation of seaweed is receiving increasing attention. In this context, a Chilean government pilot study that aims to reduce CH4 emissions from cattle, using an alga that grows in the marine ecosystems of the South Pacific has invited me to participate as a co-PI. Interestingly, it could be of great value to study similar algae that may grow on the coasts of Hong Kong and the China Sea. Furthermore, the interactive effects of seaweed with other feed additives and dietary macronutrients in modulating rumen fermentation to enhance cattle productivity remains largely understudied. It is also unknown whether the microbicidal properties of the seaweeds could be selectively manipulated to circumvent antibiotic resistance in livestock. Consequently, a deeper understanding of the mechanism(s) of action of seaweed and other fermentation modifiers in the rumen ecosystem will help to define potential nutritional and feeding strategies that reduce methane emissions without adversely affecting the metabolic health, feed efficiency and profitability of livestock operations. Importantly, the development of such nutritional approaches to manipulate the gut microbiome may lead to novel strategies for ameliorating metabolic diseases not only in production animals, but also small animal pets and humans. In addition, the use of hydroponic forage to feed ruminants deserves much attention, especially in areas where the land and water are limited. It is unknown if hydroponic forage is more digestible and therefore also may reduce methane emissions in ruminants. In consequence, in my current position, I would like to propose the creation of a Center for Ruminant Microbiome and Environmental Health, inviting to participate several colleagues of our CityU and others from mainland in China and overseas such as from Chile, and of course the Cornell University, citing the words of the Cornell University provost, DrProf. Michael Kotlikoff, in his City University Distinguished Lecture Series entitled " Universities and the Future: Building Excellence through Global Engagement and Collaboration."

Excessive omental fat in a cow with displacement of the abomasum
皺胃移位乳牛的多餘網膜脂肪

Studies have shown that the livestock sector is one of the main contributors to methane emissions in agriculture. However, livestock also contributes to mitigation through pastoral ecosystems, since the pastures capture CO2 from the environment for their normal functioning. Therefore, dietary strategies that can reduce GHG from ruminants offer opportunities to moderate global warming.

Prof. Pedro Melendez,
DVM, MS, PhD, DABVP (Dairy)
Clinical Professor,
Department of Veterinary Clinical Sciences
臨床教授, 臨床動物醫學系

Prof. Pedro Melendez joined City University of Hong Kong in January 2023 as a Clinical Professor in Bovine Production Medicine.

He obtained his DVM at the University of Chile, and then he pursued a residency program in Food Animal Medicine at the University of Florida (USA), and earned a Master of Science in 2000 and a Ph.D. in 2004 at the same University. He is a diplomate at the American Board of Veterinary Practitioners, Dairy Specialty. He was a faculty member at the University of Chile, University of Florida (USA), University Santo Tomas (Chile), University of Missouri, University of Georgia and Texas Tech University. His teaching focuses on all aspects of dairy production medicine, with special emphasis on nutritional management and metabolic diseases in dairy cattle.

Pedro Melendez 教授於 2023 年 1 月加入香港城市大學，擔任牛生產醫學臨床教授。

他在智利大學獲得 DVM，然後在佛羅里達大學（美國）攻讀食品動物醫學住院醫師課程，並於 2000 年獲得理學碩士學位，並於 2000 年獲得博士學位。 2004年在同一所大學。 他是美國獸醫委員會乳品專業的外交官。 他曾在智利大學、佛羅里達大學（美國）、聖托馬斯大學（智利）、密蘇里大學、佐治亞大學和德克薩斯理工大學任教。 他的教學側重於奶牛生產醫學的各個方面，特別強調奶牛的營養管理和代謝疾病。

在地區推進乳製品醫學

Prof. Pedro Melendez

我的研究集中於兩個領域，其中一個是關於乳牛過渡期的管理，由乳牛產前三星期橫跨至產後三星期，亦即妊娠後期到泌乳早期的階段，乳牛會經歷顯著的新陳代謝問題。

乳牛在過渡期的特點之一，是臨近分娩時會減少進食，到泌乳期才增加食量，因而在生產前後經歷典型的能量負平衡（NEB）。能量負平衡若沒處理好，乳牛或會患上低鈣血症、胎膜滯留、子宮炎、酮症、皺胃移位、脂肪肝、乳腺炎及瘸腳等疾病。這些問題為乳製品業造成巨大經濟損失，因此，我們應當制訂預防措施，並列作奶製品醫學課程的重點，這正是我將在城大教授的內容。

這些疾病大多與乳牛的脂肪組織的動態息息相關。脂肪組織的主要功能之一是儲存和釋放脂肪，以滿足能量需求。然而，脂肪組織還具有免疫、內分泌、再生、機動和熱功能。因此，通過評估身體狀況評分對監測皮下脂肪動態十分重要。然而，與皮下脂肪相比，腹部脂肪的新陳代謝更活躍，亦對降解更敏感。乳牛在腹腔內沉積更多脂肪，因此患上脂肪肝、皺胃移位和酮症的風險亦更大。

再者，腹部脂肪的沉積有基因元素。我們在美國進行幾項研究，發現乳牛的內臟脂肪沉積受基因影響，至少有一個基因組區域對內臟脂肪沉積和皺胃移位過程有多變效應。這些發現證明內臟脂肪是現代乳牛患新謝代謝疾病和引起發炎的關鍵因素，其中一個問題是發展成脂肪肝，導致乳牛的乳量減少、健康變壞、繁殖減低，送去屠宰或自然死亡的機會更高。乳牛的脂肪肝隨時間演變，比20年前更普遍和嚴重。

既然證明了腹部脂肪和某些疾病有基因元素，而腹部脂肪可更快給乳牛帶來能量，讓牠們生產更多牛奶，因此，我們應有更好方法管理乳牛。由於對牛奶產量的選擇帶來的基因，可能令腹部脂肪有更多沉積，令針對腹部脂肪的基因選擇並不簡單，因為它可能影響產乳量提高。因此，我們應研究腹部脂肪的生理和動力，以及某些疾病的發病過程，通過營養和飼養方法着手制訂預防策略，考慮使用添加劑、改善乳牛舒適度和有計劃的飼養管理，避免壓力和過度的脂肪動員。

於是，我在城大新崗位的目標之一就是研究腹部脂肪動力機制，尤其當腹部脂肪被過度調動時，所引起的脂肪肝等陳代謝疾病的關係。

我的第二個研究領域是控制反芻動物的腸道微生物基因組群，從而減輕溫室氣體排放（GHG）及改善環境健康。

氣候變化正在影響地球的生態系統，威脅當今和未來世代，其中以二氧化碳和甲烷（CH4）等溫室氣體影響最大。研究顯示畜牧業是農業甲烷排放的元兇。然而，由於牧場將環境中的二氧化碳轉化成正常運作，讓牲畜可通過牧場生態系統減輕這方面的影響，因此，減少反芻動物溫室氣體的飼養策略有助緩和全球暖化。

A jersey grazing herd from Chile
智利娟珊牛群

研究顯示畜牧業是農業甲烷排放的元兇。然而，由於牧場將環境中的二氧化碳轉化成正常運作，讓牲畜可通過牧場生態系統減輕這方面的影響，因此，減少反芻動物溫室氣體的飼養策略有助緩和全球暖化。

科學家正研究一些飼養方法，從而調節牛的瘤胃發酵和減少牠們的甲烷排放，其中以海藻這飼料補充劑越受關注。由此，智利政府推行一項先導研究，利用一種生長於南太平洋的海藻減少牛的甲烷排放，我獲邀成為這項目的共同負責人。有趣的是，類似海藻也可在香港和南中國海沿岸生長，或成為這研究的另一重要價值。此外，科學家還要研究將海藻與其他飼料添加劑及大量營養素相互影響，會如何調節瘤胃發酵，從而提高牛隻的生產力。至於海藻的殺微生物特性是否可以受到控制，以避免牲畜的抗生素抗性也是未知之數。因此，我們須更深入了解海藻和其他發酵調節劑在瘤胃的運作機制，從而制定減少甲烷排放的餵飼策略，同時不影響牲畜的新陳代謝健康、餵飼效率和盈利能力。重要的是，這種控制腸道微生物組的飼養策略可能成為改善新陳代謝疾病的新方法，造福生產動物、寵物及人類。此外，使用水培草料餵飼反芻動物應受推廣，特別是在土地和水源有限的地區，我們尚未知道水培草料是否更易消化，或能減少反芻動物的甲烷排放。因此，我希望在工作崗位上建立一個反芻動物微生物基因組群及環境健康中心，邀請城大、中國內地、智利及美國康奈爾大學等海外同事參與，呼應美國康奈爾大學學務副校長Michael Kotlikoff教授在城大傑出講座系列「大學與未來：通過環球拓展與協作達致卓越」為題。

Interview with Ruby Cheung

Bachelor of Veterinary Medicine Student

The 90sqm clinical skills lab is used throughout the BVM programme to teach students the practical skills they need to become vets. Various models are used, both low and high fidelity, to simulate clinical situations. Many resources are designed and made 'in-house' to ensure they are as valuable and applicable to our curriculum as possible.

Over the last few years the clinical skills team has been lucky enough to be assisted by our own 2020 BVM cohort student, Ruby Cheung. Ruby is currently in her 4th year of the programme and kindly agreed to be interviewed to share her experiences working on clinical skills development.

Hi Ruby! Shall we start with how you became interested in veterinary medicine and what drew you to the BVM curriculum?

After completing my first degree in psychology, I didn't feel as excited about the career options as I was about the subject itself. I didn't realize I was interested in medicine until I started my first job at a hospital, which involved research ethics. As I have always loved animals, I decided to pursue a career in veterinary medicine. What I love about veterinary medicine is the unique combination of science and compassion it offers, as well as a wide range of career options. I was impressed by the BVM curriculum's comprehensive nature, and the way it is designed to address the unique needs of the local veterinary field. I also love that I can complete the programme here in Hong Kong. I can be close to my family and continue to be involved in my community.

You obviously have a very creative side, were you creative or artistic as a child, or is this a more recent interest?

As a child, I used to love shopping for fabrics in Sham Shui Po to make all kinds of clothes and accessories for my dolls. I've always been drawn to anything that allows me to be imaginative and push the boundaries of what I can make.

Can you tell us about your interests outside veterinary medicine, and how they help you develop clinical skills resources?

I enjoy learning all about 3D modelling and special effects make-up. Although I don't have as much free time as I'd like to work on my art projects now, these interests have helped me tremendously in developing clinical skills resources for our lab, from designing the shape, material selection, all the way to producing practical and functional final models. I love the challenge of applying my skills to create teaching models and the added bonus of being able to improve my skills along the way.

What drew you to helping out with the clinical skill resources?

I wanted to help out with the clinical skill resources mostly because I was interested in model making. I'm also curious about all the different ways students can be taught hands-on clinical skills, and how we can improve the overall learning experience. That's why I thought the Clinical Skills Lab would be the perfect place for me!

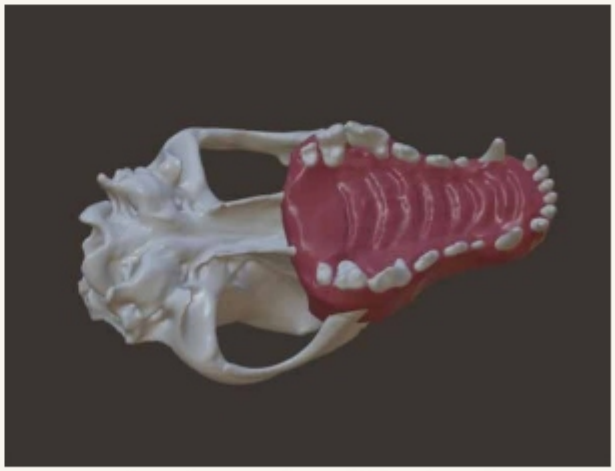
3D rendered horse testicle
3D 馬睪丸

Can you tell us about some of the models or resources you have made or been involved with developing?

Absolutely! I've helped with making a range of castration models and a model for examining ram breeding soundness - so quite a lot of testicle models of different species! I would also love to help with making models that do not involve the urogenital tract!

I know BVM students are very busy with their curriculum, how do you manage your time between your studies and your other interests?

Juggling my studies as a BVM student with my passions is difficult, but I try to tackle it one day at a time. I make sure to prioritize my studies, but I also carve out time at the end of each day to unwind and indulge in my passions, even if it is just a 15-minute break to admire the work of my favourite artists. For me, it's all about finding a happy balance and making the most of each moment.



3D rendered Dental model in development
研發中的3D牙齒模型

Do you think helping to make clinical skills resources has helped, or will help you in your BVM studies? If so, how?

Definitely! Helping to make clinical skills resources has helped me with my studies in my BVM studies in different ways. I've had to really dig into anatomy, at least for the parts I'm designing models of. It has been great to understand the surgical procedures in more detail. Also, it's fascinating to learn about the surgeries I'll be doing in a few years from both an educator and a learner's perspective.

Do you have any future plans for resources you want to develop, or further skills you want to gain in this area?

My plan is to finish a dental model I've been working on in the summer holidays, and I'm also looking forward to putting into practice, 3D printing skills I learnt during my internship at Queen Mary Hospital this summer. I'll keep honing my 3D modelling and sculpting skills, which will allow me to dive deeper into the different applications of 3D printing in teaching, veterinary, and human medicine.

Horse castration lab for Y5
五年級學生的馬匹閹割實驗

I know you are only halfway through the BVM, but do you have any thoughts yet about what you would like to do with your career?

Having already changed my career once, I will try to explore as many different career options as I can before making up my mind, but I'm determined not to settle for anything boring or unfulfilling. I want to be able to combine my passions and interests in a meaningful way to make a difference the lives of both humans and animals.

Finally, any advice you would offer to any other students that would like to be involved with clinical skills resource development?

If you're interested in getting involved with clinical skills resource development, feel free to reach out to me, Susanna Taylor or Prof Flay. We can work on new models and projects together, and it's always more fun to collaborate and learn from each other!

I was impressed by the BVM curriculum's comprehensive nature, and the way it is designed to address the unique needs of the local veterinary field.

獸醫學學士課程學生張菱殷分享

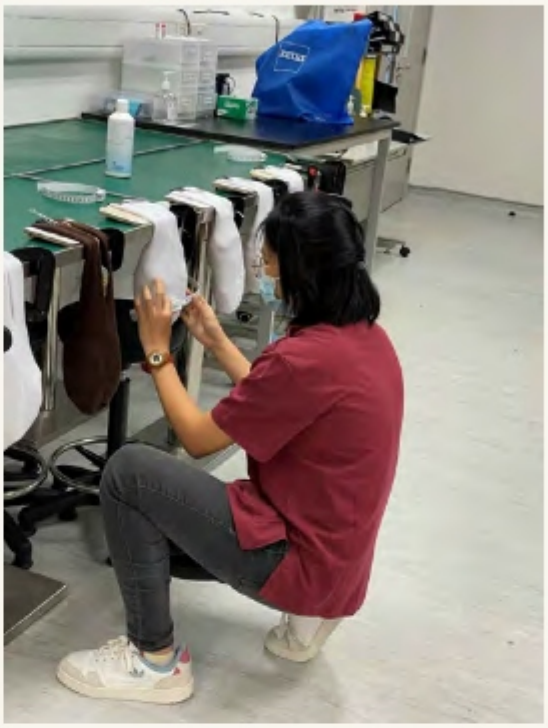
佔地90平方米的臨床技能實驗室用以教授獸醫學學士課程學生獸醫必備的實用技能，實驗室內設有多個模擬臨床情景的低保真和高保真模型，許多教學資源均由學院內部設計及製作，確保盡量滿足我們的課程需要。

幾年來，我們的臨床技能團隊有幸得到2020年屆獸醫學學士課程學生Ruby Cheung協助，她目前是四年級學生，這次欣然接受訪問，跟大家分享在臨床技能發展的經驗。

Ruby，妳好，不如先分享妳為何對獸醫學有興趣，甚麼推動妳修讀獸醫學學士課程呢？

我完成了第一個心理學學士學位後，才發現自己對從事心理學職業不像對修讀這學科那樣熱衷。直到我在醫院做第一份工作要接觸倫理學時，才意識到自己對醫學很有興趣。 由於我自幼喜歡動物，決定從事動物醫學的工作。我喜歡動物醫學將科學和愛心巧妙結合，提供的職業選擇又多。我喜歡獸醫學學士課程十分全面，課程為滿足本地獸醫界的獨特需求而設計。我也喜歡可以身在香港完成這課程，讓我能親近家人，繼續融入社區。

3D printed 'feline posterior' mounting block
3D打印貓科尾部組裝



Sheep testicles created out of silicone
用矽膠製作的綿羊睾丸

妳顯然很有創意，妳是自幼如此，還是近年的興趣？

小時候，我喜歡在深水埗買布料為洋娃娃做衣服配飾，我喜歡一切可以發揮想像力和突破界限的東西。

可以分享妳在獸醫學以外的興趣嗎？這些興趣怎樣幫你研發臨床技能資源？

我喜歡研究3D建模和特效化妝，雖然目前再沒有那麼多時間創作藝術，但這些興趣對我在實驗室研發臨床技能資源十分有用，啟發我設計形狀、選擇材料和生產實用及功能性模型。我享受將自己的強項應用到創作教學模型上，還可以從中提升自己的技巧。

是甚麼吸引妳參與研發臨床技能資源？

我想參與研發臨床技能資源，主要因為我對模型製作很有興趣，也對各種教授學生臨床技能的方式很好奇，我還想知道怎樣提升整體學習經驗，所以我覺得臨床技能實驗室是我的理想地！

我喜歡獸醫學學士課程十分全面，課程為滿足本地獸醫界的獨特需求而設計。

可以介紹一些妳製作或參與研發的模型和資源嗎？

當然可以。我參與製作了一系列閹割模型和檢查公羊繁殖能力的模型，不同動物品種的睪丸模型也不同，只要不涉及泌尿生殖道的模型，我都會樂意幫忙製作！

獸醫學學士課程非常緊湊，妳是如何分配讀書和發展興趣的時間？

獸醫學學生要發展興趣很困難，我嘗試一天集中做一件事，確保以讀書為先，但也會每天騰空放鬆自己，沉醉在興趣之中，哪怕只有15分鐘欣賞自己喜歡的藝術家作品。對我來說，這是尋找快樂平衡點，善用每一刻。

妳認為參與製作臨床技能資源有助修讀獸醫嗎，為甚麼？

肯定有！參與製作臨床技能資源在不同層面都有助修讀獸醫學學士課程，至少當我設計模型時，可以完全投入解剖學。我很享受這樣仔細了解手術過程，讓我從老師和學生的角度了解自己將來要做的手術。

妳還想研發甚麼資源，或者想再學會甚麼技能？

我的計劃是完成一個在暑假期間一直製作的牙科模型，同時我也期待著將今年夏天在瑪麗醫院實習期間學到的 3D 列印技能付諸實踐，我會繼續鑽研3D建模和雕刻技能，將3D打印應用到教學、動物醫學和人類醫學中。

雖然妳的獸醫學學士課程只讀了一半，但有打算從事甚麼職業嗎？

我已試過轉行，所以今次做決定前會盡量探索各種職業選擇，總之不做沉悶或沒有滿足感的工作，希望可以將熱情和興趣以有意義地方法結合起來，造福人類和動物。

最後，妳對其他想參與研發臨床技能資源的學生有何忠告？

如果你有興趣參與研發臨床技能資源，歡迎隨時聯絡我、Susanna Taylor或Flay教授，大家可以攜手研究新模型和新計劃，互相學習一定更有趣！

Hong Kong Veterinary Students Association (HKVSA)

HKVSA
香港獸醫學生學會

Established in 1951, International Veterinary Students Association (IVSA) is a non-profit organization that strives to connect veterinary students worldwide. It is also the world's largest veterinary student association, with 73 countries and 195 member organizations involved to provide a substantial international network for members.

The Hong Kong chapter of the International Veterinary Students Association was first established in 2020. In 2021, the session was discontinued due to the withdrawal of China from IVSA global. Nonetheless, with the hard work of our executive committee members and the support from students, in January 2023, IVSA Hong Kong was officially reestablished to provide members with fantastic opportunities again.Concurrently, we were officially appointed as the national board of IVSA China.

In 2023, we registered under the Societies Ordinance (Cap.151) as the "Hong Kong Veterinary Students Association" (HKVSA), with a belief that we will be able to expand the network of our locally trained veterinary students, as well as establish a positive image amongst the veterinary community in Hong Kong.

With the mission "connecting our members with the world", HKVSA is cooperating with IVSA chapters worldwide to provide global outreach activities to members, including virtual exchanges, individual exchanges, and group exchanges, along with opportunities to participate in veterinary congresses and symposiums. These activities are intended to expose members to diverse veterinary cultures in different parts of the world, expand their horizons, and spark their interest in journeys beyond Hong Kong.

Besides international outreaching activities, HKVSA strives to facilitate student access to local opportunities and improve Hong Kong veterinary student welfare while showcasing our local veterinary culture to people from all walks of life.

We strongly believe in the importance of fulfilling our social responsibility as future veterinarians, and will be providing our members with opportunities to volunteer and participate in social activities that advocate for animal welfare and proper pet care to the general public.

IVSA Philippines x IVSA Hong Kong Virtual Exchange
國際獸醫學會菲律賓與香港分會線上交流

Words from our President

We have a team of 8 dedicated students working towards establishing HKVSA. Our executive committee members range from Year 1-5 students, with members who come from India, educated in America, Australia, UK or born and raised in Hong Kong. This presents us with the perfect opportunity to cater to the needs of students from a diversity of backgrounds.

This year, we are honoured to have a total of 105 members, more than 60% of the total number of BVM students in CityU, and will be organising a variety of events exclusive to our members. We are confident that our society will only continue to expand in the following years to come. We are more than excited to establish our contacts with member organisations all over the world, and we are certain that the opportunities we provide will highly benefit our members, for their growth and learning experience during veterinary school.

We launched our first online-virtual exchange with IVSA Philippines on 18th February 2023, and our second online-virtual exchange with IVSA India on 1st April 2023. We were able to introduce our one-and-only Hong Kong Vet School, our local veterinary culture, as well as Hong Kong culture to our new friends, and all our participants made friends for life.

However, the importance of face-to-face interactions and experiences is also valued in HKVSA. We are honoured to have partnered with IVSA Brno, Czech Republic to launch our first ever member exchange program in August 2023. We have hosted 10 students from University of Veterinary Sciences Brno and sent 8 veterinary students from City University of Hong Kong to visit Czech Republic.

In the same month, my team and I had the privilege of representing IVSA China at the 74th IVSA Congress in Copenhagen, Denmark. During this event, we engaged with more than 140 students from over 40 countries, seizing the opportunity to showcase our unique Hong Kong Veterinary School and our local cultural heritage. I truly believe that in a world where overseas communication is easier than ever before, HKVSA would be providing our members with lots of opportunities to meet veterinary students from all over the world.

Another exciting news is our launch of the "FURever Home Campaign", the first-ever Hong Kong Veterinary Student initiated fundraising and adoption event. It is a community-focused event aimed at supporting our local dog adoption shelter while promoting pet adoption. We have partnered up with more than 20 local businesses and brands, whilst utilising our role as future veterinarians to engage in public education and advocate for proper pet ownership and care.

There is much potential for HKVSA to showcase its importance for our veterinary students and to the public. We welcome all kinds of collaborations that would facilitate our goal in exposing our members to international opportunities. For enquiries, please contact us at ivsachina.hongkong@ivsamo.org.

Best Regards,

Desiree Hung

Founding President of Hong Kong Veterinary Students Association (HKVSA)
President of IVSA Hong Kong

Besides international outreaching activities, HKVSA strives to facilitate student access to local opportunities and improve Hong Kong veterinary student welfare while showcasing our local veterinary culture to people from all walks of life.

除了國際外展活動外，香港分會亦致力為學生提供本地機會，改善香港獸醫學生的福利，同時向社會各界人士展示香港本地獸醫文化。

關於香港獸醫學生學會

成立於1951年的國際獸醫學生學會（International Veterinary Students Association，簡稱IVSA）是一個非營利性組織，致力於連繫全球獸醫學生。該學會也是全球最大的獸醫學生學會，有73個國家和195個成員組織參與，為成員提供了一個重要的國際網絡。

香港國際獸醫學生協會於2020年首次成立，但由於中國退出IVSA全球組織，2021年停止運作。儘管如此，經過執委會成員的努力和學生的支持，在2023年1月，IVSA香港正式重新成立，為成員提供出色的機會。同時，我們正式被委任為IVSA中國的全國委員會。

在2023年，我們以「香港獸醫學生學會」（Hong Kong Veterinary Students Association，簡稱HKVSA）的名義在《社團條例》（第151章）下註冊，相信我們將能擴大本地培訓的獸醫學生網絡，建立良好的形象，並與香港獸醫界建立良好的關係。

HKVSA以「讓香港獸醫學生與世界接軌」為使命，與全球的IVSA分會合作，為成員提供全球範圍的宣傳活動，包括虛擬交流、個人交流、團體交流，以及參加獸醫大會和研討會的機會。這些活動旨在讓成員接觸不同地區的多樣化獸醫文化，擴展他們的視野，並激發他們對香港以外旅程的興趣。

除了國際宣傳活動，HKVSA致力於促進學生接觸本地機會，提高香港獸醫學生的福利，同時向各行各業的人展示我們的本地獸醫文化。

我們亦堅信作為未來獸醫應履行社會責任，將為我們的成員提供參與倡導動物福利和適當寵物護理的志願活動和社交活動的機會。

會長的話

我們有一支由8名獨立學生組成的團隊致力於建立HKVSA。我們的執委會成員來自不同背景，包括來自印度、在美國、澳洲、英國接受教育，或在香港出生和成長的成員。這為我們提供了一個完美的機會，以滿足來自不同背景的學生的需求。

今年，我們很榮幸有105名成員，佔城大獸醫學生總數的60%以上，將舉辦各種只為成員而設的活動。我們有信心，在未來幾年中，我們的學會將繼續擴大。我們非常興奮地期待與世界各地的成員組織建立聯繫，我們相信我們提供的機會將極大地造福我們的成員，在他們的成長和學習過程中獲得寶貴的經驗。

我們於2023年2月18日與IVSA菲律賓啟動了第一次網上虛擬交流，並於2023年4月1日與IVSA印度啟動了第二次網上虛擬交流。我們能夠向新朋友介紹我們獨一無二的香港獸醫學校、本地的獸醫文化以及香港文化，令所有參加者都結識了終身朋友。

然而，在HKVSA中，我們也非常重視面對面的互動和經驗。我們很榮幸與捷克布爾諾的IVSA分會合作，於2023年8月啟動了我們有史以來的首個會員交流計劃。我們接待了來自布爾諾獸醫科學大學的10名學生，並派遣了來自香港城市大學的8名獸醫學生訪問捷克共和國。

在同一個月份，我和我的團隊有幸代表IVSA中國參加了丹麥哥本哈根舉辦的第74屆IVSA大會。在這個活動期間，我們與來自40多個國家的超過140名獸醫學生互動，利用了這個機會來展示我們全港唯一的獸醫學院和我們當地的文化遺產。我深信，在當今世界，跨國交流比以往任何時候都更加容易，HKVSA將為我們的會員提供與來自世界各地的獸醫學生見面的許多機會。

另一個令人興奮的消息是我們推出了“永恒犬緣活動”，全港首次由獸醫學生發起的籌款和領養活動。這是一個以社區為重點的活動，旨在支持我們當地的狗隻領養收容所，同時宣傳寵物領養。我們與超過20家本地企業和品牌合作，利用我們未來獸醫的角色進行公眾教育，倡導適當的寵物飼養和照顧。

HKVSA有很大的潛力展示對我們的獸醫學生和公眾的重要性。我們歡迎任何形式的合作，以促進我們的目標，讓成員接觸國際機會。如有查詢，請電郵 ivsachina.hongkong@ivsamo.org與我們聯絡。

此致
孔千澂

香港獸醫學生學會創會會長
國際獸醫學生學會 香港分會會長

IVSA Hong Kong X IVSA Brno Member Exchange Program
國際獸醫學會 捷克布爾諾 X 香港分會交流生計劃

FURever Home: Fundraising and Adoption Event
永恆犬緣：領養及籌款活動

Executive Committee 2023-2024
2023-2024年度執行委員會

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BVM / Year 5
獸醫學生學士 / 大學五年級

Vice President 副會長
Sammi Wong 黃樂瑤
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Student Relations Officer
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Social Media Officer
社交媒體幹部
Abbie Lee 李碧華
BVM / Year 1
獸醫學生學士 / 大學一年級
UC Berkeley BA Chemistry
加州大學柏克萊 / 理學士（化學）

Reaching out to Local Secondary Schools

Dr Howard Wong

Sometimes when you are so engrossed in doing something, that you have little time to stop and reflect on what you are doing, to take a pause and to see things from a different angle.

Fortunately, in March this year, we had the pleasure of showcasing the veterinary profession, our college and our Bachelor of Veterinary Medicine programme to over 60 school principals and career masters from over 40 schools.

We began the experience session with a video made all the way back in 2017, showcasing our very first cohort with them explaining in their own words (without scripts incidentally, which made the result even more authentic) why they joined CityU and the vet profession. Rather charmingly, this exact cohort will be graduating this year and will become Hong Kong's first ever locally trained veterinarians.

We were also able to hear personal stories from many of our new faculty, why they became vets, what brought them to Hong Kong and what makes them enjoy being a part of this profession. What was particularly interesting to me (since I had not heard them talk about themselves) was the variety and different paths they all took. We had an equine surgeon who wanted to be a jockey but grew too big for a jockey and decided to maintain his interest in horses by becoming a horse vet. Another of our faculty grew up obsessed with frogs and reptiles and is now an exotic vet specialist. Even our local vets had tales to tell with one vet who now works on our CityU Farm taking care of our dairy cows telling the audience about how she developed an interest in farm animals whilst working on farms in her early vet school years, whilst our anatomic pathologist explained to the audience how dead animals can tell us all about an animal's life history, a gift that she now puts into use every day in her chosen specialty. Finally, we heard from an epidemiologist who grew up in Iran but who has worked all over the world from the Food and Agriculture Organization of the United Nations in Rome to fish farms in Canada.

The veterinary profession is truly one of the broadest professions you can be part of and with food production and animal health becoming one of the most crucial areas relevant to the survival of the human race, the impact of vets is only set to grow and grow. This was brought home as we showcased two of our newest facilities to the teachers, namely our Clinical Skills Laboratory and our CityU Farm, which now houses our recently imported Jersey cows and their calves.

Dr Howard Wong, *B.A. (Hons), M.A., Vet.M.B. (Cantab), MPVM (UC Davis), MSc (Sustainable Aquaculture) (St. Andrews), CertAqV, MRCVS*

Director, Development for Veterinary Medicine

School Principals & Career Master visit CityU Farm
中學校長及輔導教師參觀城大農場

接觸本地中學

王啟熙獸醫

有時候，當你全神貫注做一件事時，幾乎沒有時間思考這件事，不如暫停一下，從多方面反思。今年的三月我們有幸做到了，當時邀請了全港超過40所中學，60多位學長及升學及就業輔導主任來城大，了解獸醫學學士課程和賽馬會動物醫學及生命科學院情況。

我們從2017年一段短片開始，片中由我們第一屆學生親口解釋他們加入城大和獸醫行業的原因，全程無須照稿讀，令說話更加真誠動人。更妙的是，這屆學生將在今年畢業，成為香港第一批本地培訓的獸醫。

很多教授也分享自己的故事，包括他們成為獸醫的原因，來香港工作的理由，愛上這行業的動力。對我來說，我也是初次聽他們這些分享，原來各人都有一個特別故事。我們有一位馬外科醫生，他幼時想成為騎師，但十幾歲時越長越高大，決定將對馬匹的興趣轉化成當馬匹獸醫的動力。另一位教師從小迷戀青蛙和爬行動物，現在是一名珍禽異獸專家。

連我們的自家獸醫也踴躍分享，一位現於城大農場照顧乳牛的獸醫講述自己早年讀獸醫時，因為在農場工作而對農場動物深感興趣。而另一位獸醫則分享動物屍體如何娓娓道來動物生活史，她現在成為一名專業病理學家，每天將這種天賦用於學術。最後，我們聽一位在伊朗長大的流行病學家發言，他的工作足跡遍及世界各地，橫跨羅馬的聯合國糧食及農業組織到加拿大的養魚場。

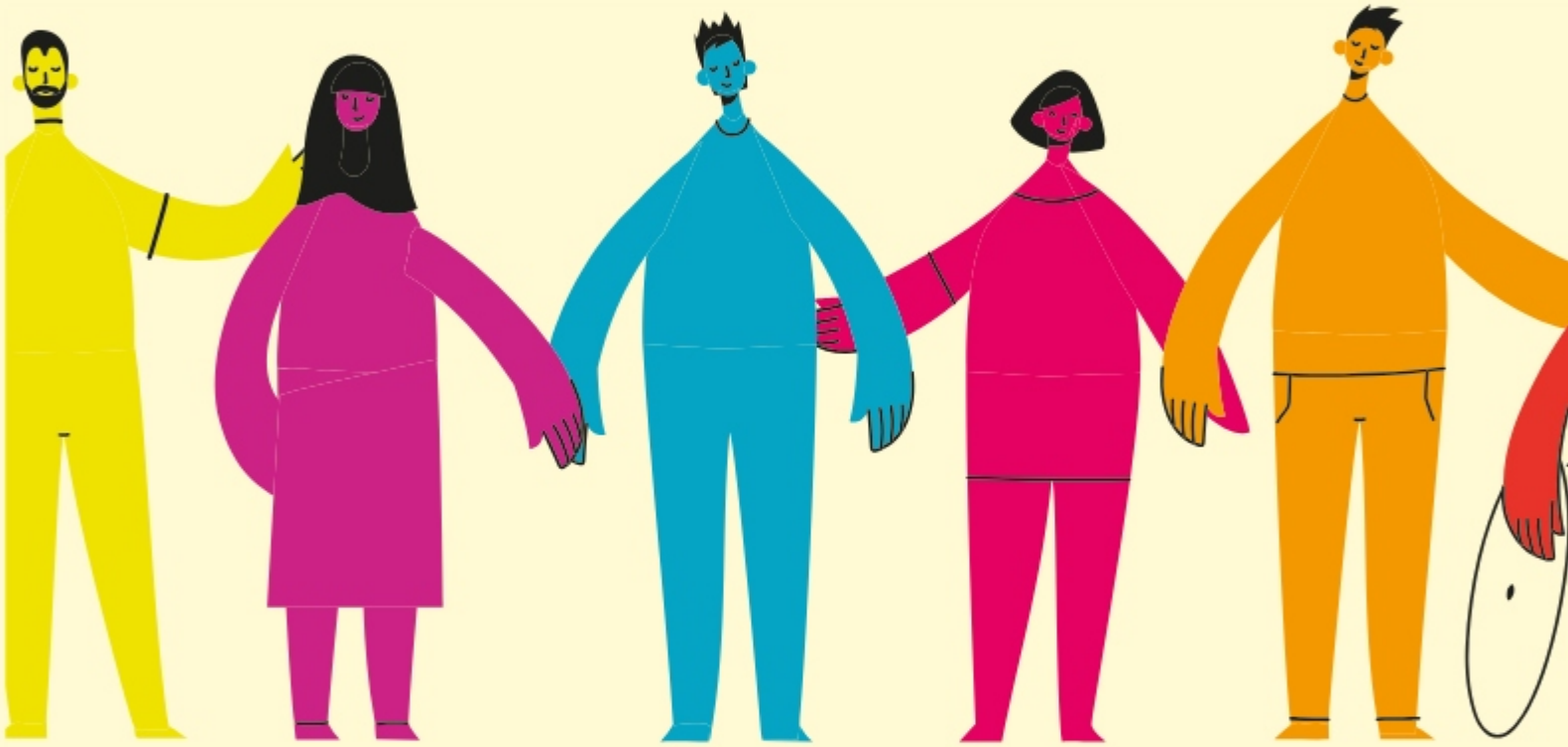
獸醫業絕對是給你最多職業選擇的專業一之，隨着食品生產和動物健康成為與人類生存相關的重要領域，獸醫的影響只會越來越大。當我們向老師們展示了我們的兩個最新設施，即我們的臨床技能實驗室和我們的現在飼養著我們最近進口的娟山牛及其初生小牛的城大農場時，便讓我們了解它的重要性。

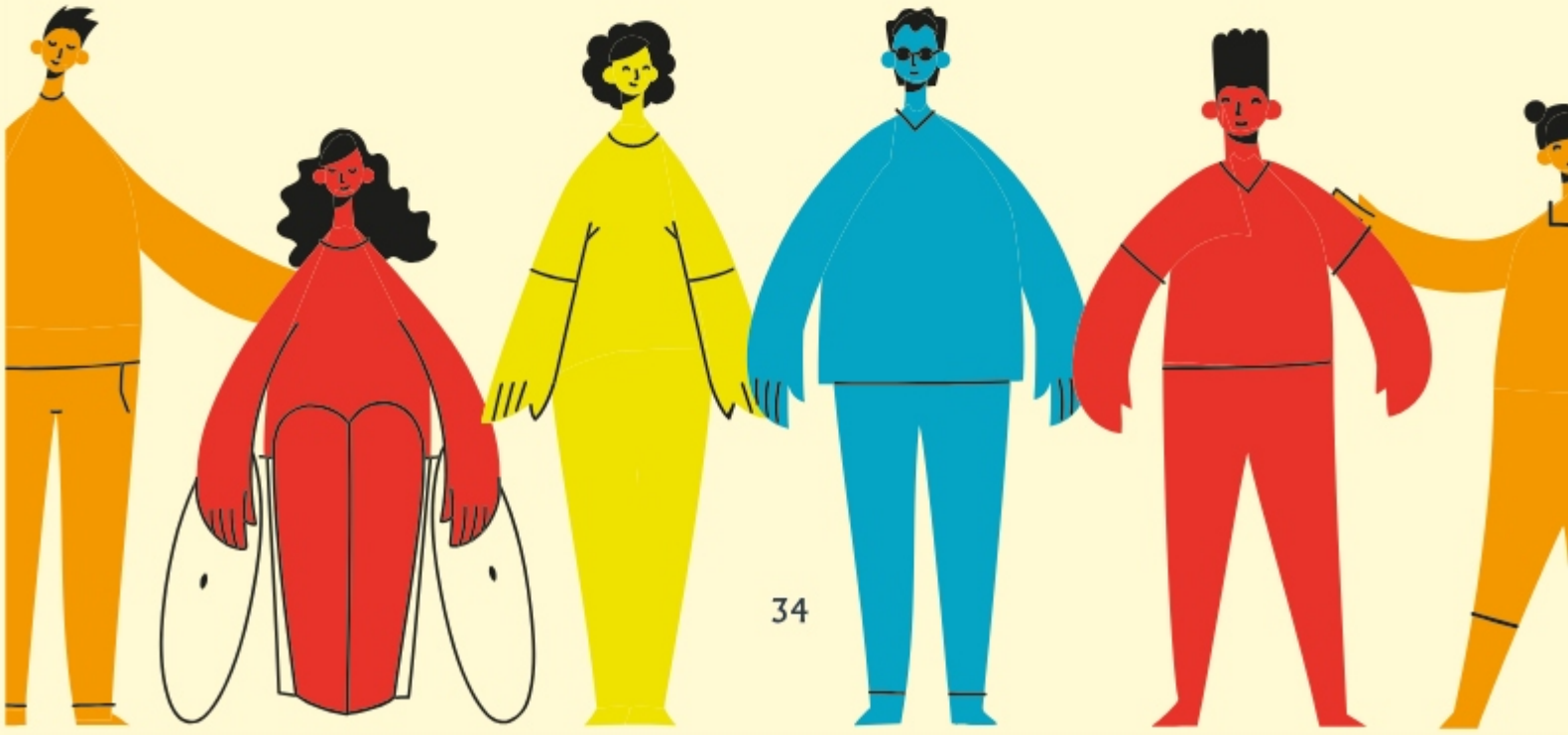
王啟熙獸醫
總監 - 動物醫學發展

BVM Diversity, Equity and Inclusion (DEI)

Prof. Alan McElligott

Chair of Diversity, Equity and Inclusion Sub-Committee





The Jockey Club College Establishes CityU's First Diversity, Equity and Inclusion Committee

Visit Us

JCC BVM DEI Website

The JCC BVM DEI subcommittee was established in August 2022, with a view to promoting a more inclusive environment for all students and staff. Having a more prominent commitment to DEI in terms of our organisation's culture and values, is also a core aspect of Royal College of Veterinary Surgeons (RCVS) accreditation for our BVM degree. The subcommittee is currently comprised of 11 members who are drawn from staff across JCC, PH, VCS and BMS, as well as student representatives. The subcommittee met twice during the last months of 2022 and have formulated a DEI action plan for the coming year, which has been endorsed by the BVM Committee. Our BVM DEI website is packed with useful information on many aspects of DEI, including our terms or reference and core commitments, action plan, further reading, links to DEI training at CityU and more broadly in Hong Kong, and news of important of cultural and religious events. Overall, we are committed to both raising awareness of DEI values for staff and students, as well as providing training opportunities. We welcome input from anyone on matters related to DEI, so please feel free to get in contact (details posted on our website).

What does DEI mean?

Diversity - psychological, physical, and social differences that occur among all individuals; including but not limited to race, ethnicity, nationality, religion, socioeconomic status, education, marital status, language, age, gender, sexual orientation, mental or physical ability, and learning styles.

Equity - the guarantee of fair treatment, access, opportunity, and advancement while at the same time striving to identify and eliminate barriers that have prevented the full participation of some groups. The principle of equity acknowledges that there are historically underserved and underrepresented populations and that fairness regarding these unbalanced conditions is needed to assist equality in the provision of effective opportunities to all groups.

Inclusion - the act of creating environments in which any individual or group can be and feel welcomed, respected, supported, and valued to fully participate. An inclusive and welcoming climate embraces differences and offers respect in words and actions for all people.

For more information please refer to the following links;

JCC BVM DEI Website: https://www.cityu.edu.hk/jcc/about-us/diversity-equity-and-inclusion

Improving diversity, inclusion in vetmed requires 'sustained effort':
https://www.veterinarypracticenews.com/improving-diversity-inclusion-in-vetmed-requires-sustained-effort/?en_click=1&utm_campaign=2022-08-16&utm_medium=email&utm_source=newsletter&utm_content=feature&max=VPN-86009

AAVMC Diversity, Equity & Inclusion Glossary:
https://www.aavmc.org/wp-content/uploads/2021/08/Monograph-DEI-Glossary-01.pdf

Cornell University, College of Veterinary Medicine, Diversity and Inclusion:
https://www.vet.cornell.edu/education/doctor-veterinary-medicine/student-life/diversity-inclusion

獸醫學學士課程多元、公平和共融小組委員會

Prof. Alan McElligott
多元、公平和共融小組委員會主席

2022年8月，城大賽馬會動物醫學及生命科學院成立「獸醫學學士課程多元、公平和共融小組委員會」，旨在為學生和教職員營造更共融的環境，以學院文化和原則高舉多元、公平和共融，這也是英國皇家獸醫學院（RCVS）對城大獸醫學學士課程認證的關鍵之一。該小組委員會由11位來自城大賽馬會動物醫學及生命科學院、傳染病及公共衛生學系、臨床動物醫學系、生物醫學系的成員及學生代表組成，在2022年底召開兩次會議，制訂了來年的多元、公平和共融活動計劃，獲獸醫學學士課程委員會通過，並在官方網頁上載豐富的多元、公平和共融資訊，包括我們的職權範圍和核心承諾、活動計劃和參考閱讀，以及城大和香港的多元、公平和共融培訓資料連結，還有重要文化和宗教活動消息。整體而言，我們致力讓學生和教職員更了解多元、公平和共融的價值，為他們提供培訓機會，歡迎大家踴躍參與，各抒己見（詳情見網站）。

DEI是什麼？

多元 - 每人之間的心理、生理和社會差異，包括族裔、國籍、宗教、社會經濟地位、教育程度、婚姻狀況、語言、年齡、性別、性取向、身心能力及學習風格等等。

公平 - 保證公平待遇、均等機會和向上流動，同時努力消除各人障礙。公平原則確認有些人一直屬於社會弱勢，這些不衡現象須公平處理，讓所有人同獲寶貴機會。

共融 - 營造人人受到尊重、支持和重視的環境，讓大家各展所長。一個共融關愛的氛圍可以減少人們的差異，讓大家在語言和行動上都感受到尊重。

城大獸醫學學士課程多元、公平和共融小組委員會網頁：
https://www.cityu.edu.hk/jcc/about-us/diversity-equity-and-inclusion

提升獸醫學界的多元、公平和共融，大家須「可持續努力」：
https://www.veterinarypracticenews.com/improving-diversity-inclusion-in-vetmed-requires-sustained-effort/?en_click=1&utm_campaign=2022-08-16&utm_medium=email&utm_source=newsletter&utm_content=feature&max=VPN-86009

美國獸醫學院協會多元、公平和共融索引：
https://www.aavmc.org/wp-content/uploads/2021/08/Monograph-DEI-Glossary-01.pdf

美國康奈爾大學獸醫學院多元、公平和共融：
https://www.vet.cornell.edu/education/doctor-veterinary-medicine/student-life/diversity-inclusion

Jockey Club College of Veterinary Medicine and Life Sciences

香港城市大學
City University of Hong Kong
in collaboration with Cornell University

Diversity Equity Inclusion

The Jockey Club College of Veterinary Medicine and Life Sciences actively promotes **Diversity, Equity and Inclusion (DEI)** for all staff and students.
Thus, the DEI Sub-committee was established under the Bachelor of Veterinary Medicine (BVM) Committee in August 2022.

SCAN ME

https://www.cityu.edu.hk/jcc/about-us/diversity-equity-and-inclusion

OUR GOALS

- Encouraging learning, deliberating, and understanding about DEI, and providing support and opportunities to all underrepresented groups
- Learning improvements in DEI across the BVM Program and continuously improving the BVM, by creating an environment that facilitates optimal research, education and work for all
- Promoting respect for all; reflected in internal operations with a view to overcome systemic barriers in order to model an inclusive society built on respect for one another
- Warranting fair and transparent treatment for all in academic and professional service roles, especially with regard to recruitment, retention and promotion, with a focus on inclusion
- Ensuring awareness and sensitivity training to staff, students and partners or partner organizations associated with the BVM program
- Leading policies, events and other activities related to DEI. Providing guidance, and working with others to promote DEI

Final Year Clinical Rotations in the Bachelor of Veterinary Medicine Degree

Dr Yorkee Leung
Clinical Programme Manager

Students are encouraged to take ownership of their cases and fully review all aspects of the case, including history taking, physical examination, developing differential diagnoses, diagnostics, treatments, and follow-up care.

Clinical education is the clinical workplace learning component of the BVM programme. It is the essential clinical teaching and training that students need to achieve The Royal College of Veterinary Surgeons (RCVS) Day One Competencies and to prepare graduates for a career as a veterinarian. Clinical placements provide real case-based learning opportunities for students to apply their theoretical knowledge, communication and technical skills in a real clinical setting under the supervision of clinical rotation supervisors who are either specialists or experienced veterinarians with expertise in diverse fields. Students are encouraged to take ownership of their cases and fully review all aspects of the case, including history taking, physical examination, developing differential diagnoses, diagnostics, treatments, and follow-up care, where possible. On core clinical rotations, students are given the time to research and discuss all aspects of clinical case management

The first cohort of BVM students (BVM Year 6) recently completed their final stage of 28 weeks of core clinical rotations and 20 weeks of elective clinical extramural studies (EMS) in Year 5 and Year 6 of the BVM programme. The clinical rotation groups of the first cohort of students consist of no more than four students per group. Students are further sub-divided within each rotation group to have a smaller number of students per clinician for certain clinical rotations.

The major core clinical teaching sites comprise of CityU Veterinary Medical Centre (VMC) and CityU Veterinary Diagnostic Centre (VDL) which are wholly owned subsidiaries of CityU. JCC Clinical Faculty, JCC Educators and VMC Rotation Supervisors lead the clinical rotations in primary care, referral medicine, diagnostic imaging, surgery, anaesthesia and emergency and critical care at VMC. Students participate in a pathology rotation hosted by VDL and JCC pathologists.

Other JCC clinical faculty in equine practice and exotics practice lead the equine rotation and exotics rotation at other JCC clinical rotation sites including the Hong Kong Jockey Club and Zodiac Pet & Exotic Hospitals respectively. Students on clinical rotations at these locations are taught by JCC faculty with the involvement of in-house veterinarians. The clinical services provided by the JCC Ambulatory Veterinary Services support the core livestock practice (pigs, poultry,

fish) rotation. Our final year students gained invaluable clinical experience in ruminant practice by attending a 2-week clinical rotation in ruminant practice at a well established cattle practice in North Queensland, Australia.

In addition to the core clinical rotations, students are required to complete a total of 20 weeks clinical EMS starting from BVM Year 5, consisting of five (5) four-week elective clinical extra-mural placements depending on students' area of interest. This will provide students with great opportunities to further develop their professionalism and equip them with the necessary clinical skills and experience to be ready for practice on Day One of clinical practice.

Dr Yorkee Leung, *BVSc(Hons), MVS, GradCertSAECC, MANZCVS*
Clinical Programme Manager

Current Structure of Clinical Rotations and Clinical EMS

Clinical Rotation	Location	Duration
Anaesthesia	CityU VMC	3 weeks
Diagnostic Imaging	CityU VMC	2 weeks
Emergency and Critical Care	CityU VMC	2 weeks
Equine	Hong Kong Jockey Club	3 weeks
Exotics	Zodiac Pet and Exotic Hospital	1 week
General Practice (Primary Care, Dermatology, Neurology)	CityU VMC	3 weeks
Livestock Practice (Aquatics, Poultry, Swine, Small Ruminants)	CityU JCC Ambulatory Veterinary Services	3 weeks
Pathology	CityU VDL	2 weeks
Referral Medicine (Referral Medicine, Cardiology, Oncology)	CityU VMC	3 weeks
Ruminant	School approved dairy practice	2 weeks
Slaughterhouse rotation	Sheung Shui Slaughterhouse	1 week
Surgery	CityU VMC	3 weeks

Clinical EMS	Duration
Elective	4 weeks
Elective	4 weeks
Elective	4 weeks
Elective	4 weeks
Veterinary Public Health	4 weeks

獸醫學學士課程結業年臨床實習

梁育宜獸醫

獸醫學學士課程的臨床教育是在臨床環境進行的學習元素，這種臨床教學及培訓十分重要，讓學生達到英國皇家獸醫學院的「第一天能力值」（Day One Competencies），讓畢業生萬事俱備當上獸醫。臨床實習為學生提供以真正病例為基礎的學習機會，讓他們在各方專家和資深獸醫組成的實習導師團隊指導下，在真正的臨床環境中應用所學的理論知識、溝通和技術技能。我們鼓勵學生投入各自病例，全面審視病例每個層面，包括動物病歷、體格檢查、制訂鑒別診斷、普通診斷、治療，如可行的話提供後續護理。在核心臨床實習中，學生有足夠時間研究和討論各方面的臨床病例管理。

我們鼓勵學生投入各自病例，全面審視病例每個層面，包括動物病歷、體格檢查、制訂鑒別診斷、普通診斷、治療，如可行的話提供後續護理。

第一屆獸醫學學士課程六年級的學生，已經完成課程中五、六年級總共28周的核心臨床實習和20周的選修臨床校外進修（EMS）。第一屆學生的臨床實習組由每組不超過4名學生組成，每組學生再各分小組，讓部分臨床實習獸醫各自指導更少的學生。

臨床教學主要地點包括由城大全資擁有的城大動物獸醫療中心（VMC）和城大動物醫療檢驗中心（VDL）。賽馬會動物醫學及生命科學院的臨床教授和導師，以及城大動物獸療中心的實習課程導師，共同指導初級護理、轉介醫學、影像診斷、外科、麻醉、急症和重症護理的臨床實習。學生亦參加由動物醫療檢驗中心和賽馬會動物醫學及生命科學院病理學家主持的病理實習。

其他臨床教授會在其他臨床實習地點指導學生，包括在香港賽馬會指導馬科實習，以及在星寵動物醫院指導珍禽異獸科實習。這些實習學生由賽馬會動物醫學及生命科學院教授授課，並有該機構的獸醫參與。賽馬會動物醫學及生命科學院門診獸醫服務部門提供臨床服務，支援豬、家禽、魚等重要牲畜實習。 最後一年的學生在澳洲昆士蘭一家大型養牛場參加為期兩周的反芻動物臨床培訓，獲得寶貴的臨床經驗。

除了核心臨床實習外，學生須從獸醫學學士課程五年級開始完成共20周的臨床校外進修課程，包括五個為期四周的臨床校外選修實習，由學生視乎興趣而決定實習領域，讓學生得以發展專業水平，讓他們臨床執業第一天即具備必要的臨床技能和經驗。

梁育宜獸醫
臨床課程經理

臨床實習和臨床校外進修的當前結構

臨床實習	地點	期間
麻醉	城大動物醫療中心	3週
影像診斷	城大動物醫療中心	2週
緊急和重症監護	城大動物醫療中心	2週
馬科	香港賽馬會	3週
珍禽異獸	星寵動物醫院	1週
全科診療 （初級保健、皮膚科、神經科）	城大動物醫療中心	3週
畜牧實習 （水產、家禽、豬、小型反芻動物）	城大獸醫學院外展診症服務	3週
病理	城大動物醫療檢驗中心	2週
轉介醫學 （轉介醫學、心臟病學、腫瘤學）	城大動物醫療中心	3週
反芻動物	學院批准的奶牛場	2週
屠宰場實習	上水屠房	1週
外科手術	城大動物醫療中心	3週

臨床校外進修	期間
選修課	4周
選修課	4周
選修課	4周
選修課	4周
獸醫公共衛生	4周

On the clinic floor, Dr. Lai emphasizes the importance of primum non nocere (first, do no harm) to her students. Her patients are the highest priority. Treating the patients' families with honesty and empathy is equally important to professional knowledge.

Specialist veterinary surgery is one of the cornerstone referral services at CityU VMC, providing consultations and high-quality surgical procedures for everything from routine to difficult or unusual cases. The surgery service works closely with clients and referring veterinarians to provide continuity of care for their patients, and the service also provides clinical training rotations for students in the JCC veterinary program. We would like to welcome Dr. Grace Lai, veterinary surgeon specialist, who has recently joined CityU VMC.

Dr. Grace Lai is from Taipei, Taiwan, and earned her Bachelor of Veterinary Medicine degree from National Chung-Hsing University. Upon graduation, she worked in a referral clinic in Taipei, where she developed a strong interest in orthopaedics. Dr. Lai decided to move to the US to pursue advanced education, completing a clinical year at University of Illinois and a rotating internship at VCA Veterinary Referral Associates, Maryland. Following her internship, she finished a surgical research fellowship at Michigan State University focusing on canine upper airway diseases. She organized and conducted a large, cross-sectional, multi-centre clinical study on a specific laryngeal disease affecting Norwich terriers in North America. After that, Dr. Lai moved to the University of Georgia for a residency in small animal surgery. In the three years of residency, Dr. Lai gained valuable experience in a broad range of complex surgical procedures. University of Georgia is one of only three institutions worldwide that performs kidney transplantation surgery in cats. During her residency, Dr. Lai received extensive additional training in microvascular and urological surgeries, honing advanced, sub-specialized skill sets which she frequently uses now for CityU VMC cases. Dr. Lai's professional interests include laryngeal diseases, cardiothoracic procedures, microvascular surgeries, arthroscopy, and fracture repair. She is now a board-certified specialist by the

Dr. Grace Lai
賴佩君獸醫

American College of Veterinary Surgeons (ACVS).

Dr. Lai has extensive international teaching experience, including orthopaedic lectures, anatomy labs, junior and senior surgery labs, and clinical rotations. As an active research committee member in the ACVS, she has a strong passion for clinical research, especially in laryngeal diseases, reconstructive surgeries, and bone biomechanics. Since joining the CityU VMC family, she has collaborated on multiple retrospective studies with other universities. She is a dedicated educator, always taking extra time to coach veterinary students and interns on surgical skills and scientific writing.

On the clinic floor, Dr. Lai emphasizes the importance of primum non nocere (first, do no harm) to her students. Her patients are the highest priority. Treating the patients' families with honesty and empathy is equally important to professional knowledge. Dr. Lai sees herself as a role model to the young generations, and she believes that if students are placed in a nurturing environment with adequate education, they will develop into strong clinicians contributing to the veterinary profession.

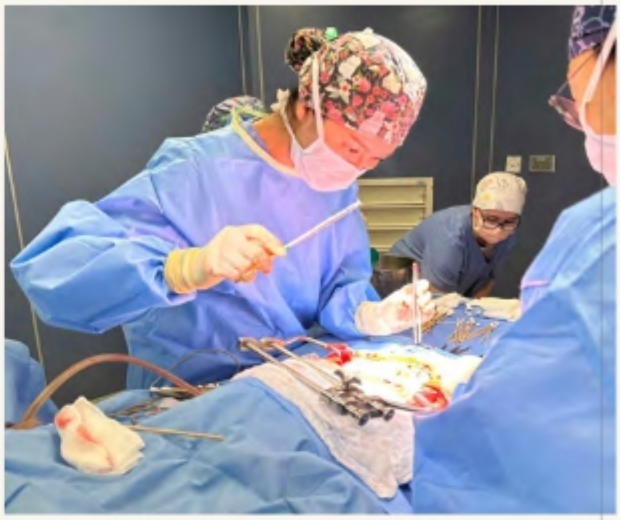
認識城大動物醫療中心外科專科
賴佩君獸醫

外科專科是城大動物醫療中心最重要的轉介服務之一，不論是一般疾病或奇難雜症，我們都能提供醫療諮詢和優質外科手術。外科團隊與客戶和轉介獸醫緊密合作，為患者提供持續護理，也為城大賽馬會動物醫學及生命科學院學生提供臨床培訓，我們歡迎外科專科賴佩君獸醫最近加入城大動物醫療中心。

賴獸醫來自台北，在國立中興大學取得獸醫學學士學位後，在台北一家轉介獸醫診所工作，漸漸對骨科深感興趣，決定到美國進修，在伊利諾大學完成一年臨床學習，再於馬里蘭州VCA轉介獸醫協會完成實習，其後在密西根州立大學以獎學金完成外科研究，探討有關犬科上呼吸道疾病。她針對北美諾威茲爹利的一種特殊喉部疾病，進行了一項大型多中心橫斷面的臨床研究。其後，賴醫生在喬治亞大學接受小動物外科住院醫師培訓，在三年的實習期中，獲得各種複雜外科手術的寶貴經驗。

全球僅有三間機構曾在貓身上進行腎臟移植手術，喬治亞大學是其中一間。在實習期間，賴醫生接受微血管和泌尿外科手術的密集培訓，當時學來的尖端亞專業技能如今在城大動物醫療中心大派用場。賴醫生的研究範圍包括喉部疾病、心胸外科手術、微血管手術、關節鏡手術和骨折修復，她現在是美國獸醫學院（ACVS）認證的外科專科獸醫。

賴獸醫擁有豐富的國際教學經驗，精通骨科講座、解剖學實驗室、初級和高級外科實驗室及臨床輪訓。作為美國獸醫學院研究委員會活躍會員，她對臨床研究－尤其是在喉部疾病、重建手術和骨生物力學由衷熱愛。自加入城大動物醫療中心以來，她與其他大學合作開展了多項回顧性研究。她是一位熱心教育工作者，總會騰空指導獸醫學生和實習生的手術技巧和科學寫作。



在診所裏，賴獸醫向學生強調*primum non nocere*（首先原則，絕不傷害）的重要性。她總是先考慮患者處境，以誠懇和同理心對待牠們的家屬，這種態度跟專業知識同樣重要。

在診所裏，賴獸醫向學生強調primum non nocere（首先原則，絕不傷害）的重要性。她總是先考慮患者處境，以誠懇和同理心對待牠們的家屬，這種態度跟專業知識同樣重要。賴獸醫視自己為年輕一代的榜樣，她相信對學生春風化雨，學生就能成為出色獸醫，為業界作出貢獻。

CityU
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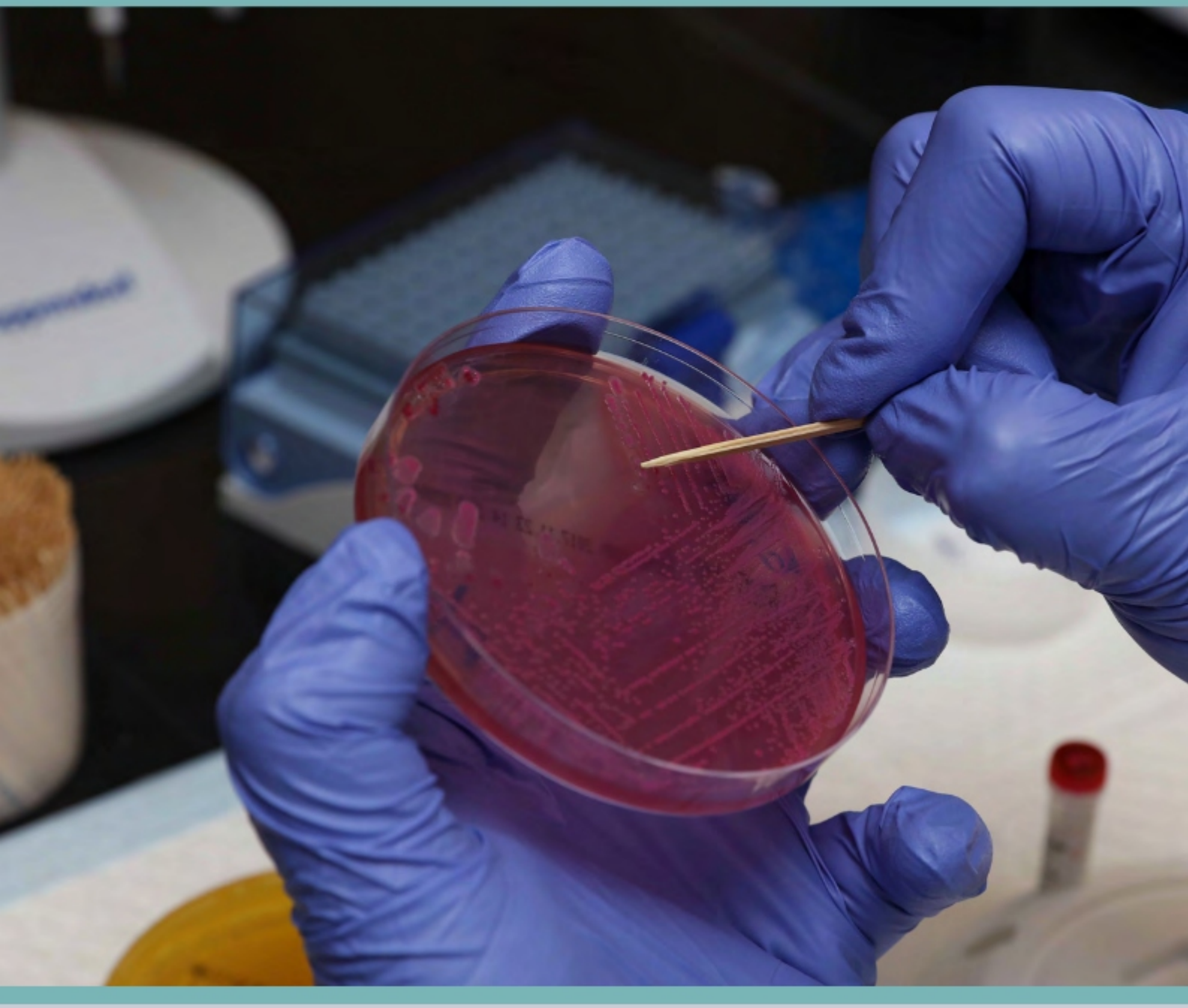
VETERINARY
DIAGNOSTIC
LABORATORY

Pathways to the answer: getting the best from your diagnostic laboratory

Dr Fraser Hill



CityU Veterinary Diagnostic Laboratory (CityU VDL) continues to find new disease syndromes and expand the knowledge of existing diseases in Hong Kong whilst contributing to research studies and assisting with veterinary student rotations, teaching and student projects.

Information has been added to known and existing disease problems of animals, along with investigations of new diseases through the cases at CityU VDL. In this report, a series of cases are shared highlighting the recent efforts.

Diarrhoea in pups can be caused by a range of different disease problems. Faecal samples received from an 8-week-old pup were examined by faecal floation revealing numerous parasite eggs. Figure 1 shows an image of the egg next to the eyepiece micrometer used to measure the egg length and width. These features all classified the eggs as those produced by Toxocara canis, a common intestinal parasite of dogs, with treatment available to quickly remove the infection and bring the pup back to full health.

It is also important to consider common disease with uncommon presentations, illustrated by two cases of dogs with almost complete hair loss.

The first case was a 12-year-old Shiba Inu with only tufts of hair remaining on the head, back and tail while the remainder of the dog was completely bald. The second case was a 3-year-old dog, examined because of diffuse skin thickening and hair loss over the entire body, with only a single hair remaining. In both these cases, examination of skin biopsies by veterinary pathologists at CityU VDL found large numbers of fungal organisms within the hair follicles and skin of the dogs. Figure 2 shows the pink staining fungi highlighted by special stains within the skin of one of the affected dogs. Most hair loss associated with fungal infection in dogs is localized and caused by Microsporum canis, Trichophyton mentagrophytes and Microsporum gypseum.

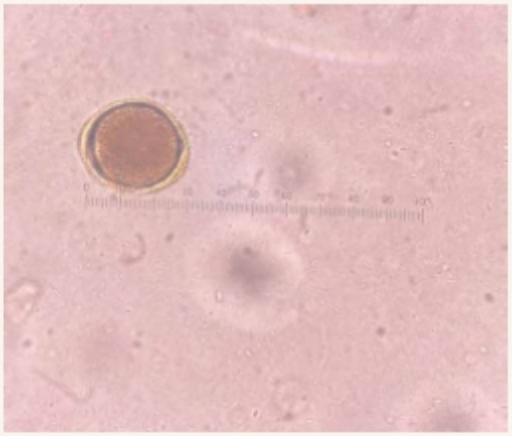


Figure 1: Parasite egg on faecal flotation with morphological features of Toxocara canis eggs (photo credit Rosil Dimalibot)
圖1：以糞便浮選法偵查寄生蟲卵，發現犬蛔蟲的形態特徵（圖片來源：Rosil Dimalibot）。

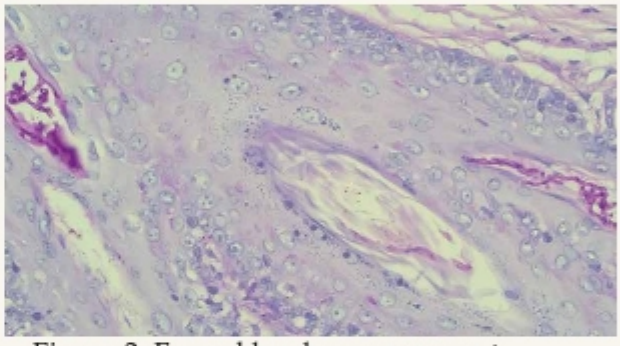


Figure 2: Fungal hyphae are present among keratin on the skin surface and extending down hair follicles. PAS stain 400x magnification
圖2：在皮膚表面角蛋白中發現真菌菌絲，並沿着毛囊下延。400倍放大PAS染色。

Both of these cases were unusual in their severity and extent of alopecia and it would be important to rule out other concurrent skin disease or other systemic disease. Fungal culture is also a useful ancillary test in cases of suspected skin fungal infection to assist with treatment decisions.

Common diseases can also be diagnosed in unusual ways. Intruders in the abdominal cavity were seen on examination of abdominal fluid aspirated from a 7-year-old poodle. The dog was heart worm positive and the organism seen in the abdominal aspirate (figure 3) is a microfilariae associated with heart worm infection. The parasite

has induced an inflammatory cell response as large numbers of eosinophils are also seen in the aspirate.

Working closely with our veterinarian clients also enables CityU VDL to respond to their inquiries on disease prevalence. A veterinarian client noticed a high frequency of faecal feline coronavirus positive results in their cases submitted for feline diarrhoea investigation, and raised the question; "How common is this?"

Working closely with our veterinarian clients also enables CityU VDL to respond to their inquiries on disease prevalence. A veterinarian client noticed a high frequency of faecal feline coronavirus positive results in their cases submitted for feline diarrhoea investigation, and raised the question; "How common is this?"

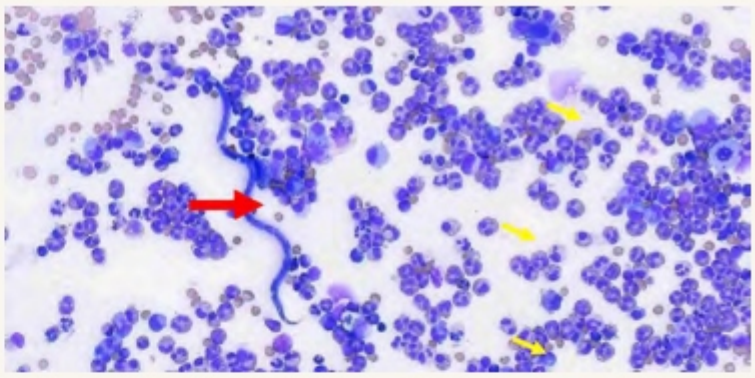


Figure 3: abdominal effusion from a dog. The red arrow points to a microfilaria and the yellow arrows point to eosinophils.
圖3：一隻狗的腹腔積液，紅色箭咀指向微絲蟲，黃色箭咀則指向嗜酸性粒細胞。

A quick search of the CityU VDL data showed feline coronavirus was detected in over 60% of feline faecal samples tested for diarrhoea. Previous analysis had found feline infectious peritonitis (FIP), caused by feline coronavirus, is the most common feline infectious disease diagnosed at CityU VDL.

The findings from CityU VDL are similar to previous reports in the literature. However, while viral shedding is common in cats in Hong Kong, this does not mean the cat is symptomatic but it may still infect other cats in the household.

Staff at CityU VDL have contributed to many scientific publications, including joint efforts with CityU VMC and CityU JCC clinicians and researchers. Recent publications include; a high incidence of inflammation in gallbladders removed from dogs with gallbladder mucocoeles, detection of rare fungal and viral disease in snakes and cattle, the absence of leptospirosis in pigs and a review of parasites as a cause of anaemia in sheep. CityU VDL facilities, resources and data have also been well utilised by senior CityU JCC students for their research projects. The projects ranged from small mammal reproductive disease, viral diagnostics, vascular neoplasia, goat and cattle parasite surveys, goat mastitis investigations, guinea pig microbiology to antimicrobial resistance projects.

CityU VDL has set up specific protocols for analysing cattle blood samples and are providing full diagnostics support to the CityU Farm.

CityU VDL provides a wide range of services to veterinarians throughout Hong Kong, including contributions to existing and emerging disease investigations. Additionally, the expert knowledge of staff, along with modern equipment and facilities is critical for advancing veterinary research projects, student teaching and animal resource management to enhance the overall CityU veterinary programme.

Figure 4: Samples being processed to extract parasite larvae from cattle faeces for a CityU JCC student project
圖4：為城大動物醫學及生命科學院學生研究準備的樣本，以提取牛糞中的寄生蟲幼蟲。

Figure 5: Cattle blood samples are loaded into the haematology analyser by a CityU VDL technologist for testing
圖5：城大動物醫療檢驗中心技術員將牛隻血液樣本載入血液學分析儀，以作檢測。

通往答案的捷徑：由你的醫療檢驗中心找最好的答案

Fraser Hill獸醫

城大動物醫療檢驗中心（VDL）除致力教學及協助獸醫學學生實習外，亦一直追尋香港的新興疾病及鑽研現有疾病。

透過城大動物醫療檢驗中心的個案，我們不單研究了不同新興疾病，亦更深入了解現有動物疾病，這篇報告旨在分享部分病例及介紹中心近期工作。

幼犬腹瀉可能由不同疾病引起。我們從一隻8周大的幼犬身上收集了糞便樣本，經糞便浮選法檢查後發現大量寄生蟲卵。圖1顯示測量蟲卵長度和寬度的目鏡測微尺旁的蟲卵圖像，這些特徵都將這些卵歸類為犬弓蛔蟲產生的卵，犬弓蛔蟲是狗的一種常見腸道寄生蟲，可以通過治療快速消除感染並使幼犬恢復健康。

大家亦應留意表現異常的尋常疾病，例如兩個近乎全禿的狗隻個案。

第一個案例是一隻12歲的柴犬，除了牠的頭部、背部和尾部剩餘少許毛髮外，身體其他部分已全禿。第二個案例是一隻3歲的小狗，主人因發現牠有擴散性皮膚增厚、全身掉剩一條毛而而帶來檢查。在這兩宗病例中，城大動物醫療檢驗中心的獸醫病理學家透過皮膚活檢，在兩隻狗的毛囊和皮膚發現大量真菌生物體。圖2顯示其中一隻受影響狗隻的皮膚因特別染色劑呈現出粉紅染色真菌。狗隻感染真菌而引致的脫毛大多是局部性，並由犬小芽胞菌、鬚毛癬菌和小孢癬菌引起。

兩個病例脫髮的嚴重程度和範圍都不尋常，必須排除其他併發皮膚病或其他系統性疾病。真菌培值也是懷疑感染皮膚真菌個案的一個重要輔助檢查，協助專家作出治療決定。

尋常疾病可以不尋常的方式診斷。我們為一隻7歲貴婦狗進行腹腔液檢查，發現牠的腹腔受到入侵。狗隻的心絲蟲檢測呈陽性，腹腔抽液中的生物體（圖3）為與心絲

蟲感染有關的微絲蟲。由於抽液中還有大量嗜酸性粒細胞，令寄生蟲誘發了炎性細胞反應。

城大動物醫療檢驗中心與獸醫客戶交流緊密，積極回應各類流行疾病的查詢，一位獸醫客戶注意到，在他們提交進行貓腹瀉調查的病例中，發現貓的糞便樣本對冠狀病毒陽性的比率很高，因而提問：「這情況有多普遍？」

城大動物醫療檢驗中心迅速搜查數據，發現逾60%的腹瀉糞便樣本中檢測到貓科冠狀病毒。根據過往分析，城大動物醫療檢驗中心最常見的貓科傳染性疾病正是貓科冠狀病毒引起的貓傳染性腹膜炎（FIP）。

這項研究結果與早已發表的文獻相似，然而，雖然病毒散播的能力在香港貓隻很常見，但牠們未必有徵兆，還可能感染家中其他貓隻。

城大動物醫療檢驗中心職員參與多項科學著作，包括與城大動物醫療中心及賽馬會動物醫學及生命科學院的臨床醫生和研究員攜手研究，最新著作包括：在患膽囊黏液囊腫狗隻移除的膽囊發炎率很高、在蛇和牛身上發現罕見真菌和病毒、在豬身上沒有發現鉤端螺旋體病，以及導致綿羊貧血的寄生蟲等的研究。

城大動物醫學及生命科學院高年級學生將城大動物醫療檢驗中心的設施、資源和數據善用於研究上， 這些研究項目包括小型哺乳動物的生殖疾病、病毒診斷、血管腫瘤、山羊和牛的寄生蟲研究、山羊乳腺炎研究、天竺鼠的微生物學和抗菌素抗性項目。

城大動物醫療檢驗中心制訂分析牛隻血液樣本的具體規則，亦為城大農場提供全面診斷支援。

城大動物醫療檢驗中心為全港獸醫提供一系列服務，包括偵測現有和新興疾病。此外，職員的專業知識配合現代化儀器和設施，對推動獸醫研究項目、學生教學和動物資源管理至關重要，從而強化城大獸醫課程。

Fraser Hill獸醫
總監，城大動物醫療檢驗中心

城大動物醫療檢驗中心與獸醫客戶交流緊密，積極回應各類流行疾病的查詢，一位獸醫客戶注意到，在他們提交進行貓腹瀉調查的病例中，發現貓的糞便樣本對冠狀病毒陽性的比率很高，因而提問：「這情況有多普遍？」

SCOPE
School of Continuing and Professional Education
專業進修學院
City University of Hong Kong

A lively discussion about Animal Welfare with tomorrow's leaders and guardians of Animal Welfare at Canadian International School of Hong Kong

Dr Queeny Yuen

Programme Leader, Advanced Diploma in Veterinary Nursing,
School of Continuing and Professional Education

At the invitation of the Animal Welfare Club of Canadian International School of Hong Kong, Dr Queeny YUEN, jointly representing Jockey Club College of Veterinary and Life Sciences (JCC) and School of Continuing and Professional Education (SCOPE), gave a talk on animal welfare, on 21st February 2023. The audience was Grade 5 students, who are embarking on their Primary Years Programme Exhibition, when they get to explore areas of learning and create projects. The overall objective of this talk was for the students to be to apply some core principles of animal welfare, and the context under which to achieve this was to assess the animal welfare friendliness of some common pet products in the market, eg cat trees, automated / self-cleaning litter box and interactive feeders.

It was a sheer delight to meet the students. They were lively and keen, with their own thoughts and views about what good welfare is for animals. It is very impressive that students showed a clear conviction that an animal's welfare is not just about physical health, but its mental or emotional state as well. When asked what is Animal Welfare to them, answers such as 'How animals are feeling', 'Happy, comfortable', 'Happiness' were firing from all directions. This was even before we spoke about the 5 domains model of Animal Welfare (Mellor et al 2020), which is an assessment model that focuses on emotional experience to ultimately denote an animal's overall welfare state as influenced by nutrition, environment, health and the animal's interactions with its surroundings, including humans.

Tony (3-year old Shih Tzu) lent Queeny a helping 'paw', by joining this discussion. Tony is a seasoned canine 'helper' in the classroom where Queeny also teaches secondary school animal care students and diploma veterinary nursing students. Tony assisted in demonstrating and reinforcing concepts and ideas that are central to animal welfare, such as sentience, interpreting emotions through body language, domestication, human-animal bond etc.

Dr Queeny YUEN,
BSc.(Hons), PGCert (Vet.Ed), PhD, FHEA
Programme Leader, Advanced Diploma in Veterinary Nursing,
School of Continuing and Professional Education (SCOPE)

It is very impressive that students showed a clear conviction that an animal's welfare is not just about physical health, but its mental or emotional state as well.

最令人印象深刻的，是他們清楚知道動物福利不單指身體狀況，還包括精神和情感狀態。

在香港加拿大國際學校與未來領袖討論動物福利

阮穎嫻博士

2023年2月21日，阮穎嫻博士應香港加拿大國際學校動物福利會邀請，代表賽馬會獸動物醫學及生命科學院和城大持續進修學院（SCOPE）舉辦了一場關於動物福利的講座。當日聽眾是一群小學五年級學生，他們正於小學課程展覽探索學習領域和學生報告。這次講座旨在讓學生應用動物福利的核心原則，評估市面上的貓爬架、自動/自潔貓砂盤和互動餵食器等常見寵物產品是否符合動物福利。

跟這些學生相處令人愉快，他們活力充沛，對動物福利各有見解。最令人印象深刻的，是他們清楚知道動物福利不單指身體狀況，還包括精神和情感狀態。問他們什麼是動物福利，大家七嘴八舌答「動物的感受」、「快樂、舒適」、「幸福 」等等。我們才開始講解動物福利五大領域（Mellor等合著，2020年），這評估模型着重動物的情感體驗及整體福利，受營養、環境、健康以及動物與人類及四周互動影響。

三歲西施犬Tony也向阮博士伸出援「爪」而參與其中，牠是阮博士給動物護理科中學生和動物護理文憑學生上課時的資深犬助手，幫助阮博士示範動物福利重要概念，包括情感、以身體語言表達的情緒、馴化、人與動物關係等。

阮穎嫻博士
城大專業進修學院動物護理學高級文憑課程主任

Mellor DJ, Beausoleil NJ, Littlewood KE, McLean AN and McGreevy P. 2020. The 2020 Five Domains Model: Including Huna-Animal Interactions in Assessments of Animal Welfare. Animals. 10:1870.

CityU SCOPE Advanced Diploma in Veterinary Nursing (ADVN) Programme graduates its 5th Cohort of students

Dr Queeny Yuen

Programme Leader, Advanced Diploma in Veterinary Nursing,
School of Continuing and Professional Education

In January 2023, to usher in the new year, the ADVN programme celebrated the graduation of its 22 students of the class of 2022, who joined the programme in 2020.

This class of students experienced and overcame formidable challenges, such as prolonged periods of learning online and work placement delays, that COVID-19 relentlessly subjected them to; we are immensely proud to say they have made it and come out strong and on top!

Every year we experience mixed feelings seeing the students graduate and leave us. Like proud parents, we are sad to see the students leave after closely studying two years with us, at the same time, we very excited for their future and for the positive impacts they will make in the animal health and care industry as they join the 4 cohorts of gradates before them. We wish them the very best of the luck!

ADVN Cohort 2020 Graduates
動物護理學高等文憑課程2020年屆畢業生

Cohort 2020 Graduates with teachers
2020年屆畢業生與老師們合照

A review of the of the ADVN journey

As COVID-19 loosens its grip and our lives gradually resumes normalcy, it is a good time to review the past and look forward to future, beginning with the Year of the Rabbit.

The ADVN programme commenced and received its first cohort of students in 2016. This programme is a legacy of the first-ever veterinary nursing degree programme in Hong Kong, jointly hosted by the Royal Veterinary College (RVC) of the University of London UK, and Hong Kong Polytechnic University. After graduating their first and only cohort in 2014, this degree programme was discontinued but fortunately this acted as a welcoming gateway for a new diploma level veterinary nursing programme which is proudly supported by the Jockey Club College of Veterinary and Life Sciences (JCC). In 2015, with barely a year of preparation, the ADVN programme, convened by CityU's School of Continuing and Professional Education (SCOPE), received its HK qualification framework Level 4 status and began classes on 31 August 2016. RVC's pledge of continuing support for veterinary education in Hong Kong and specifically for the ADVN programme was cemented through a Memorandum of Understanding (MOU); a ceremony event was held on 14 April 2016 with the signing of the MOU by Professor Stuart Reid, Principal of RVC and Professor Arthur Ellis, Provost of CityU.

The ADVN programme is similar in its overall structure to the higher education veterinary nursing programmes in UK. The 2-year full-time programme consists of an academic component and a 24-week component of practical training when students have the opportunity to apply knowledge and further develop nursing clinical knowledge and skills within real-life veterinary workplace settings. The ADVN Programme is both humbled by and immensely grateful for the generous support of over 45 veterinary clinics and animal welfare organisations which have hosted the veterinary nursing students for their work placement at different times since the programme's inception. There are 16 taught academic modules, covering the core knowledge and skills of veterinary nursing, such as anatomy and physiology, animal behaviour, welfare and restraint, medical and surgical patient nursing care, anaesthesia monitoring, and laboratory and imaging techniques. There are modules that are more generic, yet also vital for nurturing a culture of identity, integrity and professionalism among the young graduates, such as academic English, core skills for personal development, workplace communication and veterinary nursing professional practice. In addition to subscribing to JCC's mission of training high-calibre veterinary professionals who can respond to challenges and societal needs, ADVN Programme also aligns itself with JCC's goal of improving the quality of life and the health of humans, animals and the environment, through provision of a one health module, a one-of-a-kind course tailor-made for veterinary nurses.

Foreseeing the need of graduates wishing to continue their formal education in veterinary nursing, an articulation arrangement with Edinburgh Napier University (ENU) was established in August 2018 ahead of the graduation of the first cohort. Under this arrangement, 13 students have gone on to study on ENU's BSc (Hons) Veterinary Nursing programme top-up programme, five of whom received full scholarships from ENU Scholarship Trust, Hong Kong. Unfortunately, cohort 2020 was the last class to enjoy the privilege of such articulation arrangement. Another milestone the Programme reached in April 2022 is the recognition by the Royal College of Veterinary Surgeons (RCVS) of ADVN graduates for pre-registration application to practice

in UK. ADVN graduate applicants are now eligible to sit RCVS' pre-registration OSCE (Objective Structured Clinical Examination / practical) examination and pass to attain UK VN registration status.

Over the course of the past seven years, the ADVN programme has gone from strength to strength, with only a small youthful army of 2-3 full-time teaching staff members, tirelessly and efficiently backed up by SCOPE's seasoned administration force. Together we enthusiastically welcomed seven cohorts of students, and with great honour we witnessed their growth and development during the two years they study on the programme, and with even greater privilege we see our graduates in the veterinary workplaces we regularly visit, flourishing and transforming into professionals each in their own unique ways.Seeing the graduates engaged competently in their nursing roles and making an impact on the welfare of the animals they care for, is a testament that the programme is fulfilling its mission.

As we bravely enter the Lunar Year of the Rabbit, in the true spirt of the Rabbit, we are sensitive and agile in navigating through challenges that no doubt lie ahead of us, we continue to work hard and smart to be prolific in recruiting students and producing graduates with a passion for serving animals and the Society. Rabbits are symbolic of all animal species in that they are silent; as a Programme we add voice to all animals with our graduates acting as strong advocates for the humane treatment and good welfare that all animals deserve in our society.

Dr Queeny YUEN,
BSc.(Hons), PGCert (Vet.Ed), PhD, FHEA
Programme Leader, Advanced Diploma in Veterinary Nursing,
School of Continuing and Professional Education (SCOPE)

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城大專業進修學院動物護理學高等文憑課程第五屆學生畢業

阮穎嫻博士

2023年1月新年伊始，謹此祝賀於2020年入讀動物護理學高等文憑課程的22位學生正式畢業。

這一屆學生在新冠疫情期間排除萬難，克服了長期網上學習和實習安排延誤，今天終於學有所成，成果出類拔萃！

每年送別畢業學生都令人百感交集，我們的心情就像驕傲的父母，既跟緊密相處兩年的學生難捨難離，同時也為他們的未來感到振奮，他們會像前四屆的畢業生一樣貢獻動物醫學和護理行業，祝願他們大展鴻圖！

回顧動物護理學高等文憑課程

隨着抗疫措施鬆綁，大眾生活逐漸復常，正值兔年伊始，正是時候回顧過去和展望未來。

動物護理學高等文憑課程於2016年錄取第一屆學生，其歷史可上溯至英國倫敦大學皇家獸醫學院（RVC）和香港理工大學合辦的香港首個動物護理學學位課程。2014年，當第一屆也是唯一一屆學生畢業後，這學位課程就中止了，幸運的是，它開啟了動物護理學文憑課程之門，得到城大賽馬會動物醫學及生命科學院支持。2015年，城大專業進修學院（SCOPE）花近一年時間籌備的動物護理學高等文憑課程獲得香港資歷架構四級資格，於2016年8月31日開始招生。皇家獸醫學院秉承對香港動物醫學教育的支持，以諒解備忘錄落實支援動物護理學高等文憑課程。2016年4月14日，皇家獸醫學院校長Stuart Reid教授與城大學務副校長Arthur Ellis教授在典禮上簽署了諒解備忘錄。

動物護理學高等文憑課程的整體結構跟英國高等教育動物護理學課程相似，這個為期兩年的全日制課程包括學術部分和為期24周的實習部分，讓學生在真正的獸醫場所中學以致用，進一步發展護理臨床知識和技能。多得45家獸醫診所和動物福利機構的慷慨支持，我們自推出動物護理學高等文憑課程以來先後為不同學生安排實習機會。整個課程包括16堂講課，內容涵蓋動物護理學的核心知識和技能，包括解剖學和生理學、動物行為、福利和約束、內科和外科護理、麻醉監測、實驗室和成像技術。部分課堂像學術英語、個人發展、職場溝通和獸醫護理實踐等看似普通，但對培養年輕畢業生的身分認同、個人誠信和專業文化至關重要。城大賽馬會動物醫學及生命科學院矢志培訓優秀獸醫，以應對社會挑戰和需求，動物護理學高等文憑課程也以此為目標，同時為獸醫護士度身訂做獨有的健康一體化課程，矢志提升人類、動物及環境的質素和健康。

我們明白畢業生期望繼續進修動物護理學正規教育，早在第一屆學生畢業之前，於2018年8月與愛丁堡納皮爾大學（ENU）建立銜接安排，讓13名學生修讀該校的動物護理學（榮譽）理學士銜接課程，其中五位更獲香港愛丁堡納皮爾大學獎學金信托基金的全額獎金，可惜2020年屆學生是最後一屆享受這銜接安排的學生。2022年4月，我們達成另一里程碑，動物護理學高等文憑課程畢業生獲皇家獸醫學院認可，作為預先註冊在英國執業的申請，並可以應考皇家獸醫學院的客觀結構化臨床考試與實踐（OSCE）預辦考試，若通過考試可獲英國獸醫護士註冊資格。

七年來，在專業進修學院經驗豐富的行政人員努力不懈下，動物護理學高等文憑課程由只有兩、三名全職教師的小團隊變成漸有規模。我們攜手迎接了七屆學生，見證他們在兩年課程中茁壯成長，在定期探訪獸醫工作場所中，有幸看見這些畢業生各展所長，獨當一面。看到他們勝任各自的護理崗位，為自己熱愛的動物護理業作出貢獻，證明我們的課程不負使命。

當我們昂然踏入兔年時，也發揮脫兔精神乘風破浪，繼續努力靈巧地招收學生，培訓出對動物和社會有使命感的畢業生。兔子在動物中以寧靜自居，這課程則讓學生為所有動物發聲，讓這社會上的動物獲得應有的人道待遇和良好福利。

阮穎嫻博士
城大專業進修學院動物護理學高等文憑課程主任

Parrot Behaviour and Welfare

Prof. Colin McDermott

Clinical Assistant Professor of Avian and Exotic Medicine
Department of Veterinary Clinical Sciences

Prof. Alan McElligott

Associate Professor in Animal Behaviour and Welfare
Department of Infectious Diseases and Public Health

Prof. Colin McDermott & Prof. Alan McElligott

"The Jockey Club College of Veterinary Medicine and Life Sciences hosted the two-day Parrot Behaviour and Welfare seminar and workshop on CityU's campus on 18-19 March 2023. We were honored to host our invited speakers, Drs. Jan Hooimeijer and Irene Pepperberg, for the seminar. Attendees included BVM students, local veterinarians and vet nurses, researchers from universities across Hong Kong, and animal health professionals from organisations such as Ocean Park, Kadoorie Farm and Botanic Garden and SPCA (HK).

The seminar started on Saturday with a review of parrot intelligence and cognition by Dr. Irene Pepperberg, world-renowned for her work with the cognition of African grey parrots. Avian veterinarian Drs. Jan Hooimeijer provided several lectures focusing on the behaviour and welfare of parrots, with topics ranging from the welfare of captive parrots to managing individual behaviour issues in parrots. On Sunday, Dr. Pepperberg led an interactive workshop on the rival/model concept of training parrots and Drs. Hooimeijer led an interactive workshop on his 5-step behavior protocol. Attendees in these workshops were able to see the benefits of these protocols firsthand- whether it was watching African grey parrots learning how to ask for novel enrichment in real-time with Dr. Pepperberg, or observing stress-free handling techniques of parrots with Drs. Hooimeijer.

We would like to thank Sharon Kwok, from Hong Kong Parrot Rescue, for bringing in some of her parrots for the workshop.

"It is our hope that the attendees of this seminar will use the knowledge and skills from this weekend to not only improve parrot welfare, but also to further the discussion on the welfare of captive and wild animals in Hong Kong."

Prof. Colin McDermott, *VMD, Diplomate ABVP (Reptile and Amphibian Practice), CertAqV*
Clinical Assistant Professor
Department of Veternary Clinical Sciences

Prof. Alan Eclligott, *BSc, FHEA, PhD*
Associate Professor
Department of Infectious Diseases and Public Health

Attendees in these workshops were able to see the benefits of these protocols firsthand – whether it was watching African grey parrots learning how to ask for novel enrichment in real-time with Dr. Pepperberg, or observing stress-free handling techniques of parrots with Drs. Hooimeijer.

工作坊參加者得以在場見證這些規程的強項 - 無論是跟Pepperberg博士觀察非洲灰鸚鵡如何學習新事物，還是與Hooimeijer博士觀察鸚鵡如何輕鬆解決難題的技巧。

鸚鵡行為與福利

2023年3月18及19日，賽馬會動物醫學及生命科學院於城大校園舉辦為期兩天的「鸚鵡行為與福利」研討會及工作坊，有幸邀請了Jan Hooimeijer博士和Irene Pepperberg博士作為講者，出席者包括獸醫學學士學生、本地獸醫和獸醫護士、香港多間大學研究人員，以及香港海洋公園、嘉道理農場暨植物園及香港愛護動物協會等機構的動物健康專業人士。

研討會於周六開始，由享譽國際的非洲灰鸚鵡認知專家Irene Pepperberg博士講解鸚鵡的智力和認知。Jan Hooimeijer博士主持一系列有關鸚鵡行為和福利的講座，內容從圈養鸚鵡的福利至鸚鵡的行為管理。星期日，Pepperberg獸醫主持訓練鸚鵡對手 / 模型概念的互動工作坊 ，Hooimeijer博士的互動工作坊則是關於他的五步行為規程。工作坊參加者得以在場見證這些規程的強項 - 無論是跟Pepperberg博士觀察非洲灰鸚鵡如何學習新事物，還是與Hooimeijer博士觀察鸚鵡如何輕鬆解決難題的技巧。感謝「香港鸚鵡救援（HKPR）」的龐郭秀雲女士為工作坊帶來自己多隻鸚鵡 。

「工作坊參加者得以在場見證這些規程的強項 - 無論是跟Pepperberg博士觀察非洲灰鸚鵡如何學習新事物，還是與Hooimeijer博士觀察鸚鵡如何輕鬆解決難題的技巧。」

「我們希望研討會參加者能善用這個周末所學的知識和技能，不僅改善鸚鵡的福利，亦深入關注香港圈養動物和野生動物的福利議題。」

Prof. Colin McDermott
臨床助理教授, 臨床動物醫學系

Prof. Alan Eclligott
副教授, 傳染病及公共衛生系

Dr Irene Pepperberg

Drs. Jan Hooimeijer

Industry Support Profile
Royal Canin

Royal Canin is one of the world's largest manufacturers of premium pet food products. The company specializes in dry food products for dogs and cats and promotes the positive role of pets in human health and welfare. The Jockey Club College of Veterinary Medicine and Life Science, City University of Hong Kong is honoured to have received staunch support from Royal Canin for our students, the college, and the University over the past few years.

In 2021, Royal Canin established the "Royal Canin Outstanding Student Scholarship Scheme", which provides financial support for two Bachelor of Veterinary Medicine (BVM) students annually to recognize outstanding academic achievements. It provides aspiring students with a strong boost to their continuous pursuit of excellence in their studies and professional development.

The "Royal Canin Outstanding Student Scholarship Scheme" provides aspiring students with a strong boost to their continuous pursuit of excellence in their studies and professional development."

To allow the students to widen their horizons, Royal Canin also offered 5 places to BVM students in the Leading Edge for Veterinarians e-course. This online programme runs for 52 weeks, and is designed to fast track the achievement of professional mastery as well as to facilitate further success in general practice and ultimately allow for a longer and more fulfilling career as a veterinary surgeon. Students also received out-of-the-classroom experience and enjoyed exchanging ideas with other overseas vets students.

In addition, Royal Canin also shared their "Royal Canin Academy" platform for students to explore practical topics related to the veterinary profession such as webinars on mental health on COVID-19.

JCC also sought Royal Canin's support in a collaborative Webinar Series on Veterinary nutrition from May 2022 to Nov 2022. This series of 8 webinars brought together specialists from JCC, Cornell University's College of Veterinary Medicine and Royal Canin and received an overwhelming response and positive feedback with over 1,600 registrations for the live webinars. JCC is now planning a further webinar series with Royal Canin to begin later this year.

We would like to thank Royal Canin for their continued support to students and faculty in the Jockey Club College of Veterinary Medicine and Life Sciences.

The "Royal Canin Outstanding Student Scholarship Scheme" provides aspiring students with a strong boost to their continuous pursuit of excellence in their studies and professional development.

業界友好介紹：Royal Canin

Royal Canin是全球最大型優質寵物食品製造商之一，專門生產貓狗乾糧產品，提升寵物對人類健康與幸福的地位，城大賽馬會動物醫學及生命科學院多年來有幸獲Royal Canin鼎力支持我們的學生、學院和大學。

2021年，Royal Canin成立「Royal Canin傑出學生獎學金計劃」，每年向兩名獸醫學學士課程學生頒授獎學金，每年向兩名獸醫學學士課程學生頒授獎學金，以表彰他們的卓越學術成就，推動傑出學生在學術和專業發展上精益求精。

為了讓學生們開拓視野，Royal Canin亦資助五名獸醫學學士課程學生參與「獸醫在前鋒」網上課程。 這個為期52周的網上課程旨在讓學生速成專業技能，為全科診療做好準備，踏上更長遠穩固的獸醫大道。學生們還可以享受課室以外的體驗，與海外獸醫科學生交流經驗。

CHAN Fong Yuen (left) & LUI Wing Man (right), receipients of the Royal Cainin Outstanding Student Scholarship Scheme, meet with Chiu Kai-Ho, Scientific Communication Manager at Royal Cainin
獲頒授Royal Canin傑出學生獎學金計劃同學陳方圓(左)及呂穎雯(右)與Royal Canin科學傳訊及推廣經理趙啟豪先生會面

「Royal Canin傑出學生獎學金計劃」表彰獸醫學學士課程學生的卓越學術成就，推動傑出學生在學術和專業發展上精益求精。

此外，Royal Canin還提供「Royal Canin學院」平台，讓學生們探討與獸醫專業相關的實際議題，例如舉辦新冠疫情心理健康網上研討會。

在Royal Canin支持下，賽馬會動物醫學及生命科學院於2022年5月至11月舉辦了一系列有關動物醫學營養的網上研討會，這系列共八個網絡研討會雲集賽馬會動物醫學及生命科學院、康奈爾大學獸醫學院及Royal Canin的專家。這些直播網上研討會反應熱烈，好評如潮，吸引超過1600多人參加。賽馬會動物醫學及生命科學院正與Royal Canin計劃今年合辦更多網上研討會。

感謝Royal Canin一直支持賽馬會動物醫學及生命科學院一眾師生。

Department of
Infectious Diseases and Public Health
香港城市大學
City University of Hong Kong

From the Department of Infectious Diseases and Public Health

MSc in Public Health and Epidemiology

Prof. Ming Wai Kit
Assistant Professor in Public Health and Epidemiology

We are thrilled to announce that our inaugural cohort of MSc students in Public Health and Epidemiology is expected to graduate this year, after successfully beginning the program in September 2022. This year will also mark the graduation of our department's first-ever group of alumni. We are confident that our graduates will embark on their next journey in various fields related to public health and, optimistically, the majority of them will become the next generation of public health professionals and leaders.

The backgrounds of our first cohort of students are diverse, encompassing veterinary medicine, clinical medicine, nursing, and public health. They have gained extensive knowledge in epidemiology, infectious disease control and prevention, data analysis, health economics, health policy and management, and One Health. Furthermore, we are confident that our programme's graduates will enjoy promising employment prospects, securing positions in government health departments, research institutions, and non-governmental organisations to address pressing global health challenges.

Orientation day of MSc in Public Health and Epdemiology in 2022. (First row) Prof. Sophie St-Hilaire, Prof. Dirk Pfeiffer, Prof. Ming Wai Kit, Prof. Fuyong Li. (Second row) Prof. Olivier Sparagano, Prof. Kai Liu & Prof. Guan Yang.
2022年公共衛生和流行病學碩士課程迎新日

Our interdisciplinary curriculum combines both theoretical knowledge and practical skills. Through interdisciplinary coursework, hands-on research projects, and interactive learning activities, our students have acquired a comprehensive understanding of One Health, epidemiology, disease control and prevention, data analysis, health economics, and health policy and management. They have also demonstrated their ability to critically review scientific literature, design and implement public health research, apply advanced statistical methodologies to analyse epidemiological data, and collaborate effectively with individuals from diverse backgrounds. Based on our observations, our graduates show great promise in addressing complex public health challenges, contributing to evidence-based decision-making, and ultimately becoming leaders in the field of public health.

In its first year, the programme has successfully initiated numerous research projects specifically tailored for master's students. These projects offer invaluable opportunities for students to gain practical experience, understand recent developments in the fields of public health, and establish a solid foundation for their future careers. Our experienced and renowned professors, who are devoted to teaching, have enthusiastically taken on the role of mentors, guiding our students throughout their academic journey.

Our MSc in Public Health and Epidemiology programme is dedicated to cultivating a diverse and inclusive learning environment, where students with various backgrounds and perspectives come together to share their knowledge and experiences. This diversity not only enriches the learning experience but also fosters a global perspective on public health, essential for addressing emerging health challenges in an interconnected world. In addition to academic excellence, the program emphasizes professional development and networking. Students have been encouraged to participate in conferences, workshops, and seminars, and to connect with fellow students, faculty, and professionals in the field. These opportunities help students build a robust professional network and enhance their career prospects upon graduation.

MSc students visiting the Legislative Council to gain insights into the process of public health policy and regulation formulation. It was an enlightening experience for all.

公共衛生和流行病學碩士學生參觀立法會，深入了解公共衛生政策和法規的製定過程。 這對所有人來說都是一次啟發性的經歷

Msc in Public Health and Epidemiology High Table Dinner 2023.
公共衛生和流行病學碩士課程高桌晚宴2023

As our programme continues to grow and evolve, we eagerly anticipate shaping the future of public health through our innovative curriculum, dedicated faculty, and motivated students. We are confident that our first graduates will emerge as well-rounded professionals and effective leaders, equipped with the necessary skills and knowledge to make a lasting impact on the health and well-being of communities worldwide. We believe our first cohort of students will embark on a rewarding journey in public health and contribute to the betterment of society through research, practice, and leadership in the field.

Prof. Ming Wai Kit, *MD, PhD(JNU), MPH(HK), MMSc(Harvard), PostDoc(Oxon), PostDoc(Harvard) DipMed(CUHK), PDipCAH(HK), CertClinDerm(Lond), FRSPH(UK)*

Program Leader (MSc Public Health and Epidemiology)

Assistant Professor, Department of Infectious Diseases and Public Health

"Our students have acquired a comprehensive understanding of One Health, epidemiology, disease control and prevention, data analysis, health economics, and health policy and management".

理學碩士（公共衛生及流行病學）

明偉傑博士

我們很高興地宣佈，我們的第一批公共衛生和流行病學碩士學生預計將於今年畢業，該課程於2022年9月成功啟動。我們也期待著今年從我們系畢業的第一批校友。我們相信，我們的畢業生即將踏上與公共衛生相關的各個領域的下一段旅程，我們期盼畢業生們將成為下一代公共衛生專業人員和領導者。

我們第一批學生的教育背景是多元多樣化的，包括獸醫學、臨床醫學、護理學及公共衛生等。學生將在流行病學、傳染病控制和預防、數據分析、衛生經濟學、衛生政策和管理以及「健康一體化」方面擁有豐富的知識。此外，我們課程的畢業生擁有良好的就業前景，他們可在政府衛生部門、研究機構和非政府組織獲得職位，以應對緊迫的全球衛生挑戰。

此跨學科課程結合了理論知識和實踐技能。我們的學生通過參與跨學科課程、實踐研究項目和互動學習活動，對「健康一體化」、流行病學、疾病控制和預防、數據分析、衛生經濟學、衛生政策和管理有了全面的了解。他們還展示了如何批判性地審查學術文獻、設計和實施公共衛生研究、應用先進的統計方法分析流行病學數據以及與來自不同背景的人有效合作的能力。根據我們的觀察，該屆畢業生有望能夠應對複雜的公共衛生挑戰，為循證決策做出貢獻，併最終成為未來公共衛生領域的領導者。

在這第一年裡，該項目還成功開設了許多專門為碩士學生量身定制的研究項目。這些項目為學生提供了寶貴的學習及實踐機會，使他們獲得實踐經驗，不僅了解公共衛生領域的最新發展，還為他們未來的職業生涯奠定堅實的基礎。我們經驗豐富的知名教授致力於教學，熱切地擔任導師的角色，在學生的學術旅程中指導他們。

該公共衛生及流行病學理學碩士課程致力於培養一個多元化和包容的學習環境，讓擁有不同背景和觀點的學生聚在一起分享他們的知識和經驗。這種多樣性不僅豐富了學習經驗，而且促進了對公共衛生的全球視野，這對於在相互聯繫的世界中應對新出現的衛生挑戰至關重要。除了學術卓越，該課程還強調專業發展和網絡的重要性。鼓勵學生參加會議、講習班和研討會，併與該領域的同學、教師和專業人士建立聯繫。這些機會可以幫助學生在畢業時建立一個強大的職業網絡，併拓寬他們的職業前景。

隨著我們課程的不斷發展與完善，我們期待著通過創新的課程、敬業的教師和積極進取的學生來塑造公共衛生的未來。我們相信，今年第一批的畢業生將成為全面發展的專業人士和有效的領導者，具備對全球社區的健康和福祉產生持久影響所需的技能和知識。與此同時，我們的第一批學生將在公共衛生領域踏上有益的旅程，併通過該領域的研究、實踐和領導為改善社會乃至世界做出貢獻。

明偉傑博士

理學碩士（公共衛生及流行病學）課程主任

助理教授
傳染病及公共衛生學系

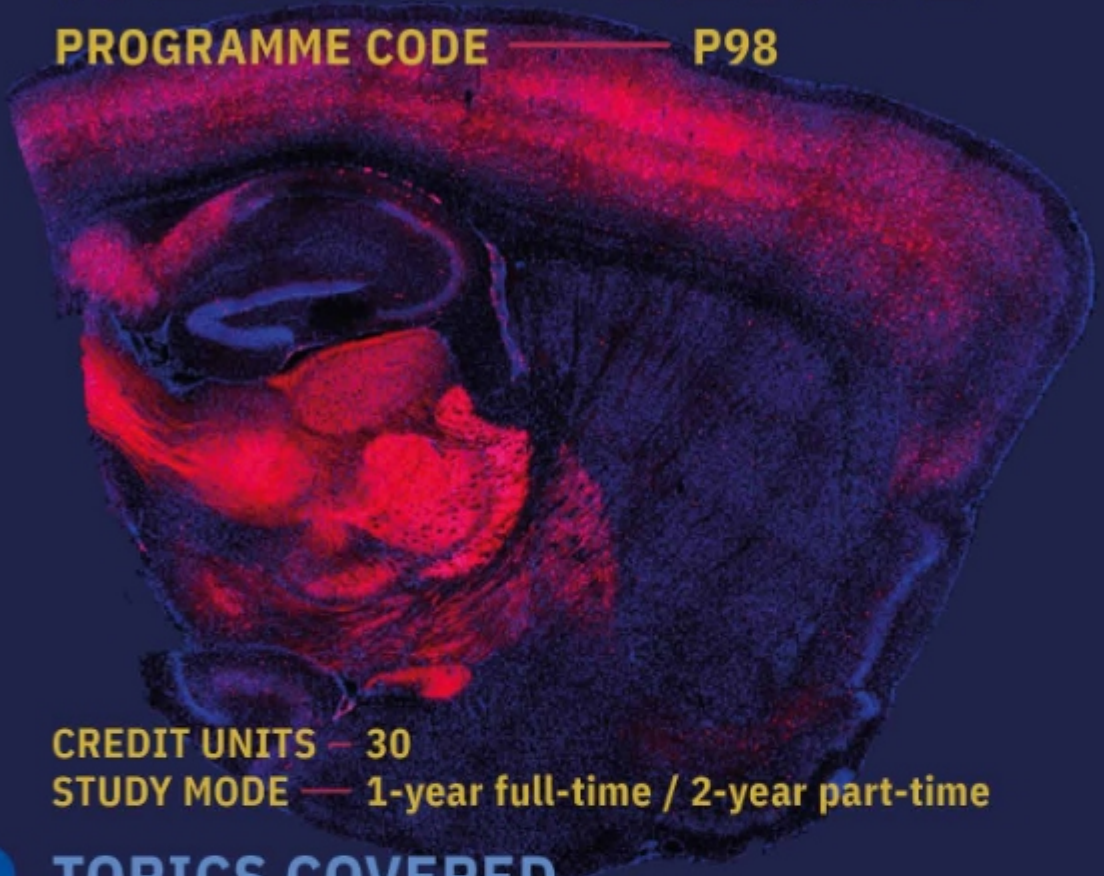
我們的學生通過參與跨學科課程、實踐研究項目和互動學習活動，對「健康一體化」、流行病學、疾病控制和預防、數據分析、衛生經濟學、衛生政策和管理有了全面的了解。

MASTER OF SCIENCE IN NEUROSCIENCE

Department of Neuroscience
香港城市大學
City University of Hong Kong

PROGRAMME CODE — P98

SEPTEMBER 2024 ENTRY



CREDIT UNITS — 30
STUDY MODE — 1-year full-time / 2-year part-time

TOPICS COVERED

Learning and Memory / Cognitive and Behavioural Neuroscience / Computational Neuroscience / Human and Artificial Intelligence / Neurobiology of Disease / Regenerative Neuromedicine / Research Project

ADMISSION REQUIREMENTS

A bachelor's degree with honours or an equivalent qualification in life science / bioengineering / psychology / medicine / dentistry / biostatistics / a related discipline, and fulfil the University's General Entrance Requirements and English Proficiency Requirements

EMAIL	ns.tpg@cityu.edu.hk
PROGRAMME	https://www.cityu.edu.hk/neuro/msn.htm
APPLICATION	https://www.cityu.edu.hk/pg/programme/p98

APPLICATION DEADLINE
31 DECEMBER 2023

Master of Science in Neuroscience
神經科學理碩士

While neuroscience research and education in Hong Kong and Greater China is expanding and gaining momentum, there is still a significant gap in knowledge and skills between basic topics such as biology, medicine, veterinary medicine and bioengineering and the advanced knowledge and skills needed to understand and manage health issues related to our nervous system.

The Department of Neuroscience is pleased to introduce our new master's degree program, MSc in Neuroscience (MSN), which will launch in the academic year 2023–24.

This new MSN is designed to bridge the gap between diverse fields of undergraduate study and emerging neuroscience areas of advanced research and education. One main focus of study for our MSN is translational neuroscience – applying our fundamental knowledge of how the brain works to facilitate and promote diagnostics and therapeutics of neurological and psychiatric disorders.

While topics such as neurobiology, learning & memory, medicine, cognition, and bioengineering will be covered in the program, both fundamental and translational knowledge will be incorporated into every course. This one-year program, featuring 5 core courses and 4–5 elective courses, will allow students to gain insights into the advanced knowledge and skills required to understand and treat the health issues related to our nervous system.

Graduating students can work in neuroscience-related jobs, such as consultancy, laboratory research in health-related organizations and also in the pharmaceutical, biotechnology, neurotechnology, artificial intelligence or data science industries. We are excited for the coming September when we welcome our first cohort of MSN students.

香港和大中華區的神經科學教研發展蓬勃，但要了解和管理與神經系統有關的健康問題所需的高等知識和技能，仍跟我們對生物學、醫學、動物醫學和生物工程學等基礎範疇所需的有很大差距。

神經科學系有幸宣布將於2023-24學年推出全新課程 - 神經科學理學碩士（MSN）。

全新神經科學理學碩士課程旨在彌補本科生不同學科與新興神經科學領域的高級教研之間的差距，這個課程研究重點之一是轉化神經學 - 善用我們對大腦如何工作的基本知識，從而推動神經和精神疾病的診斷和治療。

這課程涵蓋神經生物學、學習與記憶、醫學、認知和生物工程等主題，每門課程再融入基礎和轉化知識。這個為期一年的課程共有五個核心科目和四至五個選修科目，讓學生掌握所需的高級知識和技能，以理解和治療與神經系統有關的健康問題。

畢業生可從事與神經科學相關的工作，包括跟健康相關機構的顧問及實驗室研究，也可從事製藥、生物科技、神經科技、人工智能或數據科學行業。第一屆神經科學理碩士課程將於今年九月開課，我們十分期待。

Centre for Applied One Health Research and Policy Advice
香港城市大學
City University of Hong Kong

Centre of Applied One Health Research and Policy Advice

Dr Anne Conan
Research Associate Professor

The Centre of Applied One Health Research and Policy Advice (OHRP) at CityU was established in 2016 to generate scientific knowledge that will lead to the development of evidence-led policies at local, national, regional and international levels for the prevention and control of infectious animal diseases affecting human health and animal production, welfare and health. The OHRP is also a partner in the One Health Poultry Hub (OHPH), which is a multi-country, multi-institute and multi-disciplinary project that aims to study the consequences of intensification of poultry farming in Bangladesh, India, Sri Lanka and Viet Nam funded by the UK Research Innovation Global Challenges Research Fund and coordinated by the Royal Veterinary College (UK). The field studies are numerous, with a mix of biological sampling in chickens and in humans, ethnographic surveys and policy studies. While the pathogens (e.g. avian influenza viruses, *Campylobacter* spp., non-typhoidal *Salmonella, E. coli*) are studied in farms and "endpoints" (locations where the chickens are slaughtered), the socio-economic drivers and biosecurity and health factors are investigated all along the production and distribution networks (e.g. traders and feed dealers).

Since the start of the project in 2019, OHRP has been very active in the OHPH. Professor Dirk Pfeiffer (Director of the OHRP) is also Deputy Director of the hub and supports activities on epidemiological research and policy research. Three of the centre research assistants were also involved: Ms Lorraine Chapot was a research assistant for the hub supporting data management and data analysis (2021-2022). Ms Sara Sequeira was a research assistant working on the data of Gujarat, India (2021-2022). Finally, Ms Mila Chen Xin, current research assistant, works on data management and data analyses for the Viet Nam site. The three research assistants are or will soon be registered in PhD programmes in the US, in France and at City University respectively.

In July 2020, Dr. Anne Conan, Research Associate Professor, joined OHRP to work on the poultry hub. She is involved in epidemiology research: study design, data collection, data management and data analyses for chicken and human health. The first investigations under the OHPH started in 2020. Due to the SARS-CoV2 pandemic, Dr. Conan provided her support through meetings and trainings via Zoom platform.

In October 2022, the 3rd hub conference was held in Dhaka, Bangladesh. Dr. Conan had the opportunity to go and meet in person, the different collaborators and discuss the results of the hub. That was also the opportunity to visit a live bird market with the ethnography team.

One Health Poultry Hub researchers from Chattogram Veterinary and Animal Sciences University (CVASU, Bangladesh), Bangladesh Livestock Research Institute (BLRI, Bangladesh), Tamil Nadu Veterinary and Animal Sciences University (TANUVAS, India) and Royal Veterinary College (RVC, UK) visit a live bird market in Dhaka, Bangladesh, October 2022
2022 年 10 月，孟加拉吉大港獸醫及動物學大學、孟加拉牲畜研究院、印度泰米爾納德邦獸醫及動物學大學和英國皇家獸醫學院的健康一體化家禽樞紐計劃研究人員參觀孟加拉國達卡的活禽市場

Dr. Trang Huyen Nguyen (NIVR), Dr. Anne Conan (CityU) and Dr. Hien Manh Nguyen (Sub-Department of Animal Health, Bắc Giang) sample a bird in a chicken farm, Bắc Giang, Vietnam, November 2022
2022年11月於越南北江省養雞場抽取雞樣本

A farmer prepares his chickens for sampling
農民準備雞隻進行採樣

A researcher from the National Institute of Veterinary Research (NIVR, Vietnam) performs a tracheal swab on a chicken for the detection of avian influenza
越南國家獸醫研究所的研究人員對雞隻進行氣管拭子檢測禽流感

In November 2022, Dr. Conan went to Viet Nam and to Bangladesh to work with the national collaborators on the data collected during the first-round sampling and to prepare the second-round sampling studies. The field visit was organised with Saira Butt from the Royal Veterinary College in the UK, and consisted of various meetings and field visits. In Chattogram (Bangladesh), Dr Conan and Ms Butt also gave a 2-day workshop on the data management and data analyses using R software for researchers from the Chattogram Veterinary and Animal Study university and their collaborators from veterinary, human and environment sectors.

Collaborators from Viet Nam and Bangladesh

- National Institute of Veterinary Research (Viet Nam)
- National Institute of Hygiene and Epidemiology (Viet Nam)
- National Institute of Animal Sciences (Viet Nam)
- Chattogram Veterinary and Animal Sciences University (Bangladesh)
- Bangladesh Livestock Research Institute (Bangladesh)
- Institute of Epidemiology, Disease Control and Research (Bangladesh)

For more information:
www.onehealthpoultry.org

Dr Anne Conan, *DVM, MSc, PhD*
Research Associate Professor
Centre of Applied One Health Research and Policy Advice
研究副教授, 健康一體化及政策應用研究中心

Dr. Anne Conan joined OHRP in July 2020. Dr. Conan is a veterinary epidemiologist specialised in infectious diseases in low-income areas. Her main research topics are the consequences of intensification of chicken farming in Asia , the epidemiology of African swine fever in South East Asia, the epidemiology of Coxiella burnetii in humans and livestock, and the control of rabies in humans and dogs.

Dr. Conan completed her DVM and MSc in epidemiological surveillance in 2008. She worked at the Public Health and Epidemiology Department in Pasteur Institute in Cambodia for 5 years. Her projects focused on H5N1 avian influenza and Newcastle disease in backyard poultry flocks and on chikungunya and dengue in humans.

After completing her PhD in Epidemiology in 2013, Dr. Conan started a post-doctorate fellowship at the Department of Veterinary Tropical Diseases at the University of Pretoria (South Africa), coordinating field activities and health and demographic surveillance systems in cattle and dogs in underserved communities at the border of the Kruger National Park. She then joined Ross University School of Veterinary Medicine (St. Kitts and Nevis) in 2015 as a post-doctorate fellow before becoming an Assistant Professor in Epidemiology in 2017.

Anne Conan博士於2020年7月加入健康一體化及政策應用研究中心，她是專門研究低收入地區傳染病的獸醫流行病學家，主要研究課題包括亞洲養雞業集約化的後果、東南亞非洲豬瘟的流行病學、人類和牲畜中的貝氏考克斯菌流行病學，以及人類和狗隻的狂犬病控制。

Conan博士於2008年完成了獸醫學學士學位和流行病學監測碩士學位，曾任職柬埔寨巴斯德研究所公共衛生和流行病學系五年，研究重點為散養家禽中的H5N1禽流感和新城疫，以及人類中的基孔肯雅熱和登革熱。

Conan博士在2013年完成流行病學博士學位後，開始在普利托利亞大學（南非）熱帶疾病獸醫系做博士後研究，並在克魯格國家公園邊界的落後社區協調牛和狗的實地考察和健康及人口監測系統，再於2015年在羅斯大學獸醫學院（聖基茨和尼維斯）任博士後研究員，並於2017年成為流行病學助理教授。

健康一體化及政策應用研究中心

Dr Anne Conan

城大健康一體化及政策應用研究中心（OHRP）於2016年成立，為推動本地、國家、區域及國際層面的循證政策貢獻科學知識，從而預防和控制傳染性動物疾病，保護人類健康和動物生產、福利及健康。健康一體化及政策應用研究中心是跨國、跨機構及跨學科計劃，並且是健康一體化家禽樞紐（OHPH）的合作夥伴，該計劃旨在研究孟加拉、印度、斯里蘭卡和越南家禽養殖業的集約化影響，獲英國研究創新全球挑戰研究基金會資助，並由英國皇家獸醫學院協調。多個實地考察結合雞和人的生物採樣、人種學調查和政策研究，在農場及終站（即宰雞地點）研究病原體（如禽流感病毒、彎曲桿菌、非傷寒沙門氏菌及大腸桿菌），並在整個生產和分銷網絡（如貿易商和飼料經銷商）研究社會經濟因素、生物安全及衛生問題。

健康一體化家禽樞紐自2019年開始以來，健康一體化及政策應用研究中心一直積極參與，中心主任Dirk Pfeiffer教授身兼該計劃的副總監，推動流行病學研究和政策研究活動。中心三位研究助理亦參與其中：Lorraine Chapot女士及Sara Sequeira女士
均曾出任該計劃的研究助理（2021-2022），前者負責數據管理和數據分析，後者專責印度古吉拉特邦的數據，而辛晨女士則是該計劃現任研究助理，負責越南站的數據管理和數據分析 ，三位研究助理將會或已經分別報讀美國、法國及城大的博士課程。

2020年7月，研究副教授Anne Conan博士加入健康一體化及政策應用研究中心，參與健康一體化家禽樞紐計劃的工作。她推動多項流行病學研究，包括為雞和人類健康進行研究設計、數據收集、數據管理和數據分析。該計劃首項研究於2020年展開，但由於新冠疫情爆發，Conan博士通過Zoom平台主持會議和提供培訓。

2022年10月，健康一體化家禽樞紐第三屆會議於孟加拉達卡舉行，參與其中的Conan博士得以親身與不同夥伴討論計劃成果，亦藉此機會與人種學團隊參觀活禽鳥市場。

2022年11月， Conan博士前往越南和孟加拉，跟國際夥伴在第一輪採樣中研究所得數據，並為第二輪採樣做好準備。是次行程是她與英國皇家獸醫學院Saira Butt女士合辦，舉行了多個會議和實地考察，亦在孟加拉吉大港舉辦為期兩天的工作坊，為吉大港獸醫及動物學大學的研究人員、及來自獸醫、人類和環境部門的夥伴探討用R軟件進行數據管理及數據分析。

越南和孟加拉國夥伴

- 國家獸醫研究院（越南）
- 國家衛生及流行病學研究院（越南）
- 國家動物學研究院（越南）
- 吉大港獸醫及動物學大學（孟加拉）
- 孟加拉牲畜研究院（孟加拉）
- 流行病學、疾病控制及研究學院（孟加拉）

欲知詳情，請瀏覽：
www.onehealthpoultry.org

Centre for Animal Health and Welfare (CAHW)

動物健康與福利中心

Safeguarding animal health and welfare is essential for a thriving planet. Established in 2020, the Centre for Animal Health and Welfare (CAHW) is an Applied Strategic Development Centre of City University of Hong Kong (CityU) that hosts a multidisciplinary team of veterinary researchers with complementary expertise and shared core values of excellence, integrity and compassion. Our mission is to improve the quality of life of animals by producing high impact research bringing evidence-based solutions to address major animal health and welfare problems in Hong Kong and beyond.

Our research spans diverse disciplines to improve animal welfare including artificial intelligence, infectious and parasitic diseases, improving pain management, equine biomechanics, and the antiviral and antipathogenic properties of gut microbes.

Our Centre organises regular accessible webinars to foster public awareness of animal health and welfare and to provide continuing education for veterinary professionals. Recent events have tackled the severe welfare issues in brachycephalic animals, improving welfare for working dogs and racehorses, probing the ethics of excessive veterinary treatment and companion animal euthanasia. For more information, please visit our website.

要令地球欣欣向榮，守護動物健康和福利至關重要。動物健康與福利中心（CAHW）是香港城市大學（城大）於2020年成立的策略發展中心之一，其跨學科獸醫研究團隊各有專長，共同高舉卓越、誠信和同理心的價值觀。我們以重要研究尋找循證方案，解決香港和其他地區的動物健康和福利重要問題，從而改善動物生活品質。

我們為改善動物福利的研究橫跨不同學科，包括人工智能、傳染病和寄生蟲病、改善疼痛管理、馬匹生物力學以及腸道微生物的抗病毒和抗病原體特性。

本中心定期舉辦公開網上研討會，促進公眾關注動物健康和福利，亦為獸醫專業人士提供持續教育，近期活動包括肱骨動物的重要福利問題、改善工作犬和比賽馬的福利、探討獸醫過度治療和寵物安樂死的倫理問題。欲了解更多資料，請瀏覽我們的網站。

cityu.edu.hk/cahw

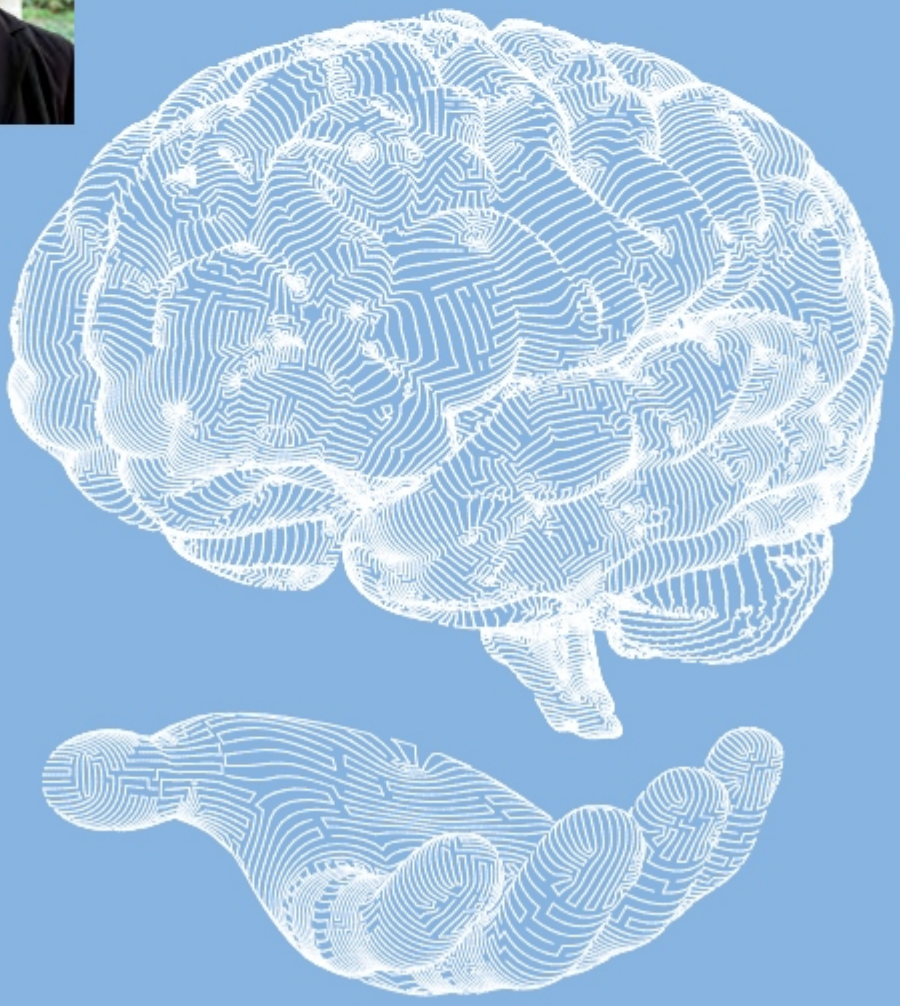
Department of Biomedical Sciences
香港城市大學
City University of Hong Kong

From the Department of Biomedical Sciences

Stroke mortality risk assessment and early identification

The integration of machine learning models to construct a multi-level prediction model for haemorrhagic and ischaemic stroke patients using bioassay data and radiology text reports.

Prof. Chan Kei Hang, Katie
Assistant Professor



A person dies of stroke every 3.5 minutes. According to a new study led by a researcher and her team from the Jockey Club College of Veterinary Medicine and Life Sciences of the City University of Hong Kong (CityU), a robust short-term mortality prediction for stroke through combining several machine learning algorithms, was established by the team (the researcher is also affiliated with the Department of Epidemiology in Brown University). This work can contribute to more efficient distribution of healthcare resources for stroke patients.

The research, which was published in Computers in Biology and Medicine, is one of the first studies to date to build a six-month mortality prediction model for haemorrhagic and ischaemic stroke patients by combining predictions from individual machine learning algorithms through a stacking ensemble technique using structured and text clinical data.

"Our team of researchers wanted to identify high-risk stroke patients early through developing clinical decision support software applications, to optimise the use of healthcare resources with electronic health records data available through the Hospital Authority." Kei Hang "Katie" Chan, PhD, MPH, assistant professor in the Department of Biomedical Sciences and Department of Electrical Engineering at CityU.

Ensemble learning methods, combining structured and textual data yielded better mortality prediction

The researchers mined data from more than 19,000 haemorrhagic stroke and 50,000 ischaemic stroke patients between 2007 to 2018 using data obtained through the Hospital Authority Data Collaboration Laboratory. Structured data included patient demographics, diagnosis, procedures, family medicine clinic, accident and emergency department attendance, outpatient appointments, inpatient admissions and discharges, laboratory results, and medications. We also collected textual data that included radiology examination reports and laboratory results. In analysing the data, the team of researchers noted the use of ensemble learning methods vs. single machine learning models to predict stroke patients' mortality risk. This is also the first study in which the structured data of in-hospital bioassay test results were combined with textual data containing radiology reports to predict stroke patients' mortality risk. Our new model led to improvements in the performance metric by at least 4 percentage points.

New biomarkers for haemorrhagic and ischaemic stroke

We noticed some biomarkers that have not been widely recognised in conventional predictive models of stroke were related to stroke mortality. They are - levels of creatinine, sodium and urea. The highlighted biomarkers for haemorrhagic stroke were high white-blood-cell and neutrophil counts, and low platelet and red-blood-cell levels. The highlighted serum indicators of ischaemic stroke were high levels of phosphate, white blood cells and neutrophils, and low levels of lymphocytes and eosinophils. Levels of urea or albumin were also identified as serum biomarkers of ischaemic stroke mortality in our study.
"All of these biomarkers have been measured in routine bioassay laboratory tests," said Chan. "However, previous stroke mortality models did not include these biomarkers as important predictive factors."

Predictive ability comparison between machine learning and deep learning models using structured and textual data

Machine learning models have better predictive capabilities with sparse information input (e.g. structured data)

and deep learning models are better when dense data is supplied. Deep neural networks are better than machine learning networks when the "memory" problem of long sequences is addressed. Therefore, deep neural networks can more easily extract the meaning of human language than machine learning networks.

One key takeaway of the research is that the use of an ensemble method can effectively combine the advantages of the different prediction models involved. The use of either soft voting or stacking methods can improve the prediction performance metrics relative to individual models.

"The models that were developed in this research need to be further validated. These models have the potential for providing clinical decision support software applications to assist in the early identification of high-risk stroke patients to optimize the use of limited healthcare resources." said Chan.

"The models that were developed in this research need to be further validated. These models have the potential for providing clinical decision support software applications to assist in the early identification of high-risk stroke patients to optimize the use of limited healthcare resources."

About the study

Additional authors of the study include Ruixuan Huang, Jundong Liu, and Demrongrat Siriwanna from the Departments of Biomedical Sciences and Electrical Engineering at the City University of Hong Kong, Yat Ming Peter Woo from the Princes of Wales Hospital, Asmir Vodencarevic from Novartis Innovative Medicines, and Chi Wah Wong from the City of Hope. This work was supported by the City University of Hong Kong New Research Initiatives/Infrastructure Support from Central.

About the research team

The research team has been conducting research related to genetic and molecular epidemiology. Their main research interest is: 1) to dissect the molecular architecture of complex diseases by integrating multi-omics, biomarkers and environmental data to provide new insights in the prevention, diagnosis and treatment approach for complex diseases; 2) to build complex diseases prediction models; 3) to develop bioinformatics tools for translational data analytics using state-of-the-art methodologies. More news about the research team can be found here: https://sites.google.com/view/kkhchan/home.

Prof Chan Kei Hang Katie,
PHD, MPH, BEng
Assistant Professor
Department of Biomedical Sciences &
Department of Electrical Engineering

中風死亡風險評估及早期識別

機器學習模型整合：以生物檢定數據及放射學文本報告為出血性和缺血性中風患者建構多層次預測模型

陳紀行教授

每三分半鐘有一人死於中風。香港城市大學（城大）賽馬會動物醫學及生命科學一名研究員與其團隊結合不同機器學習演算法，研發出穩健的中風短期死亡率預測系統。這位研究員同時隸屬美國布朗大學流行病學，她的研究有助讓中風患者獲更有效的醫療資源分配。

這項研究發表在《生物學與醫學計算機》上，是迄今其中一項最早透過結構化及文本臨床數據的集成技巧結合個別機器學習演算法，從而為出血性和缺血性中風患者建構六個月死亡率預測模型的研究。

城大生物醫學系及電子工程學系助理教授陳紀行教授說：「我們的研究團隊希望開發臨床決策支援程式，以盡早識別高危中風患者，從而善用醫院管理局醫療資源中的電子健康記錄數據。」

集成學習模型：結合結構化和文本數據，令死亡率預測更準確

藉着醫院管理局數據實驗室的資料，研究員翻查2007年至2018年間超過1.9萬名出血性中風患者和5萬名缺血性中風患者的數據。結構化數據包括患者的人口統計、診斷結果、完成手術、家庭醫學診所、急症室就診紀錄、門診預約、住院及出院紀錄、化驗結果和處方藥物。我們還收集了包括放射科檢查報告及實驗室結果的文本數據。

在分析數據時，研究團隊比較了使用集成學習模型與單一機器學習模型在預測中風患者死亡風險的差異。這也是為了預測中風患者的死亡風險，第一次將院內生物檢定結果的結構化數據結合放射學報告的文本數據，這項新模型令效果提高至少4個百分點。

出血性和缺血性中風的新生物標記

我們發現部分在傳統中風預測模型中沒受認可的生物標記與中風死亡率有關，包括肌酸酐、鈉和尿素水平。出血性中風的重要生物標記是高白血球和嗜中性白血球數目，以及低血小板和紅血球的水平。缺血性中風的重要血清指標是高水平的磷酸鹽、白血球和嗜中性白血球，以及低水平的淋巴細胞和嗜酸性粒細胞。在我們的研究中，尿素或白蛋白的水平也被確定為缺血性中風死亡率的血清生物標記。

「所有生物標記早在常規生物檢定實驗室測量過，」陳博士說：「然而，以前的中風死亡率模型並沒有將這些生物標記作為預測要素。」

使用結構化和文本數據的機器學習和深度學習模型的預測能力比較

機器學習模型在稀疏信息輸入（如結構化數據）下的預測更準確，而深度學習模型在提供密集數據時表現更佳。在解決長序列「記憶」問題時，深度神經網絡比機器學習網絡更好。因此，深度神經網絡比機器學習網絡更易獲取人類語言的含義。

該研究的關鍵之一，是使用集成方法可有效結合不同相關預測模型的優勢。相對於個別模型，使用軟投票或堆疊方法能提高預測性能指標。

陳教授說：「這項研究開發的模型需要進一步驗證，這些模型或可提供臨床決策支援應用，協助盡早識別高危中風患者，將有限的醫療資源物盡其用。」

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關於該項研究

該研究的其他作者包括香港城市大學生物醫學系及電子工程系黃睿軒、劉俊東及Demrongrat Siriwanna、威爾斯親王醫院的胡日明、諾華創新藥物公司Asmir Vodencarevic，以及Hope of City 的Chi Wah WONG。是次研究獲香港城市大學New Research Initiatives/Infrastructure Support from Central的支持 。

關於研究團隊

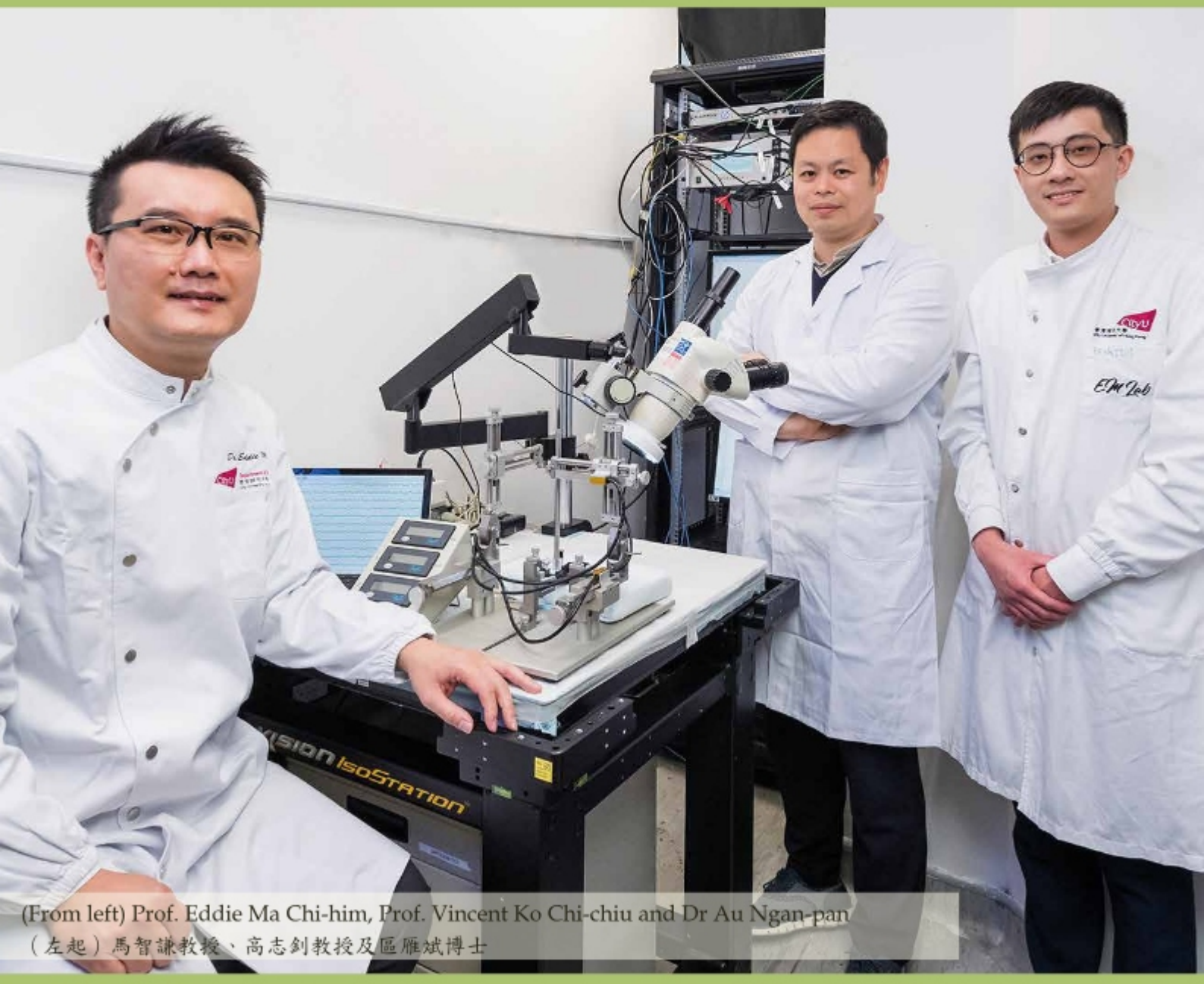
研究團隊致力研究基因和分子流行病學，主要研究範圍包括：1）通過整合多組學、生物標記和環境數據，剖析複雜疾病的分子結構，為預防、診斷及治療複雜疾病注入新見解；2）建立複雜疾病的預測模型；3）以尖端技術開發生物信息學工具，進行轉化數據分析。欲知研究團隊更多資料，請瀏覽：https://sites.google.com/view/kkhchan/home

陳紀行教授
助理教授
城大生物醫學系及電子工程學系

From the Department of Neuroscience

Small molecule offers great therapeutic potential for restoring vision

Prof. Eddie Ma Chi-him



(From left) Prof. Eddie Ma Chi-him, Prof. Vincent Ko Chi-chiu and Dr Au Ngan-pan
（左起）馬智謙教授、高志釗教授及區雁斌博士

Researchers at City University of Hong Kong (CityU) have identified and demonstrated for the first time a therapeutic small molecule, M1, that can restore the visual function in the mammalian central nervous system (CNS), offering hope for patients with optic nerve damage such as glaucoma-related vision loss.

Traumatic injuries to the CNS, including the optic nerve, the brain and the spinal cord, are the leading causes of disability worldwide for which there is no available treatment. M1 stimulates the fusion and motility of mitochondria (the powerhouse of a cell to generate energy) and induces robust axon regeneration by enhancing the intrinsic growth capacity of injured neurons.

Led by Prof. Eddie Ma Chi-him, Professor in the Department of Neuroscience and Director of the Laboratory Animal Research Unit at CityU, this research breakthrough heralds a new approach that could address unmet medical needs in accelerating functional recovery within a limited therapeutic time window after CNS injuries.

"Photoreceptors in the eyes [retina] forward visual information to neurons in the retina. To facilitate the recovery of visual function after injury, axons of neurons must regenerate through the optic nerve and relay nerve impulses to visual targets in the brain via the optic nerve for image processing and formation," said Prof. Ma.

Regenerated axons elicit neural activities in target brain regions and restore visual functions after M1 treatment. The computer screen at the left side of the photo indicates such brain activities.
經M1治療法而再生的神經軸突可在腦部目標區產生神經活動，令視覺功能得以恢復。圖中左方電腦螢幕顯示上述腦神經活動情況。

"M1 treatment sustains long-distance axon regeneration from the optic chiasm, i.e. midway between the eyes and target brain region, to multiple subcortical visual targets in the brain. Regenerated axons elicit neural activities in target brain regions and restore visual functions after M1 treatment. Our study highlights the potential of a readily available and non-viral therapy for CNS repair."

The seven-year-long study builds on the team's previous research on peripheral nerve regeneration using gene therapy.

"This time we have used the small molecule M1 for repairing CNS simply by intravitreal injection into the eyes, which is an established medical procedure for patients, i.e., for macular degeneration treatment. Successful restoration of the visual function such as pupillary light reflex and responses to looming visual stimuli, e.g. visually induced innate defensive responses to avoid predators, was observed only in M1-treated mice four to six weeks after the optic nerve had been damaged," said Dr Au Ngan-pan, Research Associate in the Department of Neuroscience.

The research team is developing an animal model for treating glaucoma-related vision loss using M1 and possibly other common eye diseases and vision impairments such as diabetes-related retinopathy, macular degeneration and traumatic optic neuropathy. Thus further investigation is warranted to evaluate the potential clinical application of M1.

"Nerve regeneration and function recovery will help improve the quality of life for patients and reduce the burden on the local community and healthcare systems," Prof. Ma added.

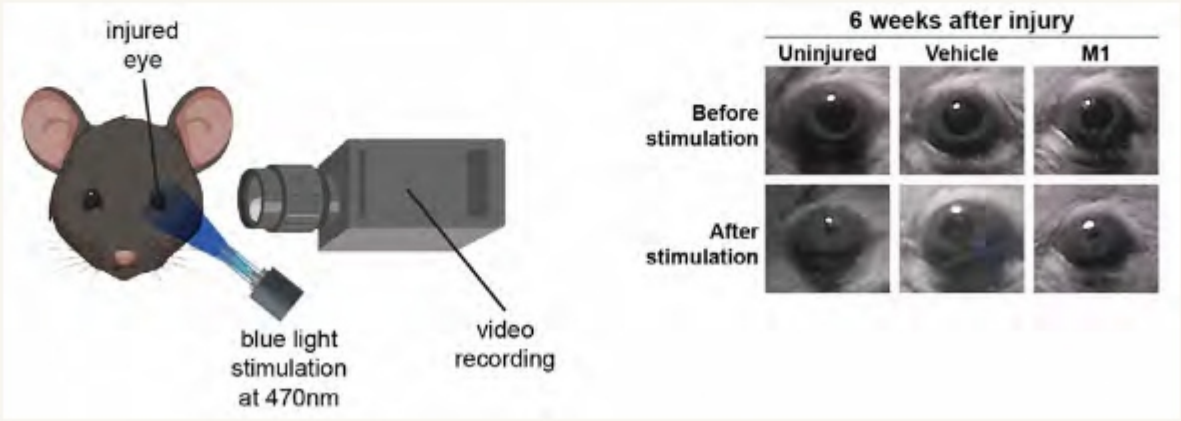
The research was published in the high-impact scientific journal Proceedings of the National Academy of Sciences under the title "A small molecule M1 promotes optic nerve regeneration to restore target-specific neural activity and visual function".

Dr Au and Prof. Ma are the first author and corresponding author for the research, respectively. Another collaborator is Prof.Vincent Ko Chi-chiu, Associate Professor in the Department of Chemistry.

The research was supported by CityU and the General Research Fund from the Research Grants Council of Hong Kong.

Prof. Eddie Ma Chi-him
Professor
Department of Neuroscience

M1 treatment sustains long-distance axon regeneration along the optic nerve as shown in the lower part of the image.
如圖片下半部顯示，M1治療法可令視神經內的神經軸突再生一段非常長的距離。



Restoration of visual function such as pupillary light reflex is observed in M1-treated mice.
接受M1治療的小鼠能夠恢復視覺功能如瞳孔對光的反射作用。

小分子在恢復視力方面極具治療潛力

馬智謙教授

香港城市大學（城大）研究人員首次發現並展示一種具治療功能的小分子M1，能恢復哺乳類動物中樞神經系統的視覺功能，為因青光眼等疾病引致視神經受損而喪失視力的病人帶來希望。

中樞神經系統受損（包括視神經、腦部及脊髓受損），是全球引致殘疾的主要原因，目前仍未有治療方法。M1能促進為細胞產生能量的線粒體的融合及軸突運輸，並通過促進受損神經元的內在再生能力，令神經軸突再生。

這項突破性研究由城大神經科學系教授兼實驗動物研究中心總監馬智謙教授領導，以一種新方式醫治神經，能夠在中樞神經系統受損後的黃金治療期內加快神經功能復原。

馬教授說：「眼睛的感光細胞[視網膜]將影像資訊傳送至視網膜的神經元。要促進創傷後視覺功能復原，神經元的軸突必須通過視神經再生，並將神經脈衝透過視神經傳至腦部的視覺目標區，以處理及形成影像。」

「採用M1治療法可令神經軸突再生一段非常長的距離，由視交叉（即眼睛至腦部目標區之間的位置）至腦部皮質下的不同視覺目標區。經M1治療法而再生的神經軸突可於視神經元受刺激後，在腦部目標區產生神經活動，並恢復視覺功能。我們的研究充分展示M1於修復中樞神經系統的治療潛力，能成為現成可用及不含病毒載體的一種療法。」

研究為期七年，團隊在先前成功以基因療法促進周圍神經再生的基礎上，研發出上述新療法。

神經科學系副研究員區雁斌博士表示：「這次我們透過玻璃體內注射法，把M1直接注射入眼內，以修復中樞神經系統，而這種注射方法亦已廣泛應用於治療黃斑病變。我們發現接受M1治療的小鼠，在視神經受損後四至六星期就能成功恢復視覺功能，例如瞳孔對光的反射作用及對隱現視覺刺激的反應（如依靠視覺誘發的先天防禦反應以避開捕食者）。」

團隊現正開發一個動物模型，以研究利用M1治療因青光眼引致的視力喪失，並探討M1是否可應用於治療其他一般眼疾或視障問題，例如因糖尿病引致視網膜病變、黃斑病變及創傷性視神經病變。為此，團隊須進一步評估M1於各種臨床應用的潛力。

馬教授補充說：「神經再生及功能復原有助改善病人的生活質素，並減輕本地社會及醫療系統的負擔。」

研究結果已刊於具影響力的科學期刊《美國國家科學院院刊》，題為「小分子M1可促進視神經再生以修復特定的神經活動及視覺功能」。

是次研究的第一作者為區博士，通訊作者為馬教授，另一合作研究員是化學系副教授高志釗教授。研究獲得城大及香港研究資助局優配研究金撥款資助。

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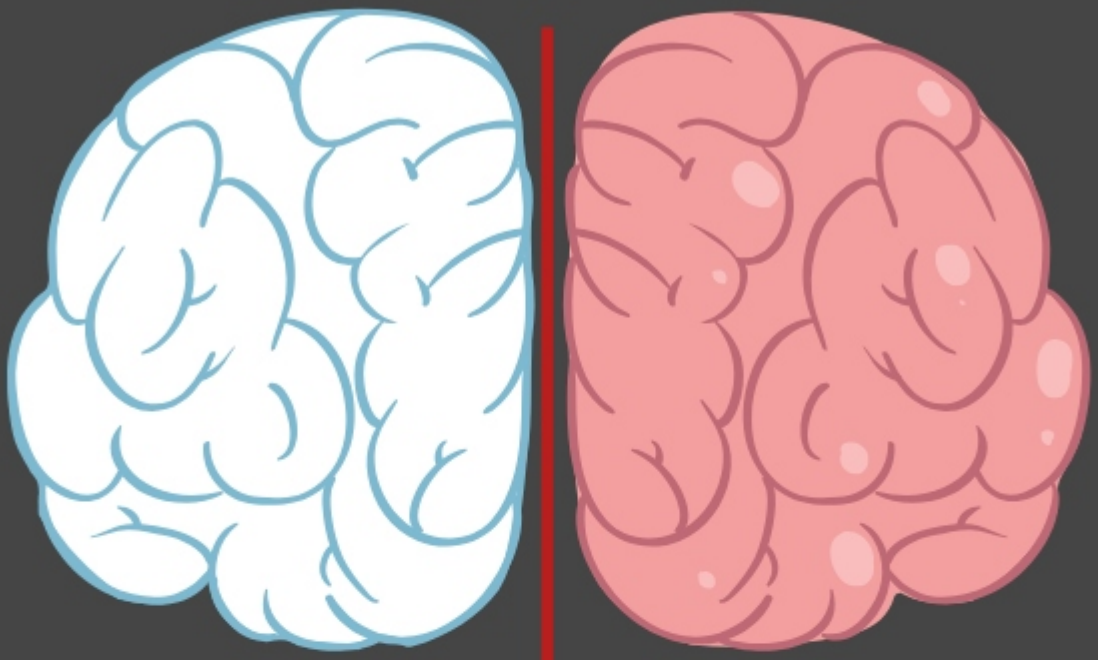
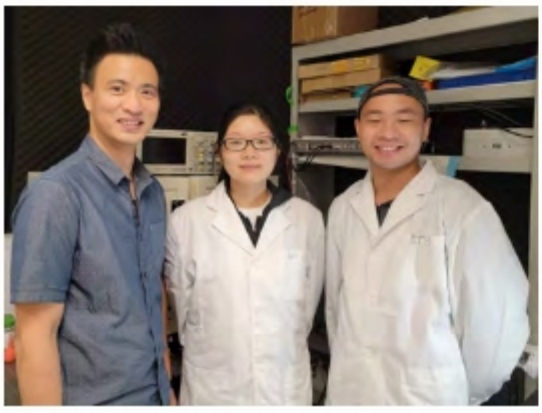


CityU neuroscientists discover a new drug candidate for treating epilepsy

Prof. Geoffrey Lau Chun-Yue



Prof. Geoffrey Lau Chun-Yue (left) and his research team at City University of Hong Kong: Dr Guo Anni (centre) and Dr Li Huanhuan.

劉俊宇教授（左）和他的城大研究團隊，郭安妮博士（中）和李歡歡博士（右）。

Temporal lobe epilepsy (TLE) is one of the most common types of epilepsy worldwide. Although symptomatic medications are available, one-third of TLE patients remain unresponsive to current treatment, so new drug targets are critically needed. A research team co-led by a City University of Hong Kong (CityU) neuroscientist recently identified and developed a new drug candidate that has potential for effectively treating TLE by suppressing neuroinflammation.

Epilepsy is one of the most prevalent chronic brain disorders and is characterised by recurrent and spontaneous seizures. Most anti-epileptic drugs that are currently available target neurons and synapses in the brain. They are effective in changing neural circuits and synapses, but this treatment overlooks another important pathology: neuroinflammation.

Neuroinflammation is caused by the abnormal functioning of reactive glial cells, such as astrocytes and microglia, causing an immune reaction in the brain. Accumulating evidence points to a key role of connexin-based gap junctions and hemichannels in brain glial cells in TLE. A hemichannel is a channel or pathway formed by the assembly of six proteins, which permits small molecules such as glutamate to be released from astrocytes and microglia to extracellular space. A gap junction is formed when the hemichannels of two adjacent cells dock with each other, as shown in Figure 1. But inhibiting both gap junctions and hemichannels can lead to undesirable side effects because the former coordinate physiological functions of cell assemblies. Therefore, scientists need to find a way to block only connexin hemichannels to effectively reduce neuroinflammation with fewer side effects.

A research team co-led by Prof. Geoffrey Lau Chun-yue, Assistant Professor in the Department of Neuroscience, identified a new, small organic molecule called D4, which selectively blocks connexin hemichannels, but not gap junctions. The team investigated its effect in treating TLE using a mouse model. The findings suggest that D4 strongly suppresses the TLE-induced neuroinflammation, curbs TLE seizures, and increases the animal's survival rate.

The findings were published in the international scientific journal **Proceedings of the National Academy of Sciences of the United States of America (PNAS)** under the title "*Inhibition of connexin hemichannels alleviates neuroinflammation and hyperexcitability in temporal lobe epilepsy*".

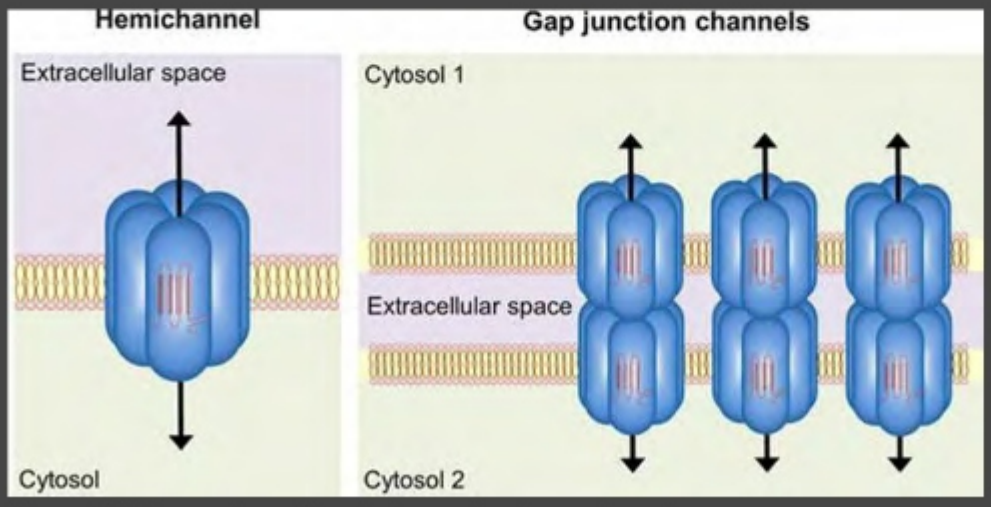


Figure 1: Illustration of hemichannel and gap junction
圖1：半通道和縫隙連接通道的圖解。
(source: Juan A. Orellana, Synaptic Functions of Astroglial Hemichannels, DOI: 10.5772/intechopen.87142. https://www.intechopen.com/chapters/67921)

New drug D4 suppresses neuroinflammation

"These are very exciting and encouraging results for translational research in epilepsy," said Prof. Lau. "We have found a very promising new drug candidate for treating epilepsy that works through a new mechanism – blocking connexin hemichannels. Our findings also highlight the important involvement of neuroinflammation in neurological disorders such as epilepsy."

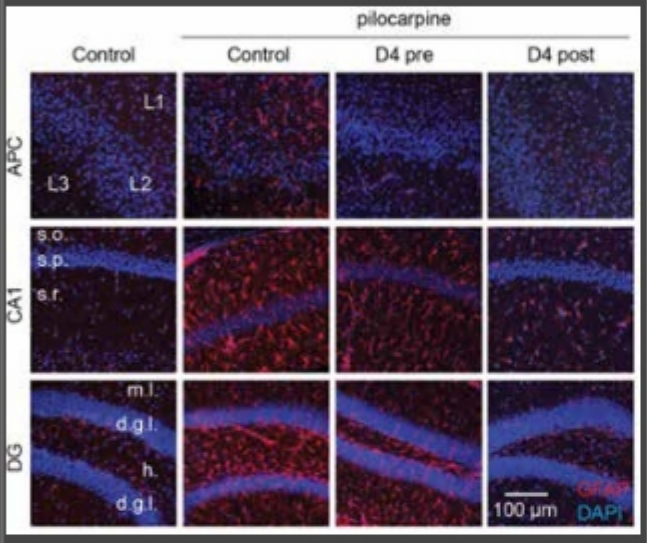


Fig. 2. 圖2
Photo source：© Guo, A. et al. (https://www.pnas.org/doi/10.1073/pnas.2213162119)

Fig. 2, D4 treatment decreases the proliferation and activation of astrocytes in two different brain regions. Pilocarpine was injected into the mice intraperitoneally to induce seizures. Seven days after pilocarpine-induced seizures, the researchers observed a chronic elevation in the number of astrocytes (marked by GFAP staining in red; all cell nuclei marked by DAPI staining in blue). A single injection of the new hemichannel antagonist D4 before or after the induced seizures significantly curbed the proliferation of astrocytes, thus reducing neuroinflammation.

The new drug, D4, targets a new class of ion channels, the connexin hemichannels in the glial cells. Glial cells include astrocytes and microglia and are important for modulating neurotransmission. Excessive glutamate and other molecules can leak out from reactive glia via hemichannels to the extracellular environment, altering synapses, enhancing neuroinflammation and exacerbating seizures. By specifically blocking connexin hemichannels using D4, Prof. Lau's team can directly target neuroinflammation caused by astrocytes and microglia.

The research adopted the pilocarpine model of epilepsy in mice, a well-known model to produce phenotypes that resemble human TLE. Pilocarpine was injected into mice intraperitoneally to induce seizures. The administration of one dose of D4 orally before inducing seizures effectively reduced neuroinflammation and altered synaptic inhibition, which increased the animal's survival rate. For treatment after induced seizures, a single dose of D4 had a prolonged effect on suppressing the activation of astrocytes and microglia. This suggests that D4 strongly alleviates neuroinflammation and has a long-term effect.

A single dose offers long-term benefits

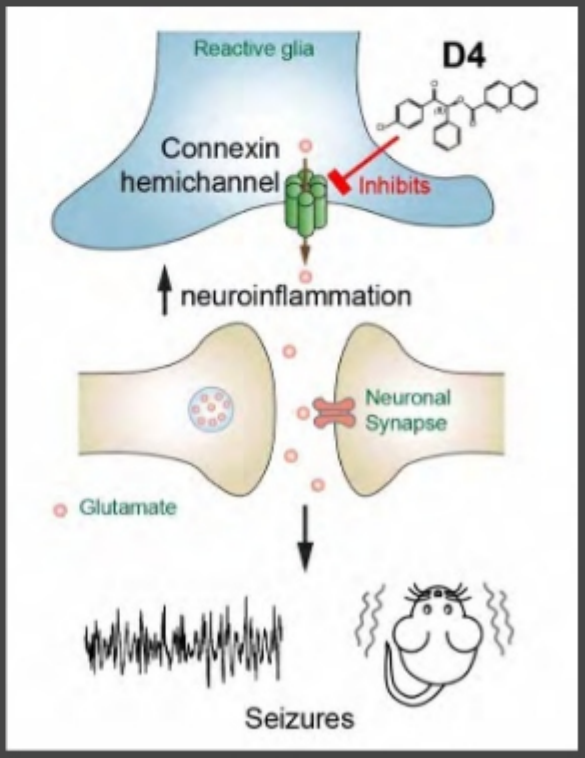


Fig. 3. 圖3
Photo source：© Prof. Geoffrey Lau

Fig. 3, Schematic model of how the new drug, D4, inhibits hemichannels and alleviates neuroinflammation and seizure symptoms. The new drug, D4, is a selective blocker of connexin hemichannels. Excessive glutamate and other molecules can leak out from reactive glia to the extracellular environment, altering synapses, enhancing neuroinflammation and exacerbating seizures. D4 blocks this pathway, suppresses neuroinflammation, and curbs the further development and occurrence of seizures. The latest research findings indicate that D4 is a promising candidate drug for treating epileptic seizures by targeting connexin hemichannels and neuroinflammation.

Results from both pre- and post-treatment indicate that targeting connexin hemichannels by D4 is an effective and promising strategy for treating epilepsy in which neuroinflammation plays a critical role. The drug can be taken orally to effectively get into the mouse brain to reduce the harmful effects of neuroinflammation. A single dose provides strong protection against future seizures. "We hope that this will ultimately result in new and better treatment options for epileptic patients," said Prof. Lau. The team will continue to work on the astrocytic mechanisms of epilepsy and the identification of new therapeutic targets.

The first author of the paper is Dr Guo Anni, CityU PhD graduate and a postdoc in Prof Lau's laboratory. Corresponding co-authors include Prof. Lau and Prof. Juan C Saez, from the University of Valparaíso, in Chile. Prof. Lau's PhD student, Zhang Huiqi, and Postdoc, Dr Li Huanhuan, also participated in the research. The research was funded by CityU, the Hong Kong Research Grants Council, InnoHK and the Shenzhen General Basic Research Program.

"These are very exciting and encouraging results for translational research in epilepsy," said Prof. Lau. "We have found a very promising new drug candidate for treating epilepsy that works through a new mechanism – blocking connexin hemichannels. Our findings also highlight the important involvement of neuroinflammation in neurological disorders such as epilepsy."

城大神經科學家發現治療癲癇的新候選藥物

劉俊宇教授

顳葉癲癇是全球最常見的腦癲癇之一，雖然有藥物可以控制癲癇症狀，但約三分一的顳葉癲癇患者對現有的抗癲癇藥物有抗藥性，急需針對新靶點的新藥治療。由香港城市大學（城大）神經科學家共同領導的研究團隊最近發現並開發了一種新的候選藥物，可望能通過抑制神經炎症，有效治療顳葉癲癇。

癲癇是其中一種最常見的慢性腦部疾病，患者會出現反覆和不由自主的癲癇發作。目前大部分可用的抗癲癇藥物，靶點都針對大腦的神經元和突觸。它們在調節神經迴路和突觸傳遞方面很有效，但這種治療卻忽略了病理上的另一個重要考慮：神經炎症。

神經炎症由反應性神經膠質細胞（例如星形膠質細胞和小膠質細胞）的功能異常引起，導致大腦出現免疫反應。有愈來愈多的證據指出，在顳葉癲癇的發病過程中，腦神經膠質細胞的縫隙連接通道（gap junctions）和半通道（hemichannels）均扮演關鍵角色。一條半通道由六個連接蛋白組成，可讓細小的分子如谷氨酸鹽（glutamate），從星形膠質細胞和小膠質細胞釋放到細胞外的空間。當兩個相鄰細胞的半通道對接，就會形成一條縫隙連接通道（圖 1）。由於縫隙連接通道在細胞的生理功能上起著重要的調控作用，若為了治療癲癇而同時抑制縫隙連接通道和半通道，會導致不良的副作用。因此，科學家們需要找到只阻斷連接蛋白半通道的方法，以有效減少神經炎症並減輕副作用。

由城大神經科學系助理教授劉俊宇教授共同領導的研究團隊，找到一種名為D4的新型有機細小分子，它可以選擇性地阻斷連接蛋白半通道而不影響縫隙連接通道。團隊使用小鼠模型，研究以D4治療顳葉癲癇的效果。結果顯示D4強烈抑制顳葉癲癇引起的神經炎症和癲癇發作，並提高動物存活率。

研究結果最近在國際科學期刊《美國國家科學院院刊》（PNAS）發表，標題為〈*Inhibition of connexin hemichannels alleviates neuroinflammation and hyperexcitability in temporal lobe epilepsy*〉。

新藥物 D4 抑制神經炎症

劉教授說：「在癲癇的轉化研究上，這是令人非常興奮和鼓舞的結果。我們找到一種極具潛力，以新機制治療癲癇的新候選藥物，它通過阻斷連接蛋白半通道發揮作用。我們的研究結果還標示了神經炎症在癲癇等神經系統疾病的重要作用。」

圖2：D4治療減少大腦兩個不同區域星形膠質細胞的增生和活化。研究項目把毛果芸香鹼注射到小鼠腹腔內以誘發癲癇發作，在誘發癲癇發作7天後，研究人員觀察到星形膠質細胞數量逐漸增加（紅色的是經GFAP染色的星形膠質細胞；藍色的是經DAPI染色的所有細胞核）。在誘發癲癇發作之前或之後，單次注射新型半通道拮抗劑D4，能顯著抑制星形膠質細胞增生，從而減少神經炎症。

新發現的藥物D4能針對新一類離子通道，即神經膠質細胞中的連接蛋白半通道（connexin hemichannel）。神經膠質細胞包括星形膠質細胞和小膠質細胞，在調節神經傳遞中很重要。過量的谷氨酸鹽和其他分子可以從反應性神經膠質細胞，通過半通道滲漏到細胞外，改變突觸、增強神經炎症並加劇癲癇發作。於是，劉教授本的團隊以連接蛋白半通道作為靶點，並以D4來針對性地阻斷通道，直接靶向由星形膠質細胞和小膠質細胞引起的神經炎症。

研究採用了毛果芸香鹼（pilocarpine）造模的小鼠癲癇模型，這是能產生近似人類顳葉癲癇表型的著名研究模型，以注射毛果芸香鹼到小鼠腹腔內誘發癲癇發作。團隊的研究結果顯示，在誘發癲癇發作前，給小鼠口服一劑D4，能有效減低神經炎症和改變突觸抑制，從而提高小鼠存活率。至於在誘發癲癇發作後的治療方面，單劑量D4對抑制星形膠質細胞和小膠質細胞的活躍程度有長期功效。這說明D4大大地紓緩了神經炎症，兼具有長期的效果。

單劑量可提供長期益處

圖3中新藥 D4抑制半通道，減輕神經炎症和癲癇發作症狀的示意圖。D4是連接蛋白半通道的選擇性阻斷劑。過量的谷氨酸鹽和其他分子從反應性神經膠質細胞滲漏到細胞外的環境，改變突觸、增強神經炎症並加劇癲癇發作。D4阻斷該通道，抑制神經炎症和癲癇發作進一步發展和發生。最新的研究結果指出，D4以連接蛋白半通道和神經炎症為靶點，是治療癲癇發作有潛力的候選藥物。

研究結果指出無論是在癲癇發作之前或之後用藥，以D4靶向連接蛋白半通道，是有效而且具有潛力的治療癲癇策略。神經炎症在癲癇扮演關鍵角色，而這種可口服的藥物能有效進入小鼠大腦，減低神經炎症帶來的有害影響。單劑量已經可以提供強力的保護，防止未來癲癇發作。劉教授補充說：「我們希望這最終能為癲癇患者帶來新的、更好的治療選項。」團隊會繼續研究星形膠質細胞在癲癇的具體機制，並嘗試找出更多新的治療靶點。

研究論文的第一作者是郭安妮博士，她是城大的博士畢業生，也是劉教授實驗室的博士後研究員。共同通訊作者包括劉教授和智利瓦爾帕萊索大學的Juan C Saez教授，劉教授的博士生張輝琪和博士後研究員李歡歡博士。研究項目的資金來源包括城大、香港研究資助局、香港特區政府創新科技署InnoHK 創新香港研發平台，以及深圳市科技創新委員會基礎研究面上項目。

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