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Ferulic Acid Alleviates Diabetic Cardiomyopathy in Mice via Decreasing Blood Glucose, Reducing Inflammation and Down-regulating TLR-4/NF-κB Pathway

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***SUMMARY*. The present study aimed to investigate the protective effect and mechanism of ferulic acid on diabetic cardiomyopathy (DCM) in mice. The C57BL/6J mice were divided into normal control group (n = 10), model group (n = 9) and ferulic acid group (n = 9). The streptozotocin-induced type 2 diabetes mellitus model was constructed in model and ferulic acid groups. The ferulic acid group was treated with 40 mg/kg ferulic acid by gavage for 8 weeks. After treatment, the fasting blood glucose (FBG), lactate dehydrogenase (LDH), creatine kinase isoenzymes (CK-MB), advanced glycation end products (AGEs), monocyte chemoattractant protein 1 (MCP-1), tumor necrosis factor-α (TNF-α) and interleukin 1β (IL-1β) levels in serum were detected. The heart mass index (HMI) and left ventricle mass index (LVMI) were measured. The myocardial Toll-like receptor 4 (TLR-4) and nuclear factor kappa-B (NF-κB) p65 expression levels were determined. Results showed that, compared with model group, in ferulic acid group the FBG level was decreased, the HMI and LVMI were decreased, the serum LDH, CK-MB, AGEs, MCP-1, TNF-α and IL-1β levels were decreased, and the myocardial TLR-4 and NF-κB p65 expression levels were decreased (all *p* < 0.05). In conclusion, the ferulic acid can alleviate the DCM in mice by decreasing blood glucose, reducing inflammatory response and down-regulating TLR-4/NF-κB signaling pathway.**

RESUMEN. El presente estudio tuvo como objetivo investigar el efecto protector y el mecanismo del ácido ferúlico en la miocardiopatía diabética (DCM) en ratones. Los ratones C57BL/6J se dividieron en grupo de control normal (n = 10), grupo modelo (n = 9) y grupo de ácido ferúlico (n = 9). El modelo de diabetes mellitus tipo 2 inducida por estreptozotocina se construyó en grupos modelo y ácido ferúlico. El grupo de ácido ferúlico se trató con 40 mg/kg de ácido ferúlico por sonda durante 8 semanas. Después del tratamiento, se detectaron los niveles la glucosa en sangre en ayunas (FBG), la lactato deshidrogenasa (LDH), las isoenzimas de la creatincinasa (CK-MB), los productos finales de glicación avanzada (AGE), la proteína quimioatrayente de monocitos 1 (MCP-1), el factor de necrosis tumoral α (TNF-α) e interleucina 1β (IL-1β) en suero. Se midieron el índice de masa cardíaca (IMH) y el índice de masa del ventrículo izquierdo (IMVI). Se determinaron los niveles de expresión del receptor 4 tipo Toll miocárdico (TLR-4) y del factor nuclear kappa-B (NF-κB) p65. Los resultados mostraron que, en comparación con el grupo modelo, en el grupo de ácido ferúlico el nivel de FBG disminuyó, el HMI y el IMVI disminuyeron, los niveles séricos de LDH, CK-MB, AGE, MCP-1, TNF-α e IL-1β disminuyeron y los niveles de expresión miocárdica de TLR-4 y NF-κB p65 disminuyeron (todos *p* < 0,05). En conclusión, el ácido ferúlico puede aliviar el DCM en ratones al disminuir la glucosa en sangre, reducir la respuesta inflamatoria y regular a la baja la vía de señalización de TLR-4/NF-κB.

KEY WORDS: diabetic cardiomyopathy, ferulic acid, mice, NF-κB, TLR-4,

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