Effects of Genetic Variations in HIF-1α on Physiological Response to Hypoxia
（低酸素に対する生理的応答における HIF-1α 遺伝子多型の影響）

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ABSTRACT

Altitude training in hypoxic conditions, such as living high and training low, is used to improve athlete performance. The benefits of altitude training vary widely among individuals, however, even resulting in reduced performance in some individuals. We hypothesized that hypoxia inducible factor-1α gene (HIF1A) polymorphisms partially affect physiological responses to hypoxia, and may predict adaptation to hypoxia. Changes in erythropoietin concentration, ventilation (V_E), and arterial O_2 saturation (SpO_2) at rest and during exercise in hypoxia were examined in subjects who have T allele of the C1772T SNP or A allele of the G1790A SNP in the HIF-1A. After 12 h of exposure to hypoxia at rest, erythropoietin concentration was higher in individuals with the SNP of G1790A than in those without. The ventilatory response to hypoxia at rest was not represented difference between the two genotypes. In all individuals, V_E increased with declining SpO_2 in response to hypoxia. Changes in V_E and SpO_2 during acute exercise under hypoxic conditions were also similar between the two genotypes. These findings give preliminary evidence to explain whether HIF-1α gene polymorphisms affect individual capacity to respond to hypoxia.

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