Interindividual variation in cardiorespiratory fitness: A candidate gene study in han Chinese people

Gaowa

Del Coso J.

Gu Z.

Gerile W.

Yang R.

Díaz-Peña R.

Valenzuela P.L.

Lucia A.

He Z.

Cardiorespiratory fitness, as assessed through peak oxygen uptake (VO2peak), is a powerful health indicator. We aimed to evaluate the influence of several candidate causal genetic variants on VO2peak level in untrained Han Chinese people. A total of 1009 participants (566 women; age [mean ± SD] 40 ± 14 years, VO2peak 29.9 ± 7.1 mL/kg/min) performed a maximal incremental cycling test for VO2peak determination. Genomic DNA was extracted from peripheral whole blood, and genotyping analysis was performed on 125 gene variants. Using age, sex, and body mass as covariates, and setting a stringent threshold p-value of 0.0004, only one single nucleotide polymorphism (SNP), located in the gene encoding angiotensin-converting enzyme (rs4295), was associated with VO2peak (? = 0.87; p < 2.9 × 10?4). Stepwise multiple regression analysis identified a panel of three SNPs (rs4295 = 1.1%, angiotensin II receptor type 1 rs275652 = 0.6%, and myostatin rs7570532 = 0.5%) that together accounted for 2.2% (p = 0.0007) of the interindividual variance in VO2peak. Participants carrying six ?favorable? alleles had a higher VO2peak (32.3 ± 8.1 mL/kg/min) than those carrying only one favorable allele (24.6 ± 5.2 mL/kg/min, p < 0.0001). In summary, VO2peak at the pre-trained state is partly influenced by several polymorphic variations in candidate genes, but they represent a minor portion of the

variance. © 2020 by the authors. Licensee MDPI, Basel, Switzerland.

Endurance performance

Genomics

Maximal oxygen uptake

Single nucleotide polymorphism

VO2max

alpha actinin 3

alpha ketoglutarate dependent dioxygenase FTO

angiotensin 2 receptor

angiotensin converting enzyme 2

angiotensin receptor

angiotensinogen

bradykinin B2 receptor

dipeptidyl carboxypeptidase

fibroblast growth factor 21

fibroblast growth factor receptor 2

follistatin

genomic DNA

interleukin 15

interleukin 6

long chain fatty acid coenzyme A ligase

myostatin

peptide YY

peroxisome proliferator activated receptor gamma coactivator 1alpha

renin

resistin

adult

age

aged

allele

Article

body mass

cardiorespiratory fitness

cross-sectional study

cycling

DNA extraction

female

genetic variation

genotype

Han Chinese

human

human experiment

male

normal human

observational study

oxygen consumption

sex difference

single nucleotide polymorphism

young adult