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The Regulation of Vimentin in Skeletal Muscle Fibrosis Affected by High-load Exercise

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Objective Long-term movement could induce micro-damage of skeletal muscle, increase collagen significantly, and appear skeletal muscle fibrosis. Vimentin is one of the most important proteins in evaluating the fibrosis after muscle injury. TGF- β 1 could up-regulate Vimentin expression, promoting cell migration and accelerating fibrosis and injury repair. This study mainly explored the role of TGF- β 1/Vim in skeletal muscle fibrosis affected by a bout of high-load exercise. And we tried to find whether the expression of vimentin could regulate the regeneration of muscle fiber and the remodeling of connective tissue.

Methods SD rats were divided into 7 groups: control group, immediately, 6-hour, 12-hour, 24-hour, 48-hour and 72-hour after group. Western Blot was used to detect TGF- β 1, vimentin, RhoA, ROCK1 and CTGF(connective tissue growth factor) expressions. Electron microscopy was used to observe the changes of collagen in skeletal muscle.

Results Vimentin protein expression increased quickly at 6-hour after exercise. At 48-hour, the vimentin expression reached the peak. And then the expression of vimentin gradually decreased. The expressions of TGF- β 1, RhoA, ROCK1 and CTGF gradually increased after exercise. The peak of these expressions appeared at 12-hour respectively. Then these protein expressions declined slowly. Collagen in skeletal muscle became long and thick in 48-hour and 72-hour after exercise.

Conclusions A bout of high-load exercise could induce skeletal muscle fibrosis. RhoA-ROCK1 maybe affect TGF- β 1/Vim expressions as main regulators, and then the protein expression vimentin could regulate the regeneration of muscle fiber and the remodeling of connective tissue as an important evaluation factor.