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CHRONIC RESPONSES OF INFLAMMATION AND MACROPHAGE FUNCTION TO EXERCISE TRAINING IN VARIOUS TISSUES OF SENESCENCE MICE

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KEY WORDS: Age-related chronic inflammation, macrophage, resistance training

INTRODUCTION

Aging induces chronic inflammation in whole-body and this chronic inflammation is associated with immune dysfunction. Moreover, the local inflammation is induced by macrophage infiltration and polarization and leads to several diseases, such as alzheimer's disease, cardio vascular diseases and metabolic disorders⁽¹⁾. Regular aerobic exercise reduces circulating levels of inflammatory markers, such as IL-6 and TNF- α , in animal and human⁽²⁾. However, the effect of different exercise manner on chronic inflammation in various tissues with aging remains unclear. The aim of this study was to investigate the effects of resistance and aerobic training on chronic inflammatory responses and macrophage infiltration and polarization in various tissues of senescence mice.

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METHODS

Male 38-week-old senescence accelerated prone mouse 1 (SAMP1) mice, as a mouse model of accelerated senescence, were randomly divided into three groups: sedentary-control (Aged-con), aerobic training (Aged-AE), and resistance training (Aged-RT). After 12-week interventions, mRNA expression of inflammatory cytokines (TNF- α and IL-6) and macrophage markers (F4/80, CD11c and CD163) in various tissues were assessed by real-

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time RT-PCR with Taqman probe. Additionally, male 25-week-old SAMP1 mice were used as sedentary-control (Young-Con).

RESULTS

in Aged-Con group, mRNA expression of TNF- α in brain, adipose tissue, blood vessel, heart, liver and small intestine significantly increased as compared with Young-Con group. However, these mRNA expressions in Aged-AE and Aged-RT groups were attenuated and these expression levels were not differed with Young-Con group. Additionally, no significant difference of IL-6 mRNA in each organ among four groups was observed. Thus, aging-induced chronic inflammation in various tissues may be attenuated by aerobic and resistance training. In the chronic inflamed tissues of Aged-Con group, F4/80 mRNA expression was significantly or slightly higher than that of Young-Con group, but did not change in the brain. In contrast, F4/80 mRNA expression in these tissues of Aged-RT and Aged-AE group significantly reduced as compared with Aged-Con group. Furthermore, aging-induced increased in ratio of CD11c / CD163 mRNA expression was attenuated by resistance and aerobic exercise training.

CONCLUSION

These results indicate that resistance and aerobic training might prevent the chronic inflammation in various tissues with advancing age, and this phenomenon might be related to the change in the macrophage infiltration and polarization.

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