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MicroRNAs (miRNAs) based Biomarkers for Acute Myocardial Infarction (AMI) Diagnosis

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MicroRNAs (miRNAs) play a significant role in regulation of genes expression and cellular processes [1-3]. In the recent past, various studies have explored the vital role of miRNAs both in cardiovascular development and cardiac diseases [4-7]. In addition miRNA has promised as biomarkers for cardiac diseases especially acute myocardial infarction (AMI) diagnosis [8-11].

Various cardiac and non-cardiac specific miRNAs correlate with AMI diagnosis. miRNA-1 levels elevate in AMI patient's serum, but due to limited sensitivity and specificity, miRNA-1 cannot be used as a marker [12]. Two miRNAs; miR-30c and miR-145 correlate with Troponin T levels, indicating these miRNAs can be used as a marker to evaluate the severity of myocardial infarction (Infarct size) [13]. miR-208 is another cardiac specific miRNA which has been evaluated as a biomarker for AMI diagnosis. miRNA-208 levels rise in the blood as a result of AMI [14]. While miR-133a/b, miR-499 have also been evaluated as AMI biomarkers, their increase is also seen in skeletal muscle injury and therefore are not AMI specific [12]. While many studies shows that miRNA concentrations are promising AMI biomarkers, studies conducted by Widera et al. claimed that miR-1, miR-133a, miR-133b, miR-208, miR-208b, and miR-499 are not useful for either diagnostic or prognostic markers in Acute Coronary Syndrome (ACS) [15].

A miRNAs based signature consisting of 20 miRNAs predicts AMI with 90% sensitivity, 96% specificity and 93% accuracy [13]. This miRNAs signature provides better diagnosis than any single marker, and is able to diagnose AMI in the shortest time even when the patient is still Troponin T negative [13]. These interesting findings are promising but need further evaluations, since the sample size was small.

In summary, miRNAs research has great potential for better understanding of cardiac pathophysiology and can also offer a novel class of biomarkers for the diagnosis of AMI. Future work should include large scale, multicenter clinical trials to validate miRNAs sensitivity and specificity as a diagnostic marker for AMI. Moreover, to achieve a miRNAs based diagnostic test, there is a need to design novel detection tools because current miRNAs detection methodologies are time consuming and unable to detect low levels of miRNAs.

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