Kaohsiung Medical University

KMU

Research Center Quarterly Report

Office of Research & Development

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contents

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University-Level Academic Research Institute

Biomedical Artificial Intelligence Academy

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University-Level Academic Research Center

Research Center for Precision Environmental Medicine

MOE Higher Education Sprout Project-The Featured Areas Research Center Program (107~116)

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Regenerative Medicine and Cell Therapy Research Center

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Drug Development and Value Creation Research Center

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Center for Cancer Research

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Deputy CEO：Jen-Yu Hung /Professor, Hui-Hua Hsiao /Professor, Ming-Yii Huang /Professor, Hsiao-Sheng Liu /Investigator、Yu-Tse Wu /Professor
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Precision Sports Medicine and Health Promotion Center

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University-Level Mission-Oriented Research Center

Center for Tropical Medicine and Infectious Disease Research

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Center of Applied Genomics

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Center for Liquid Biopsy and Cohort Research

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Center for Big Data Research

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Center for Long-Term Care Research

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Center for Medical Education and Humanizing Health Professional Education

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Research Center for Medical Technology and Policy

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2.1 Headline Focus

KMU Precision Sports Medicine and Health Promotion Center Launches, ushering in a New Era of Health

Author : Pei-Chun Liao /Assistant Prof., Shang-Jyh Huang /Director Prof., Nai-Jen Chang /CEO

Press Released : https://reurl.cc/NYGWO9

As public awareness of health continues to grow, precision sports medicine has emerged as a significant trend in healthcare and sports. Kaohsiung Medical University (KMU) has established the Precision Sports Medicine and Health Promotion Center (PSMHPC) to remain at the forefront of this movement. Integrating expertise from orthopedics, rehabilitation, physical therapy, athletic training, and fitness coaching, PSMHPC offers a one-stop service spanning prevention, diagnosis, training, and recovery. This platform aims to assist the general public, athletes, and special populations in cultivating proper exercise habits, reducing sports injuries, and improving overall health. By combining medical technology with professional expertise, the Center is committed to advancing sports injury prevention, physical fitness development, health promotion, and clinical medicine.

PSMHPC held an unveiling ceremony on March 10, 2015, featuring distinguished guests such as Director of Kaohsiung City Government's Sports Development Bureau, Mr. Zun-Yao Hou, and CEO of Taiwan institute of sports science (TISS), Mr. Chih-Huang Huang. During the event, the PSMHPC team along with the Department of Sports Medicine introduced advanced sports science equipment and functions, which attracted numerous participants from industry, government, and academia. A highlight of the event was the demonstration of the same shockwave therapy equipment used at the National Sports Training Center (NSTC), offering guests a hands-on experience of cutting-edge sports science. Attendees praised the informative presentations and expressed high expectations for future collaborations in sports and health promotion.

KMU has long been dedicated to integrating sports medicine with public health initiatives. This event not only showcased the university's expertise and capabilities in sports medicine but also underscored its aspiration to become a key hub for health promotion and sports science development in southern Taiwan.

▲ Group photo of unveiling ceremony

▲ Ribbon cutting

▲ Demonstration of the shockwave therapy equipment

▲ Experience activities of advanced sports science equipments

2.2 Headline Focus

Taiwan's Vision for Precision Medicine: Dr. Che-Yuan Wu Ignites a New Spark in Genomics Research at KMU

Author : Mission-Oriented University-Level Research Center –Center of Applied Genomics

On February 13, 2025, the Center of Applied Genomics at Kaohsiung Medical University invited Dr. Che-Yuan Wu, Principal Investigator of the Taiwan Precision Medicine Initiative (TPMI), to deliver a keyn ote lecture. Dr. Wu presented the ambitious scope of TPMI, highlighting its integration of large-scale genomic data and high-accuracy polygenic risk score (PRS) models to advance disease prevention and personalized healthcare in Taiwan. His talk offered an inspiring glimpse into the future of precision health and generated strong interest among KMU faculty and students.

▲ Dr. Wu shares Taiwan's future vision for precision medicine

The wave of precision medicine is sweeping across the globe, and the Center of Applied Genomics at Kaohsiung Medical University (KMU) is actively riding this transformative trend. On February 13, 2025, the center hosted a highly anticipated keynote lecture at the KMU Audio-Visual Center. The guest speaker, Dr. Che-Yuan Wu, a Research Fellow at the Institute of Biomedical Sciences, Academia Sinica, and the Principal Investigator of TPMI, delivered a powerful presentation titled "Current Progress and Future Prospects of the Taiwan Precision Medicine Initiative." His engaging talk ignited enthusiasm for genomics among attendees and opened new horizons for the center's strategic direction.

Precision Medicine

Dr. Wu began his lecture by painting a vivid picture of precision medicine's grand vision. He emphasized that precision medicine represents a health revolution for all—enabling disease risk prediction, personalized health recommendations, and actionable interventions that translate scientific advancements into real-life benefits. At the heart of TPMI lies the development of polygenic risk scores (PRS) for diseases such as type 2 diabetes and breast cancer. The audience was amazed by how deeply science has become embedded in everyday health decision-making.

TPMI's achievements are remarkable. Since its inception in 2019, the initiative has established one of the world's largest Han Chinese genomic databases—accumulating genotypic data from over 500,000 individuals paired with comprehensive clinical records across hundreds of diseases. Notably, TPMI stands out globally alongside international efforts like the UK Biobank and the U.S. All of Us project, showcasing unique advantages in data scale and population-specific precision.

Large prospective Genetic program

Mainly from previous public data release, may not up to date (base on 2024/03/18 official site data)

	Enrolled	EMR	Sequencing	Genotyping	Biospecimens	Return of results
TPMI	565,000+	Yes	No	Yes 508,912 typed	No	Yes
UK Biobank	500,000	limited extra test + questionnaires	Yes whole exome/genome	Yes	Yes blood, urine, saliva + biomarker	No
Taiwan Biobank	202,972 (58,553 flow up)	No (link to NHI)	~ 1500	147,823	Yes blood, urine,DNA	No
Million Veteran	1000,000+	Yes + questionnaires	partial	Yes	No	No
FinnGen	500,000	Yes	partial	Yes 356,000+ typed	Yes blood, urine, tissue , CSF, DNA, RNA	No
All of Us	778,000+	Yes + questionnaires	Yes 98,560	Yes 312,940 typed	Yes blood, urine	Yes

▲ Global overview of TPMI's standing among leading precision medicine projects. Source: Dr. Che-Yuan Wu, February 13, 2025

Dr. Wu also addressed the challenges of conducting localized precision medicine research. From limited early-stage resources to funding hurdles, TPMI has leveraged Taiwan's homogeneous population, universal healthcare, and rich electronic medical records to rise to international prominence. The TPM SNP genotyping array—custom-designed for the Taiwanese Han population—has significantly improved predictive accuracy, outperforming many Western-based models. In 2024 alone, the TPMI team published multiple high-impact papers, earning recognition across the global genomics community.

Looking ahead, Dr. Wu outlined a bold roadmap for nationwide precision health. TPMI aims to scale its cohort to one million participants, strengthen clinical applications through hospital partnerships, and promote public engagement in proactive health management. The vision includes early disease detection, personalized treatment plans, and lifestyle optimization driven by genomic insights—positioning Taiwan as a global leader in precision medicine.

This inspiring lecture energized the KMU community and set a clear path forward for the Center of Applied Genomics. Director Professor Chia-Yang Li noted that TPMI's global experience serves as a valuable reference for the center's research, especially in areas such as MASLD and prostate cancer. The center plans to leverage TPMI's data infrastructure to accelerate translational applications of localized genomic technologies. Moving forward, the center will continue collaborating closely with TPMI to advance precision medicine and improve population health outcomes in Taiwan.

▲ Faculty and students engage in a vibrant discussion on localizing precision medicine.

3.1 Research Center Column

KMU 2025 International Symposium on Air Pollution and Health Promotion : Introduce New International Knowledge and Discuss Solution Strategies

University-Level Academic Research Center | Research Center for Precision Environmental Medicine

Author : Professor Chih-Hsing Hung / CEO

Abstract : RCPEM, in collaboration with Kaohsiung Municipal Siaogang Hospital and the University Social Responsibility on Air Pollution – Environmental Education and Health Promotion for Sustainable Development Program (Air Pollution USR Program), organized the "2025 International Conference on Air Pollution and Health Promotion" to introduce the latest research developments, provide solutions and health promotion care methods, and bring positive impacts to people's health.

In recent years, the Research Center for Precision Environmental Medicine (RCPEM) has adopted several Sustainable Development Goals, including Goal 3 (Good Health and Well-being), Goal 4 (Quality Education), Goal 9 (Industry, Innovation, and Infrastructure), Goal 10 (Reduced Inequalities), Goal 11 (Sustainable Cities and Communities) and Goal 17 (Partnerships for the Goals), as its key promotion objectives. In collaboration with Kaohsiung Municipal Siaogang Hospital (KMSH) and the University Social Responsibility on Air Pollution – Environmental Education and Health Promotion for Sustainable Development Program (Air Pollution USR Program), RCPEM has conducted in-depth research on the correlations between environmental pollution and human health. At the same times, RCPEM has actively promoted environmental medicine education across local campuses and communities, thereby fulfilling the social responsibilities of a medical university.

On March 12, 2025, RCPEM, in collaboration with KMSH and the Air Pollution USR Program, organized the "2025 International Conference on Air Pollution and Health Promotion." The conference focused on critical issues such as air pollution, exposure to environmental pollutants, and lung-related diseases. Many leading experts and scholars were invited to share their latest research results, including Professor Pei-Song Gao from Johns Hopkins University, Professor Yuanpu Di from the University of Pittsburgh, Dr. Tzong-Shi Lu from Harvard Medical School, Dr. Shih-Chun Long from Academia Sinica, Professor Chih-Da Wu from National Cheng Kung University, Distinguished Research Fellow Shau-Ku Huang and Dr. Da-Wei Wu from KMSH, as well as Professor Shih-Hsien Hsu from Kaohsiung Medical University. By bringing together these cross-disciplinary experts, the conference aimed to address the escalating air pollution problem, propose innovative solutions, and promote effective health care strategies for future public health challenges.

▲ Opening Remark by the Vice President Yeou-Lih Huang

▲Group Photo of Distinguished Guests

▲ Group Photo of All Participants

▲ Group Photo of All Participants

Other Important Highlights :

RCPEM's research team continues to focus on the issue of air pollution, conducting in-depth studies on the impact of heavy metal exposure on lung diseases, and developing intervention measures. In 2025, RCPEM obtained an R.O.C patent entitled "FLAVONOIDS MEDICAMENT FOR TREATMENT, PREVENTION, OR REDUCTION LUNG FUNCTION DAMAGE."

3.2 Research Center Column

The grant event for global innovation and dialogue

University-Level Academic Research Center | Research Center for Precision Environmental Medicine

Author : Professor Yin-Chih Fu / CEO

>>> Summary of Participation in the ORS 2025 Annual Meeting

Prof. Yin-Chih Fu (CEO)and Prof. Chung-Hwan Chen (Deputy CEO), together with center teammembers—Prof. Cheng-Chang Lu, Dr. Wen-Chih Liu, Dr. Tien Ching Lee, and Postdoctoral Fellow Dr. Shu-Chun Chuang—attended the ORS 2025 Annual Meeting held from February 7 to 11, 2025, at the Phoenix Convention Center in Phoenix, Arizona, USA.

The ORS Annual Meeting is the largest and most prestigious orthopedic academic conference in the United States, attracting leading scholars and research institutions from around the world. Renowned for its rigorous abstract review process, having a submission accepted not only signifies high recognition of research excellence but also marks a key milestone in international academic engagement. All five papers submitted by the center's team were accepted, underscoring the team's strong research capabilities in orthopedics and regenerative medicine.

The four-day conference featured a wide array of topics, including cartilage regeneration, muscle injury and repair, emerging skeletal research technologies, biomaterials, and studies on the hip and knee joints, showcasing the diverse and in-depth development within the fields of orthopedics and regenerative medicine.

>>> Gained Knowledge In the Conference

The global advancement of regenerative medicine research and its clinical applications is thriving, accompanied by the progressive refinement of regulations and guidelines related to cell and gene therapies. In the field of orthopedics, both research institutions and industry players are actively engaged in the development of various cell and gene therapy products to meet the rapidly growing demands of the global regenerative medicine market and clinical applications.

Moreover, with the international promotion of non-animal alternative research methods, an increasing number of scholars are dedicating efforts to the study of bone and cartilage organoids. This year's conference showcased the latest breakthroughs in regenerative medicine and orthopedic research worldwide, offering participants valuable opportunities for knowledge exchange and future collaboration.

>>> Accepted Abstracts at ORS 2025

- Exploring the impact of hiPSC-derived extracellular vesicles (hiPSC-EVs) and ADSC-EVs on enhancing the human articular chondrocyte function /Prof. Chung-Hwan Chen (Deputy CEO)
- Effect of extracellular vesicles from the coculture medium of anterior cruciate ligament cells and bone marrow cells on hamstring tenocyte cell activity and apoptosis / Prof. Cheng Chang Lu / Emeritus Prof. Mei-Ling Ho
- Prevalence and Risk Factors for Chronic Postamputation Pain Requiring Analgesia or Nerve Interventions: A Population-Based Study in East Asia /Dr. Wen-Chih, Liu/ Prof. Yin-Chih Fu (CEO)
- Comparisons of miRNA profiles of exosomes derived from human iPSCs, ADSCs and BMSCs and effects on chondrocyte function / Postdoctoral Fellow Dr. Shu-Chun Chuang / Emeritus Prof. Mei-Ling Ho
- Effect of Wharton's jelly mesenchymal stem cells secrete extracellular vesicles on cell proliferation, survival and oxidative stress in chondrocytes / Assistant Research Fellow Dr. Shun-Cheng Wu

>>> Other Important Highlights

1.The center signed a Memorandum of Understanding (MOU) with Kaohsiung American School (KAS) for the "KAS Future Leaders Program."

To promote education and academic exchange in the biomedical field, the center has partnered with Kaohsiung American School to launch the "KAS Future Leaders Program." Through winter and summer internship opportunities, the program aims to enhance high school students' understanding of regenerative medicine and cell therapy, while nurturing future talent in the biomedical sciences. Additionally, on March 21, 2025, Prof. Yin-Chih Fu (CEO) visited Kaohsiung American School to deliver an inspiring lecture, sharing his career development experience with international students.

▲ Kaohsiung American School (KAS) visited the center to discuss winter and summer internship collaboration with Prof. Yin-Chih Fu/ CEO

▲ Group photo with the director of Kaohsiung American School

▲ CEO Prof. Yin-Chih Fu shares career development experience with international students at the Kaohsiung American School

2.Prof. Yan-Hsiung Wang hosted students from Tohoku University and Kagoshima University, Japan, for an observation and internship at the Center's laboratory.

Five students from Tohoku University and Kagoshima University, Japan, participated in a one-week exchange program at the School of Dentistry, Kaohsiung Medical University. On March 5, 2025, a special arrangement was made for them to visit the Center's laboratory for observation and hands-on practice. Through this on-site visit and practical experience, they gained a deeper understanding of the university's research in regenerative medicine and orthopedics.

During the event, Professor Yan-Hsiung Wang introduced the background and future development directions of the Regenerative Medicine and Cell Therapy Research Center as well as the Orthopedics Research Center, sharing significant past research achievements in these fields. He also personally guided the students in Osteogenic differentiation experiments, giving them the opportunity to actively participate in and experience the basic research process.

As the visiting students from Tohoku University and Kagoshima University had limited prior exposure to molecular biology experiments, they found this observational internship to be extremely valuable. They expressed great appreciation for the opportunity and were very pleased with the exchange experience.

▲ Professor Wang Yanxiong with students from the Tohoku University student outside the laboratory

▲ Prof. Yan-Xiong Wang guides students in conducting Osteogenic differentiation experiments

3.3 Research Center Column

UNLOCK THE FUTURE OF PEPTIDE INNOVATION
Specialty Peptide Synthesis Technology

University-Level Academic Research Center | Drug Development and Value Creation Research Center

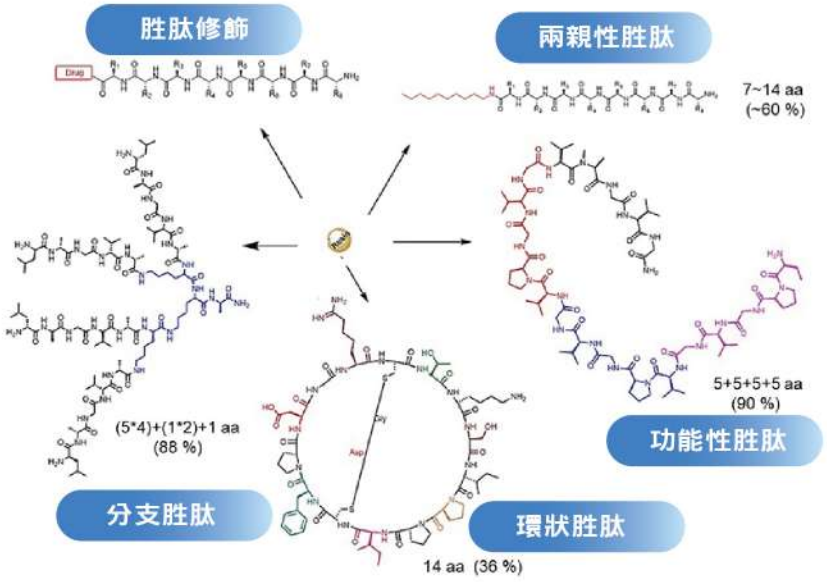
Author : Professor Chai-Lin Kao, Dep. of Medicinal and Applied Chemistry

Abstract : Chemical synthesis opens up incredible possibilities in peptide research, however, the chemical synthesis remains challenging for peptide derivatives. Besides, the chemical synthesis of long peptides remains difficult. Despite several reported approaches for those derivatives, they are limited by low efficiency and high costs. There is a significant unmet need in the market, creating a unique opportunity. The group of Professor Chai-Lin Kao and Associate Professor Hui-Ting Chen developed an efficient safety-catch resin, which was applied to prepare various peptide derivatives. This method used solid-phase synthesis to enhance yield and purity while lowering production costs, paving the way for novel peptide synthesis approaches. In 2024, the team received a grant from the National Science and Technology Council to commercialize this skill, which will drive progress in Taiwan's biotechnology and pharmaceutical industries.

Peptide drugs are characterized by low toxicity, as well as high efficiency and selectivity in targeting specific diseases. In the past two decades, peptides have become an important compound in the global drug market. The growth of peptide drugs has also been supported by advancements in synthetic technology. As a result, several peptide derivatives were introduced to the market.

Currently, biosynthesis and chemical synthesis are two major approaches for peptide synthesis. Although biosynthesis produces peptides in large quantities, it requires a long time to screen strains and purify the product, and it is difficult to prepare structurally altered derivatives. In contrast, chemical synthesis offers a flexible method for creating various derivatives. Liquid-phase and solid-phase syntheses are two major chemical syntheses of peptides. Liquid-phase synthesis methods are effective for short peptides. On the contrary, medium-length and long peptides were usually synthesized through solid-phase synthesis. After 7 decades of development, the SPPS was a powerful method for preparing linear peptides. However, their potential for peptide derivatives remains to be developed.

For the C-terminal modification, the team developed an efficient safety-catch resin, which allowed the introduction of various functionalities on the C-terminal at the cleavage step. One remarkable advantage is that no chromatographic purification is required for most products. With this method, the team synthesized amphiphilic peptides, branched peptides, and cyclic peptides. Moreover, this method was a foundation for a new ligation method for long peptides.



▲ Using this method, various peptide derivatives can be prepared.

In 2024, the team received a grant from the National Science and Technology Council to support potential commercialization. One potential application is the ligation, which could synthesize the generic peptide drugs and contribute to the structural modification. During the grant period, the team conducted an in-depth study of the supply chain within the peptide industry. To create a comprehensive overview, the team actively attended the Raw Materials Exhibition and engaged with industry experts, including those from API chemical pharmaceuticals, AI drug development, CDMO biotechnology, raw material distribution, and cosmetics manufacturing. A preliminary result concluded that the standard compound for the product and its impurity during synthesis is in high demand on the market. This demand meets the scope of this skill.

A specialty peptide synthesis company was planned to launch within 3 years and establish a position in the peptide drug and synthesis services market. Starting from Taiwan, this team intends to serve pharmaceutical industries, API manufacturers, and biotechnology industries domestically and internationally by assisting biotechnology and pharmaceutical industries with more economic R&D and manufacturing costs, and a rapid new drug development process. This partnership will create a mutually beneficial relationship.

▲ The team participated in CPHI-Delhi 2024

>>> Other Important Highlights

2024 21th National Innovation Award
(Academic Research Category)

Associate Professor Chih-Hung Chuang

Title

Selective activation of IFNγ-ipilimumab enhances the therapeutic effect and safety of ipilimumab.

Team member

Chih-Hung Chuang, Tian-Lu Cheng, Yi-Jung Huang, Shi-Wei Chao, Chia-Tse Li, Shan-Jou Chen, Cheng-Ze Gao, Hong-Ren Wang.

Associate Professor Wen-Wei Lin

Title

Dual-structured chromogenic reporter gene system: a new candidate for high-throughput drug screening.

Team member

Wen-Wei Lin, Tian-Lu Cheng, Mu-Shen Chang, Chia-Yi Lee, Hsuan Chao.

● Associate Professor Wei-Peng Li published paper in high-impact journal *Advanced Materials* (SCIE, IF2023=27.4) Liu-Chun Wang#, Yu-Cheng Kou#, Yen-Ting Kuo#, Kai-Lin Chang, Ying-Chi Chen, Wen-Jyun Wang, Ming-Yuan Hung, Fang-Yi Hsu, Pooja Aich, Yu-Wei Lin, Chia-Hao Su, Divinah Manoharan, Yi-Hsin Chien*, Wei-Peng Li*, Hong-Kang Tian*, Chen-Sheng Yeh*. "Utilizing Electron-Sink-Enhanced Nanoshells for Amplified Nanoplasmonic SERS-Based In Situ Detection of Cancer Cells, Linking Signal Enhancement with Cellular Damage". *Advanced Materials*. 2025 Mar 31:e2417950. (Online ahead of print)

3.4 Research Center Column

Precision Medicine and Early Clinical Trials for Head and Neck Cancer: Insights from Training in Japan and Prospects for International Collaboration

University-Level Academic Research Center | Drug Development and Value Creation Research Center

Author : Professor Chai-Lin Kao, Dep. of Medicinal and Applied Chemistry

Abstract : Chemical synthesis opens up incredible possibilities in peptide research, however, the chemical synthesis remains challenging for peptide derivatives. Besides, the chemical synthesis of long peptides remains difficult. Despite several reported approaches for those derivatives, they are limited by low efficiency and high costs. There is a significant unmet need in the market, creating a unique opportunity. The group of Professor Chai-Lin Kao and Associate Professor Hui-Ting Chen developed an efficient safety-catch resin, which was applied to prepare various peptide derivatives. This method used solid-phase synthesis to enhance yield and purity while lowering production costs, paving the way for novel peptide synthesis approaches. In 2024, the team received a grant from the National Science and Technology Council to commercialize this skill, which will drive progress in Taiwan's biotechnology and pharmaceutical industries.

>>> Development of Precision Medicine in Head and Neck Cancer

Head and neck cancer has a high incidence rate in Taiwan and East Asia. Treatment strategies have significantly improved with advances in genetic analysis and targeted therapy. Traditional treatments include surgery, radiotherapy, and chemotherapy. However, recent progress in precision medicine has enabled personalized treatment approaches.

With next-generation sequencing (NGS) technology, tumor driver genes can be more accurately identified, facilitating individualized treatment strategies. This has led to major breakthroughs, particularly in the study of tumor genetic variations and immune therapy responses.

>>> Genetic Mutations and Head and Neck Cancer Treatment

In recent years, the roles of PIK3CA and TP53 mutations in head and neck squamous cell carcinoma (HNSCC) have gained significant attention. According to Wang et al. (2023), co-occurrence of TP53 mutations with CDKN2A and NOTCH1 mutations may influence tumor biology and treatment responses. The study also identified tumor mutational burden (TMB) as a key predictor of recurrence risk in HNSCC patients undergoing concurrent chemoradiotherapy (CCRT). Patients exhibiting high-recurrence mutation signatures (RMS) and chromatin remodeling mutation signatures (CRMS) had shorter recurrence-free survival (RFS).

In the field of immunotherapy, PIK3CA mutations are closely associated with an immunosuppressive tumor microenvironment. Research suggests that abnormal activation of the PI3K/AKT signaling pathway may impair anti-tumor immune responses, leading to reduced efficacy of immune checkpoint inhibitors (ICI). Consequently, precision treatment strategies targeting these mutations may help improve prognosis in head and neck cancer patients.

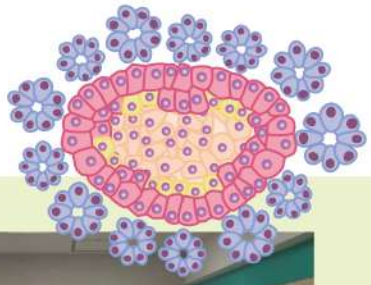
>>> Combination Strategies of Immunotherapy and Targeted Drugs

Immune checkpoint inhibitors (ICI), such as the PD-1 inhibitor pembrolizumab, have become a standard treatment for head and neck cancer. However, mono-therapy with ICI has shown limited response rates. Recent studies suggest that combining immunotherapy with antibody-drug conjugates (ADCs)— as outlined in Table 1—may enhance treatment outcomes. These ADCs target specific molecules such as EGFR, TROP2, Integrin-Beta 6, and Nectin-4.

The combination of immune therapy and ADCs improves treatment efficacy through the following mechanisms:
•Enhancing CD8+ T cell infiltration and activation
•Reducing lactic acid accumulation and immune suppression
•Precisely delivering cytotoxins to tumor cells while minimizing damage to normal tissues

These findings provide new therapeutic strategies for HNSCC, particularly for patients with poor responses to PD-1 inhibitors. The combination of ADCs and ICIs could represent a breakthrough approach in head and neck cancer treatment.

>>> Participation and Experience in Early Clinical Trials



In October 2024, I had the privilege of participating in the Hematology and Oncology Physician Training Program organized by Kaohsiung Medical University Hospita l and the National Health Research Institutes (NHRI). As part of this program, I underwent a one-month professional training at the National Cancer Center (NCC) Japan under the "113 NHRI Project – Establishing an Innovative Early Clinical Trial Intelligent Cooperation Network."

This training covered two core areas:
1.Phase 2/3 Clinical Trials in Hematologic Oncology – Learning about current treatment protocols and the design and application of innovative therapeutic strategies.
2.Phase 1 Pan-Cancer Clinical Trials – Gaining in-depth knowledge of early-phase clinical trial design, patient selection mechanisms, and the drug development process.
This experience provided valuable insights into the operational models of domestic and international clinical trials and laid a solid foundation for future international collaborations and clinical research.

>>>Establishment of International Collaboration and the Master Key Project

Through this training program in Japan, we successfully established a collaborative relationship with the National Cancer Center (NCC) Japan and initiated discussions regarding our potential participation in the Master Key Project. This project, spearheaded by Japan, is an international multicenter clinical trial initiative aimed at advancing personalized treatment strategies for cancer patients based on specific genetic mutations. The Master Key Project integrates comprehensive genomic profiling (CGP), biomarker-driven clinical trials, and novel therapeutic approaches to enhance precision medicine. It enables efficient patient stratification, allowing individuals with rare or treatment-resistant cancers to receive targeted therapies or combination treatments tailored to their molecular profile. Given the increasing complexity of cancer treatment, such a platform plays a crucial role in accelerating drug development and optimizing therapeutic outcomes.
We plan to leverage this platform to:

1. **Provide Taiwanese patients with access to cutting-edge international precision medicine trials,** particularly for rare or hard-to-treat cancers.
2. **Enhance the execution standards of domestic clinical trials** by integrating advanced trial designs, such as adaptive trials, basket trials, and umbrella trials, thereby aligning Taiwan's clinical research capabilities with global standards.
3. **Foster deeper collaboration between Taiwan and Japan in oncology research**, enabling the exchange of knowledge, technologies, and best practices to expedite the development of novel cancer therapies.

As a first step, we are actively evaluating ongoing head and neck cancer clinical trials, with Table 2 providing detailed information on current studies. These trials focus on investigating the efficacy of various targeted therapies, immune checkpoint inhibitors (ICIs), and their combination strategies in patients with specific genetic profiles.
Through these efforts, we aspire to achieve more precise and effective personalized treatment strategies in head and neck cancer, ultimately improving patient survival rates, treatment response, and overall quality of life. By integrating Taiwan into a broader international research network, we aim to expand clinical trial opportunities for our patients while positioning Taiwan as a key player in global oncology research and drug development.

Developed ADC Clinical Trials on Head and Neck Cancer

(Including target molecules, ADCs, payloads, trial phases, number of participants, objective response rates, and grade 3/4 treatment-related adverse events)

Target	ADC (Antibody-Drug Conjugates)	Payload	Phase	N	ORR	G3/4 TRAE	Most Common AEs	Reference
EGFR	MRG003	MMAE	I	15	40%	31%	Hyponatremia, Neutropenia, Leukopenia	Qiu et al., 2022
EGFR	Losatuxizumab Vedotin	MMAE	I	5	20%	60%	Infusion-related eactions (IRR)	Cleary et al., 2020
TROP2	Sacituzumab Govitecan	SN38	II	43	16%	44%	Neutropenia, Leukopenia, Anemia, Nausea	Michel et al., 2023
Integrin-Beta 6	SGN-B6A	MMAE	I	62	23%	20%	Manageable toxicity	Hollebecque et al., 2023
Tissue Factor	Tisotumab Vedotin	MMAE	II	15	40%	27%	Dry eye, Keratitis, Fatigue, Neuropathy	Cirauqui et al., 2023
CD44v6	Bivatuzumab Mertansine	DM1	I	32	10%	25%	Skin reactions, One death due to toxic epidermal necrolysis	Riechelmann et al., 2008
CD166	Praluzatamab Ravtansine	DM4	I/II	9	11%	37%	Vomiting, Peripheral neuropathy, Liver enzyme increase, Ocular toxicity	Boni et al., 2022
CD71	CX-2029	MMAE	I/II	8	12%	60%	Anemia, Febrile neutropenia, Leukopenia, IRR	Johnson et al., 2021
P-Cadherin	PCA062	DM1	I	6	20%	28%	AST increase, Thrombocytopenia,Anemia	Duca et al., 2022
Nectin-4	Enfortumab Vedotin	MMAE	II	46	24%	35%	Skin reactions, Peripheral neuropathy, Anemia, Neutropenia	Swiecicki et al., 2023

Ongoing Head and Neck Cancer Clinical Trials at Kaohsiung Medical University Hospital

Clinical Trial Name	Phase	Indication	Drug	Mechanism of Action	Combination Therapy
ASP-1929-381	I/II	Locally Recurrent or Metastatic Head and Neck Cancer	ASP-1929 (Cetuximab + IR700DX)	Photoimmunotherapy	—
MCLA-158-CLO2	I/II	Metastatic Head and Neck Squamous Cell Carcinoma	MCLA-158	EGFR & LGR5 Bispecific Antibody	—
DB-1311-O-1001	I/II	Locally Advanced or Metastatic Head and Neck Cancer	DB-1311	B7-H3 Antibody-Drug Conjugate (ADC)	—
GEN1042-01	I/II	Metastatic Head and Neck Squamous Cell Carcinoma	GEN1042	CD40 & 4-1BB Bispecific Antibody	Cisplatin /Carboplatin+5FU
SGN-B6A-001	I/II	Metastatic Head and Neck Squamous Cell Carcinoma, Non-Small Cell Lung Cancer	SGN-B6A	Integrin-β-6 ADC	Pembrolizumab
BNT113-01	I/II	Metastatic or Locally Advanced HPV+Head and Neck Cancer	BNT113	HPV16 E6/E7 mRNA Vaccine	Pembrolizumab
MCLA-158-CLO3	I/II	Metastatic Head and Neck Squamous Cell Carcinoma	MCLA-158	EGFR & LGR5 Bispecific Antibody	Pembrolizumab
XL092-305	I/II	Metastatic Head and Neck Squamous Cell Carcinoma	XL092	VEGFR2, MET, TAM Kinase Inhibitor	Pembrolizumab
INBRX-106-01	I/II	Locally Advanced or Metastatic Head and Neck Cancer	INBRX-106	OX40 Immune Stimulator	Pembrolizumab

3.4 Research Center Column

Precision Sports Medicine Takes the Lead at KMU: Sports Medicine Center Promotes National Health Enhancement

University-Level Academic Research Center | Drug Development and Value Creation Research Center

Author : Professor Chai-Lin Kao, Dep. of Medicinal and Applied Chemistry

Current Achievements of Precision Sports Medicine and Health Promotion Center (PSMHPC):

1. Cultivating Sports Instruction Professionals

(1) National Academy of Sports Medicine (NASM)-Corrective Exercise Specialist (CES) Training Course

During the winter break, PSMHPC, in collaboration with the Department of Sports Medicine at Kaohsiung Medical University (KMUSM), hosted a NASM-CES training course. Over the course of four intensive days, participants engaged in both classroom learning and practical exercises. The course featured expert instruction from the International Sports Coaching Association (ISCA) team, which helped tailor the course content to enhance practical skills, ensuring it was more relevant and aligned with the specific needs of our students. The program emphasizes continuous learning and updates, striving for constant progress.

▲ NASM-CES Training Course

The center has been proactive in assisting students with certification exams and has worked closely with certification bodies to negotiate "international training courses" at reduced costs. This effort significantly eases the financial burden on students and their families. Students no longer need to travel across counties, eliminating the costs of transportation and accommodation. Even students in southern Taiwan benefit from more accessible, high-quality education without the need to travel to the north for certification courses. Furthermore, the quality of instruction and materials is uncompromised, ensuring that students receive the same resources as others, if not more. The teaching staff is highly selective and rigorous, ensuring that our students receive the best possible education. All courses and resources are designed with the students' best interests in mind.

▲ FLOSSING International Certification Course.

(2) EASY FLOSSING International Certification Course

From March 15 to 16, 2025, the PSMHPC, in collaboration with the KMUSM, hosted the KMUSM X EASY FLOSSING International Certification Course. The event aimed to it with societal needs. Future efforts will continue to focus on nurturing sports professionals and enhancing connections with community services.

▲ Kaohsiung Fubon Marathon Sports Protection Initiative.

2. Sports Injury Prevention Services

(1) Kaohsiung Fubon Marathon Sports Protection Initiative

This event was led by the PSMHPC and Chair of KMUSM, Dr. Nai-Jen Chang. Experienced alumni with extensive clinical expertise were specially invited to join the team and support the marathon by mentoring current students. Through hands-on practice, the team facilitated an exchange of various professional techniques while providing services to the athletes, achieving the goal of knowledge transfer and showcasing the service spirit of KMU's "Sports Injury Protection Team."

The team was responsible for post-race recovery services for marathon participants, including sports massage, manual stretching, fatigue relaxation techniques, and post-race ice therapy. By continuing to promote healthy sports practices and preventing sports injuries, the team contributes to the development of national sports and health initiatives with their professional expertise.

▲ Pre-Event Briefing for the National Indigenous Games

3. Lecture on Sports Medicine Topics in National Policy Trends

PSMHPC and KMUSM at KMU co-hosted a special lecture featuring Professor Sheng-Guang Wu from the National Taiwan University of Sport. Professor Wu delivered a presentation titled "Adaptive Sports and Professional Development Planning in the Context of Establishing a National Sports Ministry."

Professor Wu, who holds a Ph.D. in Adaptive Physical Education from Loughborough University in the UK, is also an Executive Committee Member of the International Table Tennis Federation (ITTF) and Chair of its Medical and Classification Committee. He served as Deputy Chief Referee for Table Tennis at the 2024 Paris Paralympics and was honored to perform the ceremonial opening strokes for Taiwan's table tennis matches, as well as to participate as a distinguished award presenter.

During his visit to KMU, Professor Wu brought three significant mementos: the official uniform from the 2021 Tokyo Paralympics, the torch from the 2008 Beijing Paralympics, and an essential reference book, Latest Trends in Disability Sports and Classification, which is invaluable for coaches and competitive athletes involved in adaptive sports training.

▲ Professor Sheng-Guang Wu from National Taiwan University of Sport Delivers a Lecture on "The Planning for Adapted Sports and Professional Development Following the Establishment of the Ministry of Sports."

Precision Sports Medicine

4. Promoting Campus and Community Sports Clubs

The PSMHPC, in collaboration with Physical Education Center, Department of Sports Medicine, and Table Tennis Club, organized an Adapted Sports - Wheelchair Table Tennis Mixed Competition. The event aimed to promote adapted sports within the university, encouraging both faculty and students to engage in recreational activities alongside individuals with disabilities. By fostering competition, the event sought to unlock participants' potential and achieve the benefits of sports rehabilitation. Additionally, the competition helped elevate the level of table tennis performance in Taiwan, while enhancing understanding and support for individuals with disabilities. The event also contributed to the development of physical and mental health across all age groups and encouraged the spirit of teamwork.

▲ Adapted Sports - Wheelchair Table Tennis Mixed Competition

5. Collaboration with TISS

TPSMHPC has engaged in discussions with TISS to establish future collaboration models. This partnership aims to enhance the health and well-being of the people of Taiwan.

▲ PSMHPC Future Collaboration Models with TISS.

6. Interdisciplinary Collaboration at the Center

PSMHPC convened faculty, departments, and clinical medical professionals to discuss its future research plans. The focus will initially be directed toward four key areas.:

(1)Health promotion through exercise for Type 2 diabetes and metabolism-related fatty liver disease.

(2)Health promotion for Kaohsiung Medical University staff and employees.

(3)Mechanisms for sports injury recovery.

(4)Adaptive sports health promotion.

▲ PSMHPC Unites Faculty, Departments, and Clinical Professionals to Plan Research Topics.

Whether for athletes or individuals with specific health needs, the application of precise sports science research and data analysis will enhance physical fitness, prevent injuries, and promote health. This will effectively improve physical conditions, create a significant social impact, and contribute to health and disease prevention. Additionally, PSMHPC will showcase sports science equipment, such as the shockwave therapy instruments used at the National sports Training Center (NSTC). We invite experts, scholars, and professionals from various fields to participate in these events, demonstrating the center's expertise and future development plans. This will further foster cooperation and exchange in related industries.

▲ Display of Sports Science Equipment at PSMHPC

4.1 Research Platform Services

Liquid Chromatography-tandem Mass Spectrometry (LC-MS/MS) Analysis Platform

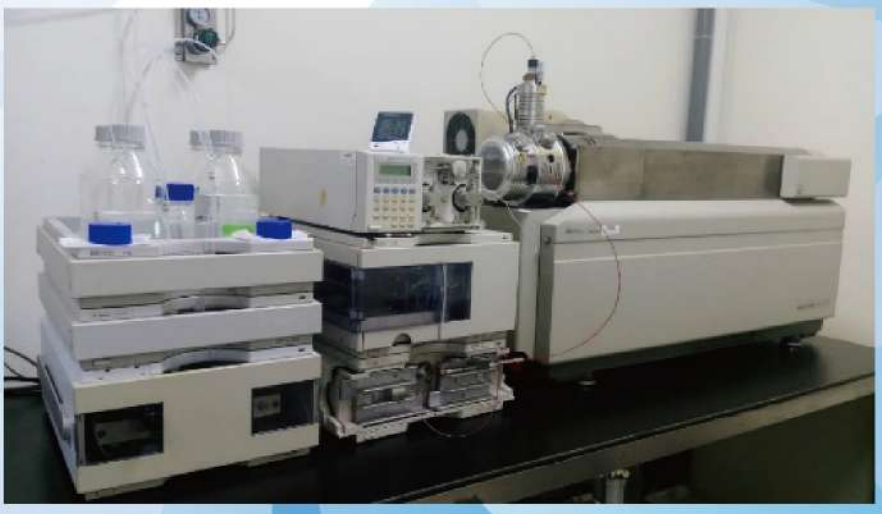
Research Center Name | Research Center for Precision Environmental Medicine

>>>Introduction

Liquid chromatography-tandem mass spectrometry (LC-MS/MS) is an advanced analytical instrument which is particularly well-suited for the separation, identification, and quantification of analytes in complex matrices. The fundamental principle of LC–MS/MS involves injecting the sample into the LC system, where it is carried by a mobile phase—typically a mixture of water and organic solvents—into a chromatographic column. Analytes in the sample are separated based on their differential affinities toward the stationary phase and mobile phases, resulting in their elution at distinct retention times. After chromatographic separation, the analytes enter the ion source of the mass spectrometer, where they are ionized into charged molecules. These ions are subsequently transferred to the mass analyzer, where they are separated and detected according to their mass-to-charge ratio (m/z), generating a mass spectrum that records the m/z values and corresponding signal intensities. Furthermore, the selected precursor ions can undergo further fragmentation to generate product ions. This fragmentation process provides valuable structural information of the analytes and contributes to enhanced resolution and analytical specificity.

LC–MS/MS offers multiple data acquisition modes:
1) Full Scan mode, which allows the detection of all ions within a selected m/z range. It can offer a broad view of the sample composition and enable the identification of unknown compounds.
2) Selected Ion Monitoring (SIM) mode, which focuses on detecting specific target ions by monitoring only selected m/z values. This targeted approach increases sensitivity and is ideal for quantifying known compounds in complex samples.
3) Selected Reaction Monitoring (SRM) mode, which monitors specific precursor- to-product ion transitions, offering high selectivity and a superior signal-to-noise ratio. It is widely used for precise quantification of target analytes, especially in complex biological or environmental matrices.

With its exceptional sensitivity and resolution, it is widely applied in areas such as pharmacokinetics, environmental pollution analysis, human biomonitoring, food safety assessment, and clinical diagnostics, serving as a critical analytical platform in biochemistry, pharmaceutical sciences, and environmental science."



▲ AB SCIX API 4000™ System

Services and Charges:

	Test Category	Item for Analysis	Pricing
1	TUrinary Melamine	Melamine	＊Non-KMU staff: NT $1,500 per sample ＊Company from Innovation Incubation Center: NT $1,350 per sample ＊KMU staff: NT $1,200 per sample
2	Urinary metabolites of phthalates	MMP、MEP、MiBP、MnBP、MEHHP、MECPP、MOHP、MCMHP、MbzP and MEHP	＊Non-KMU staff: NT $3,000 per sample ＊Company from Innovation Incubation Center: NT $2,750 per sample ＊KMU faculty: NT $2,500 per sample
3	Urinary metabolites of benzene and toluene	S-Phenylmercapturic Acid (SPMA)、t,t-Muconic acid (TTMA)、Thiodiglycolic acid (TDGA)、Phenylglyoxalic acid (PGA) and Mandelic acid	＊Non-KMU staff: NT $2,000 per sample ＊Company from Innovation Incubation Center: NT $1,800 per sample ＊KMU faculty: NT $1,600 per sample
4	Urinary metabolites of acrylamide	Acrylamide (AA)、Glycidamide (GA)、N-Acetyl-S-(2-carbamoylethyl)-L-cysteine(AAMA) and N-(R,S)-Acetyl-S-(2-carbamoyl-2-hydroxyethyl)-L-cysteine(GAMA)	＊Non-KMU staff: NT $2,000 per sample ＊Company from Innovation Incubation Center: NT $1,800 per sample ＊KMU faculty: NT $1,600 per sample
5	Qualitative analysis for organic compound	–	＊Non-KMU staff: NT $1,200 per hour ＊Company from Innovation Incubation Center: NT $1,050 per hour ＊KMU faculty: NT $900 per hour
6	Customized analytical method development	–	＊To be discussed depending on the type of analyte and sample.

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4.2 Research Platform Services

Gas Chromatography-tandem Mass Spectrometry (GC-MS/MS) Analysis Platform

Research Center Name | Research Center for Precision Environmental Medicine

>>>Introduction

The principle of gas chromatography-tandem mass spectrometry (GC - MS / MS) involves injecting a complex mixture into the instrument, where the sample is vaporized at high temperature and carried by an inert gas—such as helium—into a chromatographic column. Inside the column, individual analytes are separated based on their chemical properties. Upon elusion, the gaseous analytes are directed into the ion source of the mass spectrometer, where they undergo electron impact ionization to form molecular ions and characteristic fragment ions. These ions are subsequently accelerated and directed into the mass analyzer, where they are separated according to their mass-to-charge (m / z) ratios, allowing for both qualitative and quantitative analysis.

GC-MS/MS is primarily employed for the identification and quantification of target compounds in complex matrices. The data acquisition can be performed in various modes, including full scan, product ion scan, selected ion monitoring (SIM), and multiple reaction monitoring (MRM). Its applications include the analysis of carcinogenic compounds in environmental samples, quantification of drug metabolites, detection of pesticide residues in food, monitoring of veterinary drugs, and trace-level analysis in diverse research fields.

▲ SHIMADZU GCMS-TQ8050NX

Services and Charges:

	Test Category	Item for Analysis	Pricing
1	Qualitative analysis of volatile organic compounds (VOCs)	Butanal、2-Butanone、Benzene Pentanal、Octane、Hexanal、Valeric acid、3-Heptanone、Styrene、Cyclohexane、Heptanal、Phenol、Hexanoic acid、Decane、Octanal、2-Ethyl-1-hexanol、p-Cresol、Undecane、Nonanal、4-Ethylphenol、Dodecane	* Non-KMU staff: NT $1,000 per sample * Company from Innovation Incubation Center:NT $900 per sample * KMU staff: NT $1,800 per sample
2	Customized analytical method development	MMP, MEP, MiBP, MnBP, MEHHP, MECPP, MOHP, MCMHP, MbzP and MEHP	* To be discussed depending on the type of analyte and sample.

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4.3 Research Platform Services

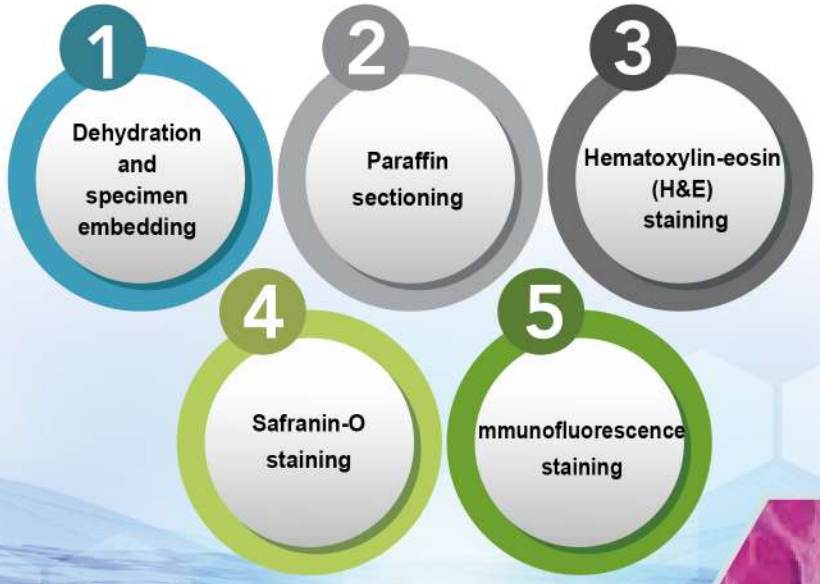
Musculoskeletal and Joint Tissue Sectioning Platform

Research Center | Regenerative Medicine and Cell Therapy Research Center

>>>Introduction

Paraffin sectioning, hematoxylin-eosin (H&E) staining, and immunostaining are widely used techniques in routine histological specimen preparation. Paraffin sections allow for the observation of the morphological structure of human or animal cells and tissues, making them a primary method for studying, examining, and identifying cellular and tissue changes in fundamental medical research, clinical medicine, pathology, and forensic science. Additionally, they are extensively utilized in various other academic fields for research and teaching purposes. Most histological specimens observed under a conventional light microscope are prepared using paraffin sectioning techniques. Living cells or tissues are generally colorless and transparent, with little contrast between different tissue types or intracellular structures, making it difficult to distinguish them clearly under a standard optical microscope. Moreover, once tissues are removed from the living organism, they rapidly degenerate and decompose, losing their original structure. Therefore, tissues must undergo fixation, paraffin embedding, sectioning, and staining to preserve their morphology and prevent cellular degradation. Hematoxylin-eosin (H&E) staining and immunostaining are commonly used techniques for observing tissue morphology and identifying the localization of specific protein expressions within tissues.

Our center's Musculoskeletal and Joint Tissue Sectioning Platform provides technical services related to routine histological specimen preparation, including:



Our center is equipped with the necessary instruments for routine histological specimen preparation, including: a tissue processor, embedding machine, cooling plate, microtomes (manual/automatic), slide dryer, water bath, ovens (37°C/60°C), freezer (-20°C), staining jars for H&E staining, optical microscopes with imaging systems, and an automated tissue scanning and analysis system.

Services and Charges:

Services	Pricing
Paraffin Tissue Sectioning	
Dehydration	＊Employee：70 TWD /Each tissue ＊Non-employee：90 TWD /Each tissue
Dehydration and specimen embedding	＊Employee：85 TWD /Each tissue ＊Non-employee：110 TWD /Each tissue
Specimen embedding (self-service)	＊Employee：50 TWD /Each tissue ＊Non-employee：No service provided
Paraffin Sectioning	＊Employee：60 TWD /Each tissue ＊Non-employee：105 TWD /Each tissue
H&E staining	＊Employee：70TWD /Each tissue ＊Non-employee：105 TWD /Each tissue
Safranin-O staining	＊Employee：80 TWD/Each slide ＊Non-employee：105 TWD/Each slide
Immunostaining	
Self-Provided Antibody	＊Employee：1,000TWD/Each slide ＊Non-employee：1,500 TWD/Each slide
Antibody testing (1 antibody only)	＊Employee：2,000 TWD/Each slide ＊Non-employee：3,000 TWD/Each slide
Immunofluorescence staining	＊Employee：1,200 TWD/Each slide ＊Non-employee：1,800 TWD/Each slide

- If applicants provide their own antibodies for immunostaining, especially self-produced antibodies, they must bear the risk of staining abnormalities due to antibody instability.
- The antibody testing service is solely for evaluating the conditions of a single antibody on a specific tissue. Applicants must provide their own antibodies along with the corresponding antibody datasheet.
- A set of 12 slides typically requires approximately 14 working days for completion. If the number of slides increases, the completion time will be assessed separately.
- If research papers utilizing this platform's services acknowledge our analysis platform in the "Acknowledgement" section, the center will offer incentives. Please refer to the incentive policy and acknowledgement guidelines for details.

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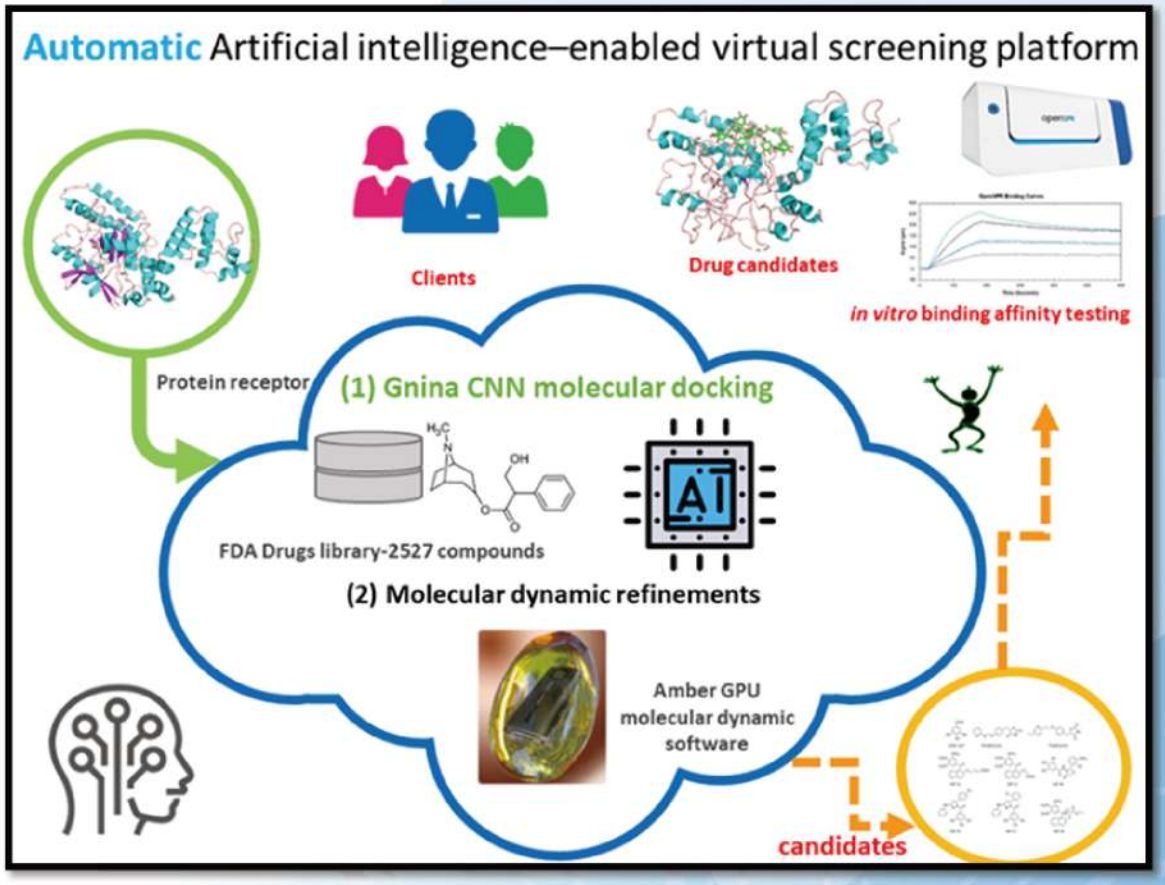
4.4 Research Platform Services

Artificial Intelligence Automated Screening Platform

Research Center | Drug Development and Value Creation Research Center

>>>Introduction



Artificial Intelligence Automated Drug Screening Platform Strategy Diagram

Small molecule drug development is a lengthy and challenging process. From discovery to approval,drugs need to go through three stages: exploratory research (1-2 years), preclinical trials (3-5 years), and human clinical trials (5-8 years), taking an average of 9-15 years and requiring investments of approximately USD 1 billion. Therefore, leveraging the database of FDA-approved small molecule drugs with artificial intelligence methods can significantly reduce the time spent in human clinical trial phases and associated research and development expenses. Our center has purchased a database of physical compounds and information for US FDA-approved small molecule drugs (2527 compounds). This is complemented by the high-precision convolutional neural network architecture GNINA molecular docking software (with R^2 values improved to above 0.7 when compared with experimental IC_{50} values) and AMBER molecular dynamics software for calculating binding free energy between drug molecules and receptor proteins to better identify potentially successful small molecules (as shown in the AI Automated Drug Screening Platform Strategy Diagram). Simultaneously, this platform provides academia and industry with a rapid and accurate virtual screening and activity experimental testing platform for small molecule drugs.

Services and Charges:

Item	Internal (KMU)	External
Non-covalent drug and single receptor protein binding (ligand-receptor docking) rapid high-throughput screening	NT$10,000 (or Free with shared research papers and patents with research center members)	NT$20,000
Covalent drug and single receptor protein binding (ligand-receptor docking) rapid high-throughput screening	NT$20,000 (or Free with shared research papers and patents with research center members)	NT$40,000
Drug design development through homology modeling and three-dimensional structure search	NT$5,000 (or Free with shared research papers and patents with research center members)	NT$10,000
Long-time domain molecular dynamics simulation	NT$20,000~300,000 Depending on information complexity (or Free with shared research papers and patents with research center members)	NT$20,000~300,000 Depending on information complexity
Other items	NT$80,000~300,000 Depending on information complexity (or Free with shared research papers and patents with research center members)	NT$80,000~300,000 Depending on information complexity

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4.5 Research Platform Services

Cancer Targeted Therapeutic Drug Monitoring Platform

Research Center | Center for Cancer Research

Introduction

Tyrosine kinase inhibitor (TKI) is the prototype of cancer-targeted therapy. Monitoring the blood concentration of TKIs has the potential to facilitate the investigation of the pharmacokinetics and the correlation between drug efficacy and/or toxicity across different cancer types under TKI treatment. The present platform provides analysis of three plasma TKIs and their active metabolites, including:

EGFR inhibitors: Afatinib, Osimertinib

VEGFR inhibitor: Sorafenib

Services and Charges

The platform utilizes UPLC-MS/MS analytical technology to monitor the blood levels of three TKIs and their metabolites:

EGFR inhibitors: Afatinib, Osimertinib

VEGFR inhibitor: Sorafenib

1.Instrument Name: Ultra - Performance Liquid Chromatography - Tandem Quadrupole Mass Spectrometer (UPLC-MS/MS)

2.Instrument Brand and Model:

Liquid Chromatography System: Waters Acquity UPLC I-Class PLUS

Mass Spectrometer: Waters Xevo TQ-S micro

3.Key Specifications:

i.Acquity UPLC I-Class PLUS system: Operational pressure up to 19,000 psi, injection volume 1-10 µL.

ii.Ionization Source: Electrospray Ionization (ESI)

iii.Tandem Quadrupole Mass Spectrometer: Mass-to-charge ratio detection range 2-2048 m/z, scan rate up to 20,000 Da/sec, capable of detecting both positive and negative ions within a single analysis.

4.Functional Capabilities:

Data Acquisition Modes:

Scan Mode	Scan Mode
Full Scan	The scanning of the mass-to-charge ratio provides information on molecular weight qualification.
Selected Ion Monitoring (SIM)	Monitors specific selected ions.
Multiple Reaction Monitoring (MRM)	Selects the precursor ions for fragmentation and monitors specific product ions, enhancing quantification accuracy and sensitivity.
Precursor Ion Scan	Scans for precursor ions that generate specific product ions.
Product Ion Scan	Selects specific ions for fragmentation and scans their product ions.

5.nstrument Location: Kaohsiung Medical University, First Teaching Building, Room 623, 6th Floor.
6.Platform Usage Application Process:
To ensure proper instrument operation, this platform operates mainly under an entrusted analysis model. Users must complete an application form and submit it along with samples to Room 543, 5th Floor, First Teaching Building. Samples are analyzed on a first-come, first-served basis; reservations cannot interfere with existing sample analysis schedules.
7.Service Fee:

Important Notes

Self-Operation: Not permitted.
Entrusted Test: NT$1,600 per sample.

Incubation Center Resident Enterprises

Self-Operation: Not permitted.
Entrusted Test: NT$1,800 per sample.

External Users

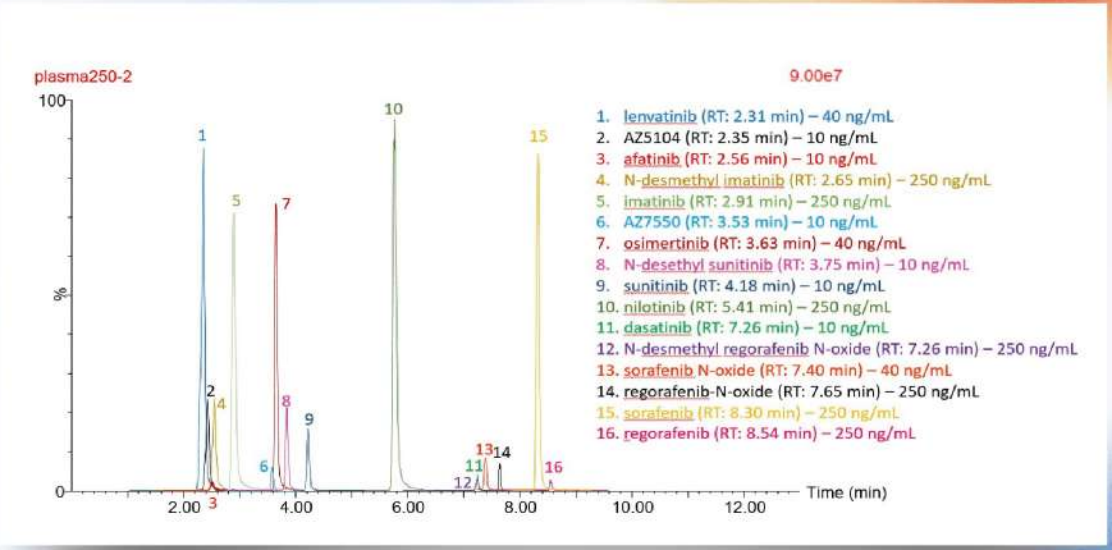
Self-Operation: Not permitted.
Entrusted Test: NT$2,000 per sample.

(For other unlisted drugs, method development projects can be negotiated.)

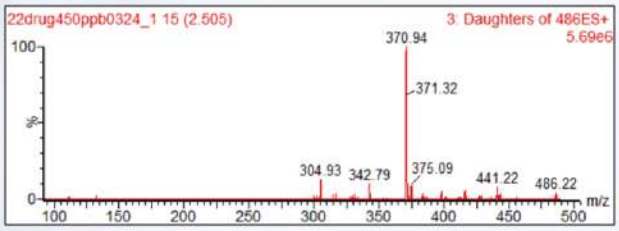
＊Important Notes:
i.Sample labeling must match the information provided on the application form.
ii.Blood sample requirements:
Whole blood (At least 3 mL); Plasma (At least 1 mL)
Storage conditions: Refrigerated (4°C) or frozen (-20°C) based on sample type.
iii.Radioactive and viral samples are NOT accepted.

8.Experimental Example:
LC-MS/MS Analysis of TKIs in Blood Samples

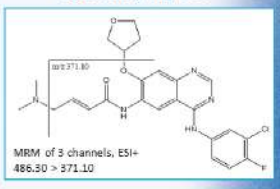
i.The center develops fit-for-purpose LC-MS/MS analytical methods based on expected concentrations for each TKI in daily clinical practice.
ii.The analysis utilizes matrix-matched, isotope-labeled internal standards and functions in multiple reaction monitoring (MRM) mode, ensuring adequate specificity, sensitivity, and a strong linear correlation between signal and concentration.



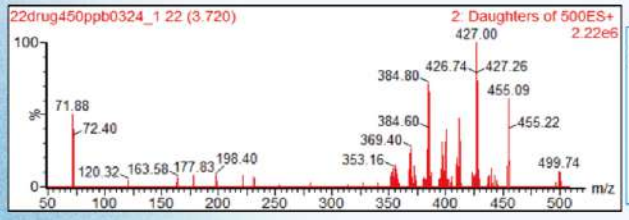
Production scan of Afatinib



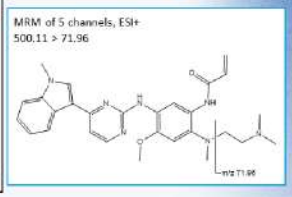
Quantifying ion



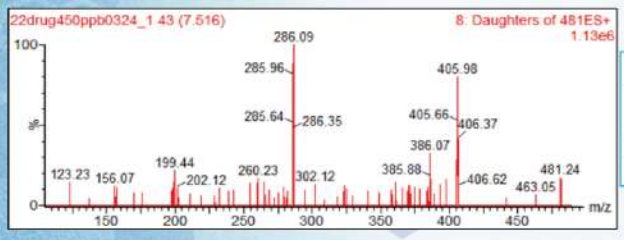
Production scan of Osimertinib



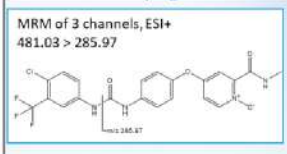
Quantifying ion



Production scan of Sorafenib



Quantifying ion



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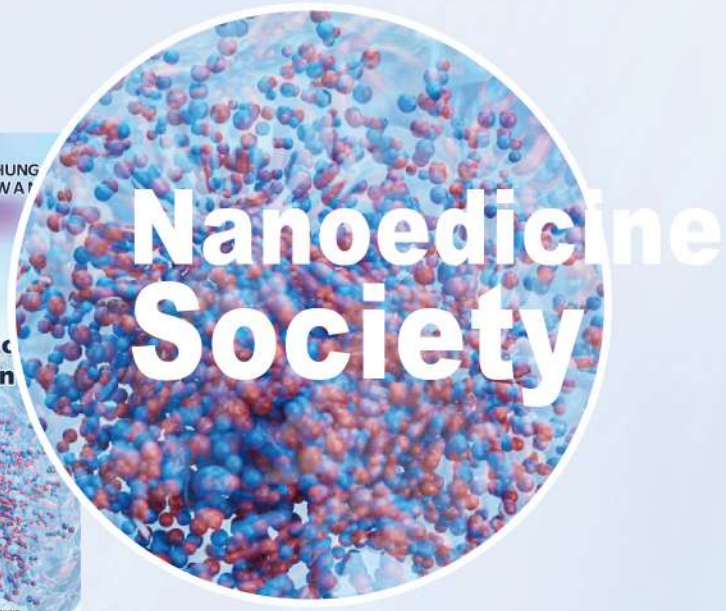
2025 Annual Meeting of Taiwan Nanomedicine Society-International Conference on Precision Nanomedicine in Theranostics

114.7.25 Fri. – 7.26 Sat.

Venue: Evergreen Laurel Hotel, Taichung

To advance the frontiers of basic and applied research in nanomedicine, the Taiwan Nanomedicine Society has been actively organizing various academic events across Taiwan in collaboration with different research institutions. These events aim to promote the sharing of the latest research findings, foster interdisciplinary integration, and enhance Taiwan's standing in international nanomedicine research.



Registration：

For more details, please visit the conference website:
https://www.tnsociety.com/Conference/

Organizer:
Taiwan Nanomedicine Society; Center of Applied Nanomedicine, National Cheng Kung University; Interdisciplinary Research Center on Material and Medicinal Chemistry, National Cheng Kung University; National Cheng Kung University; National Science and Technology Council; Ministry of Education.

※Both of Department of Medicinal and Applied Chemistry & Drug Development and Value Creation Research Center are listed as Co-Organizers.

Important Events

KMU AI seminar

How Generative Agents Are Reshaping Healthcare and Human-Machine Learning

114.1.23 Thurs 12:10~13:20

Venue: CS407 Classroom, Chi-Shih Building, KMU

The recent advancement of foundation models has initiated a new era of AI, particularly with Generative Agents. These systems can simulate human behaviors and complex medical scenarios, reshaping healthcare delivery. We will explore their applications in creating realistic patient simulations for enhanced training and optimized treatment strategies. These agents provide personalized insights, improving diagnostic processes and treatment decisions. We will also examine how causal inference enhances understanding of how different treatments affect patient outcomes, enabling better-informed clinical choices. This presentation will highlight the practical applications of generative agents in clinical practice and discuss essential ethical considerations.

Speaker: Yi-Huang Kang
(Associate Professor, Department of Information Management, National Sun Yat-sen University)

Organizer: Biomedical Artificial Intelligence Academy
Co-Organizer: Project Management Office for Intelligence Healthcare, KMU Chung-Ho Memorial Hospital

Important Events

Academic Lecture

AI x BI x CI

The Three Intelligences for Saving the Planet

114.2.5 Wed. 12:10~13:20

Venue: 1st Conference Room, 6F, Frank C. Chen Memorial Building, KMUH

Speaker : Lai-Chu Chen
(Chairman of Wu-Yun Sustainability & Taiwan Perovskite Technology)

1. The Planet is Heating Up—How Can We Save It?
   * Global warming is like a patient with a high fever—carbon neutrality is the cure.
2. What is the "Three Intelligences" Approach?
   * AI (Artificial Intelligence): Like a doctor, using data to optimize energy use.
   * BI (Business Intelligence): Like a teacher, designing sustainable business models.
   * CI (Carbon Intelligence): Like a health manager, tracking carbon emissions.
3. Successful Decarbonization Examples
   * Smart hospitals implementing energy-saving and carbon reduction strategies.
   * Buildings transforming into green power plants that generate electricity.
4. Conclusion: Energy Efficiency, Carbon Reduction, and Saving the Planet!
   * Date /Time: February 5, 2025 (Wed.) 16:10~17:10
   * Venue: 1st Conference Room, 6F, Frank C. Chen Memorial Building, KMUH

Organizer: Biomedical Artificial Intelligence Academy

Important Events

KMU AI seminar

The Evolution of Smart Anesthesia

114.2.13 Thurs. 12:10~13:20

Venue:CS201 Classroom, Chi-Shih Building, KMU

Applications of AI in the Anesthesiology Department.

Speaker : Zhi-Ping Gao
(Attending Physician, Department of Anesthesiology, KMUH)

Organizer : Biomedical Artificial Intelligence Academy
Co-Organizer : Project Management Office for Intelligence Healthcare, KMU Chung-Ho Memorial Hospital

Important Events

KMU AI seminar

Multimodal Clinical Medicine and Generative AI

114.2.20 Thurs. 12:10~13:20

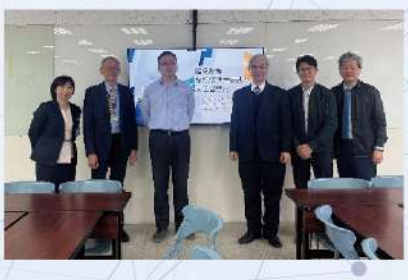
Venue:CS201 Classroom, Chi-Shih Building, KMU

Speaker :Wei-Chih Shen
(Professor, Department of Medical Informatics, Chung Shan Medical University; Director, AI Center, Chung Shan Medical University Hospital)

Not long ago, under the wave of artificial intelligence, many hospitals developed clinical applications focused on medical imaging for auxiliary detection and diagnosis. Some even went further by applying for medical device certifications or establishing startups. In the past two or three years, the emergence of ChatGPT and Generative AI (GenAI) has brought an even greater wave of change. How different industries can leverage Generative AI to benefit their fields has become a hot topic.

At the beginning of 2024, the National Science and Technology Council (NSTC) launched the first GenAI Stars competition to help industries adopt Generative AI and find key strategic directions. After a year of competition and mentorship, Chung Shan Medical University Hospital won the Gold Award, the highest honor, and was the only school-affiliated hospital among the award-winning teams.

We proposed the GenAI transformation of clinical workflows and the concept of self-built assistants for medical professionals. We successfully developed and implemented the "YiDianJia" product. In the process of driving real-world applications, we integrated multimodal AI technology, gradually realizing intelligent clinical healthcare to foster internal innovation at Chung Shan Medical University Hospital. Furthermore, we aim to commercialize the assistant to support other healthcare institutions. In this talk, we will share our experiences and discuss potential future directions.



Organizer : Biomedical Artificial Intelligence Academy
Co-Organizer : Project Management Office for Intelligence Healthcare, Kaohsiung Medical University Chung-Ho Memorial Hospital

Important Events

Academic Lecture

Implementation and Future Planning of Taiwan's Long-Term Care Plan 2.0

114.3.7 Fri. 15:00~17:00

Venue:9F Conference Room, International Academic Research Building

Not long ago, under the wave of artificial intelligence, many hospitals developed clinical applications focused on medical imaging for auxiliary detection and diagnosis. Some even went further by applying for medical device certifications or establishing startups. In the past two or three years, the emergence of ChatGPT and Generative AI (GenAI) has brought an even greater wave of change. How different industries can leverage Generative AI to benefit their fields has become a hot topic.

Speaker : Director General Chien-Fang Chu,
Long-Term Care Department, Ministry of Health and WelfareAnesthesiology, KMUH)

▲ Director General Chien-Fang Chu and Director Chi-Kung Ho took a photo together after the lecture

Organizer: Research Center for Medical Technology and Policy

Important Events

Experience Sharing of International Scholar

International Scholars Exchange Meeting on March, 2025

114.3.13 Thurs. 9:30~11:45

Venue:Emergency and critical care building 9F (NEW) -3rd Meeting Room, Kaohsiung Municipal Siaogang Hospital

On March 13, 2025, We hold an "International Scholars Exchange Meeting" at Siaogang Hospital, inviting Professor Pei-Song Gao of Johns Hopkins University, Professor Yuanpu Peter Di of the University of Pittsburgh, Vice President Li Yongjin of Siaogang Hospital, and attending physician Wang Zhiwen of the Department of Hepatobiliary and Pancreatic Medicine to share their views.

Organizer : Research Center for Precision Environmental Medicine

Co-Organizer : Kaohsiung Municipal Xiaogang Hospital、MOE USR project- Air pollution、Environmental Occupational Medicine Doctorate Program

Important Events

KMU AI seminar

The Present and Future of Generative AI in Healthcare

114.3.13 Thurs. 12:10~13:20

Venue : CS201 Classroom, Chi-Shih Building, KMU

We will start with the core technologies of Generative AI, including natural language processing (NLP), deep learning models, and data augmentation, and how they empower the healthcare industry. Next, we will introduce current clinical applications, such as AI-assisted diagnosis, clinical decision support, medical record summarization, and healthcare quality and patient safety. The session will explore the current state and future trends of Generative AI in clinical practice, healthcare management, and medical research.

Speaker : Chia-Te Liao
(Director, Center for Evidence-Based Medicine & Healthcare Policy, Chi Mei Medical Center)

Organizer: Biomedical Artificial Intelligence Academy
Co-Organizer: Project Management Office for Intelligence Healthcare, KMU Chung-Ho Memorial Hospital

Important Events

Academic Lecture

Introduction to Taiwan's Health Insurance Policy, Future Strategies, Family Doctor System, and Payment Plans for Three Chronic Conditions

114.3.14 Fri. 15:00~17:00

Venue: 6F Lecture Hall 2, Frank C. Chen Memorial Building, Kaohsiung Medical University Chung-Ho Memorial Hospital

On March 14, 2025, the Research Center for Medical Technology and Policy proudly invites Director-General Chung-Liang Shih from the National Health Insurance Administration, Ministry of Health and Welfare, to share insights on current Taiwan health insurance policies, future strategic plans, the Family Doctor System, the pilot program for acute home care, and payment plans for three chronic conditions (hypertension, diabetes, and hyperlipidemia). The lecture will also address healthcare challenges in a super-aged society and the challenges facing Taiwan's medical system. Discussions with faculty, senior and grassroots administrators, and team members will aim to enhance the quality of research and services within our institution's system and foster students' interest in public health affairs.

Speaker :
Director General Chung-Liang Shih
National Health Insurance Administration, Ministry of Health and Welfare

Organizer: Research Center for Medical Technology and Policy

Important Events

Experience Sharing of International Scholar

Experience Sharing on Clinical Digital Transformation in the U.S.

114.3.19 Wed.

12:00~13:30

Speaker : Dr Chien Chen, USA VA Hospital

Venue:CS201 Classroom, Chi-Shih Building, KMU

We sincerely invite a senior healthcare management expert from the U.S. to share insights on effectively integrating Artificial Intelligence (AI) technology into clinical practice. This lecture will cover how AI enhances medical decision-making, optimizes clinical workflows, and improves patient care experiences. It is suitable for healthcare administrators, medical professionals, and anyone interested in AI applications in healthcare.

Organizer: Biomedical Artificial Intelligence Academy

Important Events

KMU AI seminar

National Cheng Kung University Hospital Innovative Smart Healthcare Sharing

114.3.27 Thurs. 12:10~13:20

Venue : 1st Conference Room, 6F, Frank C. Chen Memorial Building, KMUH

Speaker : Yi-Shan Tsai
(Director, Clinical Innovation and Research Center, National Cheng Kung University Hospital)

Organizer: Biomedical Artificial Intelligence Academy

Co-Organizer: Project Management Office for Intelligence Healthcare, KMU Chung-Ho Memorial Hospital

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