

MicroRNAs As Promising Novel Biomarkers For Diagnosis of Breast Cancer

Thesis submitted for partial fulfillment of M.D Degree in Medical Biochemistry and
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2014

Abstract

Breast cancer is currently the most common cancer in women worldwide, both in developed and developing countries. MicroRNAs (miRNAs) are approximately 22 nucleotides long, single-stranded, non-protein-coding RNA molecules that regulate gene expression. The level of miRNAs altered during inflammatory reaction and tumorigenesis. MiRNAs are stable in the circulation and resistant to RNase digestion and other harsh conditions such as extreme PH, boiling, and multiple freeze-thaw cycles. Its level in circulation is changed in association with different diseases as well as certain biological or pathological stages. Micro RNA-21, 155 is up regulated and micro RNA 145 is down regulated in many tumors. This study aimed to evaluate the ability to use the micro RNA-21, 155 and micro RNA 145 serum level as novel new biomarker to diagnose breast cancer.

Subject and Methods:

The study included 50 female patients with breast cancer and 25 healthy female serving as control. Micro RNA-21, micro RNA -155 and micro RNA -145 serum levels was estimated by real-time quantitative reverse transcription PCR (qRT-PCR).

Results:

A significant difference between patients and controls as regard serum level of miRNA- 21($p < .001$), miRNA -155($p = 0.016$) and miRNA -145($p < .001$). No significant relation between serum level of three candidate miRNA and tumor size, node state ,metastatic state, estrogen and progesterone receptor (ER/PR)state and tumor type in patient except mi RNA 145 and tumor size ($p = 0.047$). Receiver

Operating Characteristic (ROC) Curve analysis showed that the best cutoff value for miRNA-21=1.215 with sensitivity 92% and specificity 100%, the best cutoff value for detection of cancer is miRNA-145=0.795 with sensitivity 74% and specificity 100% and miRNA-155=1.365 with sensitivity 60% and specificity 100%. A significant positive correlation between **miRNA-21** and **miRNA-155** ($r=.249$, $p=.031^*$) and a negative correlation between **miRNA-21** and **miRNA-145** ($r=-.475$, $p=.000$) serum level in patient and control.

Conclusion

MiRNA-21, mi R -155 and miRNA-145 serum level can be used as a novel biomarker to diagnose breast cancer patient.

Key words: Breast cancer, micro RNA, Marker.