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Liuwei dihuang, a traditional Chinese medicine, attenuates methylglyoxal-induced activation of oxidative stress and protein degradation in C2C12 skeletal muscle myotubes

Yi-Ching Lo and Yu-Ting Tseng
Kaohsiung Medical University, Taiwan

Introduction: Liuwei dihuang (LWDH) is a widely used traditional Chinese medicine for neurosis, diabetics and renal disorders. Methylglyoxal (MG) is the most potent precursor of advanced glycation end products, which has been implicated in diabetic complications, cardiovascular diseases and central nervous system disorders. The present study aimed to investigate the protective effects of LWDH on MG-induced myotoxicity in C2C12 myotubes.

Methods: C2C12 myoblasts were differentiated by differentiation medium to form myotube structure. C2C12 myotubes were then pre-treated with LWDH water extract (LWDH-WE) for 1h before MG treatment. Protein expressions were analyzed by Western blot analysis. Morphological changes were observed by an inverted microscope. Mitochondria membrane potential and reactive oxygen species (ROS) production were measured by flow cytometer using JC-1 staining and H2DCF-DA staining, respectively.

Results: In C2C12 myotubes, LWDH-WE attenuated MG-induced reduction of mitochondrial membrane potential. Moreover, MG-induced NADPH oxidase (Nox) activation and ROS production were inhibited by LWDH-WE treatment. Furthermore, LWDH-WE attenuated MG-induced myotubes atrophy accompanied with down-regulating signaling of protein degradation pathway including Foxo3a, atrogin-1 and MuRF-1 in C2C12 cells.

Conclusion: LWDH might provide protection against MG-induced myotoxicity via attenuating oxidative stress and protein degradation in C2C12 myotubes, suggesting the potential benefits of LWDH on treatment of skeletal muscle atrophy.

Biography

Yi-Ching Lo has her expertise in drug development and in improving the aging health. Her research interest focuses on the development of neuroprotective and muscle enhancing agents, including chemical and natural products.

yichlo@kmu.edu.tw

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