異所性脂肪由来のアディポカインが運動による動脈硬化度低下に及ぼす影響

立命館大学　長谷川　夏　輝
（共同研究者）同　家　光　素　行
同　内　田　昌　孝
同　堀　居　直　希
同　外　山　雄　大

Effect of Adipokine Secretion from Ectopic Fats on The Exercise-Induced Reduction of Arterial Stiffness

by

Natsuki Hasegawa, Motoyuki Iemitsu,
Masataka Uchida, Naoki Horii, Yuta Toyama
Ritsumeikan University

ABSTRACT

Aging-induced increase in fat accumulation causes arterial stiffness. Ectopic fat accumulation with aging may be more important than whole-body fat content for predicting cardiovascular disease. Aerobic exercise training（AT）decreases fat accumulation, concomitant with an elevation of serum level of adiponectin, as an anti-inflammatory adipokine, resulting reduction of arterial stiffness. Recently, C1q/TNF-related protein 5（CTRP5）has been identified as a novel adipokine which is paralog of adiponectin and exerts vasodilator effect. Although AT increases serum CTRP5 levels, concomitant with a reduction of fat accumulation, the differences of AT-induced increases in CTRP5 secretion from ectopic adipose tissues remain unclear.

PURPOSE: This study aimed to clarify whether AT increases mRNA expression

level of CTRP5 from ectopic fats in senescence mice.

METHODS: Seventeen 38-week-old senescence-accelerated mouse prone 1 (SAMP1) mice were divided into sedentary control (CON; n=7) and AT (voluntary wheel running for 12-weeks; n=10) groups. Expression level of CTRP5 mRNA in epididymal, perivascular, subscapular subcutaneous and brown fats were measured by using real-time RT-PCR. The vasodilatory response of acetylcholine treatment was assessed by using aortic vascular rings.

RESULTS: Compared with CON group, AT group showed significantly lower epididymal fat mass, and significantly higher vasodilatory response of acetylcholine treatment by using aortic vascular rings. However, there was no significant difference in expression levels of CTRP5 mRNA in epididymal, perivascular, subscapular subcutaneous and brown fats between two groups.

CONCLUSION: These results suggest that AT-induced increases in CTRP5 mRNA may be occurs in tissues other than epididymal, perivascular, subscapular subcutaneous and brown fats.

要　旨

加齢に伴う異所性脂肪の蓄積は動脈硬化度を増大させるが，有酸素性トレーニングによりそのリスクは低下する．近年，血管拡張作用を有するアディポカインである C1q/TNF related protein 5（CTRP5）が同定された．有酸素性トレーニングにより体脂肪の低下とともに血中 CTRP5 濃度が増加するが，運動により異所性脂肪組織の CTRP5 遺伝子発現が増加するかは明らかでない．【目的】本研究は老齢マウスの有酸素性トレーニングによる異所性脂肪での CTRP5 遺伝子発現が増加するかを検討した．【方法】38 週齢の SAMP1 マウスを有酸素性トレーニング群および安静対照群に分け，12 週間後に精巣上体脂肪，大動脈血管周囲脂肪，肩甲下皮下脂肪，肩甲下褐色脂肪を摘出し，CTRP5 mRNA 発現量を測定した．また，動脈血管の血管拡張能を測定した．【結果】有酸素性トレーニングにより，動脈血管における血管拡張能は改善したが，CTRP5 mRNA 発現量はいずれの脂肪組織においても有意な変化は認められなかった．【結論】有酸素性トレーニングによる CTRP5 遺伝子発現量の増加は，精巣上体脂肪，大動脈血管周囲脂肪，肩甲下皮下脂肪，肩甲下褐色脂肪以外の組織で生じている可能性が示唆された．