**1-B-04** The work of breathing during incremental cycling exercise in acute hypoxia

Takeshi OGAWA¹, Yukimi MAKI², Naoto FUJII³, Bun TSUJI⁴, Takeshi NISHIYASU⁵
¹ Tokuyama University, ² Graduate school of Integrated Arts and Sciences, University of Tokushima, ³ Japan Society for the Promotion of Science, ⁴ Institute of health & sports sciences in University of Tsukuba

**Purpose:** It is known that work rate of breathing (WOB) exponentially increases with increase in pulmonary ventilation (VE). We tried to investigated whether the WOB during incremental cycling exercise was higher in acute hypoxia than in normoxia, according to increase in VE in hypoxia.

**Methods:** The 14 male and female healthy subjects conducted to incremental cycling exercise to exhaustion in 15%O₂ hypoxia and normoxia. During exercise, we measured the expiratory gases to determine the VE and oxygen uptake (V̇O₂). The esophageal pressure was measured as trans-pulmonary pressure. WOB was calculated as the integration of the trans-pulmonary pressure and flow volume.

**Results and Discussion:** V̇O₂max was 16.8% lower in hypoxia than in normoxia. However, both V̇Emax and WOB were not different between the gas treatments. In sub-maximal intensity, VE and WOB were significantly higher in hypoxia than normoxia (ANOVA: p<0.05), especially at high intensity. The relationship between WOB and VE in hypoxia was similar to that of in normoxia. These results suggest that in 15% hypoxia, the WOB was higher than normoxia, according to higher ventilation in hypoxia.

**Key Words:** pulmonary ventilation, work of breathing, hypoxia.

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**1-B-05** Effect of acute hypoxia on muscle sympathetic nerve activity during dynamic leg exercise

Keiho KATAYAMA¹, Erika IWAMOTO¹, Koji ISHIDA¹, Motoyuki IEMITSU², Mitsuru SAITO³
¹ Research Center of Health, Physical Fitness and Sports, Nagoya University, ² Faculty of Sport and Health Science, Ritsumeikan University, ³ Faculty of Psychological and Physical Science, Aichigakuin University

**Purpose:** The purpose of this study was to clarify the influence of acute hypoxia on sympathetic nervous activity during dynamic leg exercise.

**Methods:** Six males participated in this study. To estimate peak oxygen uptake (V̇O₂peak), two maximal exercise tests were performed using a cycle ergometer in a semirecumbent position while breathing normoxic [inspired oxygen fraction (FIo₂ = 0.209)] and hypoxic (FIo₂ = 0.127) gas mixtures. Then, the subjects conducted four submaximal exercise tests: two were MSNA trials in normoxia and hypoxia, and two were hematological trials under each condition. In the submaximal exercise test, the subjects performed 15-min exercise at 40%V̇O₂peak of their individual V̇O₂peak in normoxia and hypoxia. During the MSNA trial, MSNA was recorded via microneurography of the right medial nerve at the elbow. During the hematological trial, venous blood samples were obtained from the antecubital vein to assess plasma norepinephrine (NE) concentrations.

**Results:** MSNA increased (P<0.05) during exercise in hypoxia, but not normoxia. MSNA during exercise was higher (P<0.05) in hypoxia than in normoxia. Plasma NE concentrations did not increase during exercise in each condition.

**Conclusion:** These results revealed that acute hypoxia augments muscle sympathetic neural activation during dynamic leg exercise. It is suggested that MSNA during hypoxic exercise could be different from the change in plasma NE concentration.

**Key words:** sympathetic neural activation, hypoxemia, leg exercise.