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### **The role of miR-34a on the glomerular injury in diabetic nephropathy**

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**Objectives:** Recent studies have shown the possibility of a new role of microRNA in lipid metabolism by regulating the expression of target genes. We aimed to investigate the role of miR-34a as one of the microRNA in lipid metabolism and renal injury in diabetic kidney disease (DKD).

**Methods:** We identified miR-34a and genes related to glomerular injury through differential expression of mRNA and functional annotation of miRNA in diabetic animal model. Using Luciferase assay, the network between miR-34a and mRNA of the lipid metabolism-related gene are analyzed and are selected in DKD. In vitro, the change of miR-34a by the administration of palmitic acid (PA), and TNF- $\alpha$  in mesangial cells was confirmed, and the target gene was evaluated accordingly. The miR-34a was modulated by inhibitor or mimics.

**Results:** The expression of miR-34a was increased in mesangial cells stimulated with TNF- $\alpha$  and PA. In luciferase assay, we found that the transcript level of ABCA1 3' UTR and miR-34a was closely related. Protein expression levels of ABCA1 was significantly increased in mesangial cells with transfected miR-34a inhibitor. Conversely, ABCA1 expression was significantly decreased by miR-34a mimic. Renal cholesterol and triglyceride contents were increased when mimic was treated for TNF- $\alpha$  and PA stimulation, and decreased when treated with miR-34a inhibitor. Apoptosis and mitochondrial dysfunction were also increased in mesangial cells with PA and TNF- $\alpha$  and were ameliorated by miR-34a inhibitor.

**Conclusions:** These findings suggest that the miR-34a has a role in the renal lipid accumulation via the ABCA1 in DKD.