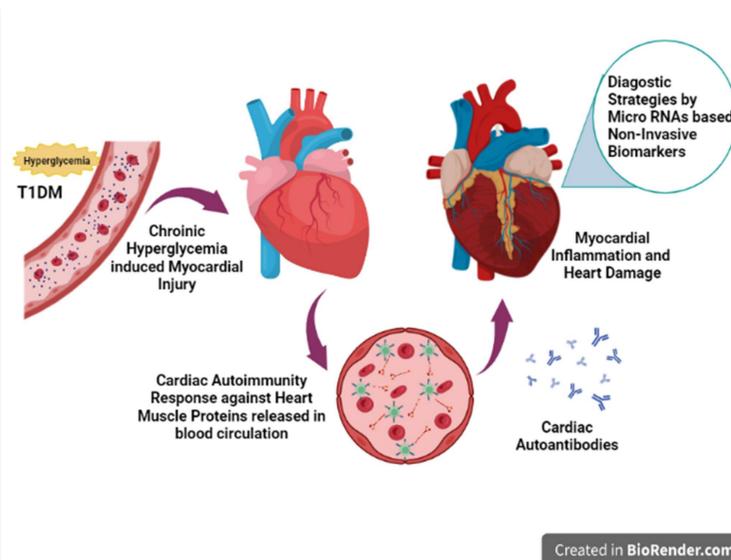


Abstract

In autoimmune disorder of Type 1 diabetes mellitus (T1DM), T cells mediated destruction of pancreatic beta cells results in insulin deficiency leads to hyperglycemia. Hyperglycemia induced autoimmunity develops oxidative stress, disrupt endothelium function, causes inflammation by upregulating C- reactive proteins, free fatty acids, and inflammatory cytokines in blood, and cardiac specific autoantibodies result in death of cardiomyocytes. There is a need to further evaluate the relation between hyperglycemia, cardiac autoimmunity, inflammation and find effective target to diagnose cardiac autoimmunity at early stage before progression to heart failure. Micro RNAs (miRNAs) are known to regulate post transcriptional expression of their target genes. We used gene target registry (GTR) for finding genes involved in hyperglycemia induced cardiac autoimmunity. Different miRNAs targeting these genes were identified by using bioinformatics tools NCBI, miRanda, TargetScan, miRBase, and TarBase. With the help of these bioinformatics repositories, we found following genes and their putative miRNAs that targets them by binding at 8mer units: TP53, VEGFA, RUNX1, IGF1, STAT3, PTEN, MAPK14, PPARG, FOXO1, TNFRSF1B, TCF7L2, PRKCD, ANXA2, INSR, TET2, ENTPD1. In conclusion, we predict that given miRNAs can be investigated as potential miRNA-based early-stage diagnostic biomarkers for the hyperglycemia induced cardiac autoimmunity.

Introduction

In T1DM, T cells mediated autoimmune response causes pancreatic beta cells destruction and insulin deficiency will leads to hyperglycemia (Katsarou *et al.*, 2017). Due to asymptomatic nature of cardiac abnormality in diabetic patient's, heart progresses towards failure and may cause death (Ritchie & Dale Abel, 2020). Cardiac injury induced by hyperglycemia results in release of cardiac antigens in blood circulation thus activating autoimmune response against these antigens (Sousa *et al.*, 2019). Micro RNAs play vital roles both in normal and disease conditions (Khatun *et al.*, 2022). Circulating micro RNAs can serve as efficient non-invasive disease biomarkers as they are stable and easily detectable (Potla *et al.*, 2021) in blood, urine, or other body fluids. These micro RNAs predict the prognosis of heart failure in diabetic patients at early-stage of disease and can reduce rate of mortality due to sudden heart failure (Russo *et al.*, 2018).



Aim & Objectives

To evaluate the potential of different micro RNAs as early-stage diagnostic biomarkers of hyperglycemia induced cardiac autoimmunity.

Methods

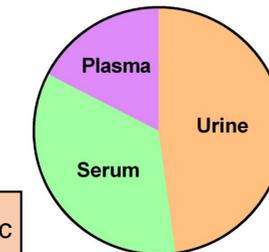
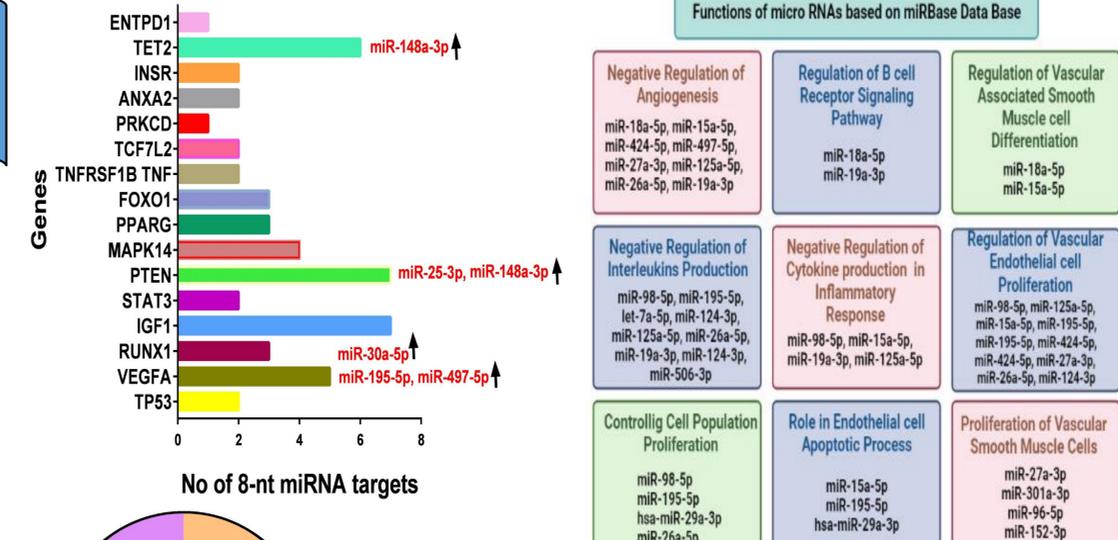


Discussion

Incidence of heart failure is 2-5 times higher in diabetic patients (Mathur & Rani, 2021). Recent studies are evaluating the potential of micro RNAs as non-invasive diagnostic biomarkers (Guo & Nair, 2017). Hyperglycemia and cardiac disease linked micro RNAs levels like MiR-125 were found upregulated in serum of patients detected by microRNA TaqMan assays (Simionescu *et al.*, 2016). In-silico analysis also predict similar potential of micro RNAs as prognostic biomarkers of hyperglycemia induced cardiac autoimmunity.

Acknowledgements

Results



Detection of Micro RNAs in Body Fluids

Conclusion

Early prediction by bioinformatic tools helps to design and execute novel research projects by using advance techniques like real time PCR, Western blots, Luciferase gene reporter assays. This may help physicians to diagnose disease at early-stage and help to reduce mortality rate in diabetes induced cardiac pathology.

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