MicroRNAs as novel Potential biomarker in gastric cancer: Diagnostic and prognostic biomarker

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Abstract

Introduction: Gastric cancer (GC) has a high incidence and ranks second in the leading causes of cancer related death. Despite many advances in treatment of GC, patients show poor prognosis and the 5-year survival rate is 5–20% and >80% of cases are diagnosed at the middle to late disease stage. Therefore, identifying novel biomarkers open new landscapes in diagnosis and prognosis for various stages of GC. Today, the existing cancer biomarkers such as MG7-Ag, CEA, CA199 and CA50 in clinical diagnosis cannot be effectively applied to the clinical diagnosis of GC because of their low sensitivity and specificity. Large part of gastric cancers causing genes regulate with microRNAs (miRNAs) that bind to 3′ untranslated region (3′UTR) of mRNAs. Detection of miRNAs, in tissue also in serum/plasma, may enhance the sensitivity and specificity of diagnostic and prognostic tests for early stage gastric cancer.

Method: We carried out PubMed search with various combinations of these keywords; circulating miRNA, microRNA, prognostic biomarker and diagnostic biomarker with gastric cancer. The results included 60 articles with specific criteria that published between 2005 to 2015.

Result: Some of these miRNAs were significantly up-regulated in GC endothelium compared to normal endothelium such as miR-21, miR-27a, mir-34b, mir-34c, mir-128a, miR-20b and miR-20a also some of Circulating miRNAs in serum/plasma were up-regulated are miR-20b, miR-20a, miR-17, miR-106a, miR-18a, miR-21. In the other hand, other miRNAs such as mir-128b, mir-129 and mir-148 were reported to be

down-regulated in GC tissue and miR-375, let-7a, miR-218 and miR-195-5p in serum/plasma of patients with GC. MiRNA expression profiles and next-generation sequencing results demonstrated that some miRNAs such as miR-375, miR-106a, miR-21 and MiR-421 in tissue and miR-1, miR-20a, miR-27a, miR-34 and miR-423-5p in blood are as a diagnostic marker and the other miRNAs are correlated with prognosis, including miR-10b, miR-21, miR-223, miR-338, let-7a, miR-30a in tissue and miR-196a, miR-200c, miR-21, miR-17-5p/20a as a circulating miRNAs.

Conclusion: Finally, miRNAs has a great potential to serve as new biomarkers in the detection and prediction of prognosis of GC.

Key words: gastric cancer, miRNA, biomarker