SELECTED ABSTRACTS OF THE CONFERENCE
“Theoretical and practical aspects of the use of biological markers in fundamental and applied medicine and biology”, March 27-29, 2018, Prague, Czech Republic.

DOI: 10.29256/v.02.01.2018.escbm01

GENETIC BIOMARKERS FOR MUSCULOSKELETAL INJURIES IN LITHUANIAN ATHLETES

V. Ginevičienė
Department of Human and Medical Genetics, Faculty of Medicine, Institute of Biomedical Science, Vilnius University, Lithuania

In sports medicine the prevention of injuries constitute a large part of a daily practice. Exercise-induced skeletal muscle injuries depend on extrinsic and intrinsic factors. Composition of a genetic profile is an intrinsic factor predisposing individuals towards higher risk of injury. The aim of this study was to analyze the influence of risk-related SNPs (ACE (I/D, rs1799752), ACTN3 (R577X, rs1815739), AMPD1 (C/T, rs17602729), MB (A/G, rs7293) in genes closely associated with the mechanisms of skeletal muscle damage, repair and elite athletic status.

Materials and methods. The Lithuanian Bioethics Committee approved the study. A total of 180 Lithuanian elite athletes (81 endurance-oriented, 44 sprint/power-oriented, 55 “mixed group”) and 255 healthy unrelated individuals without any competitive sport experience (controls) were genotyped using PCR and RFLP.

Results. For ACE (I/D) and MB (A/G) polymorphisms the genotype frequencies were significantly different between the total athlete and control group (ACE II/ID/DD: 28/47/26% vs 25/37/38%; P=0.01; MB AA/AG/GG: 19/64/16% vs 27/45/27%; P=0.0004). There were no significant AMPD1(C/T) and ACTN3(R577X) allele or genotype frequency differences between the athlete groups and the controls.
ACE genotype distribution in sprint/power athletes (II 41%; ID 39%; DD 20%) significantly differed from endurance athletes (II 21%; ID 48%; DD 31%, P=0.034) and controls (P=0.016). The ACE I allele in the sprint/power athletes (60%) was more frequent compared to endurance athletes (45%, P=0.034) and controls (43%, P=0.016). Having the musculoskeletal injuries risk-related ACE II genotype increases chances by 2.94 times (95% CI, 1.07-8.07) of being in sprint/power sport. Other markers did not show significant differences between the study groups. Sprint/power athletes are more likely to have the musculoskeletal injuries risk allele (I) of ACE compared to endurance athletes and controls. We suggest that the ACE II genotype predisposes towards increased risk of developing muscle damage in sprint/power sports. Generally, genetic profiles can be used to characterize risks of injuries for a given individual, possibly helping to apply specific treatments and prevention. Further investigations are required to clarify the effect of new SNPs at risk of injuries in sport.

Keywords: sports medicine, gene variants, elite athletes, injury

Accepted for printing on 29 Oct 2017