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[ADVANCED](#)[TOP](#) > [Available Issues](#) > [Table of Contents](#) > [Abstract](#)

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[\[PDF \(262K\)\]](#) [\[References\]](#)**Interaction between resting pulmonary ventilation function and cardiac autonomic function assessed by heart rate variability in young adults**Tomoko KUROSAWA¹⁾, Toyoto IWATA¹⁾, Miwako DAKEISHI¹⁾, Tomoko OHNO¹⁾
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ABSTRACT

An association between ambient air pollution and reduced cardiac autonomic function assessed by heart rate variability (HRV) mainly in elderly persons has been suggested by a number of epidemiological studies, but the link between the HRV and pulmonary function in humans remains unknown although such air pollution should primarily affect pulmonary function. To clarify this link, pulmonary ventilation parameters such as oxygen uptake (V_{O_2}) and carbon dioxide output (V_{CO_2}), as well as the HRV with spectral analysis (high- and low-frequency components of HRV, *i.e.*, CCV_{HF} and CCV_{LF} , reflecting cardiac parasympathetic and sympathetic activities, respectively), were measured in 66 healthy women aged 19-20 years after an overnight fast of 12 h. Significant correlations were found between the CCV_{HF} of HRV and both the end-tidal carbon dioxide concentration (FET_{CO_2}) and gas exchange ratio (V_{CO_2}/V_{O_2}) in the subjects (partial correlation coefficients $r = 0.354$ and 0.320 , respectively), whereas there was no significant connection between the FET_{CO_2} and the V_{CO_2}/V_{O_2} . Similarly, the CCV_{LF} correlated significantly with the resting tidal volume of lung ($r = 0.364$). These findings suggest that resting pulmonary ventilation function interacts with cardiac autonomic function assessed by the HRV, at least in healthy young adults, which may be useful for explaining the pathophysiology concerning the short-term effect of air pollution such as fine particulate matter on cardiovascular

function.

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