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The expression of retinal micro RNA evoked by hyperglycemia and after adiponectin treatment in human retinal endothelial Cells

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Diabetes mellitus is a chronic inflammatory disease causing macrovascular and microvascular complications including diabetic retinopathy (DR), which increases the risk of vision impairment and blindness among working adults. Adiponectin is a hormone that is naturally produced in human adipose tissue and data of our recent work demonstrated that adiponectin could ameliorate key biological process involved in the pathogenesis of DR such as the oxidative stress, barrier function, and the inflammatory pathway. Micro RNAs have been documented as novel biomarkers and are increasingly being considered as molecules with significant modulatory action in many biologic processes. Recently, adiponectin has been linked to DR; however, limited data are available regarding the role of miRNAs in adiponectin action. Thus, this research focuses on providing insight into the role of miRNAs in pathogenesis of DR. Human retinal endothelial cells (HMVRECs) were used to evaluate the contribution of miRNAs in the role of adiponectin in DR. HMVRECs have been treated with normal glucose (5mM) and high glucose (30mM) in addition to adiponectin treatment for both 24 and 96 hours. Subsequently, the miRNAs were extracted to measure the expression of different miRNAs in different treated HMVRECs. Gene panel for both adhesion molecules and angiogenesis were tested to examine the different gene expression in high glucose cells in comparison to adiponectin-treated cells. Furthermore, extracted miRNAs were sequenced and compared with the results of gene panel results. High glucose treatment increases the expression of different adhesion and angiogenesis genes as well as miRNAs involved in theses pathways. In the contrary, the adiponectin-treated cells showed a down-regulation in most of these genes. Hyperglycemia induces expression of various adhesion and angiogenesis genes. Adiponectin could counteract the destructive effects of hyperglycemia on retinal endothelial cells via miRNAs. This in turn could be helpful to develop a novel therapeutic approach for diabetic retinopathy.

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