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Decreased miR-320 and increased AQP1 in patients with breast cancer and the clinical significance

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Background & Aim: Our previous studies have demonstrated overexpression of AQP1 in breast cancer, but the mechanism of its overexpression and the clinical significance were not clearly identified. MiR-320 has been reported down-regulated in various types of cancer and downregulation of miR-320 promotes overexpression of its target gene AQP1. The aim of this study was to investigate the role of miR-320 and its target gene AQP1 in breast cancer and to assess their clinical significance.

Methods: QRT-PCR was used in the detection of miR-320 and AQP1 mRNA expression both in breast cancer tissue and in adjacent normal tissue. Immunohistochemistry and western blot were used in the detection of AQP1 protein expression. The clinicopathological implications of these molecules were analyzed statistically. Survival analysis was also performed to assess their prognostic significance.

Results: Down-regulation of miR-320 was associated with overexpression of AQP1 mRNA in breast cancer tissue with a negative correlation (r=-0.698, P<0.05). MiR-320 expression was significantly associated with pathological stage (P=0.004) and lymph node involvement (P=0.024). Overexpression of AQP1 was associated with histological grade (P=0.033). Survival analysis indicated that reduced expression of miR-320 versus overexpression of AQP1 is associated with a poorer prognosis (P<0.05).

Conclusions: Our results suggest that down-regulation of miR-320 may result in enhanced expression of AQP1 in breast cancer, which consequently favored tumor progression. MiR-320 and AQP1 may play important roles as biomarkers for prognosis and therapeutic targets in breast cancer.

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A rapid and label-free DNA amplification/detection technique using combination of helicase DNA amplification (HDA) and biophotonic sensor complex

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Epidermal growth factor receptor (EGFR) is a non-small cell lung cancer biomarker used to predict response of treatment on individual patient by using near patient testing method. Existing methods for detection of EGFR mutation status are costly, labor- and time-intensive. Here, we report an Isothermal DNA amplification/detection technique based on Helicase DNA Amplification (HDA) and Silicon Microring Resonator complex, designated detection of EGFR mutation for near patient testing in non-small cell lung cancer (NSCLC) patient. We combined a HDA assay as an isothermal DNA amplification technique and a biophotonic sensor based on silicon microring resonators to create a sensing platform for label-free and real-time monitoring of DNA amplification and detection. Moreover, complex thermal components are not necessary for this device because of the use of the HDA assay. The system delivers a result in 45 min and was able to detect a L858R mutation in a sample containing only 10% of the mutant cells in a mixture of wild-type cells compared to conventional sequencing method (>30%). Therefore, this complex system can be useful for the fast detection of L858R mutation of EGFR gene in clinical samples and this will ensure that the clinician gives appropriate treatment to patient in clinician's office.

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