Research investigating biomarkers for early detection, prognosis and the prediction of treatment responses in breast cancer is rapidly expanding. However, no validated biomarker currently exists for use in routine clinical practice, and breast cancer detection and management remains dependent on invasive procedures. Histological examination remains the standard for diagnosis, whereas immunohistochemical and genetic tests are utilized for treatment decisions and prognosis determinations. Therefore, we conducted a comprehensive review of literature published in PubMed on breast cancer biomarkers between 2009 and 2013. The keywords that were used together were breast cancer, biomarkers, diagnosis, prognosis and drug response. The cited references of the manuscripts included in this review were also screened. We have comprehensively summarized the performance of several biomarkers for diagnosis, prognosis and predicted drug responses of breast cancer. Finally, we have identified 15 biomarkers that have demonstrated promise in initial studies and several miRNAs. At this point, such biomarkers must be rigorously validated in the clinical setting to be translated into clinically useful tests for the diagnosis, prognosis and prediction of drug responses of breast cancer.

Key Word:
breast cancer; biomarkers; early diagnosis; prognosis; chemotherapy resistance.