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中藥質量研究國家重點實驗室 (澳門大學)
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State Key Laboratory of Quality Research in Chinese Medicine
(University of Macau)



中華醫藥研究院
Instituto de Ciências Médicas Chinesas
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ICMS NEWSLETTER

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NEWS & FEATURES

- ❖ UM, CUHK, and GZUCM establish Guangdong-Hong Kong-Macao University Alliance for Acupuncture and Moxibustion
- ❖ SKL-QRCM's Academic Committee holds meeting at UM, acknowledging laboratory's achievements
- ❖ Congratulations and Thank You: Announcing Professor Chan Ging's Retirement
- ❖ Collaborative Brainstorming Session on Interdisciplinary Research Strengthens International Partnerships at UM

UM, CUHK, and GZUCM establish Guangdong-Hong Kong-Macao University Alliance for Acupuncture and Moxibustion



The Guangdong-Hong Kong-Macao University Alliance for Acupuncture and Moxibustion inaugurates

The University of Macau (UM), the Chinese University of Hong Kong (CUHK), and Guangzhou University of Chinese Medicine (GZUCM) jointly led the establishment of the Guangdong-Hong Kong-Macao University Alliance for Acupuncture and Moxibustion, with the aim of promoting research, development, and innovation in acupuncture techniques in Guangdong, Hong Kong and Macao and strengthening academic exchanges and cooperation in relevant field. The inauguration ceremony of the alliance was held in conjunction with the World Federation of Acupuncture-Moxibustion Societies (WFAS) 2024 Symposium on Chinese Acupuncture and Moxibustion on March 17, 2024.

The symposium was attended by nearly 300 experts and scholars in the field of acupuncture and moxibustion from renowned universities and hospitals around the world. Chen Xin, director of UM's Institute of Chinese Medical Sciences (ICMS),

delivered a keynote presentation titled 'TNFR2 as an Emerging Target for the Treatment of Cancer and Autoimmune Diseases: Rooted in Chinese Medicine and Applied in Chinese Medicine Research', highlighting that the combination of traditional Chinese medicine and modern biomedical technology has provided solid scientific support for the development of Chinese medicine.



ICMS director Chen Xin delivered a keynote presentation at the symposium

SKL-QRCM's Academic Committee holds meeting at UM, acknowledging laboratory's achievements



The Second Academic Committee of the State Key Laboratory of Quality Research in Chinese Medicine (SKL-QRCM) held its eighth meeting at the University of Macau (UM). The meeting was held in a hybrid format on January 15, 2024.

During the meeting, Ip Kuai Lam, member of the Administrative Committee of the Science and Technology Development Fund of Macao, Lee Hun Wei, president of the Macau University of Science and Technology (MUST) and Ge Wei, vice rector of UM delivered welcoming speeches; followed by speeches by Chen Kaixian and Ding Jian, directors of the Academic Committee.

Chen Xin, Distinguished Professor at UM and director of SKL-QRCM (UM), presented to the committee the progress of SKL-QRCM in 2023 on behalf of both SKL-QRCM (UM) and SKL-QRCM (MUST). According to Chen, SKL-QRCM, by focusing on technological innovation and the development needs of the Chinese medicine industry in Macao, made significant achievements in various areas in 2023, including Chinese medicine quality assessment, identification of new pathogenesis and targets, international collaborations, publications, and patents. In addition, with the support of SKL-QRCM, the first phase of assessment for the construction of Macao Centre for Research and Development in Chinese Medicine was successfully completed, and Macao Centre for Testing of Chinese Medicine obtained accreditation from China National Accreditation Service for Conformity Assessment.

The Academic Committee acknowledged the achievements SKL-QRCM made in 2023, particularly its progress in technological collaborations between UM and MUST. Moreover, members of the committee provided valuable suggestions for the future development of SKL-QRCM.



Congratulations and Thank You: Announcing Professor Chan Ging's Retirement



Chan Ging, Associate Professor of Institute of Chinese Medical Sciences (ICMS) and the State Key Laboratory of Quality Research in Chinese Medicine (SKLQRCM) at the University of Macau (UM) has decided to retire effective February 1, 2024 after eight years of service. A celebration was held to say thank you and farewell.

Dr. Chan joined UM in 2016. He received his PhD degree from University of Illinois at Urbana-Champaign and conducted postdoctoral training at the University of Chicago. He is specialized in bioinformatics, big data analysis in Chinese medicines and development of health food.

During the farewell, Chen Xin, Distinguished Professor and director of ICMS and SKLQRCM, Wang Yitao, Chair Professor and the founding and former director, and colleagues delivered farewell speeches to express appreciation for Dr. Chan's contribution, dedication and legacy. All ICMS members wish Dr. Chan all the best in the future endeavors and a very happy retirement!



ICMS director Chen Xin and Dr. Chan Ging



ICMS founding director Wang Yitao and Dr. Chan Ging



Collaborative Brainstorming Session on Interdisciplinary Research Strengthens International Partnerships at UM



A collaborative brainstorming session with OSCAR is held online

A collaborative brainstorming session organized by the Institute of Chinese Medical Sciences (ICMS) and joined by the Oxford University and Oxford Suzhou Centre for Advanced Research (OSCAR) was held at UM on January 12, 2024. The session brought together leading scientists from the fields of traditional Chinese medicine and chemical engineering for an engaging and insightful discussion to foster interdisciplinary collaboration among the UK, China, and Macao.

The esteemed Prof. Cui Zhanfeng, the Donald Pollock Professor of Chemical Engineering at the University of Oxford led the OSCAR team including Prof. Pei Haiyun, Dr. Chang Hong, and Dr. Yang Alex from OSCAR, together with Prof. Huang Wei and Prof. Ye Cathy from the Oxford University. On the other side, Prof. Chen Xin, Distinguished Professor and Director of ICMS led the ICMS team including Dr. Lu Jiahong, Dr. Ouyang Defang, Dr. Li Yue, Dr. Song He, and Dr. Ung Carolina Oi Lam.

Academic visits to ICMS



Delegation from Sinopharm visits ICMS

Liu Jingzhen, chairman of China National Pharmaceutical Group Co Ltd (Sinopharm), led a delegation to visit the Institute of Chinese Medical Sciences (ICMS) and the State Key Laboratory of Quality Research in Chinese Medicine (SKLQRCM) as well as Macao Centre for Research and Development in Chinese Medicine (MCR&DCM) at the University of Macau (UM) on February 26, 2024. The delegation members received a warm reception from Prof. Chen Xin, Director of ICMS and Director of SKLQRCM and Prof. Wang Yitao, Chair Professor of ICMS and Director of MCR&DCM.

Academic visits to ICMS



Delegation from China Association for International Exchange of Personnel

Xia Bing, deputy director of China Association for International Exchange of Personnel, led a delegation to visit ICMS and SKLQRCM on January 30, 2024. The delegation members received a warm reception from Prof. Chen Xin, director of ICMS.

Delegation from Dalian University of Technology

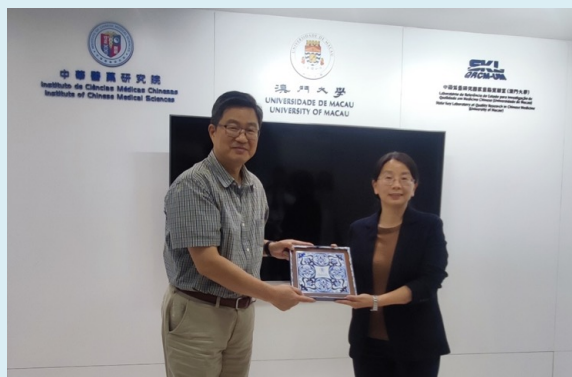
The delegation from Dalian University of Technology (DUT), led by Prof. Luo Zhongxuan, Vice President of DUT, visited ICMS and SKLQRCM on January 29, 2024. The delegation members were warmly received by Prof. Chen Xin, director of ICMS.



Academician Zhu Youyong and Prof. He Xiahong visit ICMS

Academician Zhu Youyong, renowned as the “Model of The Times”, chairman of Yunnan Association for Science and Technology and honorary president of Yunnan Agricultural University, and Prof. He Xiahong, vice president of Southwest Forestry University visited ICMS on January 16, 2024. They were warmly welcomed by Prof. Chen Xin, director of ICMS, Prof. Li Peng, deputy director of ICMS and Prof. Wan Jianbo.

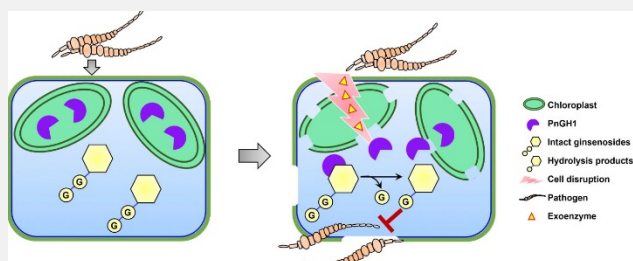
Academician Zhu gave a presentation titled “Composing the Scientific Paper on the Land,” highlighted the team’s efforts to connect the local understory habitat with the biological characteristics of *Panax notoginseng*, thereby facilitating the return of traditional Chinese medicine to its natural mountain and forest habitats. Following Academician Zhu’s presentation, Prof. He Xiahong delivered a thematic report on “Scientific and Technological Innovation of Chinese Medicinal Materials in the Forest.” The event drew the participation of over 100 ICMS staff and students.



ICMS research highlights

Discovery of chemical defence system in traditional Chinese medicine *Panax notoginseng*

A research team led by Prof. Wan Jianbo from ICMS, in collaboration with research teams from Beijing University of Chinese Medicine and Southwest Forestry University, has made a groundbreaking discovery in the plant chemical defence of traditional Chinese medicine Sanqi (*Panax notoginseng*). The study unveiled a two-component chemical defence system in *Panax notoginseng* mediated by chloroplast-localised β -glucosidase and 20(S)-protopanaxadiol ginsenosides, which will contribute to a deeper understanding of how *Panax* species defend against pathogens and provide valuable insights for the development of sustainable botanical pesticides. The research results have been published in the internationally renowned journal *Nature Communications*.

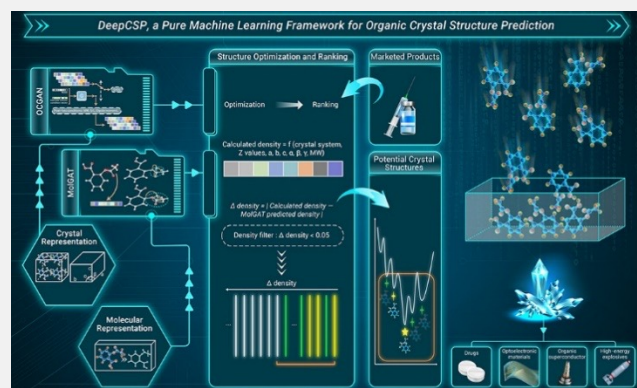


A schematic diagram of the two-component chemical defence system in *Panax* species

***Nature Communications*, 2024, 15(1):602**

An innovative machine learning framework for predicting the crystal structure of organic compounds

The research team, led by Dr. Ouyang Defang from ICMS has introduced an innovative machine learning framework named DeepCSP for predicting the crystal structure of organic compounds. Employing conditional generative adversarial network and graph convolutional networks, DeepCSP achieves the swift crystal structure predictions within minutes. Significantly, the prediction capability of DeepCSP was validated using a crystal structure dataset of the marketed drugs, and the case studies further demonstrated its functionality and performance. This novel study brings new vitality into the organic crystal research, offering potential benefits for areas such as drug development. The research has been published in the esteemed academic journal *The Innovation*.



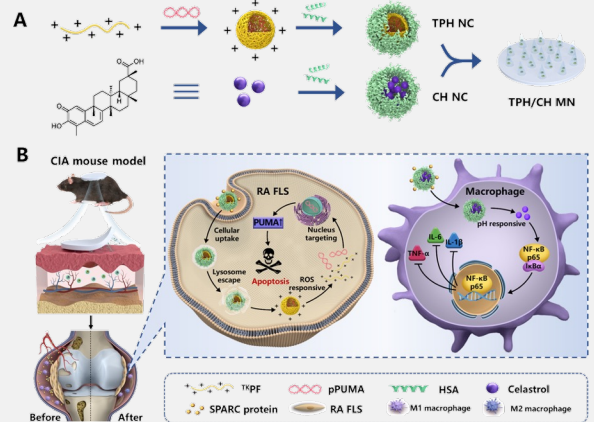
Organic crystal structure prediction via coupled generative adversarial networks and graph convolutional networks

***The Innovation*, 2024, 5(2): 100562**

ICMS research highlights

Microneedle for co-encapsulation of PUMA gene and celastrol for rheumatoid arthritis treatment through restoring synovial homeostasis

Prof. Chen Meiwan's team from ICMS have proposed a strategy of simultaneously promoting FLS apoptosis and inhibiting inflammation based on microneedle platform for effective rheumatoid arthritis (RA) therapy. A hyaluronic acid-based dissolvable microneedle TPH/CH MN is fabricated for transdermal delivery of dual human serum albumin contained biomimetic nanocomplexes (TPH NCs, CH NCs) that encapsulate PUMA gene and celastrol, respectively. Upon skin insertion, dual nanocomplexes are released rapidly from MN and accumulate in RA joint microenvironment through both passive targeting based on ELVIS effect and active targeting as mediated by HSA. TPH NCs upregulate PUMA through RA FLS transfection to trigger efficient apoptosis. CH NCs inhibit inflammation of macrophages through blocking NF- κ B pathway activation. TPH/CH MN can deplete RA FLS and inhibit M1 macrophage activation, suppress synovial hyperplasia as well as reduce bone and cartilage erosion in a collagen-induced arthritis mouse model. The research has been published in *Bioactive Materials*.

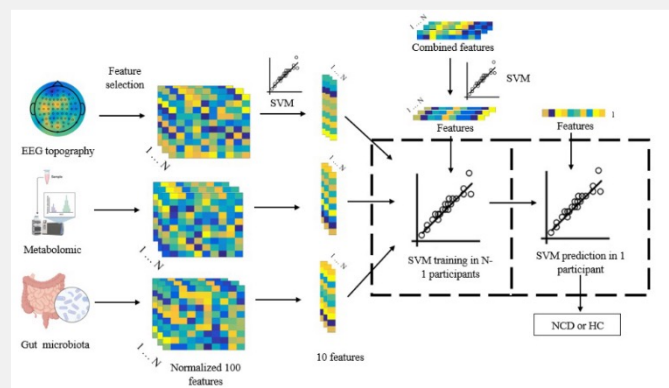


Schematic illustration of (A) the fabrication procedures of the TPH/CH MN and (B) the RA therapeutic mechanism through inducing RA FLS apoptosis and regulating inflammatory macrophages.

Bioactive Materials, 2024, 36: 83-95

Personalized Diagnosis of Neurocognitive Disorders through multi-omics profile and multimodal EEG data fusion

Dr. Zhao Yonghua collaborated with Prof. Yuan Zhen (Centre for Cognitive and Brain Sciences), provided insights for personalized diagnosis of Neurocognitive Disorders (NCDs) by the fusion of multiple omics and multimodal electroencephalogram data. Through metagenomic analysis of gut microbiota composition in elderly individuals with NCDs, specific bacterial strains associated with cognitive impairment, including *Ruminococcus gnavus*, *Enterocloster bolteae*, and *Lachnoclostridium sp.* YL 32 were identified. Intestinal metabolites related to aromatic amino acid biosynthesis and tricarboxylic acid cycle showed significant decline levels in elderly individuals with NCDs, suggesting relevant metabolic pathways involved in NCDs, which was demonstrated by Fecal Microbiota Transplantation in old mice. Subsequently, the team constructed a Support Vector Machine (SVM) algorithm and machine learning models based on multiple omics and multimodal electroencephalogram data for diagnosis. Through training and validation on samples, these models accurately differentiated between NCDs and normal aging individuals, providing a reliable tool for personalized diagnosis of NCDs. The relevant research findings were published in the journal *Microbiome*.



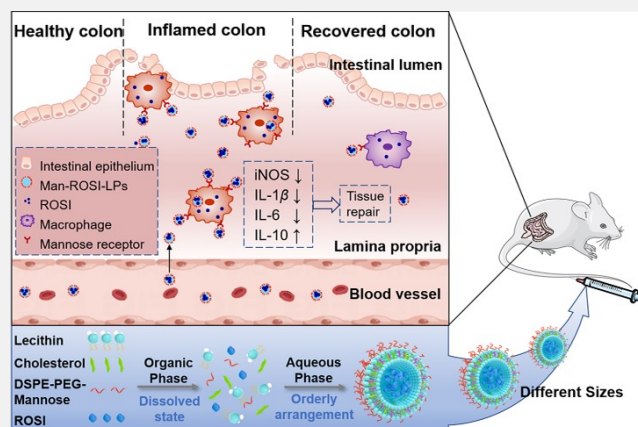
A schematic diagram showing personalized diagnosis of Neurocognitive Disorders through multi-omics profile and multimodal EEG data fusion

Microbiome, 2024, 12(1):12

ICMS research highlights

Size-dependent macrophage-targeting of mannose-modified rosiglitazone liposomes to alleviate inflammatory bowel disease

Prof. Zheng Ying in collaboration with Dr. Lu Jiahong and their team from ICMS have published their recent research in *Chinese Chemical Letters*. The team has designed mannose-modified liposomes (MAN-LPs) with different size to achieve macrophage targeting and improve anti-inflammation efficiency. Moreover, the impacts of particle size for macrophage targeting were investigated in cells and zebrafish. MAN-LPs displayed higher uptake by RAW 264.7 cells and better co-localization with macrophage in zebrafish. Furthermore, MAN-LPs could effectively accumulate in the inflammatory intestinal sites in IBD mouse model. Most importantly, the targeting ability of MAN-LPs was obviously enhanced with the increase of particle size, whereas the largest MAN-LPs particles achieved the best anti-inflammatory effect in cell model, and a higher therapeutic efficiency in IBD mouse model. Therefore, MAN-LPs is a promising strategy for macrophage targeting in IBD treatment. Particle size of MAN-LPs could affect macrophage targeting ability, as well as the therapeutic effect *in-vivo*.



A schematic diagram showing size-dependent mannose-modified liposomes for macrophage targeting and the large particles (300 nm) achieved the best targeting and anti-inflammatory effect for inflammatory bowel disease (IBD) treatment.

***Chinese chemical letters*, 2024, 35(1):108361**

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Co-first author; * Corresponding author



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