高雄醫學大學
Kaohsiung Medical University

KMU

Research Center Quarterly Report

Office of Research & Development

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KMU
Kaohsiung Medical University

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KMU

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List of Research Centers

University -Level Academic Research Institute

Biomedical Artificial Intelligence Academy

Dean:Dist. Prof. Henry Horng-Shing Lu
Deputy Dean: Prof. Chun-Wang Wei, Prof. Cheng-Che Lan
Division Director: Prof. Ming-Chung Chou, Prof. I-Chen Wu, Prof. Hao-Yun Kao
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University-Level Academic Research Center

Research Center for Precision Environmental Medicine

[MOE Higher Education Sprout Project-The Featured Areas Research CenterProgram (107~116)]

CEO:Prof. Chih-Hsing Hung
Deputy CEO:Prof. Pei-Shih Chen, Prof. Chih-Jen Yang, Prof. Tusty-Jiuan Hsieh, Prof. Wei-Ting Liao, Clinical Asst. Prof. Da-Wei Wu
E-mail:envmed@kmu.edu.tw

Regenerative Medicine and Cell Therapy Research Center

CEO:Prof. Chung-Hwan Chen
Deputy CEO:Prof. Cheng-Chang Lu, Assoc. Prof. Bin Huang
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Drug Development and Value Creation Research Center

CEO:Prof. Chih-Hung Chuang
Deputy CEO:Prof. Yeng-Tseng Wang, Prof. Chia-Hung Yen
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Center for Cancer Research

CEO:Chair Prof. Li-Tzong Chen
Deputy CEO:Prof. Ming-Yii Huang, Prof. Yu-Tse Wu, Prof. Pei-Feng Liu, Assoc. Prof. Hui-Ching Wang
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Precision Sports Medicine and Health Promotion Center

Director:Prof. Shang-Jyh Huang
Deputy Director:Prof. Pei-Hsi Chou, Prof. Nai-Jen Chang
CEO:Prof. Lan-Yuen Guo;Deputy CEO:Prof. I-Hua Chu, Assoc. Prof. Wei-Chun Hung
Division Director: Prof. Hwai-Ting Lin, Prof. Chia-Yen Dai, Asst. Prof. Yung-Li Hung
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Center for Metabolic Disorders and Obesity

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Deputy CEO:Prof. Jee-Fu Huang, Prof. Yi-Chun Tsai
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University-Level Mission-Oriented Research Center

Neuroscience Research Center

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Center for Tropical Medicine and Infectious Disease Research

Director:Assoc. Prof. Chun-Yu Lin
Deputy Director:Prof. Sheng-Fan Wang, Prof. Po-Liang Lu
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Center for Big Data Research

Director:Prof. Hung-Pin Tu
Deputy Director:Prof. Ming-Chung Chou, Prof. Ping-Ho Chen, Prof. Shih-Feng Weng, Prof. Fu-Wen Liang
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Center for Long-Term Care Research

Director:Yi-Chun Tsai /Professor,
Deputy Director:Assoc. Prof. Chia-Chi Yang, Asst. Prof. Tzu-Yu Lin, Asst. Prof. Tzu-Jung Fang
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Center for Medical Education and Humanizing Health Professional Education

Director:Prof. Ming-Ju Tsai
Deputy Director:
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Research Center for Medical Technology and Policy

Director:Prof. Chi-Kung Ho
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Indigenous Health Care and Cultural Sustainability Research Center

Director:Prof. Chia-Yen Dai
Deputy Director:Prof. Ping-Ho Chen, Assoc. Prof. Jong-Rung Tsai
E-mail:ihccsrc@kmu.edu.tw
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Center for Disease Multi-Omics Research

Director:Prof. Jaw-Yuan Wang
Deputy Director:Prof. Ya-Ling Hsu, Prof. Jee-Fu Huang
CEO:Prof. Chia-Yang Li;Deputy CEO:Prof. Yi-Ching Lin
Division Director: Prof. Yi-Chang Liu, Asst. Prof. Chao-Ju Chen, Asst. Prof. Sin-Hua Moi
Division Section Director: Dr. Peir-In Liang, Prof. Hsin-Chih Yeh, Asst. Prof. Pei-Kang Liu, Assoc. Prof. Ying-Chi Lin, Asst. Prof. Chia-Hisn Liu, Prof. Ping-Ho Chen,
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From Digital Healthcare to Medical Humanities: Kaohsiung Medical University Participates in DHA 2026 International Conference

University -Level Academic Research Institute
— Biomedical Artificial Intelligence Academy
Yi-Xiang Chen Research Assistant / Horng-Shing Lu Dist. Prof.

DHA 2026 focused on human-centered smart healthcare and human-machine collaboration, bringing together international scholars and healthcare professionals to exchange ideas on the development of digital healthcare. At Kaohsiung Medical University (KMU), Professor Henry Horng-Shing Lu served as a Co-Chair of the conference, while Dr. Wei-Chung Tsai and Professor Hui-Ju Tsai presented their research through poster and oral presentations, respectively. During the conference, participants also visited Kaohsiung Medical University Gangshan Hospital and the Museum of KMU History & Medical Humanity, highlighting KMU's diverse development across clinical practice, research, and medical humanities.

Focusing on Human-Centered Smart Healthcare and Connecting International Academic Exchange

DHA 2026 was held from September 18 to 20 at the First Campus of National Kaohsiung University of Science and Technology (NKUST). The conference was jointly organized by National Kaohsiung University of Science and Technology, Kaohsiung Medical University, The University of Sheffield, and Healthcare Systems Consortium (HSC). With the theme "Human-Centered Healthcare Process Design and Human-Machine Collaboration," the conference brought together scholars, healthcare professionals, and industry representatives from Japan, South Korea, Singapore, the United States, South Africa, Hong Kong, Canada, the United Kingdom, Taiwan, and other regions. Through keynote speeches, oral presentations, and poster presentations, participants exchanged research and practical experiences in digital health, artificial intelligence, and medical data analytics. The conference emphasized that the development of artificial intelligence and digital technologies should go beyond technological advancement itself by incorporating perspectives on human factors, design, and responsible AI, while considering how these technologies can be effectively integrated into healthcare delivery and decision-making.



▲ Group photo of the participants



▲ Group photo

KMU Research Team Participation Highlights AI Applications in Healthcare

Professor Henry Horng-Shing Lu, Dean of the Biomedical Artificial Intelligence Academy at Kaohsiung Medical University (KMU), served as a Co-Chair of the conference and participated in international academic exchange and conference-related activities. In addition to conference discussions, research from KMU was presented in different formats. Dr. Wei-Chung Tsai presented the poster “Machine Learning-Based Computer-Aided Diagnosis of Cardiovascular Disease Using Deep Learning-Derived Tongue Image Features,” exploring the application of machine learning combined with deep learning-derived tongue image features for computer-aided diagnosis of cardiovascular disease. Professor Hui-Ju Tsai delivered an oral presentation entitled “Big Data, AI-Based Medical Analytics, and Prevention/ Prediction for Childhood Allergic Diseases,” focusing on the use of big data and AI-based medical analytics for the prevention and prediction of childhood allergic diseases. The two studies approached healthcare AI from different perspectives, namely image feature analysis and medical data analytics, demonstrating the diverse applications of AI technologies in disease diagnosis, prediction, and prevention.



Professor Henry Horng-Shing Lu served as a Co-Chair of DHA 2026

Exploring the Clinical Setting: Visiting KMU Kaohsiung Municipal Gangshan Hospital

During the conference, international participants also visited Kaohsiung Medical University Gangshan Hospital to learn about the development of the KMU healthcare system and the practical implementation of smart healthcare in a clinical setting. As a hospital within the KMU healthcare system serving the Gangshan area, the visit provided international participants with an opportunity to learn about the hospital environment and healthcare services. It also extended discussions on digital healthcare and artificial intelligence from the conference setting to an actual clinical environment, facilitating exchanges between participants from different countries and regions and strengthening connections between international academic activities and the local healthcare system.



▲ Visit to Kaohsiung Medical University Gangshan Hospital

Exploring KMU’ s History and Medical Humanities

Held concurrently with the hospital visit, another group of international participants visited the Museum of KMU History & Medical Humanity, offering a different perspective on KMU. Founded in 1954 by Dr. Tsung-Ming Tu, Taiwan’s first medical doctor with a PhD, KMU was the first private medical school in Taiwan. The KMU History and Medical Humanities Museum preserves and exhibits materials documenting the university’s development and history, covering its founding, former presidents, campus development, affiliated healthcare system, and international exchange, while also presenting aspects of Taiwan’s medical history. One of the museum’s notable works, The Love of Skin Grafting, depicts the story of Dr. David Landsborough performing skin grafting to save a child in 1928. The painting was commissioned by Dr. Tsung-Ming Tu and created by artist Li Shih-Chiao in 1956, reflecting the importance of humanistic care beyond medical expertise. For international participants of DHA 2026, the museum visit provided an opportunity to learn more about KMU’s history, medical education, and commitment to medical humanities.



▲ Visit to the Museum of KMU History & Medical Humanity

Important Events

KMU AI seminar

Four Major Trends in Global Health Data Research



115.7.9

Room IR630, 6th Floor, International Academic Research Building, KMU

Jason C. Hsu (Professor, International Ph.D. Program in Biotech and Healthcare Management, Taipei Medical University)

As health data and artificial intelligence continue to advance rapidly, global healthcare research is moving toward international collaboration, data standardization, and real-world clinical applications. This lecture highlights four major trends in health data research:

1. Multinational and multicenter studies to improve the generalizability and clinical relevance of research findings.
2. Data ethics, privacy, and security, including federated research models that enable collaboration without sharing sensitive patient data.
3. Open-source AI applications for disease risk prediction, clinical decision support, and healthcare optimization.
4. Clinical and regulatory translation, transforming research evidence into clinical guidelines, regulatory decisions, and public health policies.

Drawing on examples such as OHDSI, OMOP Common Data Model, MediPlug, and TaiHDEN, this lecture will demonstrate how health data are evolving from isolated data silos into trusted global research networks, enabling smarter, safer, and more efficient healthcare.







Department of Artificial Intelligence in Medicine, Post Baccalaureate Medicine, Kaohsiung Medical University
Medical AI Innovation and Application Center, Kaohsiung Medical University Chung-Ho Memorial Hospital

Important Events

Photoplethysmography Imaging: Applications in Cardiovascular and Microcirculatory Research



Štefan Borik (Associate Professor, Department of Electromagnetic and Biomedical Engineering, Faculty of Electrical Engineering and Information Technology, University of Zilina, Slovakia)

115.7.16

Room IR630, 6th Floor, International Academic Research Building, KMU

Photoplethysmography imaging (PPGI) extends conventional photoplethysmography by enabling non-contact measurement of cardiovascular dynamics over large tissue areas using a camera. This approach provides not only pulse waveforms but also spatial information about tissue perfusion and vascular function, opening new possibilities for cardiovascular assessment and physiological research. This talk will present recent advances in PPGI through several representative biomedical applications. These include assessment of skin perfusion during the skin prick test for evaluation of allergic reactions, imaging of plantar (planta pedis) microcirculation in healthy individuals and patients with diabetes, monitoring cardiovascular responses during lower body negative pressure (LBNP) as an experimental model of central hypovolemia, and evaluation of the venous muscle pump function of the lower limbs. Together, these examples illustrate how non-contact optical imaging can provide quantitative spatiotemporal information on vascular function across a wide range of physiological and pathophysiological conditions. The presentation will also discuss practical aspects of signal acquisition and processing, current technical challenges, and the future potential of PPGI as a non-invasive imaging modality for cardiovascular physiology, microcirculatory research, and clinical assessment.





Biomedical Artificial Intelligence Academy, Kaohsiung Medical University

Important Events

KMU AI seminar

Continuous Quality Management Model for AI -Assisted Clinical Decision Support Systems



115.7.20

CS201 Classroom, Chi-Shih Building, KMU

Chieh-Liang Wu (Deputy Superintendent, Taichung Veterans General Hospital)

In recent years, the application of Artificial Intelligence in healthcare has rapidly advanced. Among these, AI-based Clinical Decision Support Systems (AI-CDSS) have been recognized as important tools for improving healthcare quality and patient safety. AI-CDSS integrates electronic health records, medical imaging, laboratory data, and physiological monitoring, and applies machine learning and deep learning algorithms to support disease risk prediction, diagnostic assistance, and treatment recommendations. Compared to traditional rule-based clinical decision support systems, AI-CDSS offers enhanced capability in handling multidimensional data and providing real-time predictions.

Studies have demonstrated that AI-CDSS can significantly improve diagnostic accuracy, operational efficiency, and patient safety in healthcare settings. However, its implementation still faces challenges, including data quality issues, limited model interpretability, algorithmic bias, and integration into clinical workflows. Therefore, the adoption of AI-CDSS should be accompanied by robust quality management and clinical governance frameworks, such as Evidence-Based Practice, Clinical Audit, and the PDCA cycle, to establish continuous monitoring and management mechanisms that ensure system safety and reliability.

Overall, with appropriate governance and management, AI-assisted clinical decision-making serves as a key tool in modern healthcare. By integrating clinical expertise with data-driven analytical insights, it can support the development of smart hospitals and enhance both healthcare quality and patient safety.





Biomedical Artificial Intelligence Academy, Kaohsiung Medical University

Department of Artificial Intelligence in Medicine, Post Baccalaureate Medicine, Kaohsiung Medical University

Medical AI Innovation and Application Center, Kaohsiung Medical University Chung-Ho Memorial Hospital

Important Events

KMU AI seminar

Innovative Applications and Advances of Artificial Intelligence in Disease Risk Assessment and Prevention



115.7.22

CS201 Classroom,
Chi-Shih Building, KMU

Hsin-Chou Yang (Director, Institute of Statistical Science, Academia Sinica)

Precision medicine and smart healthcare have become key national policy priorities and strategic development directions, requiring coordinated efforts and integration across government agencies and interdisciplinary fields. Healthcare is also evolving from the traditional one-size-fits-all approach toward personalized and precision medicine, ultimately advancing into a more comprehensive precision and smart healthcare ecosystem. In this transformation, artificial intelligence (AI) and statistical data science play pivotal roles.

Accurate disease risk assessment facilitates early disease detection, timely warning, and effective intervention, thereby reducing the risk of future disease onset. With the rapid advancement of AI technologies, integrating and analyzing large-scale multimodal medical data to develop highly accurate risk assessment models has become a major focus of preventive medicine.

This lecture will present methodologies and applications of AI in multimodal medical big data analysis and discuss its potential value and future development in clinical practice and real-world product implementation.







Biomedical Artificial Intelligence Academy, Kaohsiung Medical University

Department of Artificial Intelligence in Medicine, Post Baccalaureate Medicine, Kaohsiung Medical University

Medical AI Innovation and Application Center, Kaohsiung Medical University Chung-Ho Memorial Hospital

Important Events

Learning Clinical Event Networks and Predicting Patient Risk from Electronic Health Records

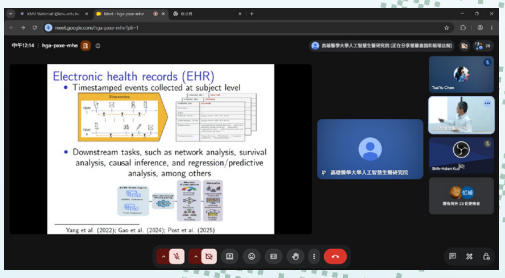


Kuang-Yao Lee (Associate Professor, Department of Statistics, Operations, and Data Science (SODS), Fox School of Business, Temple University)

115.7.28

Room IR630, 6th Floor, International Academic Research Building, KMU

Electronic health records (EHR) provide a rich longitudinal view of patient health, recording diagnoses, laboratory tests, medications, procedures, and other clinical encounters over time. Rather than treating these records as static covariates, this talk views them as multivariate clinical event histories. I will present a point-process perspective for two complementary learning tasks from such data. First, I will introduce a hidden graphical modeling framework for multivariate Cox processes, with the goal of learning clinical dependency networks among different types of EHR events. Second, I will discuss generalized point process additive models for patient risk prediction, where high-dimensional longitudinal event histories are used to predict scalar clinical outcomes such as mortality, readmission, disease risk, or treatment response. Together, these projects illustrate how point process models can support both biomedical knowledge discovery and patient-level prediction from EHR.







Biomedical Artificial Intelligence Academy, Kaohsiung Medical University

Addressing the Rising Incidence of Lung Adenocarcinoma: A Cross-Disciplinary Dialogue on Environmental and Genetic Factors

University-Level Research Centers_
Research Center for Precision Environmental Medicine (RCPEM)

Hui-Ju Chen R.A. / Chih-Hsing Hung Prof.

The Center for Precision Environmental Medicine continues to advance research on environmental exposures and health impacts while promoting interdisciplinary collaboration and talent development. Building on the success of its previous two cohorts, the Center collaborated with Dr. Tzong-Shi Lu of Harvard Medical School to host the “Harvard Summer Program in KMU – Precision Environmental Medicine Summer Training Program.”

Centered on precision environmental medicine, the program integrated environmental toxicology, epidemiology, precision medicine, molecular biology, and instrumental analysis, combining interdisciplinary knowledge with practical research training. Faculty from Harvard Medical School, Rice University, National Taiwan Normal University, and Kaohsiung Medical University contributed diverse expertise and research perspectives.

Eight students from Medicine, Public Health, Physical Therapy, and Post-Baccalaureate Medicine participated in the program, highlighting its commitment to interdisciplinary talent development. Participants gave highly positive feedback, reporting that the program strengthened their understanding of precision environmental medicine and enhanced their interest in related research.




高雄醫學大學
精準環境醫學研究中心
Harvard Summer Program in KMU
－從高雄看世界－暑期人才培育計畫


高雄醫學大學
精準環境醫學研究中心
Harvard Summer Program in KMU
－從高雄看世界－暑期人才培育計畫


精準環境醫學研究中心
Harvard Summer Program in KMU
－從高雄看世界－暑期人才培育計畫
Environmental toxicology

Connecting with Leading International Research Teams to Advance Regenerative Medicine

University-Level Academic Research Center-
Regenerative Medicine and Cell Therapy Research Center (RCC)

Chun-Ya Kao R.A. / Chung-Hwan Chen Prof.

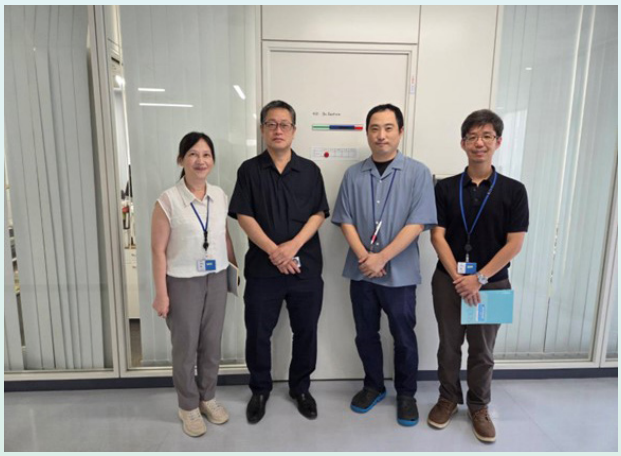
The **Regenerative Medicine and Cell Therapy Research Center at Kaohsiung Medical University** continues to expand international collaboration and strengthen its research capacity. Following the signing of a research collaboration agreement with **Kyoto University's Center for iPS Cell Research and Application (CiRA)** in October 2025, the Center began sending researchers to CiRA for specialized training in November 2025, with advanced training continuing in 2026. In June and July 2026, **Dr. Ling-Hua Chang, Associate Professor Jia-Jung Lee, and Medical Research Assistant Yi-Hsiung Lin** received training in **Ureteric Bud (UB)** differentiation, using induced pluripotent stem (iPS) cells to model kidney development. This training strengthens the Center's expertise in kidney regeneration and supports future applications in disease modeling and regenerative medicine.

The Center also promotes international exchange in **musculoskeletal regeneration**. On July 31, 2026, **Associate Professor Chun-Yuh (Charles) Huang** from the University of Miami delivered a lecture entitled **"Targeting Hippo Signaling in Post-Traumatic Osteoarthritis,"** sharing recent advances in post-traumatic osteoarthritis and cellular mechanobiology.

Through the dual approach of international technical training and academic exchange, the Center is progressively strengthening its interdisciplinary research portfolio, spanning iPS cells, kidney regeneration, osteoarticular diseases, and mechanobiology. These efforts not only enhance the research team's core technical expertise and talent development but also expand KMU's collaborative network with leading international research institutions. By advancing international



▲ With Assoc. Prof. Chun-Yuh (Charles) Huang, University of Miami



▲ Assoc. Prof. Jia-Jung Lee and Asst. Research Fellow Yi-Hsiung Lin with Prof. Kenji Osafune and Jr. Assoc. Prof. Shin-ichi Mae, CiRA

partnerships beyond formal agreements toward substantive personnel exchange, technical training, and research collaboration, the Center continues to create new momentum for regenerative medicine research and its future clinical translation.

KAS Future Leaders Program: Cultivating Future Biomedical Talent

Our Center has partnered with Kaohsiung American School (KAS) for two consecutive years to provide students with hands-on biomedical research experience. This summer, four students joined our laboratories, with several former interns returning for further training. The program promotes early engagement in regenerative medicine and cell therapy while cultivating future biomedical talent.



▲ KAS students engaged in hands-on laboratory training

Heteronemin suppresses chemoresistant oral squamous cell carcinoma cells through ROS-mediated apoptosis and cuproptosis-associated mitochondrial stress

University-Level Academic Research Center-Drug Development and Value Creation Research Center (DVCR)

Chien-Hsing Lee Prof.
(Department of Pharmacology, School of Medicine)

To address the clinical bottleneck of limited efficacy in oral cancer therapy caused by high resistance to conventional chemotherapeutics (such as cisplatin and 5-FU), this study elucidates the molecular mechanism underlying the antitumor activity of heteronemin (HET), a marine natural sesterterpenoid. Experimental results demonstrate that HET significantly inhibits the proliferation and colony formation of drug-resistant oral cancer cells, downregulates cell cycle regulatory proteins, and induces S-phase arrest. Concurrently, HET triggers mitochondrial membrane potential depolarization, initiating the intrinsic apoptotic pathway. Crucially, this study provides the first evidence that HET markedly promotes intracellular copper (Cu2+) accumulation and downregulates the expression of FDX1 and lipoylated proteins (lipoylated DLST and DLAT), thereby eliciting cuproptosis-associated mitochondrial metabolic stress. Further mechanistic exploration reveals that excessive reactive oxygen species (ROS) generation serves as a key upstream regulator governing both cell death pathways. Finally, a zebrafish xenograft model confirmed that HET exhibits potent, low-toxicity antitumor activity in vivo, highlighting its substantial potential as a novel targeted therapeutic for refractory oral cancer.

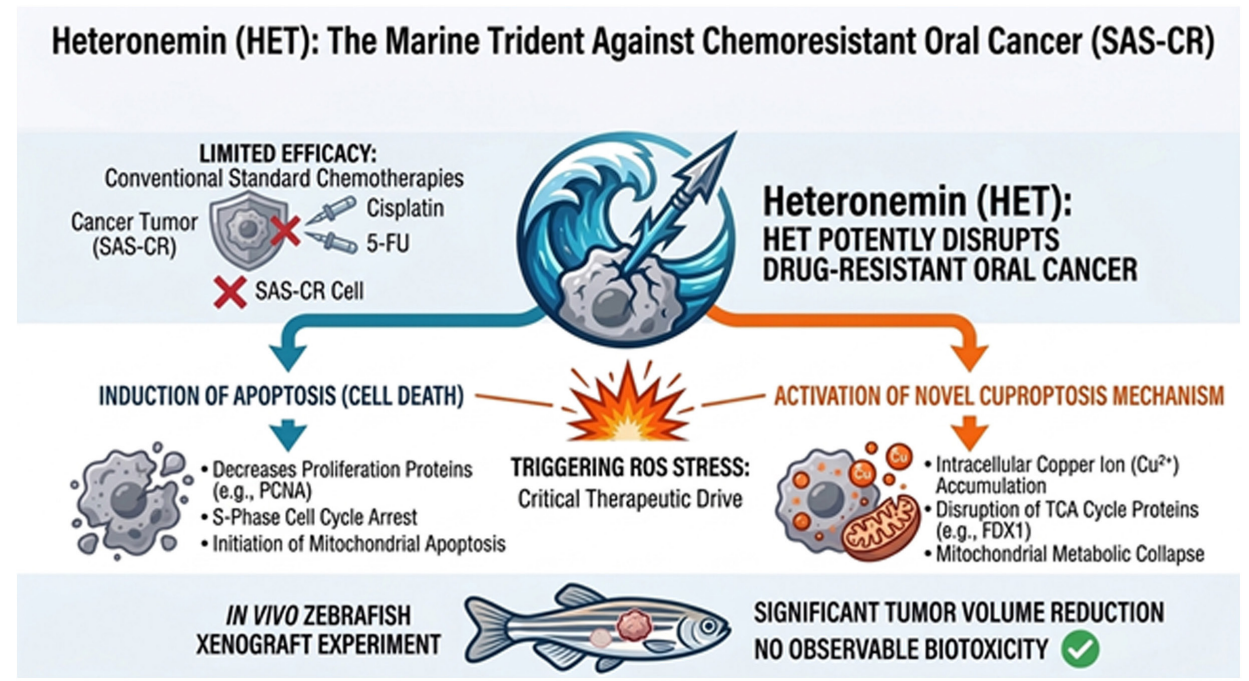
Oral cancer represents the most prevalent malignancy of the head and neck, characterized by high metastatic potential and poor five-year overall survival rates. Although regimens based on cisplatin (CDDP) or 5-fluorouracil (5-FU) remain the cornerstone of standard therapy, acquired drug resistance frequently leads to clinical treatment failure. Drug-resistant tumor cells typically evade cell death by upregulating anti-apoptotic proteins and enhancing DNA repair capacity. Consequently, identifying novel agents capable of bypassing conventional resistance mechanisms to activate alternative cell death pathways is an urgent clinical priority. Heteronemin (HET), a sesterterpenoid derived from marine natural sources, possesses versatile antitumor activities; however, its efficacy against drug-resistant oral cancer cells and its detailed mechanisms regarding metabolic and mitochondrial impairment were previously uncharacterized.

This study demonstrates that the small-molecule compound heteronemin (HET) exhibits pronounced antitumor activity against multidrug-resistant (MDR) oral cancer. Compared to clinically routinely used chemotherapeutic agents such as cisplatin and 5-fluorouracil, HET exerts superior growth inhibition in MDR oral cancer cells and significantly suppresses their long-term colony-forming ability, underscoring its potential to overcome chemoresistance.
Mechanistic evaluations reveal that HET disrupts cell cycle progression in MDR oral cancer cells, induces a loss of mitochondrial membrane potential, and modulates the expression of the pro-apoptotic protein Bax and the anti-apoptotic protein Bcl-2, thereby activating the intrinsic

mitochondrial apoptotic pathway (Cleaved Caspase-3 and Cleaved PARP). Further transcriptomic and metabolic analyses indicate that HET significantly impacts mitochondrial energy metabolism, the tricarboxylic acid (TCA) cycle, protein lipoylation in mitochondria, and intracellular copper homeostasis. HET treatment leads to intracellular copper accumulation alongside alterations in cuproptosis-associated proteins, including FDX1, SDHB, DLST, and DLAT. Furthermore, co-treatment with a copper chelator significantly attenuates HET-induced cytotoxicity. These findings support a copper-dependent cell death model and suggest the involvement of cuproptosis-related mechanisms in HET-induced antitumor responses. Additionally, HET significantly elevates intracellular reactive oxygen species (ROS) levels and induces mitochondrial oxidative stress. Antioxidant treatment effectively diminishes HET-induced oxidative stress, mitochondrial damage, apoptosis, and copper-dependent cell death, indicating that ROS acts as an upstream trigger driving HET-induced mitochondrial dysfunction and cell death signaling. Collectively, these results suggest that HET causes MDR oral cancer cell death through a synergistic, multi-targeted mechanism involving copper dysregulation, mitochondrial dysfunction, oxidative stress, and apoptotic signaling.

In a zebrafish xenograft model, HET caused no overt embryotoxicity within the tested safe dosage range while markedly reducing tumor burden. This was accompanied by alterations in cuproptosis-related markers within tumor tissues, further validating it's in vivo antitumor activity.

In summary, this study demonstrates that HET effectively suppresses multidrug-resistant oral cancer cells by promoting excessive ROS generation, disrupting copper homeostasis, impairing mitochondrial metabolism, and triggering apoptosis via mitochondrial stress pathways. These findings establish HET as a promising candidate compound for overcoming chemoresistance in oral cancer and provide an essential experimental foundation for future investigations into the interplay between apoptosis and cuproptosis, as well as its translational clinical value.



(Note: The accompanying image was generated using Notebook AI. This research milestone was published in Apoptosis, 2026;31(7):175. Impact Factor: 9)

Other Important Highlights:

1.Young Outstanding Research Award (KMU)

Professor Chih-Hung Chuang, Director of the Center, has been honored with Kaohsiung Medical University's "Young Outstanding Research Award", demonstrating the team's exceptional academic research capacity and innovative development potential.

2.2026 Ta-You Wu Memorial Award (NSTC)

Professor Wen-Wei Lin has been awarded the NSTC's "2026 Ta-You Wu Memorial Award", recognizing and affirming his outstanding achievements and contributions to academic research. The research team has developed the innovative "PUSH" masking system to overcome the high toxicity and short half-life of traditional cytokines, significantly enhancing cancer immunotherapy efficacy.

3.22nd Tien-De Lee Biomedical Award – Outstanding Paper Award

Recipient: Postdoctoral Researcher Dr. Ke-Peng Lai (Advisor: Prof. Chun-Chi Wang)







4.2026 Future Tech Award (NSTC)

Professor Chih-Hung Chuang, Director of the Center, received the National Science and Technology Council's (NSTC) "2026 Future Tech Award" for the showcased technology titled "A Tumor-Activated Immunocytokine Platform to Overcome Immune Checkpoint Resistance and Expand the Therapeutic Windows of Cancer Immunotherapy", highlighting the high industry-academia application value and market potential of our cutting-edge R&D results.

5.NSTC College Student Research Grants

This year, 16 students have been awarded grants under the NSTC's "2026 College Student Research Grants", demonstrating our exceptional achievements in talent cultivation and scientific research capabilities.





6.Invited Speech at 2026 Taiwan mRNA Research Day (Moderna Taiwan)

Hosted by Moderna Taiwan, the inaugural "2026 Taiwan mRNA Research Day" brought together top researchers and experts from the Asia-Pacific region. Dr. Kai-Wen Ho, a research fellow from the Center, was invited to deliver a speech (Topic: "To generate functional anti-protease-activated receptor-4 (PAR4), a G protein-coupled receptor, antibodies through PAR4-mRNA-LNP immunization"), successfully expanding the Center's international academic visibility and influence in the biomedical field.





Center Members Honored with "FutureTech Award": Cutting-Edge Scientific Strengths Recognized at the National Level

University-Level Academic Research Center-Center for Cancer Research

Li-Tzong Chen Chair Prof.

Our center has recently delivered outstanding results in scientific innovation and the cultivation of medical excellence. Center Director Li-Tzong Chen and jointly appointed Assistant Research Fellow Dr. Yung-Yeh Su recently received the "FutureTech Award" from the National Science and Technology Council (NSTC). They earned this honor as members of a domestic multi-center research team led by Professor Yan-Shen Shan of National Cheng Kung University (NCKU). This accolade highlights the center's robust research and development capabilities in advanced cancer treatment and precision medicine.

Our center has recently achieved high-level recognition through a major national award:

1.Cross-institutional research team honored with the "FutureTech Award":
The collaborative
team—which includes Director Li-Tzong Chen and Dr. Yung-Yeh Su—was presented with the "FutureTech Award" by the National Science and Technology Council (NSTC). This prestigious award honors their competitive strengths and innovation in cancer research.



▲ 1.National Science and Technology Council (NSTC) "FutureTech Award" RecipientAnnouncement.

Second-Line Cabozantinib Therapy for Advanced Neuroendocrine Tumors in Asian Populations – the results of an investigator-initiated trial, the TCOG T2221 - SCALET trial (ESMO Open 2026)

University-Level Academic Research Center-Center for Cancer Research

Li-Tzong Chen Chair Prof.

Neuroendocrine tumors (NETs) are rare, highly heterogeneous malignancies. For patients with advanced NETS who failed to conventional somatostatin analogues (SSAs),molecular targeted therapies (MTA, everolimus or sunitinib), and cytotoxic chemotherapy treatments;while the Peptide Receptor Radionuclide Therapy (PRRT) is expensive and largely unaffordable to majority of patients, few treatment options are available.

The efficacy of cabozantinib in NETs was first presented in the 2017 Annual Meeting of North American Neuroendocrine Tumor Society (NANETS) in USA. With an encouraging results,a National Cancer Institute (NCI)-sponsored randomized Phase III clinical trial that investigated the efficacy of cabozantinib against placebo exclusively in the United States was launched in 2018. During the 2nd Asian NET Expert Meeting (ANEM) held in April 28–29, 2019, Taipei, that was co-sponsored by the Taiwan Neuroendocrine Tumor Society(TNETS) and the Ipsen, Professor Chen explored the opportunity of an investigator-initiated phase I/II clinical trial to evaluate the efficacy of cabozantinib and lanreotide (long-acting somatostatin analogue) combination as a second-line therapy in gastroentero-pancreatic NETs (GEP-NETs) patients who progressed on standard therapies.

Driven by the dedicated efforts of Dr. Hui-Jen Tsai from the National Institute of Cancer Research, National Health Research Institutes (NHRI) who also serves as an adjunct attending physician in the Division of Hematology/Oncology at Kaohsiung Medical University Hospital, the proposal was finally unanimously approved by the Ipsen Global Study Committee on September 18, 2020. The SCALET trial was launched under the Taiwan Cooperative Oncology Group (TCOG T2221) in December 2021. This phase I/II study demonstrated remarkable efficacy for second-line oral cabozantinib plus lanreotide in Asian (Taiwanese), advanced GEP-NETs patients after prior MTA. The study met its primary endpoint and yielded a median progression-free survival (mPFS) of 25.2 months, that was numeric better that the data from the American CABINET trial recently published in The New England Journal of Medicine (NEJM), 2024.

Neuroendocrine tumors frequently originate in the gastrointestinal tract and pancreas (GEP-NETs). Finding effective second-line therapies for these tumors has long been a global clinical challenge. The CABINET trial—a US-based, multi-center placebo-controlled phase III study recently published in The New England Journal of Medicine (NEJM)—demonstrated that the small-molecule multi-targeted tyrosine kinase inhibitor cabozantinib (alone or with an unspecified SSA) significantly extends mPFS. However, over 90% of the CABINET trial participants were Western patients, while Asian individuals accounted for a mere 2.7% of the cohort.

To evaluate potential benefit of a cabozantinib and lanreotide combination regime which mayalso serve to bridge this data gap for Asian populations, a multi-center, phase I/II SCALET(TCOG T2221) trial was conducted.

A total of 42 patients were enrolled, including 10 in dose finding phase I part and 32 in the expansion phase II part.

The trial demonstrated several landmark findings:

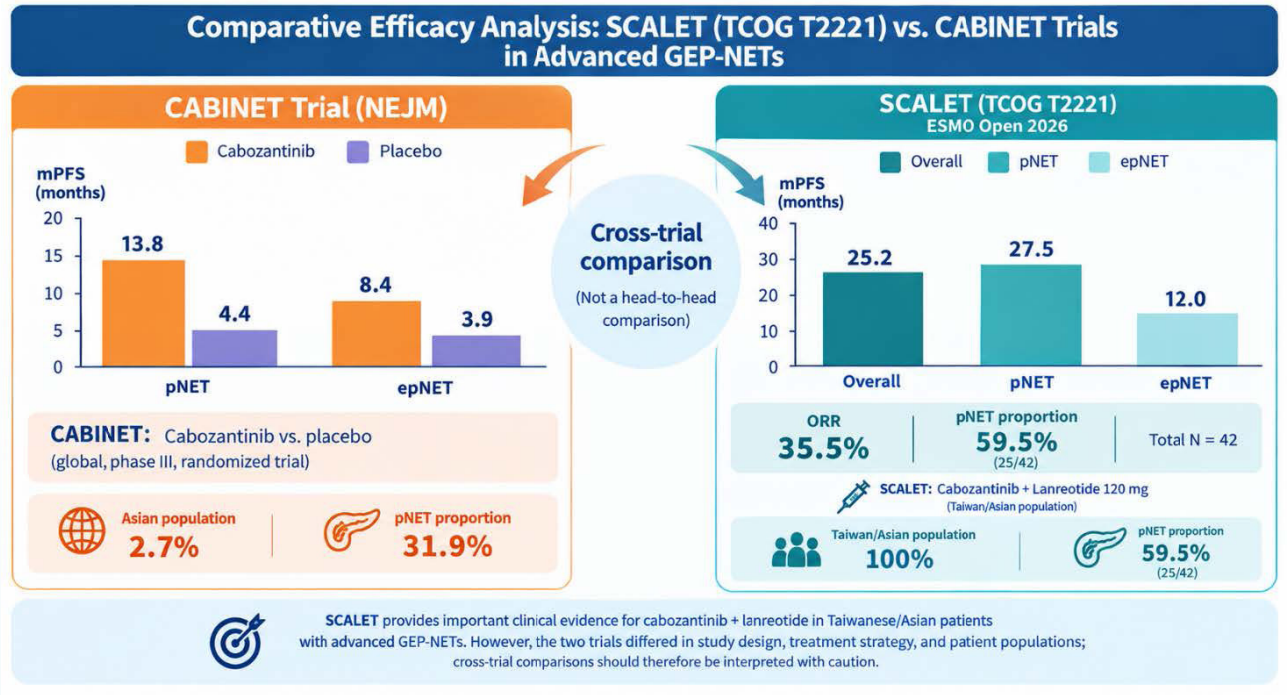
1. Remarkable extension of progression-free Survival: The SCALET trial achieved an overall mPFS of 25.2 months in the 32 patients in the expansion, phase II part.

Notably, the mPFS of patients with pancreatic neuroendocrine tumors (pNETs) was 27.5 months, while mPFS of those with extra-pancreatic neuroendocrine tumors (epNETs) was 12.0 months. The overall objective response rate (ORR) rwas 35.5%, and the median overall survival (mOS) has not yet been reached.

2. Potential advantages of combination therapy: Unlike the CABINET trial evaluating cabozantinib either alone (30%) or combining with SSAs (in 70%) at the discretion of in-charged physicians, SCALET utilized a standardized combination of cabozantinib with a fixed dose of lanreotide (120 mg).

The results suggest the potential benefit of lanreotide to improve the therapeutic efficacy of cabozantinib in GEP-NET patients that deserves further exploration.

3. Filling the data gap for Asian populations: The SCALET trial included entirely Asian (Taiwanese) subjects. Furthermore, pNET patients accounted for 59.5% of its cohort, a proportion significantly higher than the 31.9% seen in the CABINET trial. Since eNETS patients had significant better mPFS than epNET in both CABINET and SCALET studies, the higher proportion of eNETs patients in SCALET trial may lead to huge difference in the mPFS of overall cohorts between the two studies. The study also established valuable data of safety profiling and dose modification protocol for this combination therapy in Asian population.



Our center remains deeply committed to the research and development of novel oncology drugs and precision therapeutics. The success of the SCALET trial (NCT05048901) goes beyond establishing a robust, evidence-backed second-line standard of care for Asian patients with advanced neuroendocrine tumors.

It also contributes indispensable real-world clinical data from Asia to the global landscape of precision combination treatments for rare tumors.

KMU Adaptive Exercise Transition and Promotion Center Hosts the 2026 Interdisciplinary Professional Development Program in Adaptive Exercise

University - Precision Sports Medicine and Health Promotion Center.
Wei-Hsuan Huang R.A. / Shang-Jyh Huang Prof.

To strengthen interdisciplinary collaboration and promote physical activity participation and health among people with disabilities, the Kaohsiung Medical University Adaptive Exercise Transition and Promotion Center organized the“2026 Interdisciplinary Professional Development Program in Adaptive Exercise.”

The program brought together physicians, professors, and adaptive exercise specialists to deliver instruction that integrated theory with hands-on practice. Participants were guided to develop a deeper understanding of the core concepts of adaptive exercise, exercise prescription design, medical-to-exercise transition models, and exercise modification strategies for different types of disabilities. The program also aimed to strengthen interdisciplinary collaboration and establish an adaptive exercise service model linking“medical care → transition center → community-based sites.”

The program covered the following topics: understanding different types of disabilities and special medical conditions; exercise prescription design for people with disabilities (ICD/ICF × FITT principles); medical-to-exercise transition and collaboration models; an introduction to adaptive exercise from understanding to practice; exercise modification strategies for intellectual, physical, visual, and hearing disabilities; and expert practice sharing and interdisciplinary exchange.



▲ Group Photo of Program Participants



▲ Dr. Huang Yi-Ching, Department of Physical Medicine and Rehabilitation,



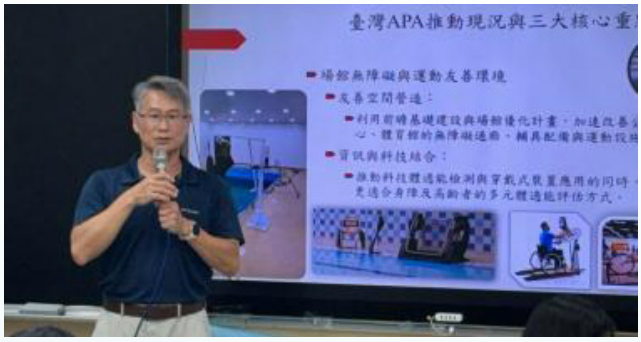
▲ Figure. Registration Information



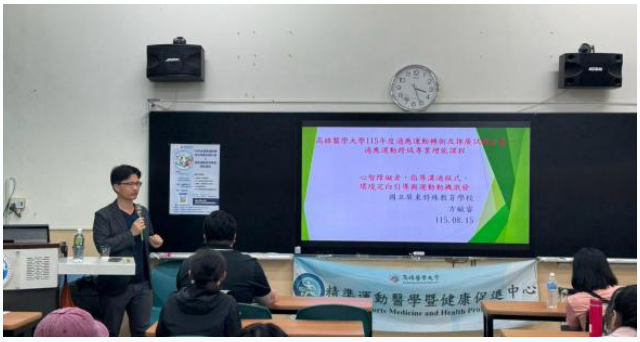
▲ Dr. Tseng Yu-Hsuan, Department of Physical Medicine and Rehabilitation,



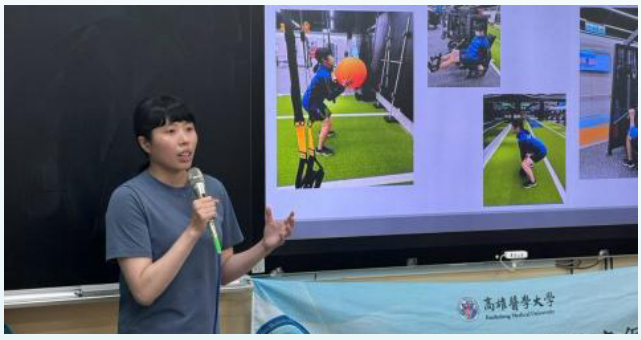
▲ Dr. Li Chia-Ling, Department of Physical Medicine and Rehabilitation,



▲ Prof. Tsai Chia-Liang, Specialist in Adapted Physical Activity - Introduction to Adaptive Exercise



▲ Instructor Fang Min-Jui, Adaptive Exercise Specialist for Intellectual Disabilities - Exercise Modification Techniques by Disability Type (I)



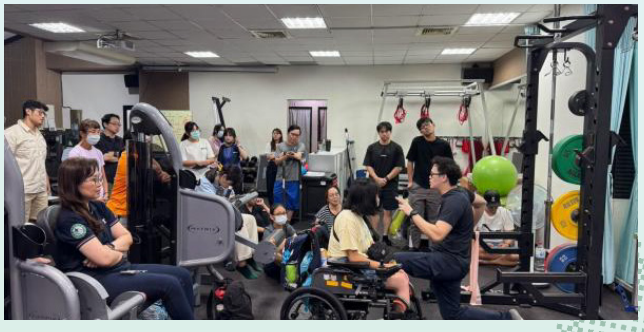
▲ Li Kai-Lin, Paralympic Silver Medalist in Visually Impaired Judo - Exercise Modification Techniques by Disability Type (IV)



▲ Instructor Chang Chen-Yu, Head of Training, Chinese Taipei Deaf Sports Federation - Exercise Modification Techniques by Disability Type (III)









▲ Hands-on Practice During the Program

On-Site Visit by the Sports Administration for the "2026 Establishment of Adaptive Sports Service Sites" Initiative

University - Precision Sports Medicine and Health Promotion Center.
Wei-Hsuan Huang R.A. / Shang-Jyh Huang Prof.

The visit was conducted by the Sports Administration to assess and confirm spaces and facilities on the KMU campus that are suitable for adaptive sports and exercise programs.

The Sports Administration visited KMU to inspect and evaluate campus spaces and facilities related to adaptive sports and exercise. The assessment covered four areas:

(1) Venues and facilities: availability, intended use, and accessible hours of exercise venues/spaces; primary circulation routes, restrooms, changing areas, and barrier-free entrances; capacity to support at least three adaptive sports for people with disabilities; and the types, quantities, and current use of training equipment and adaptive sports assistive devices.

(2) Coaches and professional personnel: whether coaches have experience in instructing sports for people with disabilities or have received relevant training; availability of assistant

coaches, strength and conditioning staff, administrative personnel, and other professionals; plans for coach education, professional consultation, or professional collaboration; willingness to engage in coach training, consultation, or external personnel collaboration; and access to external coaches, instructors, or professional resources.

(3) Training partners and training support: existing training partners, practice partners, or volunteer resources; ability to provide support for athlete transportation, equipment handling, daily training, and other needs; and opportunities to collaborate with external schools, training sites, sports organizations, or volunteer groups to provide practice and training support.

(4) Medical and care resources: availability of athletic training, medical, rehabilitation, or health management resources; availability of sport science testing, nutrition, psychological, or other professional support; emergency response, reporting, and medical referral mechanisms during training; and the ability to establish collaboration or referral mechanisms with nearby medical, rehabilitation, or sports injury prevention units



▲ Figure. Sports Administration committee members and faculty members from the Adaptive Exercise Transition Project meeting at the Center

Office of International Affairs Bimonthly "KMU Newsletter" Campus Profile Interview - Center Director: Prof. Huang Shang-Chih

University - Precision Sports Medicine and Health Promotion Center.
Wei-Hsuan Huang R.A. / Shang-Jyh Huang Prof.

The interview aimed to share the research strengths, recent achievements, and future directions of the Precision Sports Medicine and Health Promotion Center, enabling readers both within and outside KMU to gain a deeper understanding of the University's research highlights.

Interview outline:

1. Profile of the interviewee.
2. Interview questions:

(1) Director Huang has long been involved in the clinical care of kidney disease and chronic conditions. Which clinical experiences led you to place greater emphasis on the role of exercise in disease prevention and health management?

(2) In your view, what is the most significant change that can result from integrating exercise into disease prevention and health care?

(3) What are the Center's major research directions in exercise and health, and what practical applications do you hope these studies will lead to in the future?

(4) The Center's Sports Injury Prevention Division provides sport science testing. How can these assessments help athletes better understand their physical condition and further adjust their training strategies?

(5) Looking ahead, in which areas do you most hope the Center will achieve breakthroughs,and what impact do you hope it will have on KMU and society?

(6) Is the Center currently collaborating with relevant departments or professional sports organizations to provide sports injury prevention services? If so, how do you view the future development of sports injury prevention in Taiwan's professional sports sector?





▲ Content published in the Office of International Affairs online newsletter

From Treatment to Prevention: The Future of Precision Sports Medicine



Dr. Shang-Jyh Hwang currently serves as the Director of the Precision Sports Medicine and Health Promotion Center at Kaohsiung Medical University (KMU). He is also a Professor of Internal Medicine at KMU and an attending physician in the Division of Nephrology at Kaohsiung Medical University Hospital. He has long been involved in the clinical care and research of kidney diseases, chronic diseases, and metabolic disorders. Drawing on his clinical and research experience, Dr. Hwang works with the Center's team to advance precision sports medicine, health promotion, and related research and services.

With a focus on promoting health for all, the Center brings together expertise from various departments and programs at KMU, clinical units, and basic and clinical researchers to provide evidence-based sports science. The Center promotes precision sports medicine, develops sports professionals, and fosters a culture of exercise across all age groups. Through its three major areas—exercise protection, health promotion, and sports research—the Center develops sports science assessments, exercise prescriptions, and related research, with the goal of making exercise an important part of health promotion and disease prevention.

1. Based on his extensive experience in the clinical care of kidney and chronic diseases, what experiences have led Dr. Hwang to place greater emphasis on the role of exercise in disease prevention and health management?

Based on his extensive experience in the clinical care of kidney and chronic diseases, Dr. Hwang noted that many chronic diseases develop gradually over time and that the heart, liver, brain, kidneys, and metabolic health are closely interconnected. Rather than focusing on a single organ, he believes that healthcare should adopt a holistic, patient-centered approach.

He has observed that while some patients maintain stable biochemical indicators, their physical functions—including muscle strength and cardiorespiratory fitness—continue to decline. This highlights the distinction between controlling a disease and maintaining overall health. These experiences have reinforced his belief that healthcare should not focus solely on treating diseases after they develop, but should shift toward earlier intervention during the stages of sub-health or good health to help individuals establish regular exercise habits.

Dr. Hwang also emphasized that exercise for patients with medical conditions requires careful consideration of physiological balance and safety. For example, patients with kidney disease need to avoid dehydration during exercise, while those with cardiopulmonary conditions must be cautious of excessive oxygen demand that could place additional stress on the heart and lungs. Exercise, therefore, should be viewed as a safe and precise "therapeutic prescription" and an important tool for disease prevention.

2. What does Dr. Hwang see as the biggest change that integrating exercise into disease prevention and healthcare could bring?



Dr. Hwang believes that the most fundamental change would be a shift in the way we think about healthcare—from "passive treatment" to "proactive prevention."

In the future, exercise should no longer be offered as a general recommendation, but instead developed into a "precision prescription" based on scientific evidence, clearly defined dosage, and ongoing monitoring. Healthcare teams can apply the FITT principle—frequency, intensity, time, and type of exercise—while taking into account each individual's age, health conditions, and physiological safety limits to develop personalized exercise programs.

At the same time, healthcare should extend beyond the hospital into everyday life. By integrating artificial intelligence (AI) and wearable devices for long-term data monitoring, it will be possible to establish personalized health databases and enable proactive health management through prediction, prevention, and personalized interventions in daily life.

3. What are the Center's main research areas in sports and health, and what practical applications does Dr. Hwang hope these studies will lead to in the future?

The Center's current research focuses on three major areas.

The first is precision exercise prescriptions for people with sub-health conditions and metabolic diseases, including diabetes, fatty liver disease, prediabetes, and pulmonary diseases. Research focuses on identifying appropriate timing for exercise interventions and developing home-based exercise prescriptions.

The second is exercise for all and smart health. The Center is developing AI-based decision-support systems for early warning of fatigue and injury among athletes, as well as initial triage of patients with orthopedic shoulder injuries.

The third is adaptive sports and inclusion for diverse populations, exploring the health benefits of table tennis training for people with disabilities and dance-based interventions for individuals with visual impairments.

Looking ahead, the Center hopes to translate these research findings into standardized clinical exercise prescription protocols. It also plans to establish exercise referral and matching platforms in collaboration with community gyms and qualified coaches, enabling patients who have completed rehabilitation and people with disabilities to transition smoothly into community-based exercise programs. Through these efforts, the Center aims to promote greater equity in access to exercise and help delay functional decline.



4. Looking ahead, in which areas does Dr. Hwang hope the Center will make further breakthroughs, and what kind of impact does he hope it will have on KMU and society ?

Looking ahead, Dr. Hwang hopes the Center will make breakthroughs in several areas. A key priority is to connect existing assessment databases with clinical departments and translate data into precision clinical exercise prescriptions that can be implemented and monitored in practice.

The Center also aims to integrate AI and wearable devices while cultivating interdisciplinary talent with expertise in both medicine and engineering to develop smart health systems. With the launch of the Ph.D. program in the Department of Sports Medicine in the 2026–27 academic year, the Center also hopes to establish a high-level talent pool with interdisciplinary expertise.

For KMU, these efforts will strengthen its distinctive interdisciplinary research integrating medicine and sports science, while nurturing the next generation of professionals with expertise in both clinical medicine and sports science. For society, the Center hopes to contribute to the United Nations Sustainable Development Goals (SDGs) by helping reduce the burden of chronic diseases through prevention, while also supporting the development of smart sports and health industries in Kaohsiung and Taiwan.

▲ Office of International Affairs interview conducted at the Center

Disease Burden and Metabolic Risk in MASLD in Taiwan Implications for Early Prevention and Management

University-level Academic Research Center
Center for Metabolic Disorders and Obesity

Edward Hsi PhD / Ming-Lun Yeh MD PhD

A collaborative study involving the Center for Metabolic Disorders and Obesity at Kaohsiung Medical University analysed data from 426,478 adults and found that 35.1% met the definition of metabolic dysfunction-associated steatotic liver disease (MASLD), equivalent to approximately three to four in every ten participants. Of particular concern, MASLD prevalence increased among adults younger than 40, while the burden of dysglycaemia remained high in older adults. Published in Hepatology International on 3 July 2026, these findings provide important evidence from Taiwan to support the Center's work on early identification, risk assessment and intervention research.

Identifying health risks that warrant earlier attention

Beyond the high prevalence of fatty liver, a key finding of this study is the identification of groups that may benefit from earlier health management. The study was led by teams at Kaohsiung Medical University and its affiliated hospital, in collaboration with National Yang Ming Chiao Tung University, Academia Sinica and National Sun Yat-sen University, among other institutions. Using existing data from 2001–2021, the researchers compared MASLD and metabolic risk across age groups, sexes, regions and periods to inform priorities for prevention and management.[1] This work also reflects the Center's focus on metabolism and obesity and its use of disease surveillance to improve the prevention and management of noncommunicable diseases.

Data from more than four hundred and twenty thousand adults

The study combined data from the Taiwan Biobank and MJ health examinations. After excluding participants with hepatitis B, hepatitis C or alcohol use meeting the study's exclusion criteria, 426,478 adults were included: 131,857 from the Taiwan Biobank and 294,621 from MJ. Mean age was 42.0 years, and 57.2% were women. The study compared the proportion of participants meeting the disease definition in each period, that is, prevalence. It did not follow each individual over time to determine how many subsequently developed new disease.[1]

MASLD is defined by hepatic steatosis together with at least one cardiometabolic risk factor

(CMRF). The five domains assessed in this study were body weight or waist circumference, glycaemia, blood pressure, triglycerides and high-density lipoprotein cholesterol (HDL-C). Hepatic steatosis was assessed primarily by abdominal ultrasonography, which was available for 291,736 participants. When imaging was unavailable, the Hepatic Steatosis Index (HSI) or Fatty Liver Index (FLI) was used to estimate its presence. Overall, 36.3% met the definition of steatotic liver disease (SLD), and 35.1% met the definition of MASLD; the age- and sex-adjusted MASLD prevalence was 36.7%. In addition, 72.4% had at least one CMRF, indicating that metabolic abnormalities were common in this study population.[1]

Changes in adiposity and glycaemia warrant particular attention

Between 2001–2005 and 2016–2021, MASLD prevalence among study participants increased from 31.1% to 37.9%, an increase of 6.8 percentage points. Relative to the initial prevalence of 31.1%, this represents a 21.9% increase; both measures describe the same change. Over the same interval, SLD prevalence increased from 32.4% to 38.3%, and the proportion with at least one CMRF rose from 66.7% to 81.1%. All five metabolic risk factors were more prevalent in the final than in the initial period. Body-weight or waist-related risk increased from 44.0% to 62.6%, and prediabetes or diabetes from 31.9% to 49.4%, corresponding to relative increases of 42.3% and 54.9%, respectively. Blood-pressure risk increased from 27.5% to 31.6%, high triglycerides from 19.8% to 21.2%, and low HDL-C from 19.9% to 24.7% (Figure 1).[1]

Across the full study period, body-weight or waist-related risk and prediabetes or diabetes were also the two most common metabolic abnormalities, present in 51.6% and 39.9% of participants, respectively. Among participants with SLD, the corresponding proportions were 87.1% and 59.5%. The term ‘body-weight or waist-related risk’ has a specific definition in this study: a body mass index (BMI) ≥23 kg/m², or waist circumference >94 cm in men or >80 cm in women. It should therefore not be interpreted as the prevalence of obesity in general. These findings help identify priorities, but this study alone cannot establish how much each risk factor contributed causally to the increase in MASLD.[1]

Changes over the two decades must also be interpreted in the context of differences in participant composition. The earlier periods consisted predominantly of MJ participants, whereas the

proportion from the Taiwan Biobank increased in later periods; the two sources differed in their age and sex distributions. In a further age–period–cohort analysis of the combined data, the overall annual change was −0.01% (95% confidence interval [CI], −0.25% to 0.22%; p=0.927), with no statistically significant overall period trend.[1]

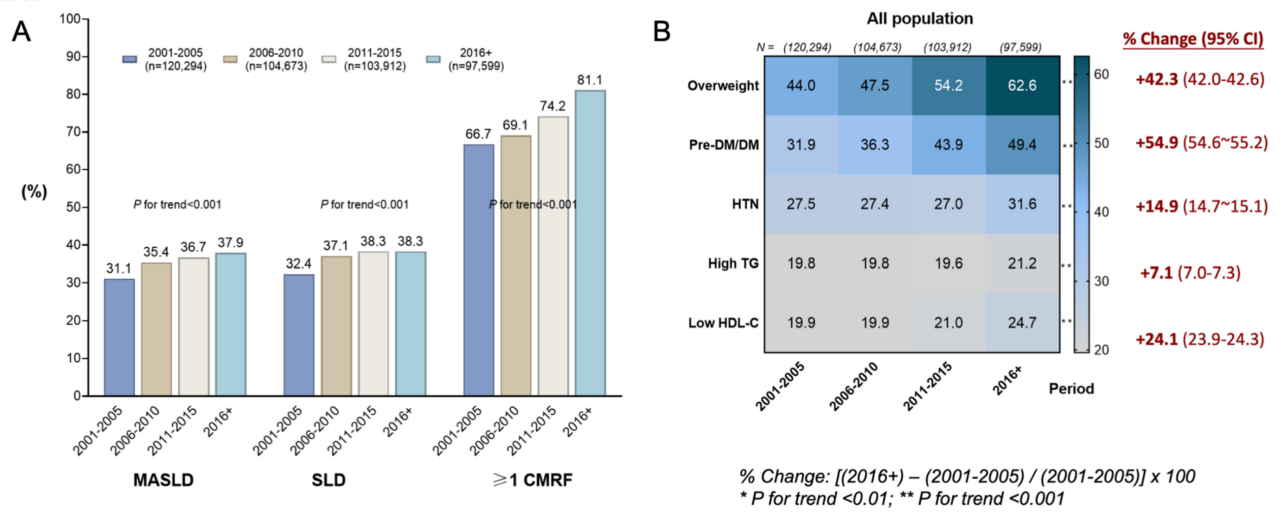


Fig. 1 Changes in the prevalence of MASLD, SLD, and having at least one CMRF (**A**) and changes in the prevalence of the five CMRF components (**B**) in overall population from 2001–2005 to 2016 and beyond

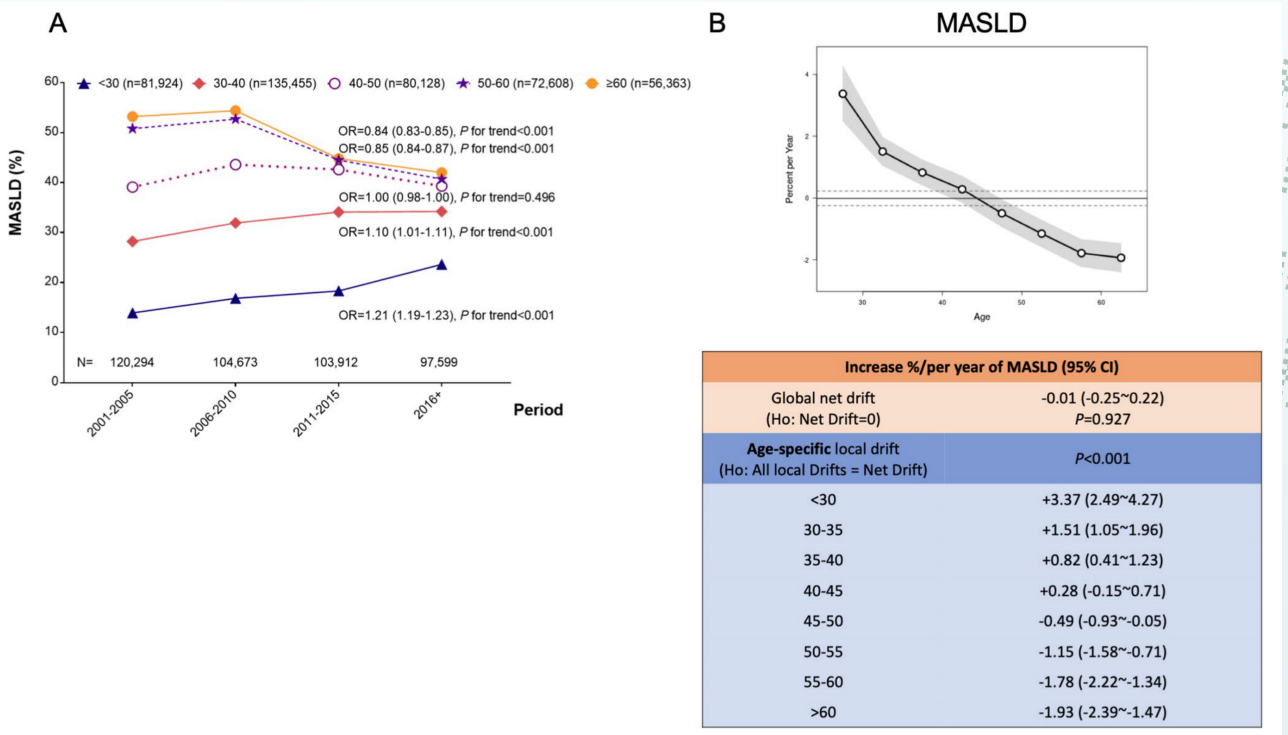
▲ Temporal changes in MASLD and metabolic risk. Panel A presents the prevalence of MASLD, SLD and at least one CMRF. Panel B presents the five CMRFs and their relative changes between the first and final periods. The category '2016+' represents 2016–2021.

Earlier weight management in younger adults and continued glycaemic care in older adults

Age-specific analyses showed that the increase in MASLD after 2010 occurred mainly among adults younger than 40. Comparing 2001–2010 with 2011–2021, prevalence increased from 15.1% to 19.6% in those younger than 30 and from 30.0% to 34.1% in those aged 30–39. Among those aged 40–49, prevalence was 41.3% and 40.8%, respectively, with no statistically significant difference. Prevalence decreased from 51.7% to 42.5% in those aged 50–59 and from 53.8% to 43.2% in those aged 60 or older, although prevalence in older adults remained higher than in younger adults. These two-period comparisons are presented in Table 2 of the original article; the age-specific changes across four periods are shown in Figure 2A.[1]

In an additional analysis restricted to MJ data, MASLD prevalence continued to increase overall, with an average annual increase of 1.42% (95% CI, 1.18% to 1.66%). The largest annual increase was observed among participants younger than 30, at 2.59% (95% CI, 2.03% to 3.15%).[1]

The metabolic concerns also differed by age. Body-weight or waist-related risk increased by 43.0% in relative terms among those younger than 30 and by 41.1% among those aged 30–39, exceeding the increases in older groups. Prediabetes or diabetes increased from 52.1% to 64.3% in those aged 50–59 and from 60.7% to 74.5% in those aged 60 or older; it also increased from 15.4% to 18.9% in those younger than 30. Conversely, blood-pressure and triglyceride-related risk declined in older groups, while increases in low HDL-C were more evident in middle-aged groups. These findings highlight the importance of body weight and waist circumference from early adulthood and of continued glycaemic management in older adults, even when fatty liver prevalence declines.[1]



Increase %/per year of MASLD (95% CI)	
Global net drift (Ho: Net Drift=0)	-0.01 (-0.25~0.22) P=0.927
Age-specific local drift (Ho: All local Drifts = Net Drift)	P<0.001
<30	+3.37 (2.49~4.27)
30-35	+1.51 (1.05~1.96)
35-40	+0.82 (0.41~1.23)
40-45	+0.28 (-0.15~0.71)
45-50	-0.49 (-0.93~-0.05)
50-55	-1.15 (-1.58~-0.71)
55-60	-1.78 (-2.22~-1.34)
>60	-1.93 (-2.39~-1.47)

Fig. 2 Changes in the prevalence of MASLD across different age groups. (**A**) Influences of ages, periods, and birth cohorts on the MASLD risk, and the changes in the incidence of MASLD across different age groups (**B**)

▲ Age-specific changes in MASLD. Panel A presents age-specific prevalence across four periods. Panel B presents annual relative changes estimated by the age–period–cohort model using the two data sources combined.

Higher disease burden in men and larger increases in selected metabolic risks in women

In the study, MASLD prevalence was 49.2% in men and 24.5% in women. After accounting for other factors, the male-to-female odds ratios were 3.5 and 3.4 before and after 2010, respectively. An odds ratio is a statistical measure comparing two groups; it does not indicate how many times more likely men are than women to develop the disease in the future. Older age also remained associated with higher odds of MASLD, although the age gradient narrowed: the adjusted odds ratio for those aged 60 or older versus those younger than 30 decreased from 7.3 to 3.5.[1]

Although women had lower initial prevalence, some metabolic risks increased more rapidly in women. The relative increase in body-weight or waist-related risk was 76.3% in women and 27.1% in men; the corresponding increases in prediabetes or diabetes were 85.7% and 37.8% (Figure 3B; Figure 4B in the original article). Postmenopausal women had higher MASLD prevalence than premenopausal women in every period, but after 2010, prevalence declined in the former and continued to increase in the latter. The study did not establish that hormonal or lifestyle factors caused these differences. Health management should therefore address both the higher disease burden in men and the changing metabolic risks in women.[1]

Regional patterns also provide findings that warrant continued monitoring. In the study sample, MASLD prevalence was higher in Eastern and Southern Taiwan, at 41.1% and 39.5%, respectively, compared with 33.6% in Northern Taiwan and 33.8% in Central Taiwan. Some differences persisted after adjustment for other factors, although the regional gaps narrowed after 2010.

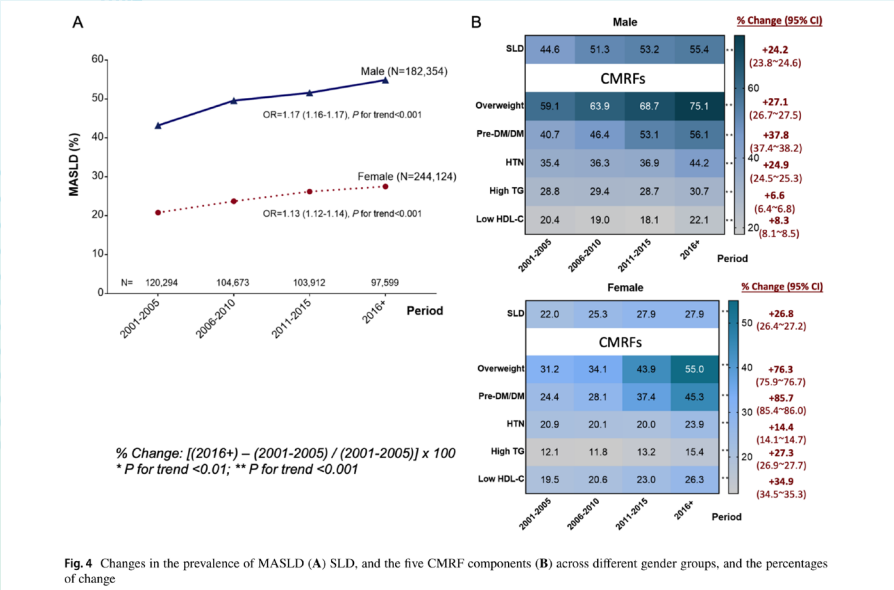


Fig. 4 Changes in the prevalence of MASLD (**A**) SLD, and the five CMRF components (**B**) across different gender groups, and the percentages of change

▲ Changes in MASLD and metabolic risk in men and women. Panel A compares MASLD prevalence in men and women across four periods. Panel B presents the prevalence of SLD and the five CMRFs, together with their relative changes. Men had a higher disease burden, whereas women had larger relative increases in body-weight or waist-related risk and dysglycaemia.

Translating research into prevention and sustained care after health examinations

This study highlights the value of attention to body weight and waist circumference from early adulthood and of continued glycaemic care in older adults. It also identifies a high disease burden in men and more rapid increases in selected metabolic risks in women.[1] With its focus on metabolism and obesity, the Center aims to translate these findings into earlier health management, reduce the health and economic burden of noncommunicable diseases, and promote a healthy, sustainable society. When fatty liver is identified during a health examination, the next step is to assess metabolic status and liver-related risk and discuss appropriate follow-up and care with healthcare professionals.

To help direct prevention and management resources to areas of greatest need, this large study identifies regions with a higher disease burden. In clinical care, risk-stratified screening can help reduce underdiagnosis. Assessment of body weight, waist circumference, glycaemia, blood pressure and lipids can begin in routine health examinations, community settings and primary care. Clinical guidelines recommend further assessment of liver fibrosis risk in people with type 2 diabetes, abdominal obesity accompanied by other metabolic risk factors, or persistently elevated liver enzymes. Healthcare professionals can calculate FIB-4 using age, AST, ALT and platelet count, then arrange liver elastography or specialist referral according to the result and individual circumstances. Interpretation of FIB-4 is influenced by age and the clinical setting. Even people classified as low risk require continued management of metabolic abnormalities and periodic reassessment.[2,4]

The smart-screening initiative in which the Center participates has also begun implementation in the hospital setting. In November 2025, the Taiwan Association for the Study of the Liver, Kaohsiung Medical University, National Sun Yat-sen University, Novo Nordisk Taiwan and Taiwan Health and Bio DataBank Technology signed a memorandum of understanding to advance the ‘Smart Screening Programme for Risk Stratification and Management of Metabolic Fatty Liver and Obesity’.[5] Initial implementation at Kaohsiung Medical University Hospital was formally completed in September 2026. The programme combines non-invasive testing, data analysis and clinical decision support to assist risk assessment and provide personalised management recommendations. Expansion to 25 hospitals across Taiwan and into primary care within three years is a subsequent rollout objective, with continued monitoring of implementation progress and effectiveness.[4–5]

After risk identification, sustained long-term care is essential. The Center can bring together expertise in hepatology, cardiology, nephrology, metabolic medicine and nutrition to study exercise, dietary and health-management approaches suited to different populations. Younger adults can

focus on regular physical activity and weight management. For middle-aged and older adults and those with dysglycaemia, care must also consider metabolic control, comorbidities and physical function. Medication selection should be determined by healthcare professionals according to each individual's condition, approved indications and clinical evidence. Lifestyle tracking and self-management tools can support care and help assess outcomes.[2,3]

In the prevention and management of metabolic fatty liver disease, the Center actively promotes screening followed by risk stratification, referral and follow-up for people at high risk, and assessment of improvements in body weight, waist circumference, glycaemia and liver-related risk. It also monitors disease progression, cardiovascular and kidney events, quality of life, healthcare utilisation and cost-effectiveness over the long term. The current prevalence study and initial implementation of smart screening establish a foundation for the Center's prospective follow-up and intervention research to evaluate the actual benefits of care. These efforts advance the goals of reducing the burden of noncommunicable diseases, slowing disease progression, reducing premature deaths and reducing mortality from noncommunicable diseases.

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