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Effectiveness of Coenzyme Q10-Micelle Compared With Coenzyme Q10 On Tacrolimus-Induced Renal Injury

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Objectives:

We and others have recently demonstrated that Coenzyme Q10 (CoQ10) has protective effects against diabetes mellitus and various types of renal injury. This study investigated whether CoQ10-micelle treatment would affords superior renoprotection compared with CoQ10 in the governing tacrolimus (Tac)-induced renal injury in the rats.

Methods:

Male adult Sprague-dawley Rats were treated daily with Tac (1.5mg/kg/day, subcutaneous), CoQ10 (20mg/kg/day, oral), and CoQ10-micelle (20 mg/kg/day, oral) for 4 weeks. The effects of CoQ10 or CoQ10-micelle on Tac-induced renal injury were assessed in terms of renal function, histopathology, oxidative stress, apoptotic cell death, and mitochondria network.

Results: After 4 weeks of Tac treatment to rats caused renal dysfunction, typical pathologic lesions, and oxidative stress marker. The serum creatinine was reduced by Tac cotreatment with CoQ10 or CoQ10-micelle groups compared with the Tac and VH group (0.31 ± 0.03 in the VH group vs. 0.43 ± 0.041 in the Tac group vs. 0.37 ± 0.031 in the Tac+CoQ10 group 0.30 ± 0.02123 in the Tac+CoQ10-micelle group; 1P<0.05 vs. VH. 2P<0.05 vs. TAC. . 3P<0.05 vs. TAC+C.) The administration of CoQ10-micelle improved renal immunoreactivity, which was accompanied by reductions in oxidative stress and apoptosis. Assessment of the mitochondrial ultrastructure by electron microscopy revealed that tacrolimus cotreatment with CoQ10-micelle increased the size and number of mitochondria more than cotreatment with CoQ10, compared with that induced by TAC treatment alone.

Conclusions: This finding suggests that both CoQ10 and CoQ10-micelle effectively attenuates Tac-induced renal injury by way of preserving mitochondrial network intact, and CoQ10-micelle provides more benefits than that of CoQ10.