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MOLECULAR GENETIC MARKERS IN UKRAINIAN ATHLETES

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Genetics has a great influence over components of the athletic performance such as strength, power, endurance, muscle fiber size and composition, flexibility, neuromuscular coordination, temperament and other phenotypes. Despite a relatively high heritability of athlete status, the search for genetic variants contributing to predisposition to success in certain types of sport has been a challenging task. Although the great interest of scientists to this problem exists, a comprehensive approach involving molecular genetic markers in determining predisposition to high sports performance is not used. The effect of genetic markers depends on either ethnic or specific factors of population, such as gene-gene and gene-environment interaction. The aim of the study was to investigate the association of gene polymorphisms with athlete status in Ukrainians.

Materials and methods. 20 SNPs were identified using the Real-time PCR: ACE I/D, HIF1A Pro582Ser, NOS3 –786 T/C, NOS3 G894T exon 7, PPARA intron 7 G/C, PPARG Pro-12Ala, PGC1A G/A PPARGC1B Ala203Pro, ELN G1355→A, MMR2 C→T-1306, DRD2 A1/A2, ACTN3 R/X, MCT1 A1470T, COL12A1 T/C and G/A, COL1A1 +1245 G/T, UCP2 C/T, GALNT13 A/G , mTOR T/C and T/G.In total, 475 Ukrainian athletes were recruited from the endurance-oriented (n=201) and power-oriented (n=210) and mix (n=64) sports. Controls were 326 healthy Ukrainians.

Results. Analysis of the distribution frequency of genotypes and alleles of studied polymorphisms in groups of athletes and the control group suggests that Pro582Ser HIF1A, T-786 → C eNOS, T/G mTO) Pro12 → Ala PPAR) are associated with the status of an athlete, reflecting the lev-

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el of physical efficiency. I/D polymorphism of ACE, T-786 → C polymorphism of eNOS, R577X polymorphism of ACTN3, G/C polymorphism of the 7th intron PPARA are important markers for determining the genetic predisposition to exercise in speed and power sports, and T-786 → C polymorphism of eNOS gene is a marker of predisposition to sports with the requirements of the combination of strength and endurance. Conclusion. Our data uggest an overall more 'favourable' polygenic profile in power-oriented athletes compared to controls. The necessity of determining own genetic profile for particular disciplines exists.

Key words: gene polymorphisms, athletes status, physical performance, sport selection

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