The Evolving Role of Long Noncoding RNA HIF1A-AS2 In Diabetic Retinopathy: A Cross-Link Axis Between Hypoxia, Oxidative Stress and Angiogenesis Via MAPK/VEGF-Dependent Pathway

Marwa Mohamed Atef 1, Noha M Shafik 2, Yasser Mostafa Hafez 3, Mona Mohamed Watany 4, Amal Selim 5, Heba M Shafik 6, Omnia Safwat El-Deeb 7
1,2,6&7 Medical Biochemistry Department, Faculty of Medicine, Tanta University
3 Assistant professor of Internal Medicine, Tanta University
4 Clinical pathology Department, Faculty of Medicine, Tanta University
5 Ophthalmology Department, Faculty of Medicine, Tanta University

Abstract

Background:

Diabetic retinopathy (DR) signifies a frequent serious diabetic complication influencing retinal structure and function. Dysregulation of lncRNAs drives a wide array of human diseases especially diabetes; thus, we aimed to study lncRNA HIF1A-AS2 role and its interplay with hypoxia, oxidative stress (OS), and angiogenesis in DR.

Materials and methods:

60 DM patients in addition to 15 healthy subjects. were enrolled. LncRNA HIF1A-AS2 mRNA relative gene expression was assessed. Hypoxia inducible factor 1-alpha (HIF-1α), vascular endothelial growth factor (VEGF), mitogen activated protein kinase (MAPK), and endoglin levels were assessed. Detection of DNA damage using comet assay, and Redox parameters were also detected.

Results:

LncRNA HIF1A-AS2 expression was significantly increased in diabetic patients with the highest levels in proliferative DR patients. Moreover, HIFα, VEGF, MAPK, and Endogolin levels were significantly higher in the diabetic patients compared to control group with the highest levels in in proliferative DR patients. Significant DNA damage in comet assay was observed to be the highest in this group.

Conclusion:

We observed for the first time the imminent role of long noncoding RNA HIF1A-AS2 in DR throughout its stages and its interplay with hypoxia, OS, and angiogenesis via MAPK/VEGF-dependent pathway.

Keywords: Diabetic retinopathy; HIF- 1α; HIF1A-AS2; MAPK; VEGF; angiogenesis; endoglin; oxidative stress.

Conflict of interest statement

No potential conflict of interest was reported by the author(s).