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2. Title

Effect of Smoke Extract on Disuse Muscle Atrophy and Skeletal Myogenesis

3. Period

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4. Summary

Skeletal muscle atrophy becomes a social problem in the advancement of aging society at present. The aim of this study is to reveal the effects of smoking on the recovery process from disuse muscle atrophy and on the stem cell functions to differentiate into skeletal myocytes. In this study, we established the disuse muscle atrophy model, using coiled-wire casts on hindlimbs of mice, to reveal the recovery process with or without cigarette smoke extract (CSE) treatments after removal of hindlimb casts. In addition, we utilized the human iPS cells-derived myogenesis system to investigate the differentiation process from human stem cells to mature myocytes.

In the disuse muscle atrophy model mice treated with CSE or PBS (control) injection (s.c.) after removal of hindlimb casts, the percentage of NADH-TR staining positive-myofibers was significantly decreased in soleus muscle, compared with the ones in mice with PBS injection. Treatments of CSE during iPS cell-derived skeletal myogenesis significantly inhibited the expression of Myh7, a specific marker of high oxidative myofiber, and the percentage of NADH-TR staining positive-myocytes, compared that with PBS control. These results suggested that CSE has inhibitory effects on the skeletal myogenesis, especially on high oxidative myofibers, in the recovery phase from disuse muscle atrophy. Further studies are necessary to confirm the detail mechanisms of CSE effects on skeletal myogenesis.