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Expression of Myosin Heavy-chain mRNA in Cultured Myoblasts Induced by Centrifugal Force

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Abstract: Ballistic muscle training leads to hypertrophy of fast type fibers and training for endurance induces that of slow type fibers. Numerous studies have been conducted on electrical, extending and magnetic stimulation of cells, but the effect of centrifugal force on cells remains to be investigated. In this study, we investigated the effect of stimulating cultured myoblasts with centrifugal force at different speeds on cell proliferation and myosin heavy-chain (MyHC) mRNA expression in muscle fiber. Stimulation of myoblasts was carried out at 2 different speeds for 20 min using the Himac CT6D, a desk centrifuge, and cells were observed at 1, 3 and 5 days later. Number of cells 1 and 5 days after centrifugal stimulation was significantly larger in the 62.5×g and 4,170×g stimulation groups than in the control group. Expression of MyHC-2b mRNA 1 day after centrifugal stimulation was significantly higher in the 2 stimulation groups than in the control group. Almost no expression of MyHC-2a was observed in any group at 1 and 3 days after centrifugal stimulation. However, 5 days after stimulation, MyHC-2a was strongly expressed in the 2 stimulation groups in comparison to the control group. Three days after centrifugal stimulation, expression of MyHC-1 was significantly higher in the 2 stimulation groups than in the control group. The results of this study clarified the effect of different centrifugal

stimulation speeds on muscle fiber characteristics, and suggest that centrifugal stimulation of myoblasts enhances cell proliferation.

Key words: Myosin heavy chain, Myoblasts, Centrifugal force



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