



PRESS RELEASE

[16 August 2022] | FOR IMMEDIATE RELEASE

Proteins in cell-based particles could lead to early diagnosis and treatment of breast cancer metastasis

Singapore, 16 August 2022 — One woman is diagnosed with breast cancer every fourteen seconds somewhere across the globe — based on data showing that an approximate 2.3 million women worldwide were newly diagnosed with breast cancer in 2020.

In Singapore, it is the most common cancer among women, and will likely affect one in thirteen women in their lifespan. Although advances in medicine today allow for treatments for early-stage and non-metastatic breast cancer, advanced stage and metastatic breast cancer is considered incurable with current treatment options, with very poor prognosis.

The early detection of breast cancer metastasis is therefore paramount in the treatment of the condition, and a team of researchers discovered a non-invasive biomarker that could aid with earlier diagnosis. Led by **Assistant Professor Minh Le from the Institute for Digital Medicine (WisDM) and Department of Pharmacology at the National University of Singapore's Yong Loo Lin School of Medicine (NUS Medicine)**, and **Associate Professor Andrew Grimson from the Department of Molecular Biology and Genetics at Cornell University**, the researchers found that particles which are secreted by tumour cells, extracellular vesicles (EVs), displayed a high level of protein integrins αv and $\beta 1$, in patients with locally advanced and metastatic breast cancer.

Asst Prof Le said, "Metastasis is the chief concern for breast cancer patients. The study highlights the potential of integrins αv and $\beta 1$ as a promising prognostic and therapeutic target for patients with metastatic breast cancer. Our research has opened several doors, and we hope that future work will help develop new ways to assess, monitor and suppress this hallmark of cancer."

Published in the [*Journal of Extracellular Vesicles*](#), the team used an ultra-sensitive protein identification tool to obtain a set of protein expression profiles from the EVs of different metastatic breast cancer cell lines. They discovered that, among many candidate proteins, integrins αv and $\beta 1$ were consistently overexpressed in EVs of high metastatic background. In addition, the team collaborated with Associate Professor Victor Lee, Senior Consultant, Department of Pathology, National University Hospital, and found a high level of integrin αv in samples from patients with stage III or IV breast cancer. He said, "Through the study, we

discovered the potential of integrin αv as a new non-invasive biomarker for the early diagnosis of breast cancer metastasis.”

Assoc Prof Grimson added, “The study has led to fundamental insights in the underlying mechanisms of breast cancer metastasis. In addition to its clinical relevance, the research contributes to recent advances in the EV field, in that there are functionally distinct subsets of EVs, which can now be more readily identified and studied to understand their functions and potential as therapeutic targets in the tumour environment.”

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About National University of Singapore (NUS)

The National University of Singapore (NUS) is Singapore's flagship university, which offers a global approach to education, research and entrepreneurship, with a focus on Asian perspectives and expertise. We have 16 colleges, faculties and schools across three campuses in Singapore, with more than 40,000 students from 100 countries enriching our vibrant and diverse campus community. We have also established our NUS Overseas Colleges programme in more than 15 cities around the world.

Our multidisciplinary and real-world approach to education, research and entrepreneurship enables us to work closely with industry, governments and academia to address crucial and complex issues relevant to Asia and the world. Researchers in our faculties, 30 university-level research institutes, research centres of excellence and corporate labs focus on themes that include energy; environmental and urban sustainability; treatment and prevention of diseases; active ageing; advanced materials; risk management and resilience of financial systems; Asian studies; and Smart Nation capabilities such as artificial intelligence, data science, operations research and cybersecurity.

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About the NUS Yong Loo Lin School of Medicine (NUS Medicine)

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Through a dynamic and future-oriented five-year curriculum that is inter-disciplinary and inter-professional in nature, our students undergo a holistic learning experience that exposes them to multiple facets of healthcare and prepares them to become visionary leaders and compassionate doctors and nurses of tomorrow. Since the School's founding in 1905, more than 12,000 graduates have passed through our doors.

In our pursuit of health for all, our strategic research programmes focus on innovative, cutting-edge biomedical research with collaborators around the world to deliver high impact solutions to benefit human lives.

The School is the oldest institution of higher learning in the National University of Singapore and a founding institutional member of the National University Health System. It is one of Asia's leading medical schools and ranks among the best in the world (Times Higher Education World University Rankings 2022 by subject and the Quacquarelli Symonds (QS) World University Rankings by subject 2022).

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