Relationship between plasma asymmetric dimethylarginine concentrations and aerobic exercise capacity in postmenopausal women

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Background: Asymmetric dimethylarginine (ADMA) is an endogenous competitive inhibitor of nitric oxide (NO) synthase, an enzyme responsible for generation of NO. Plasma concentration of ADMA increases in elderly people and in postmenopausal women. Elevated ADMA leads to endothelial dysfunction and increases risk for cardiovascular disease. Habitual aerobic exercise has a favorable effect on vascular aging. However, the relationship between ADMA and aerobic exercise capacity is unknown. The aim of this study was to determine whether plasma ADMA concentrations are associated with aerobic exercise capacity. Methods: Thirty healthy, postmenopausal women aged from 50 to 76 years, participated in this study. We measured plasma concentrations of ADMA, and oxygen consumption at ventilatory threshold (VO2VT), an index of aerobic exercise capacity. Plasma ADMA concentrations was measured by enzyme-linked immunosorbent assay. VO2VT was measured during an incremental cycle ergometer exercise with a respiratory gas analyzer. Each individual VO2VT was determined using regression analysis of the slopes of CO\textsubscript{2} production, O\textsubscript{2} uptake, and the minute–ventilation plot. Relationship between plasma ADMA concentrations and VO2VT was analyzed using Pearson’s correlation. Stepwise regression analysis was used to identify independent associations of plasma ADMA concentrations. Results: There was negative correlation between plasma ADMA concentration and VO2VT (R = −0.532, P < 0.01). In addition, stepwise regression analysis showed that plasma ADMA concentration was significantly associated with VO2VT. Conclusion: We found that plasma ADMA concentrations were associated with aerobic exercise capacity in postmenopausal women. These results suggest that habitual aerobic exercise may decrease plasma ADMA concentrations.


The role of NPBWR1 on autonomic nervous system

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Neuropeptide B/W receptor (NPBWR1) is a G-protein coupled receptor whose ligands, neuropeptide B (NPB) and neuropeptide W (NPW), were identified. Intracerebroventricular administration of NPW to rats was reported to increase arterial blood pressure, heart rate (HR), and plasma catecholamine concentration (Yu et al., 2007). To elucidate the role of NPBWR1 in autonomic functional regulation under stress, we examined the phenotype of NPB/WR1 deficient (Npbwr−/−) mice. The urinary catecholamine amount of Npbwr−/− mice was increased for 24 h. To elucidate the role of NPW−NPBWR1 on acute stress, we created a stress model being contacted with intruder C57/Bl6J mice for 30 min and monitored HR, activity, and body temperature using a telemetry system. In Npbwr−/− mice, recovery to the steady state of the HR after contact with the intruder was significantly slower compared with wild-type mice and the increase of HR lasted 4 h. In 12 week-old Npbwr−/− mice, cardiac hypertrophy was increased in comparison with the same-age wild-type mice. After administration of angiotensin II for 2 weeks, the cardiac hypertrophy of Npbwr−/− mice tended to deteriorate as compared with wild-type mice.


Fig. 1. The change of HR (%) after contact to intruder.

Relationship between digit ratio and idiopathic pulmonary hypertension in Japanese women

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Background: The second to fourth digit (2D:4D) ratio is a biometric marker influenced by testosterone concentrations, and covarying with the sensitivity of the androgen receptor in the uterus. Some reports described that the 2D:4D ratio is linked to disease predisposition among patients with gender-dependent diseases. Furthermore sex hormones are also reported to modulate plasma endothelin levels. Since idiopathic pulmonary arterial hypertension (IPAH) is more prevalent in women, we hypothesized that the 2D:4D ratio is linked to disease predisposition reflecting the association with sex steroids. Methods: 13 female patients with IPAH at Keio University Hospital and 41 unrelated age-matched control women were studied. Digital cameras were used to photograph the right hand of patients and controls. Finger lengths and the 2D:4D ratio were measured by two experienced scorers. Results: Mean age of the patient group and the control was 43.2 ± 3.5 years and 40.9 ± 1.7 years, respectively. The 2D:4D digit ratio was significantly higher for patients with IPAH than for the control women (0.975 ± 0.042, 0.940 ± 0.039, P < 0.05). The age at the onset of IPAH did not correlate with the ratio. Conclusions: Female patients with IPAH had a higher 2D:4D digit ratio, suggesting that prenatal circulating testosterone is lower than that of healthy subjects. Several studies show that the plasma basal levels of ET-1 were increased in male with hypogonadism. In conclusion, the 2D:4D digit ratio is a useful biomarker for IPAH, and prenatal testosterone level is an important factor to maintain plasma ET-1 levels and have a protective effect against developing IPAH.