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miR-29b modulates DNA methylation in diabetic nephropathy

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DNA methylation plays a major role in the pathophysiology of Diabetic Nephropathy (DN). According to recent reports, it has been inferred that hypermethylation could be one of the principle reason behind aggravation in DN condition. Through in silico analysis, an interrelationship between miR-29b and DNA methylation was suggested. We have validated that miR-29b prominently targets DNA Methyl Transferase (DNMT), specifically DNMT1, DNMT3A and DNMT3B. We have developed an in vitro DN model using Renal Proximal Tubule Epithelial Cells (RPTECs), in which there was a significant alleviation in RNA and protein expression levels of DNMT3A, DNMT3B and DNMT1. The developed model also demonstrated downregulation in expression of miR-29b. Our studies have suggested that miR-29b targets DNMT1 *via* targeting its transcription factor SP1. In addition to this, downregulation of a specific biomarker for kidney injury, tubular Kidney Injury Molecule-1 (KIM-1) and fibrosis causing glycoprotein i.e. fibronectin, was also demonstrated. Hence, the developed model revealed that hypermethylation was a key factor incorporated in DN and miR-29b could effectively ameliorate defensive actions in DN pathogenesis. To further validate this correlation, we developed an in vivo Streptozotocin induced DN model in which we reconfirmed the role of miR-29b in modulation of DNA methylation. Hence, this research suggests role of miR-29b in amelioration of defensive actions in DN and paves the way for microRNA mediated hypermethylation in DN condition.

Biography

Piyush Gondaliya has completed his Diploma and Bachelors in Pharmacy from L.M. College of Pharmacy, Ahmedabad, India. He has pursued his Masters in Biotechnology at NIPER-A. He is currently pursuing his PhD research work in Biotechnology at NIPER-A. He has many publications in reputed journals and his research interests include exploring role of microRNAs and other epigenetic modifications in diabetic nephropathy.

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