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Novel miRNAs as diagnostic marker for HER2 positive breast cancer & novel miRNAs as resistance marker for trastuzumab

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The humanized anti-HER2 antibody, trastuzumab (Herceptin), has been widely used in the treatment of early stage and metastatic types of HER2 positive breast cancers. Resistance to trastuzumab has become a critical problem for targeted therapy of HER2-positive breast cancers. MicroRNAs (miRNAs) are a class of short, non-coding RNAs that regulate gene expression post-transcriptionally. MicroRNAs are promising as critical core regulators of drug resistance that perform modulating the epithelial-to-mesenchymal transition (EMT) and cancer-related immune responses. Trastuzumab-resistant BT-474 cells were generated by long-term *in vitro* culture of BT-474 cells in the presence of trastuzumab. The expression of candidate miRNAs was then evaluated by Real-Time PCR. Our results showed that some miRNAs expression was significantly different in trastuzumab resistant cells in comparison with the parent cells. We are now studying the amount of candidate miRNAs in the blood of patients showed acquired resistance to trastuzumab compared to those who do not. We hope to find and introduce a valuable miRNA as a resistance marker for trastuzumab. At the same time we are studying the amount of candidate miRNAs in the blood of HER2 positive breast cancer patients compared to healthy women at the same age to find a novel diagnostic marker.