

中文題目：應用 Protocatechuic Aldehyde 原兒茶醛減緩糖尿病腎病變

英文題目：Evaluation of the Therapeutic Effects of Protocatechuic Aldehyde in Diabetic Nephropathy

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**Background:** Diabetic nephropathy (DN) is one of the most severe chronic kidney diseases in diabetes and is the main cause of end-stage renal disease (ESRD). Protocatechuic aldehyde (PCA) is a natural product with a variety of effects on pulmonary fibrosis.

**Method:** In this study, we examined the effects of PCA in C57BL/KS db/db male mice. Kidney morphology, renal function indicators, and Western blot, immunohistochemistry, and hematoxylin and eosin (H&E) staining data were analyzed.

**Results:** The results revealed that treatment with PCA could reduce diabetic-induced renal dysfunction, as indicated by the urine albumin-to-creatinine ratio (db/m:  $120.1 \pm 46.1 \mu\text{g}/\text{mg}$ , db/db:  $453.8 \pm 78.7 \mu\text{g}/\text{mg}$ , db/db + 30 mg/kg PCA:  $196.6 \pm 52.9 \mu\text{g}/\text{mg}$ , db/db + 60 mg/kg PCA:  $163.3 \pm 24.6 \mu\text{g}/\text{mg}$ ,  $p < 0.001$ ). However, PCA did not decrease body weight, fasting plasma glucose, or food and water intake in db/db mice. H&E staining data revealed that PCA reduced glomerular size in db/db mice (db/m:  $3506.3 \pm 789.3 \mu\text{m}^2$ , db/db:  $6538.5 \pm 1818.6 \mu\text{m}^2$ , db/db + 30 mg/kg PCA:  $4916.9 \pm 1149.6 \mu\text{m}^2$ , db/db + 60 mg/kg PCA:  $4160.4 \pm 1186.5 \mu\text{m}^2$   $p < 0.001$ ). Western blot and immunohistochemistry staining indicated that PCA restored the normal levels of diabetes-induced fibrosis markers, such as transforming growth factor-beta (TGF- $\beta$ ) and type IV collagen. Similar results were observed for epithelial–mesenchymal transition-related markers, including fibronectin, E-cadherin, and  $\alpha$ smooth muscle actin ( $\alpha$ -SMA). PCA also decreased oxidative stress and inflammation in the kidney of db/db mice.

**Conclusions:** This research provides a foundation for using PCA as an alternative therapy for DN in the future.