Effects of Resveratrol Supplementation on Contusion-induced Muscle Injury in Mice

Chun-Shen Ho (MD)[1,2], Yi-Ju Hsu (Ph.D)[2], Mon-Chien Lee (Ph.D)[2], Wen-Ching Huang (Professor)[3], Nai-Wen Kan (Professor)[4], Shao-Wen Hung (Ph.D)[5], Chi-Chang Huang (Professor)[2,*]

[1]Division of Physical Medicine and Rehabilitation, Lo-Hsu Foundation, Inc., Lotung Poh-Ai Hospital, Yilan, Taiwan

[2]Graduate Institute of Sports Science, National Taiwan Sport University, Taoyuan 33301, Taiwan

[3]Department of Exercise and Health Science, National Taipei University of Nursing and Health Sciences, Taipei, Taiwan

[4]Center for General Education, Taipei Medical University, Taipei 11031, Taiwan

[5]Division of Animal Resources, Animal Technology Laboratories, Agricultural Technology Research Institute, Taiwan

*Corresponding author: john5523@ntsu.edu.tw

Abstract

Introduction: Muscle injuries are frequent in high demand sports. The current treatment options for soft tissue injuries remain suboptimal and often result in delayed/incomplete recovery of damaged muscle. In this study, the effects of oral resveratrol (RES) on inflammation and skeletal muscle regeneration after a contusion injury in mice were investigated.

Methods: Total 32 mice used in this study. Each 8 mice made one study group, including supplemented with RES (25 mg/kg/day) post injury (RES), only post-injury without any treatment (MDI), with topically applied NSAID (10 mg/kg/day) post-injury (NSAID), or post-injury with both RES and NSAID treatments(R+N). The left gastrocnemius muscle of mice will be subjected to mass-drop injury (MDI) . The topical NSAID or orally RES administered in post-injury once a day for seven days. Macrophage will be assessed by means of immunohistochemistry. Indicators of muscle satellite cell proliferation and regeneration will also be used to evaluate muscle repair process.

Results: The MDI-alone group showed significantly higher serum uric acid (UA) and creatine kinase (CK) than those in the normal control group ($\mathbf{p} < 0.05$). The MDI mice treated with DCF or RES showed significantly lower serum UA and CK and promoted muscle satellite cell regeneration (desmin protein increased) than those in MDI-alone mice group.

Conclusions: The study has found that resveratrol potentially accelerate muscle recovery, thereby it may be a potential candidate for further development as an effective treatment for clinical use to repair muscles.

Keywords: Mass-drop injury (MDI), Inflammation, Contusion, Resveratrol (RES)