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This report is based on your DNA predispositions obtained from your uploaded DNA file. Genomelink analyzes key genes that are associated with fitness to provide recommendations.

Any assertions or recommendations in the report as to an exercise regime or fitness recommendation, whether specific or general, are based on the following assumptions:

- that you are in a good state of health and do not have any medical problems that you are aware of;
- that you have not had any recurring illness in the past few months;
- that no medical practitioner has ever advised you not to exercise;
- that you are not on any prescribed medication that may affect your ability to exercise safely or your diet;
- that there is no other reason why you should not follow the assertions or recommendations in the report.

If you have any concerns at any time about whether or not these assumptions are correct in your particular circumstances, before acting, or not acting, on any of the assertions or recommendations, you must consult a medical practitioner.

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Fitness recommendation



Aerobic training



Resistence training for power



Resistence training for building muscle size

Predominantly

(two times a week) **70-80%**

(two times a week) **moderate**

(two times a week) **moderate**

Additionally

(one time a week) **80-100%**

(one time a week) **heavy**

(one time a week) *light*

Maximum HR in men can be determined with formula 220-age. Maximum HR in women can be determined with formula 206-(0.88*age).

High-intensity interval training as a sole type of training can be effective only for amateur level, elite endurance athletes should also use moderate – and low-intensity types of aerobic training.

Light weights can be lifted >15 times. Moderate weights can be lifted 8-12 times. Heavy weights loads can be lifted 3-7 times.

Low-intensity training can be effective for building muscle size, but for the improvement of strength it's recommended to train at high and moderate intensities. Light weights can be lifted >15 times. Moderate weights can be lifted 8-12 times. Heavy weights can be lifted 3-7 times.

These results are based on your 3 fitness phenotypes

Endurance profile



Average

Speed profile



Average

Strength profile



Low

Endurance

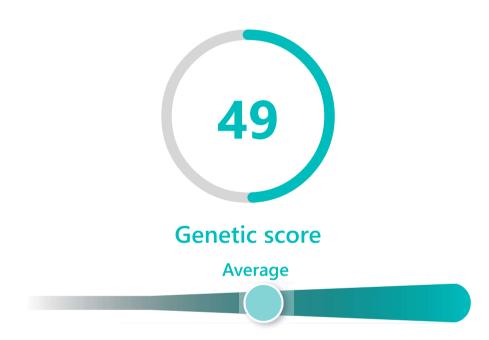


performance

Endurance is the ability to sustain repeated contractions against a resistance for an extended period. There are two main types of training to improve endurance:

- 1. Continuous aerobic training with low- to moderate- 2. Aerobic interval training which involves highexamples: long-distance running, mountain climbing, road cycling
- intensity (heart rate around 60-85% of your maximum); intensity bouts of work followed by lower intensity bouts of work, or rest, that is repeated for a specific number of repetitions depending on the fitness level of the individual (heart rate may reach 90-95% of your maximum).

Your result



Level	European
Low	0-40
Below average	41-45
Average	46-50
Above average	51-56
High	56-100

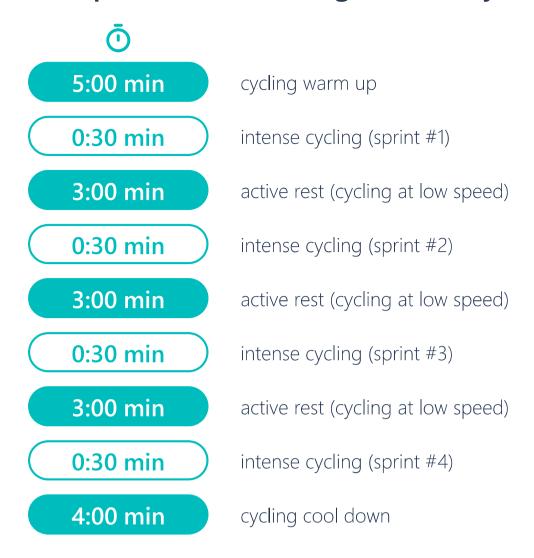
Recommendation



To improve your endurance, choose both high-intensity interval training and continuous aerobic training with low- to moderate-intensity. One type of training can be performed on one day and another type on another training day (for example, if you train 3 times a week, in two weeks you need to complete 3 interval trainings and 3 continuous aerobic trainings).

High-intensity interval training involves high-intensity bouts of work followed by lower intensity bouts of work, or rest, that is repeated for a specific number of repetitions (from 4 to 8) depending on the fitness level of the individual (heart rate may reach 90-95% of your maximum);

Example of a 20-min high-intensity interval training:



Continuous aerobic training involves comparatively easy work performed for a relatively long period. Cycling at a slow to moderate speed (heart rate around 60-85% of your maximum) for 30-60 minutes is one example of continuous training. Other examples: long-distance running, mountain climbing, rowing, swimming, skiing, skating.

Scientific Details



List of calculated gene and your genotype (22)

Gene	SNP	Genotypes	Phenotype	Gene	SNP	Genotypes	Phenotype
ACE	rs4341	CC CG GG	low	KCNJ11	rs5219	CC CT TT	low
ADRB2	rs1042713	AA AG GG	mid	KDR	rs1870377	AA AT TT	high
AQP1	rs1049305	CC CG GG	mid	NACC2	rs4409473	CC CT TT	high
BDKRB2	rs1799722	TT CT CC	low	NFIA-AS2	rs1572312	GG TG TT	high
COL5A1	rs12722	TT CT CC	high	NOS3	rs1799983	GG GT TT	na
GABPB1	rs7181866	GG AG AA	low	NOS3	rs2070744	TT CT CC	mid

Gene	SNP	Genotypes	Phenotype	Gene	SNP	Genotypes	Phenotype
GABPB1	rs12594956	AA AC CC	na	PPARA	rs4253778	GG GC CC	high
GALNTL6	rs558129	GG GA AA	mid	PPARGC1A	rs8192678	CC TC TT	low
GSTP1	rs1695	GG GA AA	low	UCP2	rs660339	AA AG GG	low
HFE	rs1799945	GG CG CC	mid	UCP3	rs1800849	AA AG GG	mid
HIF1A	rs11549465	CC CT TT	high	VEGFA	rs2010963	CC GC GG	mid

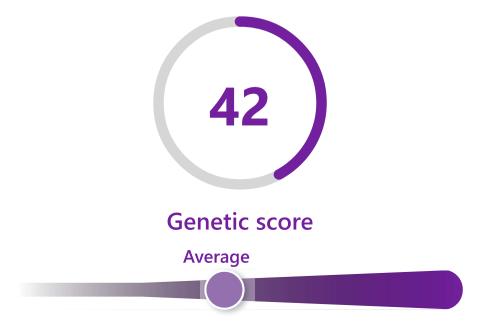
Speed performance



Speed is the ability to move quickly across the ground or move limbs rapidly to grab or throw.

Speed can be improved with power training which is identified as high intensity exercise performed quickly, but over shorter time periods. Speed is crucial for such sports events as: sprint running, speed skating, sprint swimming, sprint cycling, jumping events, ice hockey, boxing, bobsledding/luge, soccer etc. Here are some examples of types of sprint training: sprinting drills, acceleration, plyometrics, resistance training, overspeed training etc.

Your result



Level	European			
Low	0-36			
Below average	37-41			
Average	42-46			
Above average	47-51			
High	52-100			

Recommendation



You are predisposed to middle and long distances in sprint (for example, 200-400 m in running, 100 m in swimming) and thus may benefit from moderate- and low-intensity training.

You are predisposed to short and middle distances in sprint (for example, 100-200 m in running, 50 m in swimming) and thus may benefit from high- and moderate-intensity training.

Scientific Details



List of calculated gene and your genotype (20)

Gene	SNP	Genotypes	Phenotype	Gene	SNP	Genotypes	Phenotype
ACE	rs4341	GG CG CC	high	GALNT13	rs10196189	GG AG AA	na
ACTN3	rs1815739	CC CT TT	na	IGF1	rs35767	AA AG GG	mid
ADRB2	rs1042714	GG CG CC	low	IGF2	rs680	CC CT TT	mid
ADRB2	rs1042713	GG GA AA	mid	IL6	rs1800795	GG CG CC	mid
AGT	rs699	GG GA AA	mid	MTHFR	rs1801131	GG GT TT	low
AHSG	rs4917	CC CT TT	high	NOS3	rs2070744	TT TC CC	mid
AMPD1	rs17602729	GG GA AA	mid	PPARA	rs4253778	CC CG GG	low
CKM	rs8111989	CC TC TT	na	PPARG	rs1801282	GG CG CC	low
CNTFR	rs41274853	AA AG GG	na	SOD2	rs4880	GG GA AA	low
CPNE5	rs3213537	CC CT TT	mid	TRHR	rs7832552	TT TC CC	high





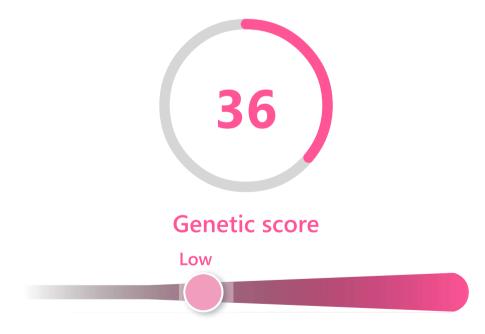
Strength performance

Strength is the maximum force that can be exerted by a muscle or group of muscles during a single contraction. Whatever exercise you use, there are four key techniques or types to help you build key aspects of strength:

- training for explosive strength (ability to perform a powerful movement in minimal time)
- training for maximum

 (absolute) strength
 (ability to lift or push heavy weights in a relatively slow mode)
- training for muscle hypertrophy (aims to increase the amount of lean muscle in the body)
- training for endurance strength (ability to keep performing a movement for a prolonged period; also useful for weight loss)

Your result



Level	European
Low	0-36
Below average	37-41
Average	42-46
Above average	46-50
High	51-100

Recommendation



You may benefit from low- and moderate-intensity resistance training to develop Strength endurance. Strength endurance is the ability to maintain muscular contractions or a consistent level of muscle force for extended periods of time. Examples: kettle-bell lifting, high volume bodybuilding-type training, workout, crossfit, rowing etc.

You may benefit from moderate- and high-intensity resistance training to develop maximum (absolute) strength. Maximum (absolute) strength is the ability of a muscle or specific group of muscles to recruit and engage all motor units to generate maximal tension against an external resistance when there is unlimited time. Examples: powerlifting, squat, deadlift and bench press and strongman competitions.

Scientific Details



List of calculated gene and your genotype (20)

Gene	SNP	Genotypes	Phenotype	Gene	SNP	Genotypes	Phenotype
ACTN3	rs1815739	CC CT TT	na	HIF1A	rs11549465	TT CT CC	low
ACVR1B	rs2854464	AA AG GG	high	IGF1	rs35767	AA AG GG	mid
ADRB2	rs1042713	GG GA AA	mid	IL6	rs1800795	GG CG CC	mid
ADRB2	rs1042714	GG GC CC	low	LRPPRC	rs10186876	AA AG GG	na
AGT	rs699	GG AG AA	mid	MLN	rs12055409	GG GA AA	mid
AMPD1	rs17602729	GG AG AA	mid	MTHFR	rs1801131	GG GT TT	low
CKM	rs8111989	CC TC TT	na	PPARA	rs4253778	CC GC GG	low
CNDP1	rs2887	AA AG GG	mid	PPARG	rs1801282	GG CG CC	low
COL2A1	rs12228854	TT GT GG	low	SOD2	rs4880	GG GA AA	low
GBF1	rs2273555	TT TC CC	na	ZNF608	rs4626333	CC CT TT	na

Reference papers

https://www.elsevier.com/books/sports-exercise-and-nutritional-genomics/barh/978-0-12-816193-7



1. The association of sport performance with ACE and ACTN3 genetic polymorphisms: a systematic review and meta-analysis.

Ma F et al. 2013

2. Association between a beta2-adrenergic receptor polymorphism and elite endurance performance.

Wolfarth B et al. 2007

3. Associations of polymorphisms of eight muscle- or metabolism-related genes with performance in Mount Olympus marathon runners.

Tsianos GI et al. 2010

4. The COL5A1 gene: a novel marker of endurance running performance.

Posthumus M et al. 2011

5. NRF2 genotype improves endurance capacity in response to training.

He Z et al. 2007

6. NRF2 genotype improves endurance capacity in response to training.

He Z et al. 2007

- 7. No Evidence of a Common DNA Variant Profile Specific to World Class Endurance Athletes.

 Rankinen T et al. 2016
- 8. GSTP1 c.313A>G polymorphism in Russian and Polish athletes.

Zarebska A et al. 2017

9. Increased body iron stores in elite road cyclists.

Deugnier Y et al. 2002

10. Sequence variation in hypoxia-inducible factor 1alpha (HIF1A): association with maximal oxygen consumption.

Prior SJ et al. 2003

11. Association between KCNJ11 E23K genotype and cardiovascular and glucose metabolism phenotypes in older men and women.

Yi Y et al. 2008

- 12. Association of the VEGFR2 gene His472GIn polymorphism with endurance-related phenotypes.

 Ahmetov II et al. 2009
- 13. Genome-wide association study identifies three novel genetic markers associated with elite endurance performance.

Ahmetov I et al. 2015

14. The bradykinin beta 2 receptor (BDKRB2) and endothelial nitric oxide synthase 3 (NOS3) genes and endurance performance during Ironman Triathlons.

Saunders CJ et al. 2006

15. PPARalpha gene variation and physical performance in Russian athletes.

Ahmetov II et al. 2006

16. The PPARGC1A gene Gly482Ser in Polish and Russian athletes.

Maciejewska A et al. 2012

17. The combined impact of metabolic gene polymorphisms on elite endurance athlete status and related phenotypes.

Ahmetov II et al. 2009

18. The combined impact of metabolic gene polymorphisms on elite endurance athlete status and related phenotypes.

Ahmetov II et al. 2009

19. The combined impact of metabolic gene polymorphisms on elite endurance athlete status and related phenotypes.

20. Elite endurance athletes and the ACE I allele--the role of genes in athletic performance.

Gayagay G et al. 1998

21. Associations of polymorphisms of eight muscle- or metabolism-related genes with performance in Mount Olympus marathon runners.

Tsianos GI et al. 2010

22. A variant within the AQP1 3'-untranslated region is associated with running performance, but not weight changes, during an Ironman Triathlon.

Saunders CJ et al. 2015

- 23. Genetic determination of the vascular reactions in humans in response to the diving reflex.

 Baranova TI et al. 2017
- 24. The COL5A1 gene, ultra-marathon running performance, and range of motion.

 Brown JC et al. 2011
- 25. The rs12594956 polymorphism in the NRF-2 gene is associated with top-level Spanish athlete's performance status.

Eynon N et al. 2013

26. NRF2 intron 3 A/G polymorphism is associated with endurance athletes' status.

Evnon N et al. 2009

27. THE GSTP1 c.313A>G POLYMORPHISM MODULATES THE CARDIORESPIRATORY RESPONSE TO AEROBIC TRAINING.

Zarebska A et al. 2014

- 28. Mutations in the hereditary haemochromatosis gene HFE in professional endurance athletes.

 Chicharro JL et al. 2004
- 29. A common haplotype and the Pro582Ser polymorphism of the hypoxia-inducible factor-1alpha (HIF1A) gene in elite endurance athletes.

Doring F et al. 2010

30. Gender-related associations of genetic polymorphisms of alpha-adrenergic receptors, endothelial nitric oxide synthase and bradykinin B2 receptor with treadmill exercise test responses.

Nunes RA et al. 2014

31. Gender-related associations of genetic polymorphisms of alpha-adrenergic receptors, endothelial nitric oxide synthase and bradykinin B2 receptor with treadmill exercise test responses.

Nunes RA et al. 2014

32. Variation in the PPARalpha gene in Polish rowers.

Maciejewska A et al. 2011

- 33. PPARGC1A genotype (Gly482Ser) predicts exceptional endurance capacity in European men.

 Lucia A et al. 2005
- 34. Polygenic Study of Endurance-Associated Genetic Markers NOS3 (Glu298Asp), BDKRB2 (-9/+9), UCP2 (Ala55Val), AMPD1 (Gln45Ter) and ACE (I/D) in Polish Male Half Marathoners.

 Gronek P et al. 2018
- 35. DNA sequence variation in the promoter region of the VEGF gene impacts VEGF gene expression and maximal oxygen consumption.

Prior SJ et al. 2006

36. Human angiotensin I-converting enzyme gene and endurance performance.

Myerson S et al. 1999

37. Polymorphisms of the beta(2)-adrenergic receptor determine exercise capacity in patients with heart failure.

Wagoner LE et al. 2000

38. Effect of COL5A1, GDF5, and PPARA Genes on a Movement Screen and Neuromuscular Performance in Adolescent Team Sport Athletes.

39. The GABPB1 gene A/G polymorphism in Polish rowers.

Maciejewska-Karlowska A et al. 2012

40. Eighty percent of French sport winners in Olympic, World and Europeans competitions have mutations in the hemochromatosis HFE gene.

Hermine O et al. 2015

41. The combined impact of metabolic gene polymorphisms on elite endurance athlete status and related phenotypes.

Ahmetov II et al. 2009

42. Polygenic Study of Endurance-Associated Genetic Markers NOS3 (Glu298Asp), BDKRB2 (-9/+9), UCP2 (Ala55Val), AMPD1 (Gln45Ter) and ACE (I/D) in Polish Male Half Marathoners.

Gronek P et al. 2018

43. The NOS3 G894T (rs1799983) and -786T/C (rs2070744) polymorphisms are associated with elite swimmer status.

Zmijewski P et al. 2018

44. PPAR-alpha and PPARGC1A gene variants have strong effects on aerobic performance of Turkish elite endurance athletes.

Tural E et al. 2014

45. **Do PPARGC1A and PPARalpha polymorphisms influence sprint or endurance phenotypes?**Eynon N et al. 2010



Speed potential

1. ACTN3 R577X and ACE I/D gene variants influence performance in elite sprinters: a multi-cohort study.

Papadimitriou ID et al. 2016

2. ACTN3 R577X and ACE I/D gene variants influence performance in elite sprinters: a multi-cohort study.

Papadimitriou ID et al. 2016

- 3. Association of the ADRB2 Gly16Arg and Glu27Gln polymorphisms with athlete status.

 Sawczuk M et al. 2013
- 4. Association of the ADRB2 Gly16Arg and Glu27Gln polymorphisms with athlete status.

 Sawczuk M et al. 2013
- 5. Lack of association between genotype score and sprint/power performance in the Japanese population.

Miyamoto-Mikami E et al. 2017

- 6. Distribution of the AMPD1 C34T polymorphism in Polish power-oriented athletes.

 Cieszczyk P et al. 2012
- 7. Lack of association between genotype score and sprint/power performance in the Japanese population.

Miyamoto-Mikami E et al. 2017

- 8. A Genome-Wide Association Study of Sprint Performance in Elite Youth Football Players.

 Pickering C et al. 2019
- 9. Can IGF-I polymorphism affect power and endurance athletic performance?

 Ben-Zaken S et al. 2013
- 10. A Genome-Wide Association Study of Sprint Performance in Elite Youth Football Players.

 Pickering C et al. 2019
- 11. The -174 G/C polymorphism of the IL6 gene is associated with elite power performance.

 Ruiz JR et al. 2010
- 12. Association of the MTHFR 1298A>C (rs1801131) polymorphism with speed and strength sports in Russian and Polish athletes.

13. The association of gene polymorphisms with athlete status in ukrainians.

Drozdovska SB et al. 2013

14. PPARalpha gene variation and physical performance in Russian athletes.

Ahmetov II et al. 2006

15. PPARG Gene polymorphism and locomotor activity in humans.

Ahmetov II et al. 2008

16. SOD2 gene polymorphism and muscle damage markers in elite athletes.

Ahmetov II et al. 2014

17. Lack of association between genotype score and sprint/power performance in the Japanese population.

Miyamoto-Mikami E et al. 2017

18. The angiotensin converting enzyme I/D polymorphism in Russian athletes.

Nazarov IB et al. 2001

19. Association of the ACTN3 R577X polymorphism with power athlete status in Russians.

Druzhevskaya AM et al. 2008

20. A Genome-Wide Association Study of Sprint Performance in Elite Youth Football Players.

Pickering C et al. 2019

21. A Genome-Wide Association Study of Sprint Performance in Elite Youth Football Players.

Pickering C et al. 2019

22. Analysis of sports-relevant polymorphisms in a large Brazilian cohort of top-level athletes.

Guilherme JPLF et al. 2018

23. AHSG gene variant is associated with leanness among Swedish men.

Lavebratt C et al. 2005

24. Effect of AMPD1 gene polymorphism on muscle activity in humans.

Fedotovskaya ON et al. 2013

25. High prevalence of the IGF2 rs680 GG polymorphism among top-level sprinters and jumpers.

Ben-Zaken S et al. 2017

26. Association of the 174 G/C polymorphism of the IL6 gene in Polish power-orientated athletes.

Eider J et al. 2013

27. Genetic polymorphisms of the enzymes involved in DNA methylation and synthesis in elite

athletes.

Terruzzi I et al. 2011

28. Analysis of sports-relevant polymorphisms in a large Brazilian cohort of top-level athletes.

Guilherme JPLF et al. 2018

29. PPARA intron polymorphism associated with power performance in 30-s anaerobic Wingate

Test.

Petr M et al. 2014

30. Association between the Pro12Ala polymorphism of the peroxisome proliferator-activated receptor gamma gene and strength athlete status.

Macieiewska-Karlowska A et al. 2013

31. Increased prevalence of MnSOD genetic polymorphism in endurance and power athletes.

Ben-Zaken S et al. 2013

32. Genome-wide association and replication studies identified TRHR as an important gene for

lean body mass.

Liu XG et al. 2009

33. Association analysis of ACE and ACTN3 in elite Caucasian and East Asian swimmers.

Wang G et al. 2013

34. The association of sport performance with ACE and ACTN3 genetic polymorphisms: a systematic review and meta-analysis.

- 35. The C allele of the AGT Met235Thr polymorphism is associated with power sports performance.

 Gomez-Gallego F et al. 2009
- 36. AMPD1 rs17602729 is associated with physical performance of sprint and power in elite Lithuanian athletes.

Gineviciene V et al. 2014

37. A meta-analysis of the association of CKM gene rs8111989 polymorphism with sport performance.

Chen C et al. 2017

38. G Allele of the IGF2 Apal Polymorphism Is Associated With Judo Status.

Itaka T et al. 2016

- 39. A Genome-Wide Association Study of Sprint Performance in Elite Youth Football Players.
 Pickering C et al. 2019
- 40. The -786 T/C polymorphism of the NOS3 gene is associated with elite performance in power sports.

Gomez-Gallego F et al. 2009

41. The association of gene polymorphisms with athlete status in ukrainians.

Drozdovska SB et al. 2013



Strength potential

- 1. **Association of the ACTN3 R577X polymorphism with power athlete status in Russians.**Druzhevskaya AM et al. 2008
- 2. ACVR1B rs2854464 Is Associated with Sprint/Power Athletic Status in a Large Cohort of Europeans but Not Brazilians.

Voisin S et al. 2016

- 3. Association of the ADRB2 Gly16Arg and Glu27Gln polymorphisms with athlete status.

 Sawczuk M et al. 2013
- 4. Association of the ADRB2 Gly16Arg and Glu27Gln polymorphisms with athlete status. Sawczuk M et al. 2013
- 5. **Genetic Variability Among Power Athletes: The Stronger vs. the Faster.**Ben-Zaken S et al. 2019
- 6. Distribution of the AMPD1 C34T polymorphism in Polish power-oriented athletes.

 Cieszczyk P et al. 2012
- 7. Single Nucleotide Polymorphisms in Carnosinase Genes (CNDP1 and CNDP2) are Associated With Power Athletic Status.

Guilherme JPLF et al. 2017

- 8. The HIF1A gene Pro582Ser polymorphism in Russian strength athletes.
- 9. Can IGF-I polymorphism affect power and endurance athletic performance?

 Ben-Zaken S et al. 2013
- 10. The -174 G/C polymorphism of the IL6 gene is associated with elite power performance.

 Ruiz JR et al. 2010
- 11. Large-scale GWAS identifies multiple loci for hand grip strength providing biological insights into muscular fitness.

Willems SM et al. 2017

12. Association of the MTHFR 1298A>C (rs1801131) polymorphism with speed and strength sports in Russian and Polish athletes.

Zarebska A et al. 2014

13. PPARalpha gene variation and physical performance in Russian athletes.

Ahmetov II et al. 2006

14. PPARG Gene polymorphism and locomotor activity in humans.

Ahmetov II et al. 2008

15. SOD2 gene polymorphism and muscle damage markers in elite athletes.

Ahmetov II et al. 2014

16. The association of sport performance with ACE and ACTN3 genetic polymorphisms: a systematic review and meta-analysis.

Ma F et al. 2013

17. Comprehensive fine mapping of chr12q12-14 and follow-up replication identify activin receptor 1B (ACVR1B) as a muscle strength gene.

Windelinckx A et al. 2011

- 18. A Genome-Wide Association Study of Sprint Performance in Elite Youth Football Players.

 Pickering C et al. 2019
- 19. A Genome-Wide Association Study of Sprint Performance in Elite Youth Football Players.

 Pickering C et al. 2019
- 20. Lack of association between genotype score and sprint/power performance in the Japanese population.

Miyamoto-Mikami E et al. 2017

21. Effect of AMPD1 gene polymorphism on muscle activity in humans.

Fedotovskaya ON et al. 2013

22. Large-scale GWAS identifies multiple loci for hand grip strength providing biological insights into muscular fitness.

Willems SM et al. 2017

23. The association of gene polymorphisms with athlete status in ukrainians.

Drozdovska SB et al. 2013

- 24. Association of the 174 G/C polymorphism of the IL6 gene in Polish power-orientated athletes. Eider J et al. 2013
- 25. Biological Insights Into Muscular Strength: Genetic Findings in the UK Biobank.

 Tikkanen E et al. 2018
- 26. Genetic polymorphisms of the enzymes involved in DNA methylation and synthesis in elite athletes.

Terruzzi I et al. 2011

27. PPARA intron polymorphism associated with power performance in 30-s anaerobic Wingate Test.

Petr M et al. 2014

28. Association between the Pro12Ala polymorphism of the peroxisome proliferator-activated receptor gamma gene and strength athlete status.

Maciejewska-Karlowska A et al. 2013

- 29. Increased prevalence of MnSOD genetic polymorphism in endurance and power athletes.

 Ben-Zaken S et al. 2013
- 30. **GWAS** analysis of handgrip and lower body strength in older adults in the CHARGE consortium.

 Matteini AM et al. 2016
- 31. The association of ACE, ACTN3 and PPARA gene variants with strength phenotypes in middle school-age children.

Ahmetov II et al. 2013

- 32. Analysis of sports-relevant polymorphisms in a large Brazilian cohort of top-level athletes.
- 33. AMPD1 rs17602729 is associated with physical performance of sprint and power in elite Lithuanian athletes.

34. A meta-analysis of the association of CKM gene rs8111989 polymorphism with sport performance.

Chen C et al. 2017

35. The association of ACE, ACTN3 and PPARA gene variants with strength phenotypes in middle school-age children.

Ahmetov II et al. 2013

36. The association of gene polymorphisms with athlete status in ukrainians.

Drozdovska SB et al. 2013