香港浸會大學
HONG KONG BAPTIST UNIVERSITY

School of 中醫藥學院
Chinese Medicine

The 10th Honorary Professorship

Conferment Ceremony-cum-Seminar

第十屆榮譽教授頒授典禮暨研討會

2025.10.18 | 09:30 – 12:50

Lam Woo International Conference Centre (WLB103)
Hong Kong Baptist University & Zoom Webinar

香港浸會大學林護國際會議中心 (WLB103)
及視像會議

香港浸會大學尚志會
HKBU CENTURY CLUB
(An association independent of Hong Kong Baptist University)

聯通課程
Co-curricular Learning

Programme 議程

09:00–09:30 Reception & Registration 招待茶會及登記

09:30–10:00 **Honorary Professorship Conferment Ceremony 榮譽教授頒授典禮**

10:00–10:30

The Four Challenges in Diagnosing and Treating Chronic Kidney Disease and Strategies for Addressing Them
慢性腎臟病辨治「四難」與對策思考

Professor PI Chiheng 皮持衡教授

National TCM Master; Professor and Chief Traditional Chinese Medicine Physician, Jiangxi University of Chinese Medicine, China
國醫大師、江西中醫藥大學教授及主任中醫師

10:30–11:00

We Are All in One Boat: Climate Change and Sustainability Sourcing as "New" Challenges for Chinese Materia Medica and Other Herbal Products. "你要去哪里" /Quo Vadis?
同舟共濟：氣候變遷和永續採購對中藥和其他草藥產品構成「新」挑戰 ·「你要去哪裡」/Quo Vadis?

Professor Michael HEINRICH

Professor of Ethnopharmacology and Pharmacognosy, School of Pharmacy, University College London, United Kingdom
英國倫敦大學學院藥學院民族藥理學及生藥學教授

11:00–11:15 Coffee Break 小休

11:15–11:45

The Applications of Traditional Exercise Therapy in Disease Rehabilitation
傳統運動療法在疾病康復中的應用

Professor CHEN Lidian 陳立典教授

Former President, Fujian University of Traditional Chinese Medicine; Chairman, Chinese Association of Rehabilitation Medicine, China
福建中醫藥大學原校長、中國康復醫學會會長

11:45–12:15

Practice and Thinking on the Treatment of Type 2 Diabetes Based on the Theory of Fire and Heat
以火熱立論辨治2型糖尿病實踐與思考

Professor LI Saimei 李賽美教授

Professor, Guangzhou University of Chinese Medicine, China
廣州中醫藥大學教授

12:15–12:45

Circadian Rhythms and Glucocorticoids in Skeletal Health
晝夜節律、糖皮質激素與骨骼健康

Professor ZHOU Hong 周虹教授

Senior Principal Research Fellow and Head of Molecular Bone Biology Laboratory of ANZAC Research Institute, The University of Sydney, Australia
澳洲悉尼大學高級首席研究員及ANZAC研究所骨分子生物學實驗室主任

12:45–12:50 Closing Remarks 總結

註 Remarks:

- **主辦機構保留對節目調動之權利而不作另行通知。**
  The organiser reserves the right to alter the topic/content/speaker of the programme without prior notice.
- **主辦機構保留對註冊中醫進修學分之最終決定權。**
  The organiser reserves the right to offer the CME credits.

Biographies and Abstracts of Speakers

講者

簡介及演講摘要

Professor PI Chiheng 皮持衡教授

National Traditional Chinese Medicine Master; Professor and Chief Traditional Chinese Medicine Physician, Jiangxi University of Chinese Medicine, China

國醫大師、江西中醫藥大學教授及主任中醫師

Biography 簡介

Pi Chiheng, Chief Traditional Chinese Medicine (TCM) Physician, Level II Professor, Doctoral Supervisor, Member of the Academic Division of the China Academy of Chinese Medical Sciences, National TCM Master, First National Famous TCM Physician, State Council Special Allowance Expert, and Academic Mentor for the Second, Third, Fourth, Sixth, and Seventh Batches of National Inheritance Programs for the Academic Experience of Veteran TCM Experts. Formerly served as Vice President, President, and Deputy Party Secretary of Jiangxi University of Chinese Medicine. Currently serves as Advisor to the Nephrology Branch of the Chinese Association of Chinese Medicine, Advisor to the Gan Medical Federation, and Honorary Chairman of the Jiangxi Provincial Traditional Chinese Medicine and Chinese Herbal Medicine Research Association. With over 60 years of experience in TCM medical practice, education, and research, he established Jiangxi's first specialised TCM nephrology department. Academically, he advocates "building upon ancient foundations while innovating for the present, learning from masters without rigid adherence to tradition, synthesising diverse strengths, adapting ancient wisdom for contemporary use, and integrating Western insights into Chinese medicine to maximise efficacy." He formulated the "Five Theories" academic framework for diagnosing and treating chronic kidney diseases. He developed effective formulations and treatment protocols including "Kidney Failure Toxin-Clearing Oral Liquid," "Kidney Medicine No. 3," and the "Three-Nut Kidney Failure Toxin-Clearing Protocol." These are widely applied in treating chronic kidney failure patients, yielding significant clinical efficacy and social benefits. This demonstrates his profound mastery of TCM theory and extensive clinical expertise.

皮持衡，主任中醫師、二級教授、博士研究生導師、中國中醫科學院學部委員、國醫大師，首屆全國名中醫，國務院政府特殊津貼專家，全國第二、三、四、六、七批老中醫藥專家學術經驗繼承指導老師。曾任江西中醫學院副院長、院長、黨委副書記，現任中華中醫藥學會腎病分會顧問、贛醫聯合總會顧問，江西省傳統中醫中藥研究會名譽理事長。從事中醫藥醫教研工作60餘年。創建了江西省首個中醫腎病專科，學術上主張「循古拓今，師宗不泥古，博採眾長，古為今用，洋為中用，致力於發揮」，總結提出慢性腎臟疾病證治「五論」學術思想。創制出「腎衰泄濁口服液」、「腎藥III號」及「三仁腎衰泄濁方案」等有效製劑及方法，廣泛應用於慢性腎衰患者的治療，取得了顯著的臨床療效及社會效益，展示了其深厚的中醫藥理論功底和豐富的臨床經驗。

The Four Challenges in Diagnosing and Treating Chronic Kidney Disease and Strategies for Addressing Them

慢性腎臟病辨治「四難」與對策思考

Abstract 演講摘要

Chronic kidney disease is characterised by a protracted course, persistent progression, and complex pathology. It involves damage or dysfunction across multiple organs, leading to deficiencies or exhaustion of qi, blood, yin, and yang throughout the body. The syndrome manifests as "underlying deficiency with superficial excess." Clinically, the underlying deficiency primarily stems from organ qi depletion, with the spleen and kidney being most affected (damage to both congenital and acquired functions). The superficial excess arises from water-dampness (phlegm) obstruction (suppression), blood stasis, and internal accumulation of turbid toxins. Regardless of whether the presentation is deficient or excess, "deficiency, dampness (phlegm), turbidity, blood stasis, and internal toxins" persist throughout the disease process. Consequently, "deficiency, dampness, stasis, and toxins" constitute the "four major challenges" in the clinical diagnosis and treatment of chronic kidney disease.

First, addressing deficiency is challenging because the disease involves multiple organs. The root lies in spleen and kidney deficiency, with congenital kidney essence being difficult to replenish. Spleen deficiency further impairs the ability to transform and transport nutrients, hindering the absorption of tonifying agents. Second, resolving dampness is difficult. Internally generated dampness stems from disharmony in the lung, spleen, and kidney. Its sticky and clinging nature affects multiple organs, injuring qi and damaging yang, and is exacerbated by deficiency of vital energy. Third, eliminating stasis is difficult. Blood stasis is present from the onset of the disease, easily forming "micro-masses." Weak organ qi and prolonged illness affecting the collaterals further aggravate blood stasis. Fourth, the difficulty lies in eliminating "toxins." Prolonged illness leads to organ dysfunction, causing the kidneys to lose their detoxification capacity. Accumulated toxins within the body trigger various symptoms, and the depletion of vital energy further exacerbates dampness and blood stasis, creating a vicious cycle.

Based on the above understanding, Professor Pi Chiheng believes that clinical diagnosis and treatment of chronic kidney disease must "transcend conventional approaches, innovate with fresh perspectives, and employ specialised reasoning" to achieve meaningful outcomes. Otherwise, satisfactory clinical efficacy remains elusive. Drawing from years of diagnostic and therapeutic experience, he proposes the following approaches: (1) Incorporate modern medical insights into differential diagnosis and treatment; (2) Implement multi-modal comprehensive therapy; (3) Combining decoctions with proprietary Chinese medicines; (4) Exercising caution with toxic Chinese herbs or proprietary medicines; and (5) Consistently prioritising "resolving stasis and purging toxins." These approaches aim to delay renal failure, stabilise conditions, and enhance patients' quality of life.

慢性腎臟病病程冗長，病勢纏綿，病情複雜，且涉及多臟腑功能損傷或障礙，累及機體氣血陰陽的不足或虛衰，其證「本虛標實」，責之臨床本虛以臟氣虛衰為主，脾腎二臟為著（先、後天俱損），標實以水濕（痰）阻滯（遏）、瘀血作祟、濁毒內盛為多，且無論其證為虛為實，「虛損、濕（痰）濁、瘀血、內毒」貫穿病變始終。因而，「虛、濕、瘀、毒」成為慢性腎臟病臨床辨治的「四大難點」。

其一補「虛」難，因病變累及多臟腑，脾腎虧虛為本且先天腎元難補，脾虛難以運化補虛之品等；其二化「濕」難，濕邪內生源於肺、脾、腎失調，其性黏膩纏綿，累及多臟腑且傷氣損陽，還會因正虛等加重；其三蠲「瘀」難，疾病發生即有血瘀，易形成「微型癥積」，臟氣虛弱、久病入絡等會加重瘀血；其四除「毒」難，病程久致臟腑功能衰微，腎臟排毒功能喪失，濁毒蓄於體內引發多種症狀，且正氣虛損會加重濕濁、血瘀，形成惡性循環。

基於上述認識，皮持衡教授認為臨床辨治慢性腎臟病，必須要「超越常規、創之新意、特殊思考」方能有所獲，否則，難以取得滿意的臨床療效，總結多年的診療體會與心得，提出從以下幾個方面入手：（1）參考現代醫學為辨治施治所用；（2）多途徑綜合治療；（3）湯劑聯合中成藥運用；（4）慎用有毒中藥或中成藥；及（5）始終以「蠲瘀泄毒」為重點。以期延緩腎臟衰竭、穩定病情、提高患者生活質量。

Professor Michael HEINRICH

Professor of Ethnopharmacology and Pharmacognosy, School of Pharmacy, University College London, United Kingdom

英國倫敦大學學院
藥學院民族藥理學及生藥學教授

Biography 簡介

Michael Heinrich is a Professor of Ethnopharmacology and Medicinal Plant Research (Pharmacognosy) (https://profiles.ucl.ac.uk/34589-michael-heinrich) and was until 2018 the Head of the research cluster/ Centre "Biodiversity and Medicines" at the School of Pharmacy, University College London (UCL). From 2017 to 2023, he served as the joint chair of UCL's Research Ethics Committee. Since 2022, he also is a Yushan Fellow at China Medical University, Taiwan, China (https://yushan.project.edu.tw/TopTalent/EN/Intro#section1) developing research on various aspects of Chinese herbal medicine. He is listed among the Clarivate Highly Cited Researchers (https://clarivate.com/highly-cited-researchers/?action=clv_hcr_members_filter&clv-paged=4&clv-category=&clv-institution=University%20College%20London&clv-region=&clv-name=).

Currently, he is the President of the GA (Society for Medicinal Plant and Natural Product Research), one of the largest societies in the field.

He is Specialty Editor in Chief of *Frontiers* in Pharmacology (Ethnopharmacology), among a wide range of other roles. In 2023, he received the 2023 American Botanical Council's "Norman R. Farnsworth Excellence in Botanical Research Award". He is an Honorary Fellow of the Academy of Pharmaceutical Sciences of Great Britain.

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We Are All in One Boat: Climate Change and Sustainability Sourcing as "New" Challenges for Chinese Materia Medica and Other Herbal Products. "你要去哪里"/Quo Vadis?

同舟共濟：氣候變遷和永續採購對中藥和其他草藥產品構成「新」挑戰・「你要去哪裡」/Quo Vadis?

Abstract 演講摘要

Climate change and human activities severely impact plants and ecosystems, threatening biodiversity, healthcare resources, and sustainable development of plant-based products. Medicinal plants, including Chinese materia medica, are widely traded and provide key ecosystem services, but face increasing risks to their long-term viability. However, these species are also relevant for ecosystem services including climate mitigation, and for their socio-economic role.

Recently, we proposed a new framework for assessing the impact of climate change and more generally the sustainable sourcing of natural products and herbal medicines (Mykhailenko et al. 2025), including the main factors to better understand and address the vulnerability of a species, hence mitigate the impact of climate change. Biotic and abiotic (ecosystem) determinants affect species distribution and long-term survival, which in turn influence the quality of plants used as herbal medicines and other high-value products. Four research priorities emerge: climate effects, bioeconomic drivers, habitat conditions (incl. human pressure), and reproductive success.

In a scoping review we are currently assessing the state of research on how climate change affects medicinal plants, focusing on ecological shifts, traditional uses, changes in secondary metabolites, and adaptation strategies (Takubessi et al., n.d.). Research output has rapidly expanded, dominated by studies on Asian resources, especially China, with limited coverage of Africa, Europe, and South America. So far, 357 species have been assessed, including climate-sensitive high-altitude taxa. Shifts in secondary metabolite production, linked to stress factors such as drought, indicate a need for new analytical methods.

Conservation gaps remain severe: 40.6% of species are classified as threatened by The International Union for Conservation of Nature, while 59.4% remain unevaluated. Species Distribution Modeling (SDM), especially MaxEnt, is the main tool for vulnerability assessment.

Climate change is reshaping both ecology and pharmacological value of medicinal plants. This requires refocused research, sustainable sourcing, and better regulation of which products—such as supplements or cosmetics—can be safely commercialised.

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Professor CHEN Lidian 陳立典教授

Former President, Fujian University of Traditional Chinese Medicine;
Chairman, Chinese Association of Rehabilitation Medicine, China
福建中醫藥大學原校長、中國康復醫學會會長

Biography 簡介

Chief physician, doctoral supervisor, academician of the International Eurasian Academy of Sciences, and president of the Chinese Association of Rehabilitation Medicine. He has served as an executive committee member of the International Society of Physical and Rehabilitation Medicine and was a visiting scholar at Shenandoah University, USA. He is editor-in-chief of the *Journal of Rehabilitation Medicine* and the *Chinese Journal of Rehabilitation Medicine*.

He has led 11 national research projects, including the National Key R&D Project and National Natural Science Foundation Key Projects of China. He has published 336 papers as first or corresponding author, 31 teaching materials and monographs, and holds 23 invention patents. He has also chaired the development of five national guidelines and clinical pathways in rehabilitation medicine.

His achievements have been recognised with major honors, including the National Science and Technology Progress Award (second prize) and the Cheung On Tak International Award for Outstanding Contribution to Chinese Medicine.

陳立典，教授、主任醫師，博士生導師，國際歐亞科學院院士，中國康復醫學會會長，曾任國際物理與康復醫學會執行委員，美國雪蘭多大學訪問學者，《康復學報》、《中國康復醫學雜誌》主編，百千萬人才工程國家級人選、岐黃學者。主持國家重點研發計劃、國家自然基金重點項目等國家級項目11項，以第一作者或通訊作者身份發表論文336篇，主編國家規劃教材、專著31部，授權發明專利23項，主持制定康復醫學相關指南、臨床路徑等5項。獲國家科技進步二等獎、國家級教學成果二等獎、張安德中醫藥國際貢獻獎、中國中西醫結合學會科學技術一等獎、中華中醫藥學會科普著作一等獎等。

The Applications of Traditional Exercise Therapy in Disease Rehabilitation

傳統運動療法在疾病康復中的應用

Abstract 演講摘要

Traditional exercise therapy has a rich history spanning thousands of years. From the early Daoyin practices of the Pre-Qin era to the well-developed Baduanjin, Yijinjing, and Tai Chi Chuan during the Song and Ming dynasties, these practices emphasise the unity of movement and stillness as well as the cultivation of both body and mind. Once regarded primarily as traditional Chinese physical exercises, they have evolved into globally recognised mind-body rehabilitation therapies.

Over the past decades, traditional exercise has received growing international attention. PubMed indexed 2,726 papers on this topic, while the China National Knowledge Infrastructure database contains over 15,000 related publications. High-impact studies published in journals such as *The BMJ* and *JAMA Network Open* provide robust clinical evidence that traditional exercise can slow cognitive decline, improve cardiopulmonary function, enhance balance, reduce falls, alleviate pain, and regulate sleep and emotional well-being. These findings have been integrated into multiple national and international clinical practice guidelines.

Basic research, utilising multidisciplinary approaches including neuroimaging, biomechanics, and molecular biology, has begun to clarify the underlying mechanisms, establishing a scientific basis for therapeutic applications. These works have been strongly supported by national-level funding, including the National Natural Science Foundation of China and the National Key R&D Project.

Meanwhile, advances in virtual reality, artificial intelligence, and wearable devices are enabling intelligent rehabilitation technologies that incorporate traditional exercise, ushering in a new stage of technology-driven development.

Today, traditional exercise therapy stands as a distinctive hallmark of rehabilitation medicine in China and a significant contributor to global health promotion and integrative rehabilitation. It represents a unique convergence of cultural heritage with scientific innovation, pointing toward a future model of rehabilitation that integrates humanistic tradition with cutting-edge research.

傳統運動療法歷史悠久，自先秦時期的導引術，至宋明時期發展成熟的八段錦、易筋經、太極拳等，強調「動靜結合、形神共養」，已由最初僅作為中國傳統的體育運動，發展為全球認可的身心康復療法。

有關傳統運動療法的各類創新性科學研究一直是國內外康復領域關注的熱點。近10年，PubMed發表的有關傳統運動療法的論文共2,726篇，中國知網數據庫有關的學術論文超過15,000篇。一系列標誌性論文在BMJ、JAMA Network Open等刊物發表，在延緩認知衰退、增強心肺功能、改善平衡控制、降低跌倒風險、緩解疼痛以及調節睡眠與情緒狀態等方面高質量臨床證據不斷增長。傳統運動在疾病康復中的應用已被國內外多部臨床指南推薦。基礎研究借助多學科交叉的研究手段在神經影像、生物力學、分子生物學等方面開展作用機理闡釋，系統揭示了傳統運動改善健康水平、提升功能狀態的現代科學內涵，為傳統運動療法在康復領域的應用奠定了重要科學基礎。傳統運動療法的研究也獲國家自然基金重點項目、國家重點研發計劃項目等多項國家級課題的研究支持。

此外，隨著虛擬現實技術、人工智能、可穿戴設備等前沿科技的發展，傳統運動智能化的康復新設備、新技術不斷湧現。傳統運動療法的發展也進入科技賦能與機制引領的新發展階段。

傳統運動療法不僅是我國康復醫學的鮮明標識，更在全球主動健康與整合康復中發揮重要作用，代表了一種融合人文傳承與科學前沿的未來康復方向。

Professor LI Saimei 李賽美教授

Professor, Guangzhou University of Chinese Medicine, China
廣州中醫藥大學教授

Biography 簡介

Li Saimei, a second level professor, chief physician, and doctoral supervisor at Guangzhou University of Chinese Medicine. She is an expert with special government allowance from the State Council, a famous traditional Chinese medicine doctor in Guangdong Province, a famous teacher in colleges and universities in Guangdong Province, a famous teacher in the Guangdong special support program, and the chairman of the national typhoid fever alliance. The sixth and seventh batches of national old experts in traditional Chinese medicine academic experience inheritance work instructor, national famous old experts in traditional Chinese medicine, Li Saimei studio experts. She has been engaged in the teaching, clinical and scientific research of traditional Chinese medicine classics for a long time. She has successively served as the director of the Teaching and Research Section of Typhoid Theory of Guangzhou University of Chinese Medicine, the director of the Institute of Classical Clinical Research, and the leader of the national key discipline of clinical basis of traditional Chinese medicine.

She is good at differentiating and treating type 2 diabetes with pure traditional Chinese medicine, creating a clinical case library of typhoid fever theory, establishing an international classic prescription class and the country's first classic prescription exhibition hall. She has edited 55 textbooks and works, and won the second prize of the National Science and Technology Progress Award and the first prize of the Teaching Achievement Award of Guangdong Province. She is a national model teacher, a national education system heroine, a national March 8th red flag bearer, and the first national outstanding female traditional Chinese medicine doctor.

李賽美，廣州中醫藥大學二級教授，主任醫師，博士生導師。國務院政府特殊津貼專家，廣東省名中醫，廣東省高等學校教學名師，廣東特支計劃教學名師，全國傷寒論聯盟理事長。第六、七批全國老中醫藥專家學術經驗繼承工作指導老師，全國名老中醫專家李賽美工作室專家。長期從事中醫經典教學、臨床與科研工作。歷任廣州中醫藥大學傷寒論教研室主任，經典臨床研究所所長，中醫臨床基礎國家重點學科帶頭人。

擅長純中醫辨治2型糖尿病，創建傷寒論臨床案例庫，創辦國際經方班及全國首個經方展館。主編教材著作55部，獲國家科技進步二等獎，廣東省教學成果一等獎。是全國模範教師，全國教育系統巾幗建功標兵，全國三八紅旗手，全國首屆傑出女中醫師。

Practice and Thinking on the Treatment of Type 2 Diabetes Based on the Theory of Fire and Heat

以火熱立論辨治2型糖尿病實踐與思考

Abstract 演講摘要

Diabetes mellitus is a high incidence and chronic disease in the world today. How to give full play to the unique role of traditional Chinese medicine and occupy a place in the field of diabetes prevention and treatment, traditional Chinese medicine people have been exploring.

In the form of video and clinical case sharing of the seventh series of “Hanging Pot Lingnan”, the speech first answers the question of the efficacy of traditional Chinese medicine in reducing blood glucose. The conclusion is: the curative effect of pure traditional Chinese medicine in treating diabetes is convincing! Not only is the effect fast and obvious, but also there is no adverse reaction, and the objective indicators are improved synchronously. Then, the causes of diabetes were discussed. Put forward the seed and soil theory of diabetes, and explore the close relationship between its pathogenesis and spleen, kidney and liver in traditional Chinese medicine from the aspects of diet, exercise, aging and emotion.

On the pathogenesis of diabetes, based on clinical observation, put forward the theory of heat toxicity. The evolution of pathogenesis presents three stages: spleen and kidney loss, Yang depression and heat toxin accumulation. The idea of diabetes treatment emphasises three sentences: High sugar cannot be separated from fire, low sugar cannot be far from cold; This is due to the deficiency of health, strengthening the spleen and kidney; The syndrome is more stagnant, and blood circulation is expensive. Five words are put forward for the prescription and medication: the modular combination of clearing, opening, tonifying, unblocking and transforming.

糖尿病是當今全球高發病、慢性病。如何發揮中醫獨特作用，在糖尿病防治領域佔一席之地，中醫人一直在探索前行。

演講以《懸壺嶺南》第七輯視頻和臨床案例分享形式，首先回答中醫藥降糖的療效問題。結論是：純中醫治療糖尿病，療效令人信服！不但見效快而明顯，且無不良反應，客觀指標同步改善。繼之探討糖尿病的發病原因。提出糖尿病種子、土壤學說，從飲食、運動、年齡老化及情志方面探討其發病與中醫脾腎肝密切相關。

關於糖尿病病機，基於臨床觀察，提出熱毒學說。病機演變呈現由脾腎虧損、陽郁不達、熱毒積聚三階段。糖尿病治療思路，強調三句話：糖高不離火，降糖不遠寒；本在正虛損，扶正重脾腎；兼證多鬱滯，氣血貴流通。組方用藥提出五個字：清、開、補、通、化之模塊組合。

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Biography 簡介

Professor Hong Zhou is a Senior Principal Research Fellow at the University of Sydney and Head of the Molecular Bone Biology Laboratory at the ANZAC Research Institute, Sydney. She has considerable expertise in the cell and molecular biology of musculoskeletal tissues, glucocorticoid signalling, systemic fuel metabolism, and animal models of bone and joint pathology. Over the last 20 years, Hong Zhou has worked continuously in the areas of glucocorticoid physiology and pathophysiology, in particular glucocorticoid action in bone and joints. Since 2005, her research has been continuously funded through competitive grants from national funding agencies. (NHMRC funding: 10 project grants, and 2 idea grants, total $7.3m. In past 5 years, her research was supported by 6 NHMRC project or idea grants. Over the course of her career, she has published more than 130 scientific reports, many of which appeared in top-ranking journals such as *Cell Research*, *Nat Commun*, *Bone Research*, *J Clin Invest*, *J Exp Med*, *PNAS*, *Development*, *Arthritis Rheum*, *Diabetes*, and *Cancer Res* with 8,243 citations. Her current h-index is 54.

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Circadian Rhythms and Glucocorticoids in Skeletal Health

晝夜節律、糖皮質激素與骨骼健康

Abstract 演講摘要

Nearly all biological processes, including hormone release, systemic metabolism and behaviour are subject to circadian rhythms (CRs), roughly 24-hour cycles that are generated by the body's internal clocks. Prolonged disruption of CR is increasingly being recognised as an important contributor to adverse health conditions such as cardiovascular disease, metabolic disorders and neurodegeneration. More recently, shift work and sleep disorders have been found to increase the risk of bone loss and fractures as well as the development of osteoarthritis in humans.

Since glucocorticoids are known to synchronise the cell-autonomous clocks throughout the body, we investigated whether bone loss and osteoarthritis is mediated through glucocorticoid signalling during chronic disruption of circadian rhythm. Our studies utilised the mouse lines in which the glucocorticoid receptor (GR) was specifically deleted in osteoblasts and osteocytes or chondrocytes. We then exposed these knockout mice and their wild-type littermates to either normal light-dark cycles or weekly alternating 12-hour phase shifts in the light-dark cycle for 22 weeks, an established model of chronic circadian rhythm disruption. The adrenal secretion of glucocorticoids follows a circa dian pattern where circulating glucocorticoids levels peak at the beginning of the wake period. This regular rhythm becomes a flattened without the normal daily peak in shifted mice. Consequently, this disordered glucocorticoid rhythmicity during chronic disruption of circadian rhythm disturbs skeletal circadian gene expression and induces bone loss and cartilage degradation in knee joints. When this abnormal rhythmic glucocorticoid signaling blocked in GR knockout mice, circadian gene expression in bone and cartilage maintained intrinsic rhythmicity and bone and cartilage loss was mitigated during chronic CR disruption. Importantly, restoring the normal daily peak of glucocorticoids by daily injection in shifted wild-type mice protected the bone and cartilage loss.

Our findings provide compelling in vivo evidence that chronic circadian rhythm disruption abolishes glucocorticoid rhythmicity which thereby disturbs skeletal circadian gene expression and induces bone and cartilage loss.

古人曰日出而作，日落而息。地球上的所有生物都有「生物節律」的生理機制，在長期的進化中，地球生物形成了與24小時光週期同步的生物節律（生物鐘）。長期晝夜節律紊亂是導致心血管疾病、代謝紊亂和神經退行性疾病等不良健康狀況的重要因素。近期研究發現，輪班工作和睡眠障礙會增加人類骨質疏鬆、骨折以及骨關節炎的風險。

鑒於糖皮質激素能夠同步全身細胞自主生物鐘，我們探究了在慢性晝夜節律紊亂期間，骨質流失和骨關節炎是否由糖皮質激素信號傳導介導。我們將小鼠分別置於正常的或者在晝夜節律紊亂模式（每週交替的12小時相位改變）。在正常晝夜循環條件下，糖皮質激素的分泌遵循晝夜節律模式，其中循環糖皮質激素水平在清醒期開始達到最高峰值。在改變相位的小鼠中，這種節律變得平坦，失去了其正常的每日峰值。這種糖皮質激素節律紊亂擾亂了骨與軟骨的生物鐘基因表達，並誘導骨質流失和膝關節軟骨退化。當這種異常節律性糖皮質激素信號在糖皮質激素受體敲除小鼠中被阻斷時，骨和軟骨中的生物鐘基因表達保持內在節律性，節律紊亂所誘導的骨和關節軟骨的損失明顯減輕。重要的是，每日注射糖皮質激素恢復野生型小鼠的正常糖皮質激素峰值有效的阻斷了節律紊亂所誘導的骨和關節軟骨的損失。我們的研究結果表明慢性晝夜節律紊亂會消除循環糖皮質激素的晝夜節律及其峰值，從而擾亂骨與關節軟骨晝夜節律基因表達並導致骨骼和關節軟骨丟失。

現代生物鐘研究揭示了生命節律的分子機制和時鐘基因的調控，使生物能夠適應晝夜循環變化。而中醫的子午流注學說以「天人合一」的理論蘊含了古人對生命節律的深刻洞察。它依照十二時辰的運行規律，強調了晝夜節律與人體生理功能及疾病的對應關係。希望未來通過對生物鐘的分子機制研究來闡明和拓展中醫藥的千年智慧。

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