Novel diagnostic tool for ethnically diverse non-small-cell lung cancer patients

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Early-stage Non-small-cell Lung Cancer (NSCLC) is asymptomatic and difficult to detect since no blood test for NSCLC is currently available. In a new study, Chen-Yu Zhang and Chunni Zhang's group at Nanjing Advanced Institute for Life Sciences, Nanjing University identified a panel of five serum microRNAs (miRNAs) as the potential biomarker for NSCLC diagnosis.

The study is published this week in the journal *EBioMedicine*.

MiRNAs are a family of small, single-stranded non-coding RNAs that are critical regulators of numerous diseases, and their expression patterns have the potential to diagnose various types of cancer. In previous studies, Chen-Yu Zhang's group and others have demonstrated that human body fluid such as serum contains numerous stable miRNAs and serum miRNAs are promising novel biomarkers for cancer detection including NSCLC. However, multicentric and blind studies of ethnically diverse NSCLC are still lacking currently, and the development of sensitive and reliable biomarkers remains a major challenge for researchers.

In this newest study, the group recruited 438 participants including 221 NSCLC patients, 161 controls and 56 benign nodules from both China and America. They used a high-throughput TaqMan Low-Density Array scanning combined with an individual quantitative reverse transcription polymerase chain reaction PCR confirmation and successfully identified a panel of five serum miRNAs including miR-483-5p, miR-193a-3p,

miR-25, miR-214 and miR-7 that were significantly elevated in NSCLC patients using samples from three independent Chinese cohorts. Subsequently, a blind trial was then performed to assess the ability of the panel to diagnose NSCLC in an American cohort and to function as a reliable diagnostic indicator of NSCLC in patients of different ethnicities. The panel has a high accuracy to classified NSCLC cases and controls from both the Chinese and the American cohorts. Most importantly, the panel was allowed correct prediction of stage I-II tumours and capable of distinguishing NSCLC from benign nodules in the American cohort.

"This work is important for the following reasons", said Chen-Yu Zhang, MD/PhD, Director of Nanjing Advanced Institute for Life Sciences and the corresponding author.

First, this is the first multiethnic, multicentric, single-blind global analysis of miRNA expression patterns of NSCLC patients in four independent cohorts from five centers in both China and America. We collaborated with Dr. Mingde Xia, Dr. Anh Van Le and Dr. Rafael Soto-Gil at Johnson & Johnson and Ortho-Clinical Diagnostics, who provided the American cohort samples that from Mayo Clinic (Mayo Validation Support Services, 3050 Superior Drive, NW, Rochester, Minnesota) in a blinded fashion. The results demonstrated that effectiveness of the five-miRNA panel is not limited to Chinese patients, but also has high sensitivity and specificity for the diagnosis of NSCLC in American patients. Thus this miRNA panel has potential utility as a common potential biomarker for detecting NSCLC in persons of different races.

Second, the five-serum miRNA panel was generated in three Chinese cohorts first and then validated the wide applicability in a large American cohort in a blinded fashion. Results generated in this multiethnic, multicentric, blind sensitivity study were seemed more reliable and more likely to achieve true translational relevance and bring

circulating miRNAs into routine diagnostics for NSCLC in the future.

Third, the panel can differentiate malignant lesions from early stages of the cancer even in the benign nodules that are frequently found by CT scans in high-risk populations, which provide the potential for early interventions, therapy and treatment options and expand upon the results of previous studies of circulating-miRNA signatures in patients with NSCLC.

Furthermore, said Professor. Chunni Zhang at Jinling hospital, the co-corresponding authors of this publication, "We have clearly demonstrated that this group of serum miRNAs may potentially serve as a more accurate biomarker with high sensitivity and specificity for diagnosing NSCLC than traditional blood-based protein markers such as carcinoembryonic antigen and squamous cell carcinoma antigen".

More information: A Five-miRNA Panel Identified from a Multicentric Case-Control Study Serves as a Novel Diagnostic Tool for Ethnically Diverse Non-small-cell Lung Cancer Patients, Publishing on *Ebiomedicine*, August 14, 2015. www.sciencedirect.com/science/ … ii/S2352396415300864

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