KMU Newsletter

Kaohsiung Medical University , Taiwan

Profile Interview • Research Achievements • Latest News

Kaohsiung Medical University

Kaohsiung Medical University (originally known as Kaohsiung Medical College) was formally established in 1954. Apart from being the first private medical university in the university has also become an important cradle for highly-skilled physicians and medical-related specialists. Kaohsiung Medical University was a center of both medical care and the study of local tropical medicine in the early days. The colleges set aside its tropical disease research mission after the World Health Organization announced that was no longer a tropical disease endemic area, and turned its full attention to the steadily evolving areas of basic medical science and clinical medical research.The university has also continued to strengthen its medical services. Kaohsiung Medical University therefore has laid a solid foundation as southern's leading medical institution. After Kaohsiung Medical College became a university in the summer of 1999, it seized this opportunity to move faster and further and attain to the highest standards in teaching, research and service. The shared vision of everyone at Kaohsiung Medical University is to make the university a modern, forward-looking institution striving for excellence in both academics and medical care. Kaohsiung Medical University has all the strengths of a well-established university. There is a wide range of medical related courses, and the facilities both for basic and clinical research are sufficient and of a good quality. The University is located in city center of Kaohsiung, the second biggest city in , which has all the attractions and excitement of city life.

Kaohsiung Medical University , Taiwan

Profile Interview

President MING-LUNG YU holds a Ph.D. from the Graduate Institute of Medicine at KMU. He has previously served as the superintendent of the Kaohsiung Municipal Ta-Tung Hospital and the Vice President of National Sun Yat-sen University. His areas of expertise include Hepatitis B and C, liver cancer, digestive science, reproductive biology, and translational medicine.

President Yu has received the following prestigious awards: the 2019 29th Wang Ming-Ning Award for Outstanding Contribution to Medical Technology Development, Public Health, and National Society, the 2023 Outstanding Research Award, National Science and Technology Council, the 2023 Special Contribution Award, Taiwan Association for the Study of the Liver, and the 2024 Tien-Te Lee Biomedical Foundation "The 20th Medical Science and Technology Award". His research has integrated clinical applications, benefiting numerous patients. As one of the pioneers in personalized precision treatment for hepatitis C, President Yu has over 30 years of experience and outstanding achievements in the medical field. He aims to shape the future of medical education and nurture physicians who truly care for their patients.

Profile Interview

What inspired your decision to pursue this research field?

More than three decades ago, I embarked on my career in liver disease research. At that time, routine health screenings were not widely available, which often resulted in patients being diagnosed only after their conditions had progressed to advanced stages, such as cirrhosis or liver cancer, missing critical opportunities for early intervention.

A particularly concerning aspect of liver disease is its asymptomatic nature in the early stages, allowing the disease to advance silently and compromise health undetected. As I studied this phenomenon, I recognized that it was a significant challenge for individual patients and an urgent public health issue in Taiwan.The field of liver disease research, with its many unresolved questions and vast potential for innovation, offered an opportunity to make a meaningful impact. This realization inspired me to dedicate my career to this critical area, driven by the hope that my research could help mitigate the global burden of liver disease and improve public health outcomes.

What preventive measures are available to the public for hepatitis and liver cancer?

The prevention and treatment of liver diseases primarily focus on Hepatitis B and C. In recent years, significant breakthroughs have been made in treating Hepatitis C. The use of oral antiviral medications has led to cure rates of 90-95%, drastically reducing the impact of the disease on patients' health. While there is currently no complete cure for Hepatitis B, a nationwide vaccination program that started over 40 years ago has significantly reduced the infection rate among individuals under the age of 40. However, since the Hepatitis B virus can persist in the body, the primary goal of treatment is to control viral replication and delay disease progression, thus reducing the risk of cirrhosis and liver cancer. According to current trends, Taiwan will need at least another 20 years of sustained efforts to mitigate the public health impact of Hepatitis B.

When it comes to liver cancer, early detection significantly increases the chances of successful treatment through surgical resection or local tumor therapies. However, current screening coverage remains inadequate; only about 30% of high-risk individuals undergo regular checkups, resulting in

many patients being diagnosed with liver cancer at advanced stages and missing the optimal window for intervention. Beyond surgery and tumor ablation therapies, the effectiveness of current pharmacological treatments is still limited. Therefore, enhancing screening rates, developing more effective drugs, and implementing integrated treatment strategies will be crucial for future advances in liver cancer prevention and treatment. For high-risk groups, follow-up examinations every six months are recommended to improve the chances of early diagnosis.

Additionally, with the changing lifestyle in modern society, obesity and metabolic syndrome have become significant factors that affect liver health. Currently, approximately 50% of adults in Taiwan suffer from fatty liver disease, with about one-third at risk of progressing to non-alcoholic steatohepatitis (NASH), which increases the risk of cirrhosis and liver cancer. Hence, over the next decade, liver disease prevention and treatment should extend beyond controlling viral hepatitis to also include the prevention of metabolic-related fatty liver disease. This can be achieved through healthy diets, regular exercise, and weight management, thereby reducing the incidence of liver diseases and improving the overall liver health of the population.

What has been the greatest challenge in your over 30 years of medical experience, and how do you maintain your passion and drive in this field?

Over the course of my more than thirty years in medicine, the most formidable challenge I have encountered is the insidious nature of liver diseases and the profound public health dilemmas they present. The absence of early symptoms often leads to delayed diagnoses, with many patients only discovering their condition once it has progressed to cirrhosis or liver cancer. This results in a missed opportunity for effective treatment. Compounding this issue are the limitations in diagnostic technology and the scarcity of effective treatment options, leaving medical teams struggling to intervene. In response, I have dedicated my career to enhancing early diagnosis accuracy, developing more effective treatment strategies, and promoting public education on disease prevention, all with the goal of reducing the devastating impact of liver diseases.

Throughout this journey, my passion for medical advancement has been driven by a desire to challenge the status quo and a deep sense of duty to share KMU's contributions on a global stage. The actual value of academic research lies in constant innovation; it cannot rest on past accomplishments. Whenever I am invited to speak, I recognize that I am not just sharing my own insights

but representing KMU's ongoing progress and impact. The world must see the continuous evolution of our research and the ways in which it shapes the future of medicine. With this in mind, I always seek unresolved challenges, striving to drive medical progress beyond government policies and surpassing conventional frameworks of thought.

Moreover, academia's influence extends beyond theoretical discourse; it must translate into concrete, actionable policy recommendations.To truly inform and shape governmental decision-making, we cannot remain confined to slogans or advocacy alone; our arguments must be rooted in rigorous research and empirical evidence. Only through a deep understanding of key issues, a willingness to challenge existing perspectives, and the provision of scientifically sound evidence can our recommendations hold genuine value,
driving progress in medicine and public health.

How do you view the current development of the liver disease field, and how should future challenges be addressed?

In the field of liver disease prevention and treatment, we have continuously advanced both research and clinical applications. For decades, the prevailing belief has been that breakthroughs in liver disease hinge primarily on fundamental biomedical research. While laboratory discoveries are indispensable, the more significant challenge lies in translating these research findings into practical applications that can effectively enhance human health.The ultimate objective of basic research is to identify novel and effective clinical diagnostic and treatment methods. However, if the focus is exclusively on drug development without considering the issue of accessibility, tolerability, and real-world applicability, its impact will remain limited to provide tangible benefits to patients. For instance, even if a new drug theoretically offers a 100% cure rate, its clinical utility may be nullified if the associated side effects are intolerable for most patients. Therefore, while fundamental research remains crucial, the greater priority is ensuring that its findings translate into tangible benefits for society.

Moreover, it is important not to categorize all medical research as overly specialized or inaccessible. Many public health solutions can be achieved through targeted and pragmatic approaches. In the field of public health, although advancements in treatment methodologies are significant, enhancing public awareness of diseases and ensuring that high-risk populations receive timely diagnosis and treatment are equally important. For example, despite the availability of many emerging treatments for Hepatitis C, a critical concern is that a substantial number of individuals are unaware of their infection status, resulting in missed opportunities for early intervention. Consequently, future

strategies for liver disease prevention and treatment should not be confined to drug development but should also prioritize the promotion of widespread screening and early diagnostic mechanisms. Initiatives, such as community-based outreach programs and large-scale testing campaigns, are essential to interrupt disease transmission at its source effectively.

Looking forward to addressing the challenges of liver disease prevention and treatment, we need a more comprehensive strategy. This strategy should deepen basic research and develop more effective treatments, as well as strengthen public health policies and health education. This approach will ensure that a greater number of individuals receive timely medical intervention during the early stages of disease progression. By integrating scientific research, policy development, and concerted societal action, we can genuinely transform the landscape of liver disease prevention and treatment, thereby fostering a sustainable global impact on public health.

How can KMU break through conventional frameworks and foster innovative thinking?

KMU's ability to break through traditional frameworks and foster innovative thinking lies in expanding international collaboration and promoting interdisciplinary research. By integrating resources, forming strategic partnerships, and creating an open academic environment, institutions can enhance their competitiveness. In today's era of globalization, academic exchange is no longer limited by geographic boundaries. With the advancement in digital communication and remote collaborations, virtual meetings have become essential modes of scholarly interaction. To strengthen its global presence, KMU should consolidate resources and prioritize funding for international cooperation and forward-thinking initiatives. Particularly, establishing long-term, stable partnerships with one or two world-leading universities will ensure sustained academic collaboration and meaningful research outcomes.

Additionally, academic innovation thrives on intellectual exchange with outstanding researchers. Therefore, KMU should actively invite scholars with forward-looking expertise to participate in dialogue and collaboration. This could include creating interdisciplinary research centers, developing cross-domain courses, fostering industry-academia partnerships, and supporting innovation incubators. Through these strategic efforts, KMU can stay at the forefront of medical and academic advancements while fostering a global perspective among students and researchers. This will further enhance KMU's international reputation and academic competitiveness.

Research Achievements

Two outstanding alumni from Kaohsiung Medical University receive Tien-Te Lee Biomedical Foundation "The Medical Science and Technology Award”

This year, two outstanding alumni from Kaohsiung Medical University—MING-LUNG YU, President of KMU, and Distinguished Researcher Hsieh, Patrick Ching-Ho from the Academia Sinica—were both awarded Tien-Te Lee Biomedical Foundation "The 20th Medical Science and Technology Award" for their medical research in the treatment of "liver" and "heart" respectively.

President MING-LUNG YU of Kaohsiung Medical University has long been dedicated to precision medicine research on Hepatitis C. His research has made significant breakthroughs in 'Translational medical research on the individualized treatment of chronic Hepatitis C with antiviral drugs through applied virology and pharmacogenomics, as well as resource-oriented treatments for Hepatitis C precision medicine.' Currently, in combination with the new generation of Hepatitis C treatment drugs, he has successfully developed the 'C-Hepatitis Micro-eradication' strategy. President Yu's research achievements in Hepatitis C are widely cited in clinical practice and have been recognized by the international academic community, contributing significantly to the global medical and pharmaceutical development and public health.

President MING-LUNG YU and Distinguished Researcher Hsieh, Patrick Ching-Ho are both outstanding alumni in the 'academic' category of Kaohsiung Medical University. Both are excellent physician-scientists who have not only excelled in academic research but have also dedicated themselves to translating their research findings into effective clinical treatments and technologies, benefiting the public.

Research Achievements

The Tien-Te Lee Biomedical Foundation "The Medical Science and Technology Award" 'Excellence in Medical Technology Award' is granted annually to scholars who have contributed to the development of medical and pharmaceutical technologies and to the well-being of the nation and society. This year, President MING-LUNG YU and Distinguished Researcher Hsieh, Patrick Ching-Ho were jointly honored for their innovative research achievements, showcasing the strong capabilities of KMU alumni in the field of medical technology. KMU will continue to uphold the spirit of balancing humanities and science, nurturing more outstanding talents, providing solutions to global health issues, and contributing to the well-being of humanity.

Professor Chai-Lin Kao's research team receives a subsidy of NT$6 million from the National Science and Technology Council

Professor Chai-Lin Kao's research team focuses on the theme of "High-efficiency Peptide Synthesis Technology for Specialty Peptides" and has received a subsidy of NT$6 million from the National Science and Technology Council for the second batch of the 2024 Taiwan Germination Program. The research team from KMU collaborates with Associate Professor Chen, Hui-Ting from the Department of Pharmacy at National Yang Ming Chiao Tung University to carry out this project. The research outcomes of this project will lead to the establishment of a startup company to develop new and efficient peptide synthesis technologies, addressing industrial needs and advancing peptide drug development.

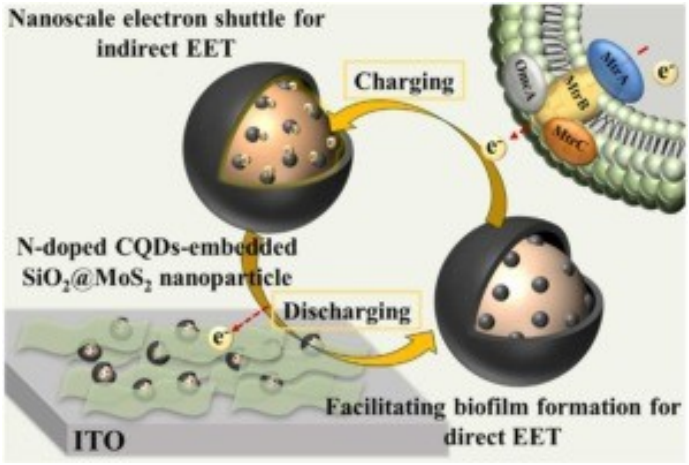
The goal of the "Taiwan Germination Program" is to help scientific research entrepreneurship projects achieve commercialization milestones and enhance their valuation. It assists research institutions in identifying significant research outcomes with entrepreneurial potential, supports their commercialization, and leads to innovative products or services that meet market demands.

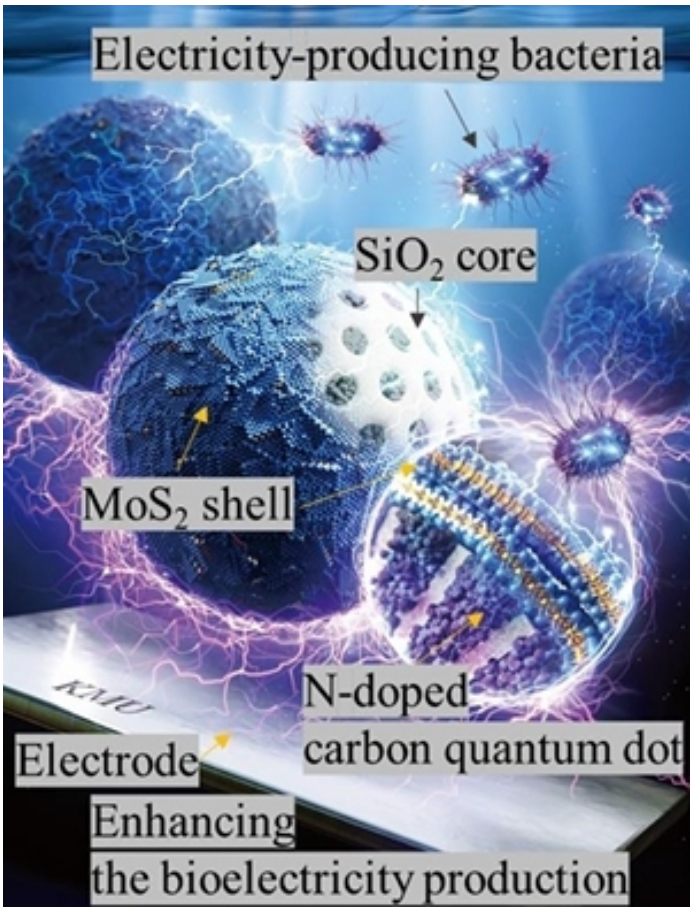
Nanoscale electron shuttle facilitating the electron transport in microbial fuel battery to enhance bioelectricity production

Abstract:

A microbial fuel cell (MFC) is an advanced green battery that has limited application because of its low current density. In the present study, Shewanella oneidensis MR-1, which is an electricity-producing bacterium, was used in an electrochemical reactor as a bacterial model.

Thus, these NPs could act as an electron nanoshuttle and a conductive medium in biofilms for enhancing systematic extracellular electron transport. A 10-fold increase in bioelectricity production than no NPs addition was achieved, which confirmed the applicability of the aforementioned NPs in advanced MFC applications. The NPs prepared in this study, which mimic biological electron shuttles (e.g., RF) in long-distance conduction, can usher in a new era in the development of advanced MFCs.





Read more

Electron-producing bacteria, similar to electric eels, can release electrons into their environment. The transfer of metabolic electrons from the cell to the surroundings requires the assistance of conductive proteins. These bacteria play a crucial role in balancing environmental minerals. In recent years, related applications, such as microbial fuel cells, have gradually emerged. This technology holds promise for future use as a power source for long-wearing biological devices and nanorobots.

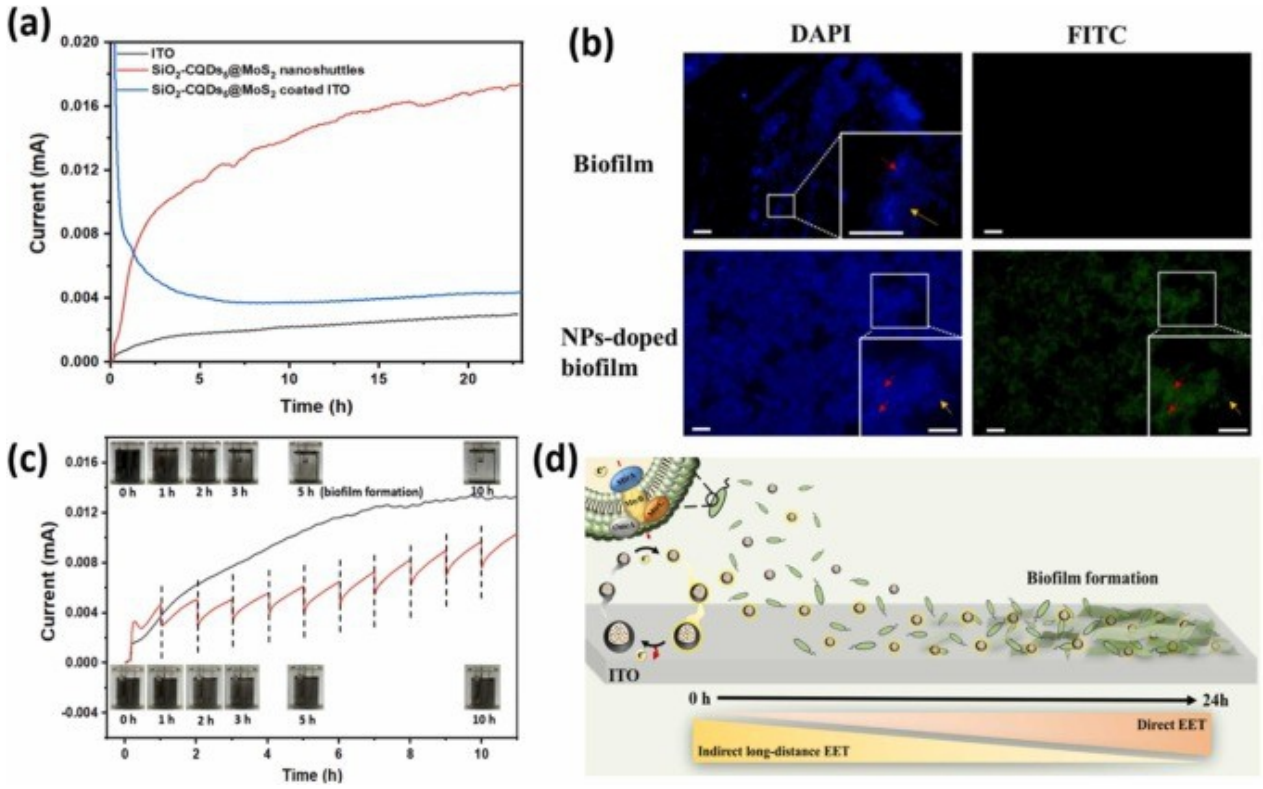
Research Achievements

This study is inspired by riboflavin, a natural electron carrier secreted by Shewanella oneidensis MR-1. Riboflavin facilitates the rapid transfer of accumulated metabolic electrons in bacteria, transporting them via diffusion to environmental minerals, enabling long-range electron transfer. In this study, we developed a nanoscale electron carrier consisting of mesoporous silica (SiO2) nanoparticles as the core, with riboflavin loaded into the pores. The surface of the SiO2 is grafted with thiol functional groups. Following this, a molybdenum precursor and thiourea are added to the reaction, and through a hydro-thermal process, metallic molybdenum disulfide (MoS2) nanosheets are formed. These conductive MoS2 nanosheets are deposited on the surface of the thiolated SiO2 nanoparticles, creating a conductive shell.

Metabolic electrons on the bacterial surface flow through the MoS2 shell to reach the CQDs inside the nanoparticle (charging), and then the nanoparticle diffuses to the electrode to release the stored electrons (discharging). This process introduces a new electron transport pathway between bacteria and electrodes, increasing bioelectricity production by 10- fold. This research represents a significant step forward in the feasibility of applying microbial batteries to biological devices.

Application and Highlights:

1. Highly conductive CQDs-embedded SiO2@MoS2 nanoparticle was successfully fabricated.
2. The charged capability of N-doped CQDs enables an increase in electron delivery density.
3. This nanoparticle was applied as the nanoscale electron shuttle in a microbial fuel battery to achieve a 10-fold increase in bioelectricity production.



The design and synthesis of catalysts for thering-opening polymerization of cyclic esters

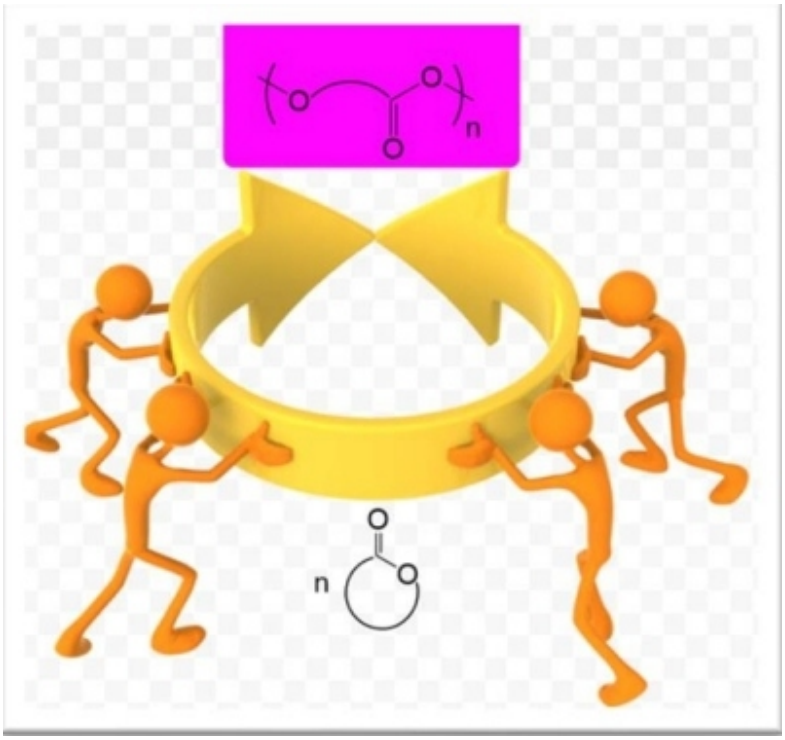
Our laboratory focuses on the design and synthesis of catalysts for the ring-opening polymerization of cyclic esters. The catalysts play the role of Lewis acid to activate the carbonyl group of the cyclic esters during the polymerization process, and different ligands can change the Lewis acidity of the metal catalysts. In addition, ligands can protect the metal catalytic center from transesterification.

Since we published some papers about the multinuclear metal catalysts for ring-opening polymerization of cyclic esters and proved the effectiveness of multinuclear metal catalysts, we combined our experience with relevant literature reports and published in Coordination Chemistry Reviews (2023, 475, 214847; IF＝20.3; 1/44 in CHEMISTRY, INORGANIC & NUCLEAR). This review paper so far has been cited 51 times, highlighting the importance of this research.

Currently, our research in our laboratory has three themes:

1. Improve the polymerization ability of the catalyst by changing the geometric structure of the catalyst.
2. Use sulfur-containing ligands to synthesize metal catalysts to improve the polymerization ability of the catalyst.
3. Design multi-nuclear metal catalysts to improve the polymerization ability of the catalyst.

Read more



Latest News

Kaohsiung Medical University Achieves New Milestones in Research and Development, Winning 13 Awards at the 21st National Innovation Award

The 21st National Innovation Award ceremony was held on December 26, 2024.KMU received a total of 13 awards, including 5"Academic and Research Innovation Awards," 3"Clinical Innovation Awards," and 5"Innovative Improvement Awards," demonstrating its outstanding research and development capabilities.

KMU pointed out that the awarded Academic and Research Innovation Awards includes Professor Li-Tzong Chen and Professor Wen-Chun Hung's team from the National Health Research Institutes (NHRI) for their work on "Developing a humanized CXCR2 antibody for the treatment of solid tumors and improving the immune microenvironment," which can significantly inhibit the growth of pancreatic cancer and blood cancer cells while improving the immune microenvironment. Additionally, Professor Tsung-Lin Cheng's team received the award for their work on "Coagulation regulator and miRNA for the prevention or treatment of osteoarthritis," focusing on enhancing the anti-inflammatory, proliferative, and migratory abilities of chondrocytes.

Kaohsiung Medical University , Taiwan

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The three technologies awarded the Clinical Innovation Awards include: Professor Shu-Pin Huang's team for developing the "Second-generation hormone drug precision testing service for prostate cancer" which has achieved an 87.25% accuracy in predicting drug response and provides clinical physicians with precise medication, prolonging the survival of prostate cancer patients and reducing waste from ineffective medical treatments; Professor Chia-Hsin Chen's team, in collaboration with Professor Ke Li-Wei from National Yang Ming Chiao Tung University, Professor Wu, Jyh-Ming from National Tsing Hua University, and industry partners, for developing the "Smart Tongue Vibration Training System," which combines visual feedback with tongue rehabilitation training games to enhance patient engagement and increase fun; and Dr. Chen Hao-Wei's team for developing the "Rapid Kidney Stone AI Screening System, " which, using AI algorithms from Professor Chung-Yao Kao of National Sun Yat-sen University, analyzes whether kidney stones are present based solely on the subject's health check data, with a clinical test accuracy rate of 92.7%.

KMU has completed the patent layout for its research and development technologies in multiple countries. The university looks forward to continuing its collaboration with the industry to promote technology transfer and jointly create value and business opportunities in medical innovation.

Latest News

Enhanced Childcare Support! KMU and the Nation Join Forces for Childcare Kaohsiung Medical University Cultivates a Sustainable Campus and Infinite Happiness in the Workplace

In light of the latest population projection report released by the National Development Council, the issues of low birth rates and an aging population are more severe than expected. If the birth rate does not improve, the country's total population may fall below 15 million by 2070. To encourage childbirth, the government is promoting the "0 to 6 Years National Childcare 2.0" policy. In response to the government's "Countermeasures for Low Birth Rates" plan, KMU, with the support of its Board of Directors, has enhanced its "0-6 Years National • KMU Childcare Together" safe childcare and talent retention program.

Additionally, female employees undergoing assisted reproductive treatments are eligible to apply for reproductive leave. It is hoped that these thoughtful policies will provide peace of mind for colleagues to raise children, create a more fulfilling work environment, help retain KMU's outstanding talent, and contribute to the country's efforts in addressing the low birth rate and childcare policies.e patent layout for its research and

Latest News

KMU recognizes the significant impact of the low birth rate issue on the country's future social and economic development, and believes that talent is the key to its sustainable growth. Therefore, KMU has decided to further enhance its welfare system by introducing a series of additional measures. The new welfare measures are as follows:

1. Birth Incentive Bonus: When employees and their spouses have children, the subsidy for each birth will increase from NT$2,000 to NT$2,000 for the first child, NT$3,000 for the second child, and NT$4,000 for the third child and beyond. The subsidy cap for the second child will also be removed, and the program will be expanded to include full-time employees (including contracted and temporary staff).
2. Pre-school Education Subsidy: The early childhood education subsidy now covers pre-school children. In addition to the existing three-year kindergarten subsidy, a supplementary NT$500 per semester will be provided for children attending toddler classes, with an extension of one more year.
3. 0-6 Years Old Parenting Allowance: Full-time employees (including contracted and temporary staff) with children aged 0 to 6 will receive an additional NT$1,000 per child per month, in addition to the government subsidy.
4. Assisted Reproductive Leave: Female employees undergoing assisted reproductive treatments can apply for up to 7 days of paid leave per year, with supporting documentation from the competent authority.

Kaohsiung Medical University , Taiwan

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KMU has always upheld a people-centered philosophy, aiming to take good care of every employee and their beloved family members, so that our colleagues can provide high-quality medical services to the public without worries. Our efforts to create a happy workplace have been recognized, as we were awarded the "2024 Work-Life Balance Award" by the Ministry of Labor, along with two additional honors: the "Employee Care Award" and the "Family-Friendly Award."

KMU is committed to continuing to enhance workplace benefits and constantly improving the quality of life for both employees and their families. We strive to ensure that every colleague can maintain their best physical, mental, and emotional well-being as we work together to build a healthier Taiwan!

Latest News

Congratulations to our alumni, Hsiu-Hung Wang, on her reappointment as a commissioner of the 14th Examination

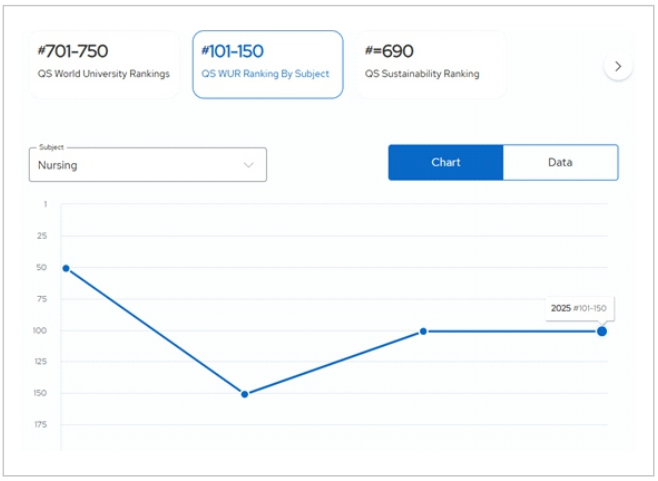
Congratulations to alumni Hsiu-Hung Wang for passing the Legislative Yuan's confirmation of personnel appointments and being reappointed as a commissioner of the 14th Examination Yuan. She will officially take office on December 20th.

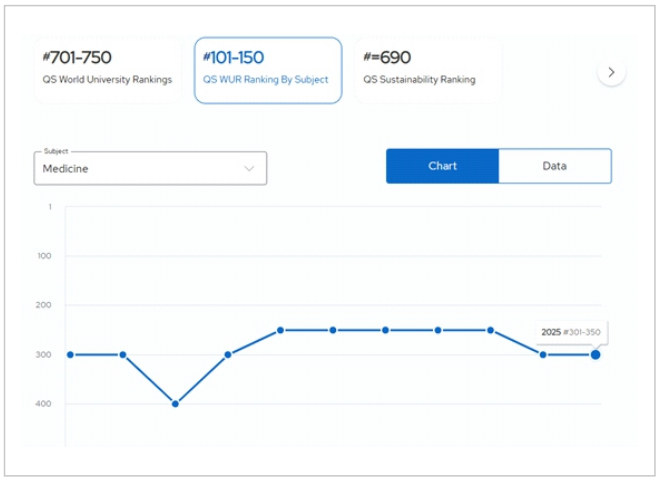
Latest News

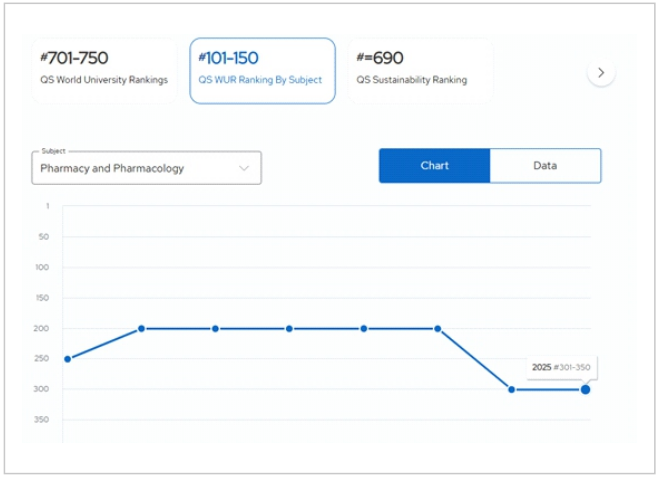
KMU Excels in QS Rankings with Three Disciplines, Advancing Toward Becoming a World-Class Medical University World-Class Medical University

Congratulations to KMU for its outstanding performance in the QS World Rankings By Subject. In the latest rankings, three of KMU's academic disciplines were recognized for their excellence. Nursing was ranked in the 101–150 range globally, while both Medicine and Pharmacy & Pharmacology were placed in the 301–350 range.

This prestigious recognition not only affirms KMU's long-standing dedication to excellence in teaching, research, and clinical practice, but also underscores the university's prominent position in global medical education. Looking ahead, KMU will continue to uphold its spirit of professionalism and innovation, deepen its academic pursuits, expand international collaboration, and move steadily toward becoming a world-class medical university.







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