
The relationship between percent change in salivary α -amylase activity and fitness level (VO_2 peak and anaerobic threshold) following maximal cycling exercise in moderately trained male individuals.

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ABSTRACT

PURPOSE: Salivary α -amylase has been proposed as a biomarker for autonomic nervous system activity as well as mucosal immune function given that its release into saliva is elicited by the stimulation of the salivary glands by sympathetic and parasympathetic activities. Clarifying how a individual's fitness level will influence on the secretion of salivary α -amylase in response to exercise is a critical biological determinant of vulnerability to psychological and physiological stress. Although previous studies have shown the correlation between salivary α -amylase and exercise intensity, the relationship between autonomic nervous system activity and fitness level such as peak oxygen uptake (VO_2 peak) and anaerobic threshold still remain to be clarified. The purpose of this study was to determine the relationship between percent change in salivary α -amylase activity and VO_2 peak, ventilatory threshold, and percent VO_2 peak at ventilatory threshold following maximal cycling exercise in moderately trained male individuals. **METHODS:** Moderately trained men [n=14; age: 19.9 ± 1.4 year; height: 171.2 ± 3.6 cm; body weight: 67.5 ± 11.9 kg; body mass index: 23.0 ± 3.5 kg/m²; body fat: 15.1 ± 6.6 %; VO_2 peak: 58.4 ± 9.5 ml/kg/min (mean \pm SD)] served as the subjects. After an overnight fast, all subjects performed an incremental cycling exercise until volitional exhaustion to obtain VO_2 peak on an electromagnetically braked cycle ergometer. Each subject performed a cycling exercise at an initial power output of 0 W for three minutes, which was increased by 25 W every 1 min until exhaustion. Pedaling frequency was 60 rpm. Expired gases and heart rate were continuously measured using a respiratory monitor system and electrocardiograph. At the 10-min period before and after maximal cycling exercise, salivary samples were collected and stored at -80 °C for the later determination of salivary α -amylase activity using an enzymatic assay. Consequently, percent change in salivary α -amylase activity was calculated in order to evaluate a degree of stimulation for the autonomic nervous activity. **RESULTS:** The percent change in salivary α -amylase activity was significantly correlated with VO_2 peak and ventilatory threshold, respectively ($p < 0.05$). In contrast, no significant correlations were observed between percent change in salivary α -amylase activity and percent VO_2 peak at ventilatory threshold. **CONCLUSIONS:** The main findings of the present study indicate that augmented stimulation for autonomic nervous activity and mucosal immune defense at the basis of elevated secretion of salivary α -amylase following maximal effort of cycling appears to be correlated with higher fitness levels.