A new way to diagnose and treat lung cancer

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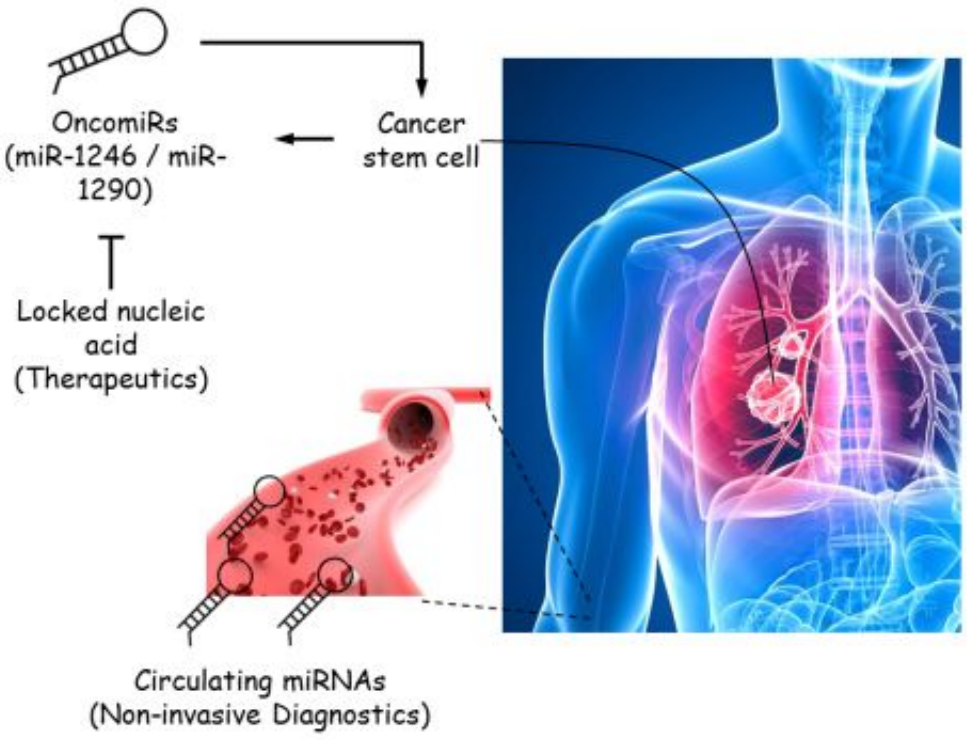

A new way to track and treat lung cancer by targetting cancer stem cells. Credit: Agency for Science, Technology and Research (A*STAR), Singapore

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."

More information: Wen Cai Zhang et al. Tumour-initiating cell-specific miR-1246 and miR-1290 expression converge to promote non-small cell lung cancer progression, *Nature Communications* (2016). DOI: 10.1038/ncomms11702

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