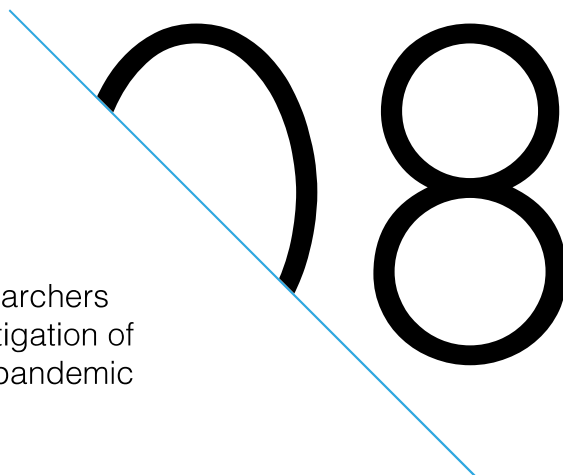


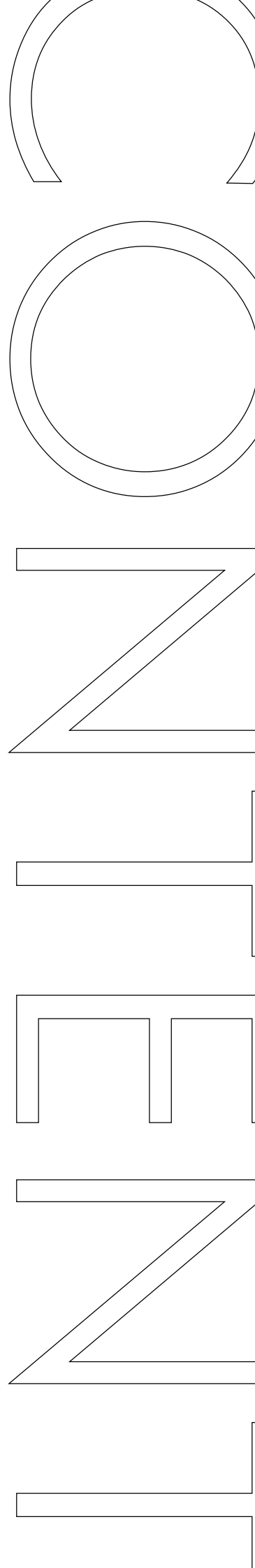
Opportunistic Lung Cancer
Screening: Good or Bad?

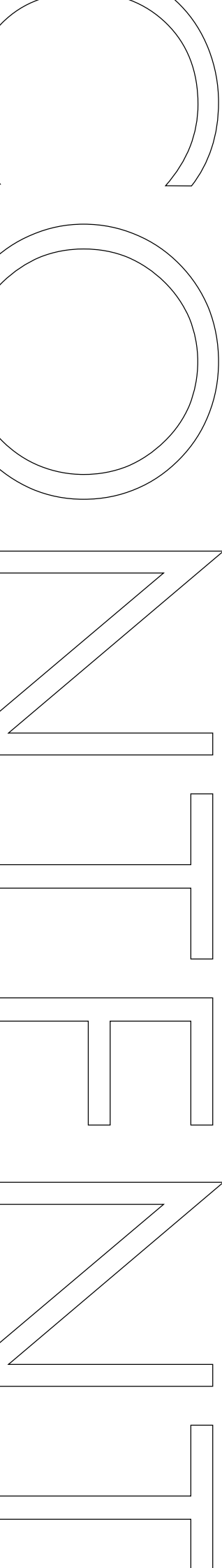


TMU Healthcare System
strengthens cancer treatment
provision with new proton
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TMU Outstanding
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Graduates

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Clinical & Translational Cancer Research at Taipei Medical University

Taipei Medical University focuses on developing and applying key cancer detection and early diagnosis technologies, assisting doctors in planning the best treatment strategy and regular follow-up, and providing patients with consistent and integrated medical care. It also helps establish a genetic map of hereditary cancer families and studies the relationship between gene expression and carcinogenesis. All cancer researchers at TMU are putting together a strong base of knowledge and expertise easily accessible to researchers around the world to maximize the impact of our Clinical & Translational Cancer Research.

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臺北醫學大學
TAIPEI MEDICAL UNIVERSITY

Opportunistic Lung Cancer Screening: Good or Bad?

This study proves potential overdiagnosis of lung cancer among non-smoking Taiwanese women due to increased low dose computed tomography screening.

According to World Health Organization (WHO), in 2020, an estimated 2.21 million lung cancer cases were reported worldwide, with more than 80% resulting in fatalities. Centers for Disease Control and Prevention (CDC) warns that more than 8 million lives will be lost yearly from diseases related to tobacco use by 2030 if the global smoking pattern remains unchanged.

Apart from urging people to stop smoking, lung cancer awareness campaigns commonly emphasize the alarming effects of second-hand smoke exposure and other risk factors. In developed countries, people are not just becoming more health-conscious; they are also open to proactive approaches when managing their health through preventive measures.

In cases of cancer, it is undeniable that early detection boosts survival chances, lowers morbidity, and decreases treatment costs compared to later stages of the disease. In 2021, the US Preventive Services Task Force modified lung cancer screening standards to include those with less smoking exposure. In Asia, developed nations like China, Japan, South Korea, and Taiwan have actively promoted opportunistic screening for lung cancer in lower-risk groups to reduce the disease burden. In Taiwan, specifically, despite the restriction to openly market medical services, low dose computed tomography (LDCT) screening has been promoted on hospital websites and media, particularly targeting young Taiwanese women. Following such practices, researchers from Taipei Medical University and their collaborators were intrigued to



Wayne Gao

Associate Professor, Ph.D. Program in
Global Health and Health Security



understand the repercussions of lung cancer incidence when lung cancer screening is promoted to a population with a smoking prevalence of less than 5%.

In an attempt to prove the efficacy of the LDCT screening approach, two fundamental prerequisites were considered, (1) increased early-stage incidence, demonstrating that screening detects cancer early, and (2) decreased late-stage incidence, demonstrating that screening leads to a reduction in the presentation of advanced cancer. A population-based ecological cohort study involving a dataset of approximately 12 million Taiwanese women between 2004 and 2018 from the Taiwan National Cancer Registry was conducted. Findings indicate that the rise of LDCT screening among low-risk women population led to 6 times higher early-stage lung cancer (stage 0-I) detection; however, there were no notable changes in the incidence of late-stage lung cancer (stage II-IV). As a matter of fact, the lung cancer mortality rate within the study population remained consistent between 2004 and 2018, yet the 5-year survival rate more than doubled to 40% within the given period, thus, concluding the potential misleading feedback that follows unnecessary excessive cancer screening.

Unfortunately, overdiagnosis bears a more negative impact than what was initially intended. One such consequence is the clouding of the true occurrence of lung cancer among Taiwanese women with low smoking prevalence, diminishing the seriousness of smoking as a risk factor for lung cancer. Subsequently, despite the cost of screening not being covered, overdiagnosis-led overtreatment involving costly downstream procedures increases National Health Insurance (NHI) expenditure. Hence, this proves that organized screening, compared to opportunistic

screening, is still a more cost-effective approach in health management, reducing harm and unnecessary healthcare-service utilization.

In conclusion, regardless of tremendous celebrity support and popularity, it is evident that LDCT screening among non-smoking Asian women primarily leads to overdiagnosis. To the best of the researchers' knowledge, this study is the first to showcase LDCT-induced lung cancer overdiagnosis at a population level. Without dismissing the potential of LDCT screening for lung cancer, the study suggests the target groups be heavy-smoker specific for better reliability instead of broad low-risk population screening. With that, researchers hope that healthcare policymakers could refer to these findings for a better decision-making process concerning healthcare coverage, quality, and affordability of medical services as emphasized in the third United Nations' Sustainable Development Goal 3, Good health and well-being. 🏠



TMU Healthcare System strengthens cancer treatment provision with new proton therapy facilities

by Taipei Medical University Hospital, TMUH

/ Jeng-Fong Chiou, Superintendent

/ Hsin-Lun Lee, Director, Department of Radiation Oncology

TMU Proton Center and the first user of its proton facilities, an 8-year old patient, marked a new page for Taiwan cancer treatment. Officially opened in July, 2022, it is the first in Taipei Metropolitan Area and the third in Taiwan.

“With 10 years of preparation and 3 years of construction, the opening of TMU Proton Center provides patients with advanced, comprehensive treatments and services, and moves toward becoming an international hub for cancer treatment,” TMUH Superintendent Dr. Jeng-Fong Chiou said.

TMUH's top gun for cancer treatment

Proton therapy: the combination of precision and effectiveness

Radiation therapy is a type of cancer treatment that uses high-energy radiation beams to kill cancer cells, thereby helping patients to control and even recover from cancer. Proton therapy, by contrast, uses precise targeting to concentrate high-dose energy on tumors, and therefore, it provides the benefit of minimizing damage to surrounding healthy tissue. Compared with traditional radiation therapy, proton therapy can greatly reduce side effects and improve the quality of life of patients. Proton therapy has been around since 1954. More than 220,000 people worldwide

have received proton therapy treatment in health facilities. As of the end of 2021, 99 proton therapy centers have devoted themselves to clinical services worldwide and around 40 were said to be under construction which will benefit many more cancer patients around the world.

Advanced technology in use to hit cancer right where it lives

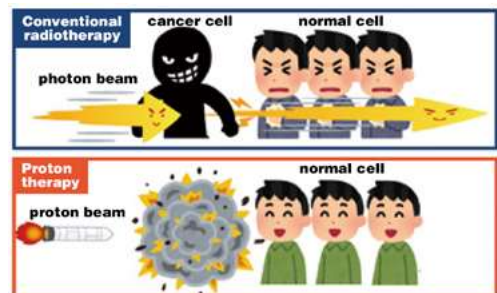
TMU Proton Center is one of the few proton therapy facilities that is completely underground, and it was built with the highest standards of earthquake, flood, and radiation protection. The center synergizes the state-of-

the-art proton therapy equipment with the pencil-beam scanning intensity-modulated technology, which not only allows quicker and more precise treatment, but also provides maximum protection to surrounding healthy tissue. The equipment is also furnished with an image-guided navigation system that functions as the telescopic sight of a sniper rifle. Robotic treatment couches are used in TMU Proton Center to allow proton beams delivery from any direction. Over the past years, the Center have also been working with an extensive network of medical centers and communities around the world for continued enhancement of its expertise and the results of its research and development activities. All these efforts have allowed TMU Proton Center to access the world's most advanced medical technology, making TMU Proton Center a unique provider for patients in Taiwan.

Work together in the fight against cancer

Fighting cancer is never a one-man battle. At TMU Proton Center, a series of advanced technologies, including immunotherapy, hyperthermia therapy, and cell therapy, are combined to deliver the best treatment results. Fighting cancer is a long and arduous journey, but TMU Healthcare System is committed to standing side-by-side with its patients and offer solid support along the way. Protons are positively charged particles, hence the saying, "Think like a proton, always positive." In the face of challenges ahead, let's stay positive like a proton!

In the future, TMU Proton Center will ally with domestic medical institutions and establish a proton therapy sharing platform to refer patients to TMUH for proton therapy. Through the accumulation of clinical experience, we look forward to becoming a training center in the Indo-Pacific region, contributing to the international medical community. 🍀



Provided by Dr. Ping-Hsiu Wu, Department of Radiation Oncology

Old vs. New proton therapy equipment

	old	new
unit volume	large	small
superconducting cyclotron	✗	✓
pencil-beam scanning intensity-modulated technology	✗	✓
image-guided navigation system	✗	✓
duration of single treatment	long	short
treatment angle/site	limited	no limitation
new technology combination	difficult	easy

TMU Proton Center's mission statement



As Taipei's first proton therapy center, TMU Proton Center is committed to providing comprehensive and precise tumor treatment in the fight against cancer. Its logo is a lucky four-leaf clover—representing TMU established the very first proton center in Greater Taipei area. The perpendicular white lines that stand for a proton beam intersect within the clover, forming a glowing cross that symbolizes a glimmer of hope for its patients.

TMU parasitology researchers engaged in field investigation of in Africa amid COVID pandemic

Taipei Medical University research team, led by Professor Chia-Kwung Fan of the Department of Molecular Parasitology and Tropical Diseases, visited the Kingdom of Eswatini, a diplomatic ally of Taiwan, between October and December in 2021. During the visit, the team successfully carried out a parasitic disease investigation and continued to support the bilateral public health cooperation for parasite control and prevention which was initiated 12 years ago.

Professor Chia-Kwung Fan has for many years been a key supporter of public health diplomacy, leading the collaboration with Mbabane Government Hospital, Malaria Center and the Parasite Prevention Center to monitor various parasitic diseases in Eswatini, such as intestinal parasites, malaria and schistosomiasis by disseminating knowledge and skills required for laboratory work and pest control through tailored training programs. The hope is to bring neglected tropical diseases (NTDs) to an end by 2030 (in line with United Nations' Sustainable Development Goals Target 3.3 on communicable diseases) through cross-national collaboration.

The planned collaboration in research was forced to suspend due to COVID-19 pandemic in 2020, which could lead to the lost momentum in disease prevention and control and the consequent reappearance of chains of infection. Professor Fan therefore led a team of researchers, consisting of post-doctoral researcher, Chia-Mei Chou, doctoral student of the Department of Public Health, Hsiao-Ching Kuo, and doctoral student of the Graduate Institute of Medical Sciences, Yun-Hung Tu, to re-initiate the collaborative research project in Eswatini.



1.

TMU researchers discussing the inspection workflow with local community on a rainy day

2.

Taking an inspection and a questionnaire in a local household

Reflecting on the task, Professor Fan indicated that the project was awash with unknown and possibly severe challenges. In addition to the preparation of protective equipment and vaccines necessary for protection from COVID-19, a large majority of time was spent with the health personnel in Eswatini strategizing the best plan of action to go deep into the community through scenario planning and carrying out itinerary checks for the inspections, blood collection and questionnaires. On top of the monitoring of intestinal parasites, they also targeted provinces with potential pork tapeworm epidemics risks for serum screening.

Yun-Hung Tu found that even with the training and work experience of a professional medical examiner, he finds it challenging working in the field while wearing full PPE and shuttling between local communities to recover blood, urine and feces samples. Meanwhile, Hsiao-Ching Kuo encountered problems during her research when the off-road bus she took broke down and there was power outage in the accommodation area followed by bad weather. The outbreak of the South African variant of Omicron further

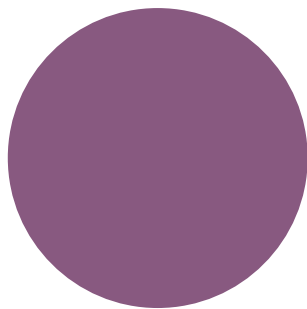
complicated matters and resulted in the cancellation of the return flight. While in the field members of the TMU research team faced numerous situations that tested their adaptability and communication skills.

Despite a series of challenges, Professor Fan and his team successfully completed the investigation and produced a solid analysis with recommendations for the local authorities and communities to plan for follow-up treatment. Professor Fan believes that long-term bilateral medical and public health collaboration projects serve to benefit a new generation of medical talent in the fields of biomedical research and international collaboration. Taiwan is uniquely placed to offer its strong clinical capabilities in medical and parasite control and public health to contribute to the wellbeing of international communities. Professor Fan hopes that TMU and the Taiwanese government will continue to pay attention to the development of related fields in medicine and continue to support such partnerships between Taiwan and its international friends. 🇹🇼



Professor Fan Chia-Kwung (3rd from the right in the back row), Dr. Chia-Mei Chou (2nd from the left in the front row), doctoral candidate Hsiao-Ching Kuo (3rd from the left in the front row), doctoral student Yun-Hung Tu (1st from the left in the front row) from TMU's research team joining the Eswatini capital tribal leadership meeting

TMU research on Taiwan's modern history of medicine wins recognition



Dr. Lin-Yi Tseng (曾齡儀) is currently an associate professor from the Center for General Education at Taipei Medical University. Her work on “the Development history of Western Medicine in Dadaocheng in Modern Taiwan” recently won the 8th Professor Liao Shutsung Research Award by North American Taiwanese Professors' Association (NATPA).



Lin-Yi Tseng

Associate Professor, Center for
General Education



According to Dr. Tseng, Dadaocheng played a very important role in the modernization of Taiwan's medical care, and was the location of many firsts, such as Taiwan's first general hospital, "Hongji Hospital"; Taiwan's first female physician, A-Hsin Tsai (蔡阿信); Taiwan's first dentist, Dr. Tseng-Chyuan Chen (陳增全) (Tseng-Chyuan Dentistry); and the first Indigenous Taiwanese physician (from the Puyuma tribe) to complete a Western-style medical education path, Dr. Tang-Shan Hsieh (謝唐山). In addition, from the Japanese Colonial Period to the early Post-War Period, Dadaocheng had a large number of western hospitals and pharmacies, such as Watsons Pharmacy and Taihetang Pharmacy, etc., which influenced the medical development of not just Taipei, but arguably even all of Taiwan. Unfortunately, Dadaocheng's medical history and contributions are rarely covered in our history textbooks, and there is a dearth of complete and comprehensive professional research, which is a pity.

Dr. Tseng's research depicts the evolvement of medical care over decades. The Japanese colonial period brought modern medical care to Taiwan. Through the establishment of new medical schools and hospitals, as well as various medical experiments, the medical foundation of modern Taiwan was laid. Among them, Dadaocheng is an important area for the attainment and practice of medical knowledge.

Dr. Tseng indicated that "humanities" are also of great significance to medical research. With the passage of time, many important medical materials in Taiwan may gradually disappear. As a historian, one has the responsibility of getting Taiwanese people understand the medical history of modern Taiwan through interviews, studies, writing and publications. Furthermore, as a lecturer at a medical university, it is one's responsibility to get students to understand the medical development of modern Taiwan. The research results should also be published as a historical publication so that more people can understand the deep relationship between Dadaocheng and Western medicine. ㊦



TMU Outstanding International Graduates

Reni Ajoy

India



Reni Ajoy's previous clinical work with psychotherapy and psychiatric symptoms provided a background in teasing out the underpinnings of various psychiatric symptoms, but the "soft" psychotherapeutic approach could be frustrating for someone more interested in the biochemical side of specific brain-related diseases. Searching for a suitable place to dive into the "hardcore science" of the brain, Ajoy found TMU's PhD program in Neural Regenerative Medicine a good match with her aspiration.

It would be a challenge to shift from a therapist's office to a lab, but the risk brought with it considerable personal and economic benefits. There was a deal to catch up on, but with a comprehensive of background courses and support from professors Ajoy quickly found her footing. Networking early, she also found her supervisor, Dr. Szu-Yi Chou, associate professor and researcher at TMU's Neuroscience Center.

Her research was looking at CCL5, a neuroinflammation-linked chemokine that had only recently gained attention for its role in neurodegenerative diseases. With at least five receptors and multiple actions in different parts of the brain, no one was clear what exactly it did. It was Ajoy's job to

find out. She'd figured out that one of CCL5's receptors in the hypothalamus was related to insulin-resistance disorders.

She'd also found CCL5's connection to memory disorders through a receptor in the hippocampus and down-expression of memory-related proteins. Then, by increasing CCL5 expression and improving cognitive performance in both CCL5 deficient and normal mice, she proved the chemokine's role in memory – a groundbreaking finding published in *Molecular Psychiatry*.

Ajoy received three job offers before even graduating and she accepted a position at one of Taiwan's burgeoning biotech companies, where she'll use next-gen sequencing to develop treatments for neurodegenerative diseases like Alzheimer's, Parkinson's, and epilepsy.

Even though the long hours and being held to a high standard of excellence could feel "like the military" at times, the training and support is something for which Ajoy is "... really grateful, and I will be for the rest of my career."



Ouada Nebie

Burkina Faso

Ouada Nebie was trained to be a medical biologist working at the country's National Blood Center. He had come across the work of Prof. Theirry Burnouf when browsing overseas PhD programs, and, with something of an adventurous spirit and intrigued by work of his future advisor's research into platelets, Nebie reached out. He was eager to pursue an interest in science and looking forward to something different in culture, lifestyle, and working environment.

Under Prof. Burnouf's supervision, Nebie began a series of experiments to see if platelet lysate had a potential neuroprotective effect after traumatic brain injury (TBI). The three-stage process involved characterizing lysate contents, developing a cell model to assess safety and observe any changes to cell morphology caused by lysate, and confirming observations with in-vivo studies in mice.

The plan was ambitious, but what really set Nebie apart was choosing the dual-degree route (a dual PhD program between TMU and the Université de Lille in France). All doctoral degrees demand careful time management, but Nebie was in effect working on two PhDs at once, and meeting the requirements of two institutions and balancing two advisors (Dr.

David Blum was his advisor at Lille) made for a tight time frame. This meant no vacation, but Nebie had confirmed for the first time that bioactive compounds in human-derived platelet lysate could safely improve motor function, reduce inflammation, and decrease the loss of cortical synaptic proteins. In short, he and his team had shown for the first time that platelet lysate could help heal the brain.

The advantages of a dual degree had made the challenge worthwhile. Nebie had successfully completed his program in a relatively short 3.5 years. It's a challenge Nebie says, but besides developing exceptional self-, stress-, and time-management skills, dual degree students experiencing two distinct academic working culture and learning to apply the unique strengths of two labs across contexts can be a major career asset.

Nebie now works as a postdoctoral researcher at the Université de Lille, where he's expanding his work with platelet lysates to develop treatment applications for Alzheimer's disease. Before heading back to the lab, he had a few words for prospective students: "If you're motivated and have the opportunity, apply. Keep focused on your goals and the benefits you'll get. Learn from both environments and the people you meet. Your mind will be opened and you'll set yourself apart. Don't hesitate. Try it!"



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Outstanding
Alumni!

Mega Hasanul Huda

Indonesia



Ample job opportunities at home and abroad were open to Indonesian nurses, but the number of patients and challenging workload got Mega Hasanul Huda thinking of a different way to support Indonesian health care. She completed Master's programs in nursing and hospital administration, and after a stint as a lactation consultant for a WHO sponsored breastfeeding program, began looking at PhD programs.

That's when Mega found her future advisor, Dr. Shu-Yu Kuo, who taught at TMU's School of Nursing. Mega applied for TMU's English-language nursing PhD program, was accepted, and soon arrived in Taiwan.

Like many new arrivals, Mega had concerns about adapting and being accepted in a new culture, but her fears quickly disappeared as she found Taiwan to be both comfortable and Muslim-friendly. Taipei's transportation a welcome change from Jakarta's infamous traffic jams. Mosques and prayer rooms were available for her religious needs, and local friends and colleagues were understanding about dietary restrictions. Professor Kuo even scheduled meetings outside of fasting times. The openness to someone from a different culture and religion was touching. "I was surprised they tried to learn my culture, and they really wanted to know about me," Mega said. "That's why Taipei felt like my second home."

Mega's PhD goal was focused on increasing the prevalence of breastfeeding in

Indonesia. In Indonesia, as in Taiwan, exclusive breastfeeding rates fall below the 50% target set by the WHO (about 38 and 17 percent, respectively). Her research consisted of five studies, ranging from a systematic review of existing interventions, translating materials to Indonesian, and developing and testing a web-based education program. Then Mega began testing her program, a six-session intervention that helps mothers – and fathers – develop positive attitudes towards breastfeeding through education and skills training, with the ultimate goal of increasing their intention to breastfeed.

The intervention quickly garnered attention back in Indonesia, and Mega was recruited to head the research division at Herminia Hospital Group, overseeing projects at over 40 hospitals. As a member of Indonesia's new generation of foreign-educated medical researchers, Mega is now the one young researchers look up to. She is dedicated to improving education and research in Indonesia, adapting the TMU University-Hospital affiliation model and building on her relationships with TMU. She also wants to create an Indonesia-Taiwan bridging program so that other young students can benefit from the same positive educational experience that she had. "My country needs a country like Taiwan that wants to teach. Because of the high level of knowledge in Taiwan, I promise someday I will send my students to TMU."



Uyanga Batzorig

Mongolia

Uyanga Batzorig wanted to expand her horizons beyond her native Mongolia, and began looking into opportunities to study abroad. With the suggestion of a friend returned from studying in Taiwan, Batzorig applied for a TMU Master's program in Medical Science, and continued her PhD degree in TMU's new International PhD in Medicine; a three-year program designed to help medical professionals from around the world hone their research skills.

Her research was aimed at the role of glucose-related protein 94 in the progression of colorectal cancer. The protein was already well-known in the context of treating liver and breast cancer, but its role in the lower digestive system was poorly understood.

The undertaking would prove a challenge, especially under pressure to complete it

within the program's expected timeframe, and required both resilience and encouragement.

Two years later, she'd discovered the detailed pathways through which GRP94 affects the invasiveness, migration, and proliferation of colorectal cancer. The next step is for drug developers to target the protein in clinical trials.

Looking ahead, Batzorig has a list of plans that leverage her TMU education. Besides researching cancer and organizing social activities, she received training in medical AI and kept up with dermatopathology training at Mackay Memorial Hospital (one of only two dermatopathology training centers in Asia) where she is now a full-time fellow. After finishing training at Mackay, Batzorig plans to return to Mongolia and improve the nation's dermatology and dermatopathology facilities and services, in cooperation with her colleagues in Taiwan.



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