1-C-14 Effects of upper limb force generation on the lower limb movement

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Purpose: The present study investigated the effects of upper limb force generation on the lower limb multi-joint movement.

Method: Subjects performed knee-hip extension movements of one leg at their maximal effort on ergometer with an electromagnetic load control. Subjects performed the movements with or without upper limb force generation. During the movements, leg movement velocity and foot pressure were measured with speedometer and pressure sensor mat, respectively.

Result and Discussion: The knee-hip extension movements with upper limb force generation influenced leg movement velocity and foot pressure. The results indicate that upper limb force generation during the lower limb multi-joint movement may interact with force generation of lower limb.

Key Words: Interlimb force generation, neuromuscular control, multi-joint movements

2-C-01 Potential functional roles of histamine receptor H1 in the nucleus tractus solitarii in exercise–induced cardiovascular adaptation.

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Purpose: The nucleus tractus solitarii (NTS) is one of potential central sites which are associated with exercise-induced cardiovascular adaptation. We previously found that exercise therapy in hypertensive animals altered the expression levels of some NTS genes which are associated with neuroactive ligand-receptor interactions. One of those genes was histamine receptor H1 which was down-regulated in the trained animals. However, the functions of H1 receptor within the NTS are still not fully established. In this study, we performed microinjection studies to elucidate its functional roles on cardiovascular regulation.

Methods: Cardiovascular parameters including mean arterial pressure (MAP) and heart rate (HR) were monitored before and after microinjections of 2-Pyridylthylamine, histamine receptor H1 agonist, into the NTS of urethane-anaesthetized Wister rats.

Results and Discussion: When H1 agonist was bilaterally microinjected into the NTS, MAP and HR were significantly increased. The maximal responses were dose-dependent. Pretreatment with H1 receptor antagonist cetirizine into the NTS significantly inhibited the H1 agonist-induced responses. We have also immunohistochemically identified that H1 receptors were dominantly expressed in the NTS neurons. These findings suggest that histamine in the NTS may be important for regulating cardiovascular homeostasis via activation of H1 receptors expressed in the NTS neurons. Moreover, a down-regulation of H1 receptors in the NTS may be involved in the exercise-induced hypertensive effects in hypertensive patients. The study was supported by the JSPS (21300253).

Key Words: NTS, blood pressure, H1 receptor