

Micro RNAs (194 and 135a) as Biomarkers and Therapeutic Targets in Type 2 Diabetic Rats

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Abstract : Background of the study: Type 2 diabetes is emerging as the predominant metabolic disorder in the world among adults characterized mainly by the resistance of the insulin sensitive tissues towards insulin followed by the decrease in the insulin secretion. The treatment for this disease usually involves treatment with oral synthetic drugs which are known to cause several side effects. Therefore, identification of new biomarkers as therapeutic target is the need of the hour. miRNAs are small, non-protein-coding RNAs that negatively regulate gene expression by promoting degradation and/or inhibit the translation of target mRNAs and have emerged as biomarkers in predicting diabetes mellitus. Objective of the study: To elucidate the therapeutic role of gallic acid in modulating the alterations in glucose metabolism induced by miRNAs 194 and 135a in Type 2 diabetic rats. Materials and Methods: T2D was induced in rats by feeding them with a high fat diet for 2 weeks followed by intraperitoneal injection of 35 mg/kg/body weight (b.wt.) of streptozotocin. Microarrays were used to assess the expression of miRNAs in control, diabetic and gallic acid treated rats. Gene expression studies were carried out by RT PCR analysis. Results: Forty one miRNAs were differentially expressed in Type 2 diabetic rats. Among these, the expression of miRNA 194 was significantly decreased whereas miRNA 135a was significantly increased in Type 2 diabetic rats. The glucose metabolism was also altered significantly in skeletal muscle of Type 2 diabetic rats. Conclusion: T2D is associated with alterations in the expression of miRNAs in skeletal muscle. Both these miRNAs 194 and 135a play an important role in glucose metabolism in skeletal muscle of diabetic rats. Gallic acid effectively ameliorated the alterations in glucose metabolism. Hence, both these miRNAs can serve as biomarkers and therapeutic targets in diabetes mellitus. The study also establishes the role of gallic acid as therapeutic agent. Acknowledgment: The financial assistance provided in the form of ICMR women scientist by ICMR DHR INDIA is gratefully acknowledged here.

Keywords : gallic acid, high fat diet, type 2 diabetes mellitus, miRNAs

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