



Review

The diagnostic and prognostic role of miR-27a in cancer



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ABSTRACT

MicroRNA-27a (miR-27a) has been reported to be abnormally expressed in patients with cancer, and it could play potential roles as a diagnostic and prognostic biomarker of cancers. However, the diagnostic and prognostic role remains unclear. Hence, this meta-analysis, based on published data, was conducted to assess the utility of miR-27a as a diagnostic and prognostic marker in various cancers. To identify eligible studies, databases: Web of Science, PubMed, and CNKI were searched, with 868 literatures obtained, 16 of which were included in the Meta-analysis. The pooled results of studies conducted with serum/plasma showed that miR-27a was a valuable diagnostic biomarker in cancers (area under curve (AUC)= 0.91, sensitivity (SEN)= 0.84, specificity (SPE)= 0.85), with the diagnostic value slightly reduced in tumor tissue samples (AUC=0.83, SEN=0.78, SPE: 0.74). Additionally, the pooled results revealed that high expression of miR-27a predicted poor prognosis of cancer in serum/plasma (hazard ratio (HR) = 0.63, $P_{\text{Heterogeneity}} = 0.278$, $I^2 = 21.50\%$) but not in tumor tissue (HR = 0.98, $P_{\text{Heterogeneity}} = 0.577$, $I^2 = 0.0$). In brief, our results suggested that miR-27a in serum/plasma or tumor tissue could act as a diagnostic biomarker, and that miR-27a in serum/plasma could predict cancer patients' survival.

1. Background

MicroRNAs(miRNAs) are a class of small, non-coding RNAs with 20–22 nucleotides. They mediate gene expression by binding to the 3'-untranslated region (3'-UTR) of target messenger RNA (mRNA) [1]. miRNAs are involved in various biogenesis which are associated with carcinogenesis, such as cell proliferation, cell cycle, apoptosis, angiogenesis, invasion, and metastasis [2]. More importantly, a growing number of evidences suggests that miRNAs play multiple roles in the development and progression of cancers.

miR-27a is a member of miR-27 family that has two members (miR-27a and miR-27b), located on chromosome 19 [3]. It has been identified as an oncogenic miRNA, and its important role in cancer development has been demonstrated in a few studies [4]. For example, by inducing epithelial-to-mesenchymal transition (EMT) [5], miR-27a promoted metastasis of human gastric cancer (GC) cell [6]; in breast cancer(BC), miR-27a was involved in the apoptotic response, cell cycle checkpoints, and cellular metabolism [4]; in squamous cell lung cancer (SCLC), overexpression of miR-27a promoted tumor growth and metastasis by targeting SMAD2 and SMAD4 [7]. Nevertheless, in some types of

Abbreviations: AUC, area under curve; SROC, summary receiver operating characteristic; CI, confidence interval; FN, false negative; FP, false positive; TP, true positive; TN, true negative; GC, gastric cancer; HCC, hepatocellular carcinoma; HR, hazard ratio; miRNA, microRNA; NSCLC, non-small cell lung cancer; OS, overall survival; RFS, recurrence/relapse-free survival; DFS, disease-free survival; PFS, progression-free survival; qRT-PCR, quantitative real-time polymerase chain reaction; SEN, sensitivity; SPE, specificity; EMT, epithelial-to-mesenchymal transition; SCLC, squamous lung cancer; SNP, single nucleotide polymorphism; NOS, Newcastle-Ottawa Scale; PLR, positive likelihood ratio; NLR, negative likelihood ratio.

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