Genome Institute
of Singapore
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MEDIA RELEASE
FOR IMMEDIATE RELEASE

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A NEW WAY TO DIAGNOSE AND TREAT LUNG CANCER
Discovery of a class of small RNA molecules provide novel insights into therapy resistance in the disease and may lead to more effective treatments

SINGAPORE – A team of researchers from Singapore has discovered a class of small RNA molecules, known as oncomiRs, which are responsible for fuelling lung cancer. Published in *Nature Communications*, the findings provide fresh insight into understanding therapy resistance in lung cancer and unveil new avenues to monitor and treat the disease more effectively.

Jointly led by Drs Lim Bing and Tam Wai Leong from A*STAR's Genome Institute of Singapore (GIS), the study revealed that rare cancer stem cells within tumours are resistant to conventional therapies, making them the major culprits for relapse in lung cancer patients. As oncomiRs are the main drivers of these cancer stem cells, administering therapies that obliterate the oncomiRs opens up possibilities to kill the cancer stem cells. The researchers applied a new class of therapeutics, known as locked nucleic acid (LNA), which would work against oncomiRs in the cancer stem cells. The method successfully obliterated human lung tumours grown in mice models, and the team is now working to develop this into a drug that can be administered into humans by collaborating with pharmaceutical companies.

The research team also found that oncomiRs could be detected in patients' blood through liquid biopsies, which is minimally invasive and less time consuming compared to tissue biopsies. Their levels are, in fact, indicative of whether patients would respond well to conventional therapies or succumb to the disease. Tracking the oncomiR levels real-time in the blood of patients who are receiving standard-of-care treatments enables the researchers to monitor their response and potentially predict any recurrence and metastasis.

"We are interested in developing this detection method into a companion diagnostic that can improve disease tracking and provide real-time information on tumour progression," said Dr Tam, the study's co-lead author and Senior Research Scientist, Cancer Therapeutics & Stratified Oncology at the GIS. "In addition, we hope to be able to overcome the clinical problem of tumours which develop resistance to therapy by understanding the key drivers of lung cancer, so as to develop new ways to improve the durability of patient response and improve health outcomes."

GIS Executive Director Prof Ng Huck Hui said, "Targeting the most recalcitrant cells in a tumour allows us to attack the root cause of cancer. It is crucial to understand the way diseases like cancer progress. This will enable scientists and oncologists to improve patient stratification, and to develop therapeutic methods that are targeted, precise, and can reach tumours in the quickest time possible."

IMAGE
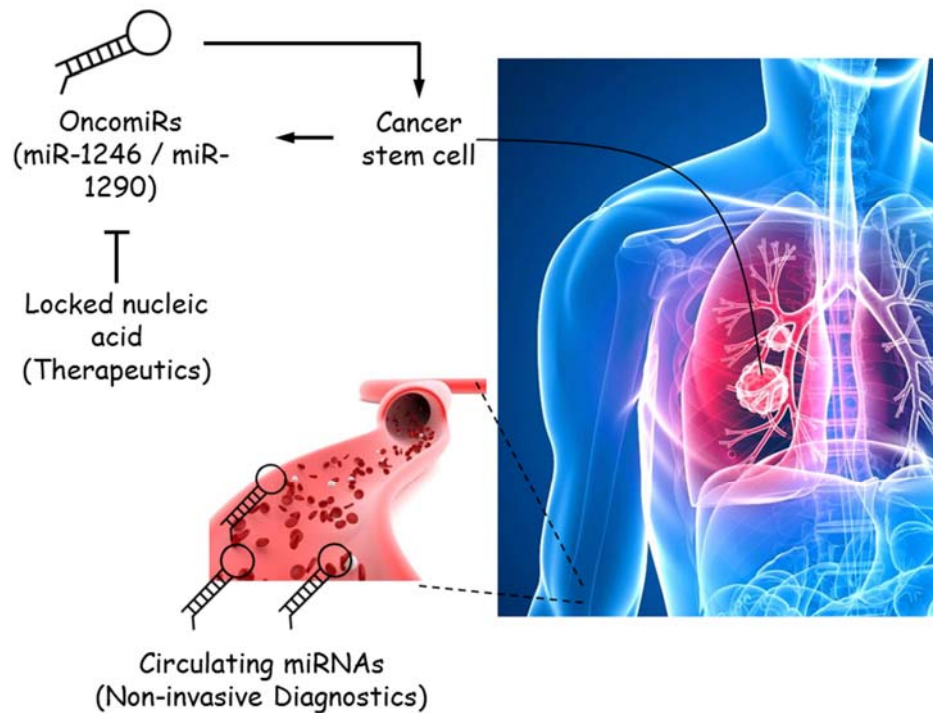
A new way to track and treat lung cancer by targetting cancer stem cells.

Notes to Editor:

The research findings described in this media release can be found in the scientific journal *Nature Communications,* under the title, "Tumour-initiating cell-specific miR-1246 and miR-1290 expression converge to promote non-small cell lung cancer progression" by Wen Cai Zhang[1,†], Tan Min Chin[2,3], Henry Yang[2], Min En Nga[4], Declan Patrick Lunny[5], Edwin Kok Hao Lim[1], Li Li Sun[1], Yin Huei Pang[4], Yi Ning Leow[1], Shanneen Rossellini Y. Malusay[1], Priscilla Xin Hui Lim[1], Jeravan Zili Lee[1], Benedict Jian Wei Tan[1], Ng Shyh-Chang[1], Elaine Hsuen Lim[6,7], Wan Teck Lim[7], Daniel Shao Weng Tan[1,7], Eng Huat Tan[7], Bee Choo Tai[8], Ross Andrew Soo[2,3], Wai Leong Tam[1,2,9] & Bing Lim[1,†]

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Full text of the *Nature Communications* paper can be accessed online from: http://www.nature.com/ncomms/2016/160621/ncomms11702/full/ncomms11702.html

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About A*STAR's Genome Institute of Singapore (GIS)

The Genome Institute of Singapore (GIS) is an institute of the Agency for Science, Technology and Research (A*STAR). It has a global vision that seeks to use genomic sciences to achieve extraordinary improvements in human health and public prosperity. Established in 2000 as a centre for genomic discovery, the GIS will pursue the integration of technology, genetics and biology towards academic, economic and societal impact.

The key research areas at the GIS include Human Genetics, Infectious Diseases, Cancer Therapeutics and Stratified Oncology, Stem Cell and

Regenerative Biology, Cancer Stem Cell Biology, Computational and Systems Biology, and Translational Research.

The genomics infrastructure at the GIS is utilised to train new scientific talent, to function as a bridge for academic and industrial research, and to explore scientific questions of high impact.

For more information about GIS, please visit www.gis.a-star.edu.sg

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As a Science and Technology Organisation, A*STAR bridges the gap between academia and industry. Our research creates economic growth and jobs for Singapore, and enhances lives by contributing to societal benefits such as improving outcomes in healthcare, urban living, and sustainability.

We play a key role in nurturing and developing a diversity of talent and leaders in our Agency and Research Institutes, the wider research community and industry. A*STAR oversees 18 biomedical sciences and physical sciences and engineering research entities primarily located in Biopolis and Fusionopolis.

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