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### **Abstract**

#### **“MicroRNA expression profiling in Non Small Cell Lung Cancer and its clinical implications”**

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#### Abstract

MicroRNAs (miRNAs) represent a class of small non-coding RNAs that regulate gene expression at the posttranscriptional level. Recent evidence demonstrates that some miRNAs have functions similar to oncogene or tumor suppressors and play an important role in tumorigenesis. Recent studies have shown that miRNAs represent a new class of powerful tools for cancer prevention and therapeutics and that circulating miRNAs in plasma seem to be very promising novel tumor biomarkers. Especially in NSCLC many studies have shown that miRNAs expression is correlated to diagnosis, prognosis and prediction of response to treatment.

The aim of our study was to evaluate mature miRNAs as novel tumor biomarkers in NSCLC, by exploring global expression profile of miRNAs in NSCLC paired fresh tissues and corresponding plasma samples.

FlexmiR bead array (Luminex) assay was utilized for miRNA expression profiling in 21 surgically removed NSCLC fresh tissues and their corresponding adjacent non-cancerous tissues. According to our FleximiR results, evaluated by three different statistical approaches, 23 miRNAs were found to be differentially expressed. Our FleximiR experiments were validated for four of these microRNAs in 40 paired NSCLC and matched corresponding adjacent non-cancerous tissues by Taqman RT-qPCR microRNA assays (Applied Biosystems). Moreover, total RNA was extracted from 37 corresponding plasma samples and miR-21 expression was quantitated by RT-qPCR.

23 miRNAs were found to be differentially expressed in NSCLC by the FleximiR assay. Four of these, miR-21, miR-126\*, miR-30d and miR-451, were further evaluated by quantitative RT-qPCR. The expression level of miR-21 was significantly higher in NSCLC tissues than in adjacent normal tissues ( $P=0.002$ ); while miR-126\* ( $P=0.000$ ), miR-30d ( $P=0.000$ ) and miR-451 ( $P=0.000$ ) were down-regulated in NSCLC. Interestingly, high miR-21 expression and low miR-126\* and miR-30d expression were associated with disease free survival ( $P=0.027$ ,  $P=0.047$  and  $P=0.048$  respectively). Levels of circulating miR-21 in plasma of NSCLC patients were significantly higher in NSCLC than in healthy volunteers ( $P=0.003$ ). Circulating miR-21 in plasma was found to be an independent prognostic factor for NSCLC ( $P=0.019$ ).

Based on our FlexmiR bead array assay results in NSCLC paired tissues, we have shown the potential of miR-21, miR-126\* and miR-30d as novel prognostic biomarkers in NSCLC. Furthermore, circulating miR-21 in plasma was found to be an independent prognostic factor for NSCLC.

## **Biography**

Athina Markou (Ph.D.) graduated in 2003 from the University of Athens, Greece and completed her MSc thesis in Clinical Chemistry in the same University in 2005. Four years later she completed her PhD thesis in the Laboratory of Analytical Chemistry, entitled "*Gene expression analysis of circulating tumor cells in peripheral blood of breast cancer patients*". Dr Markou is currently a postdoctoral fellow at the Laboratory of Analytical Chemistry, University of Athens, (Dr E. Lianidou's lab). Dr Markou is the author of 5 publications and recipient of the American Association of Cancer Research (AACR): AACR 2011-Susan G. Komen Scholar-in-Training Award for her participation in the 2011 annual meeting and the American Association of Cancer Research (AACR): Avon foundation international travel award for her participation in the 2008 annual meeting.