PRESIDENT'S SCIENCE AWARD 2025

LIM CHWEE TECK

Director, Institute for Health Innovation & Technology

National University of Singapore

"For his pioneering contributions to cancer research through innovative mechanobiology approaches, successfully bridging engineering, biological sciences and medicine to foster a deeper understanding of cancer metastasis."

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Professor Lim Chwee Teck's pioneering research has fundamentally transformed the understanding of cancer metastasis, the leading cause of cancer-related deaths. He introduced the concept of "mechanoresilience", revealing why only a small subset of cancer cells survive the extreme physical stresses of travelling through the bloodstream, such as high fluid pressure and squeezing through narrow capillaries, to form secondary tumours, while most circulating cancer cells perish. Using custom-engineered microfluidic platforms that simulate these conditions, Prof Lim and his team identified that these mechanoresilient cells display distinctive traits: enhanced DNA repair, altered nuclear stiffness, and unique gene expression profiles. These confer a survival advantage, enabling the cells to seed new tumours and resist treatment.

What distinguishes Prof Lim's work is his focus on the physical and mechanical challenges faced by metastatic cancer cells; an aspect often overlooked in traditional cancer research, which has largely centred on genetic and biochemical factors. By showing that mechanical forces act as a natural filter, selecting only the most robust and adaptable cancer cells, his discoveries have reframed how scientists and clinicians understand cancer progression. This paradigm shift offers promising new strategies: therapies that could target DNA repair pathways or nuclear properties of mechanoresilient cells, while diagnostic tools could detect these traits early to better predict and manage metastatic risk. By integrating engineering, mechanics and biomedicine, Prof Lim has demonstrated the power of interdisciplinary collaboration to translate laboratory discoveries into clinical applications.

The impact of Prof Lim's research extends well beyond the laboratory. Cancer patients, particularly those at risk of metastasis, may benefit from more precise risk assessments and personalised treatment plans. Pharmaceutical innovation can also accelerate, as this new understanding inspires the development of drugs and diagnostics that directly address the mechanisms of cancer spread.

Complementing his academic achievements, Prof Lim is a serial entrepreneur who had co-founded six startups, including one that commercialised a cancer biochip and achieved a successful IPO in 2018. These efforts highlight his commitment to translating scientific discoveries into technologies that benefit patients and healthcare systems.

He also serves as Director of the Institute for Health Innovation and Technology at the National University of Singapore, where he leads multidisciplinary teams to drive advances in healthcare through translational research. Under his leadership, the institute fosters collaboration between engineers, scientists, clinicians and industry partners, accelerating the development and adoption of innovative healthcare solutions to improve patient care and public health.

Prof Lim's influence is also strongly felt through his mentorship and leadership in training the next generation of scientists and engineers. He has built a collaborative, interdisciplinary research environment in Singapore and globally, with his mentees going on to establish impactful careers of their own. In recognition of his outstanding mentorship, he was awarded the Nature Lifetime Achievement Award for Mentoring in Science in 2022.

Prof Lim's exceptional contributions have been recognised through numerous prestigious awards, including the President's Technology Award, Wall Street Journal Asian Innovation Award, Otto Schmitt Award, Vladimir K. Zworykin Award, Highly Cited Researcher, Asia's Most Influential Scientist Award, Asian Scientists 100, ASEAN Outstanding Engineering Achievement Award and IES Prestigious Engineering Achievement Award. He is also an elected fellow of ten esteemed academies—including the Royal Society (UK), Royal Academy of Engineering (UK), National Academy of Inventors (US), American Institute for Medical and Biological Engineering, International Academy of Medical and Biological Engineering, Singapore National Academy of Science, and Academy of Engineering, Singapore, reflecting international recognition of his contributions, leadership, and impact.