

The genetic basis of sport-training

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Abstract

Success in sport is determined by many factors including training, motivation, tactics and perhaps most important factor, talent. A person's genetic make-up is called genotype. The physiological expression of the genotype as particular characteristics is called the person's phenotype (the body's physical, physiological and metabolic characteristics). Characteristics of human skeletal muscle fibre types (type I and type II), structural and functional aspects, energy substrates, enzyme activities, proportions of the different fibre types in a muscle determine its capacity for power or endurance and physical performance. These characteristics are all a large extent determined by the genotype of the individual. Changes in skeletal muscle secondary to aerobic training include: biochemical changes and changes within Type I and Type II muscle fibres. An individual's maximum oxygen uptake (VO₂ max) is modifiable by training, but is mostly determined by genetics. Genetic limitations can also influence the magnitude of the change in VO₂ max with training.

Keywords: genotype, phenotype, physical effort, maximum oxygen uptake, training.