Research Highlights

Blood Screening Test for Malignant Pleural Mesothelioma

Malignant pleural mesothelioma (MPM) is an aggressive tumor with a poor prognosis. Since both MPM and benign asbestos pleurisy (BAP) are associated with exposure to asbestos with similar symptoms and imaging findings, pathological validation by means of an invasive pleural biopsy of the parietal pleura is strongly necessitated. Therefore, there is a critical demand for a non-invasive test for the detection of MPM.

Junichi Soh, Shinichi Toyooka (Prof. of Okayama U.) and colleagues have previously shown that microRNA-34b/c (miR-34b/c) plays an important role in the pathogenesis of MPM and is frequently down regulated by DNA methylation in approximately 90% of MPM cases (*Clin Cancer Res* 2011). Now, they established a new digital methylation specific PCR (MSP) assay to estimate the degree of miR-34b/c methylation in serum-circulating DNA.

Digital PCR was originally developed as a tool for the amplification of individual molecules for purposes of identifying and counting individual DNA molecule sequence alterations with highly sensitive manner. Here it was applied to determine coding mutations, loss of heterozygosity, SNP polymorphisms and DNA methylation. Researchers' digital MSP assay quantified the degree of miR-34b/c methylation by counting the number of miR-34b/c methylated wells per sample. The degree of miR-34b/c methylation in MPM cases was significantly higher than that in BAP cases or healthy volunteers. In addition, advanced MPM cases tended to have higher degree of miR-34b/c methylation than early MPM cases.

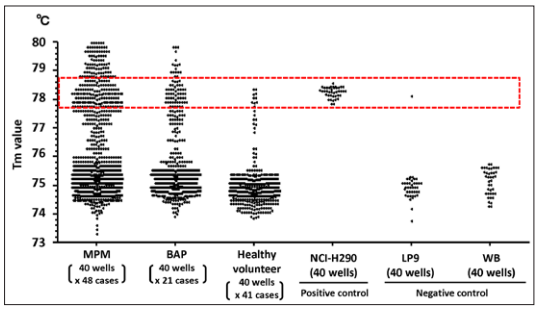

Figure 1 A distribution map showing the Tm values for all wells in all the cases and the positive range for miR-34b/c-methylated well. The positive well for miR-34b/c methylation being bounded by dotted square has the Tm within the mean value ± 3 standard deviations of positive control sample (NCI-H290). WB refers to water blank.

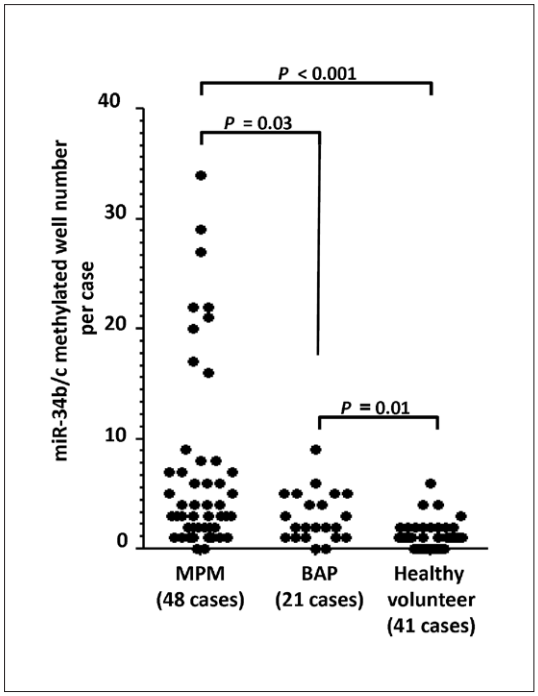

Figure 2 Comparison of the numbers of miR-34b/c methylated wells among three groups.

The digital MSP assay can quantify miR-34b/c methylation in serum-circulating DNA. This approach is useful for the establishment of a new blood-based diagnosis for MPM.

Reference:

- Authors: Junichi Soh and Shinichi Toyooka
- Title of original paper: The degree of microRNA-34b/c methylation in serum-circulating DNA is associated with malignant pleural mesothelioma.
- Journal, volume, pages and year: *Lung Cancer*, 82, 485-90 (2013)
- Journal website: http://ousar.lib.okayama-u.ac.jp/metadata/52119
- Digital Object Identifier (DOI): 10.1016/j.lungcan.2013.09.017
- Affiliations: Department of Thoracic Surgery, Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences, Okayama, Japan.

