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### **Protective effect of curcumin on high-glucose-induced podocyte injury**

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**Objectives:** Diabetic nephropathy is the major cause of mortality or morbidity in type 2 diabetes patients. Podocyte is known to play a significant role in the progression of diabetic nephropathy and previous studies have shown an elevated oxidative stress level in high glucose-induced podocyte injury. Curcumin, a hydrophobic polyphenol responsible for the yellow color in *Curcuma longa*, has gathered attention from various research fields with its natural anti-oxidative, anti-inflammatory, and anti-apoptotic effects. Nonetheless, the effect of curcumin on high glucose-induced podocyte injury is not well known. Thus, this study investigated the effect of curcumin on high glucose-induced podocyte injury caused by oxidative stress or inflammatory response.

**Methods:** Podocytes were incubated with normal glucose (5.5 mM) and high glucose (30 mM) in the presence or absence of curcumin (50  $\mu$ M) for 24 hrs. Intracellular reactive oxygen species (ROS) generation was analyzed using 2'-7' dichlorofluorescein diacetate (CM-H<sub>2</sub>DCF-DA). Western blot and quantitative real time-PCR, and immunofluorescence analysis were carried out to evaluate the effects of curcumin on high glucose-induced podocyte injury. CCL2 (C-C motif chemokine ligand 2) level in high glucose-treated podocytes was measured by ELISA.

**Results:** Increased ROS in podocytes stimulated by protein was also reduced with curcumin. Furthermore, curcumin treatment has significantly restored the upregulation of VEGF, TGF- $\beta$ , and CCL2 and downregulation of nephrin at mRNA levels in cultured podocytes exposed to high glucose environment. In addition, high glucose-induced changes in the expression of TGF- $\beta$ , nephrin, and CCL2 at protein levels were considerably reverted to the original level with curcumin treatment. High glucose-mediated F-actin rearrangement of podocytes was recovered significantly by curcumin treatment.

**Conclusions:** The research suggests that curcumin may have a novel therapeutic effect on high glucose-induced podocyte injury by regulating RI high glucose was improved with curcumin treatment. High glucose-induced increase of RIPK3 PK3, oxidative stress, and inflammatory pathway.