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Study of DNA methylation associated with lung cancer: GLAD-PCR assay of R(5mC)GY sites

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An aberrant methylation of the genes regulatory regions is shown for many cancer diseases. The detection of these epigenetic biomarkers is one of the most promising diagnostic and prognostic tools. Such de novo DNA methylation in cancer cells is catalyzed by DNA methyltransferases *DNMT3A* and *DNMT3B*, which methylate RCGY sequences with formation of R(5mC)GY sites. Based on the methyl-directed DNA endonuclease *GlaI*, we developed a GLAD-PCR assay, which allows a quick and inexpensive determination of R(5mC)GY site in a selected position of human genome without bisulfite conversion. Recently, we applied GLAD PCR assay for development of the epigenetic test for colorectal cancer. In the present study, we applied GLAD-PCR assay to find out marker R(5mC)GY sites for detection of lung cancer (LC) which is one of the most frequent malignancies. The studied group of patients included forty LC patients who had a surgery. A total 65 surgical resection samples were studied including lung cancer tissues of varying degree of differentiation (n=40) and paired normal lung tissue controls (n=25). In the present work, we studied four R(5mC)GY sites in regulation regions of *HOXA5*, *LHX6*, *RASSF1* and *RARB* genes to identify aberrantly methylated RCGY sites. The analysis of RCGY sites methylation with GLAD-PCR assay demonstrated a relatively good prognostic potential of LC detection for RCGY sites in regulation regions of *LHX6* and *RASSF1* genes. We believe that these RCGY sites may be used for LC determination by GLAD PCR assay of DNA samples from blood and sputum.

Biography

Evgeny Dubinin is a Senior Researcher at SibEnzyme Ltd. Russia. The main area of company's activity is research of new DNA enzymes and their application in modern life sciences. We are the discoverers of new type of enzymes – methyl-directed DNA endonucleases which are very promising for epigenetic studies.

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