Supplementary Tables

Table S1. *Previous associations of single nucleotide polymorphisms with body composition/muscle-related phenotypes/performance.*

Single nucleotide polymorphisms	Phenotype	Previous literature for selection of SNPs and the outcome measures	Score allocation for genotype in the present study
ACTN3 rs1815739	Muscle size	XX genotype had lower mid-thigh area than RX/RR (Zempo et al., 2010) [37]	RR=2, RX=1, XX=0
	Knee extension torque	XX genotype had lower knee torque than RR/RX. (Walsh et al., 2008) [33]	
	Sarcopenia	XX genotype at higher risk of sarcopenia (Cho et al., 2017) [6]	
	Elite sprint athlete status	RR genotype overrepresented in elite sprinter group versus controls (Chen et al., 2020) [5]	
ACE rs4341 (I/D)	Lean mass	D allele favourable for higher lean mass (Charbonneau et al., 2008) [4]	DD=2, ID=1, II=0
CNTF rs1800169	Knee flexion	A-allele carriers weaker than GG homozygotes in middle aged women (De Mars et al., 2007) [9]	AA=0, AG=1, GG=2
	Knee extension	G-allele favourable for knee strength among elderly (He et al., 2020) [16]	
	Handgrip strength	AA homozygotes had 3.8 kg weaker handgrip strength than G-allele carriers (Arking et al., 2006)[2]	
CNTFR rs2070802	Knee extension and flexion	T-allele carriers could produce greater torque (De Mars et al., 2007) [9]	TT=2, AT=1, AA=0
ESR1 rs4870044	Sarcopenia	T-allele carriers had higher risk of sarcopenia (Khanal et al., 2020) [19]	CC=2, CT=1, TT=0
ESR1 rs1999805			AA=2, AG=1, GG=0, (based on beta coefficient)
FTO rs9939609	Muscle area	AA homozygotes had a larger vastus lateralis muscle area (Khanal et al., 2020) [19]	AA=2, AT=1, TT=0
HIF1A rs11549465	Oxygen consumption capacity	TT associated with higher $V0_{2max}$ among elderly (Prior et al., 2003) [23]	TT=2, CT=1, CC=0
	Strength/power athlete status	Overrepresentation of TT genotype in weightlifters, wrestlers and power-oriented athletes compared to controls (Ahmetov et al., 2008 [1], Drozdovska et al., 2013 [10])	
ID3 rs11574	Obesity-related indices	A-allele associated with increment in BMI and fat mass (Svendstrup et al., 2018) [30]	TT=0, CT=1, CC=2 (based on beta coefficient)
IGF1 rs35767	Body composition	GG homozygotes had greater total fat but lower lean and muscle mass (Kostek et al., 2010) [20]	AA=2, AG=1, GG=0
IL6 rs1800795	Elite athlete status	Overrepresentation of G- allele among weightlifters, jumpers, and elite athletes (Ruiz et al., 2010 [25], Cenikli et al., 2016 [3])	GG=2, GC=1, CC=0

MTHFR rs1801131 rs1537516 rs17421511	Strength/sprint athlete status Maximal rate of oxygen consumption	Overrepresentation of rs1801131 C-allele among strength and sprint athletes (Zarebska et al., 2014) [36] rs1801131 C-allele carriers had greater improvement in VO_{2max} during training (Cięszczyk et al., 2016) [7]	MTHFR rs1801131 (GG=2, GT=1, TT=0) MTHFR rs1537516 (AA=0, AG=1, GG=2) (based on beta coefficient) *MTHFR* rs17421511 (AA=2, AG=1, GG=0) (based on beta coefficient)
PTK2 rs7843014, rs7460	Specific force	AA homozygotes had greater vastus lateralis specific force in healthy population (Erskine et al., 2012 [12], Stebbings et al., 2017 [29])	*PTK2* rs7843014 (AA=2, AC=1, CC=0) *PTK2* rs7460 (AA=2, AT=1, TT=0)
TRHR rs7832552	Lean body mass Sarcopenia	T-allele favoured greater lean body mass (Liu et al., 2009 [21], Lunardi et al., 2013 [22]) C-allele carriers at higher risk of sarcopenia than TT homozygotes (Khanal et al., 2020) [19]	TT=2, TC=1, CC=0
TTN rs10497520	Endurance running performance	T-allele carriers had better marathon performance (Stebbings et al., 2018) [28]	TT=2, CT=1, CC=0
VDR rs2228570	Muscle size Knee strength	C- allele associated with lower fat-free-mass (Roth et al., 2004) [24] C/CC allele/genotype had lower knee strength compared to f-allele carriers (Windelinckx et al., 2007 [34], Hopkinson et al., 2008 [18])	AA=2, AG=1, GG=0
MSTN rs1805086	Muscle strength/muscle size	C- allele associated with lower muscle strength (Seibert et al., 2001 [26], Corsi et al., 2002 [8]) C- allele associated with lower muscle mass among elderly women (González-Freire et al., 2010) [14]	TT=2, CT=1, CC=0
COL1A1 rs1800012	Muscle strength	A-allele associated with lower handgrip and biceps strength in elderly (Van Pottelbergh et al., 2001 [31])	CC=2, AC=1, AA=0
ACVR1B rs2854464 *ACVR1B* rs10783485	Muscle strength Sprint/power athlete status Muscle mass	A-allele associated with higher knee strength (Windelinckx et al., 2011 [35]) A-allele overrepresented in sprint and power athletes (Voisin et al., 2016 [32]) A-allele associated with higher SMM (He et al., 2018 [17])	GG=0, GA=1, AA=2 GG=0, GT=1, TT=2
NOS3 rs1799983	Power athlete status Stroke volume Sarcopenia	T-allele common among power athletes (Gómez-Gallego et al., 2009 [13], Sessa et al., 2011 [27], Zmijewski et al., 2018 [38], Eider et al., 2014 [11]) Postmenopausal women with T-allele had higher stroke volume during dynamic exercise (Hand et al., 2006) [15] T-allele carriers had higher skeletal muscle mass above sarcopenic threshold (Khanal et al., 2020) [19]	TT=2, CT=1, CC=0

1. Ahmetov, II, Hakimullina, A.M., Lyubaeva, E.V., Vinogradova, O.L. and Rogozkin, V.A. Effect of HIF1A gene polymorphism on human muscle performance. *Bulletin of experimental biology and medicine.* **2008**, *146*, 351–353.
2. Arking, D.E., Fallin, D.M., Fried, L.P., Li, T., Beamer, B.A., Xue, Q.L., Chakravarti, A. and Walston, J. Variation in the ciliary neurotrophic factor gene and muscle strength in older Caucasian women. *Journal of the American Geriatrics Society.* **2006**, *54*, 823–826.
3. Cenikli, A., Nursal, A., Tural, E., Polat, Y., Tasmektepligil, M. and Yigit, S. The Correlation Between Rs1800795 Variant of IL-6 and sports performance among turkish elite athletes. *International Journal of Humanities Social Sciences and Education.* **2016**, *3*, 1–5.
4. Charbonneau, D.E., Hanson, E.D., Ludlow, A.T., Delmonico, M.J., Hurley, B.F. and Roth, S.M. ACE genotype and the muscle hypertrophic and strength responses to strength training. *Medicine and science in sports and exercise.* **2008**, *40*, 677.
5. Chen, W., Zhang, B., Li, Y. and Liang, T. Association Between rs1815739 Polymorphism of ACTN3 Gene and Athletic Ability in Chinese Sprinters. *Journal of Science in Sport and Exercise,* **2020**, *2*, 113–119.
6. Cho, J., Lee, I. and Kang, H. ACTN3 gene and susceptibility to sarcopenia and osteoporotic status in older Korean adults. *BioMed research international.* 2017
7. Cięszczyk, P., Zarębska, A., Jastrzębski, Z., Sawczyn, M., Kozakiewicz-Drobnik, I., Leońska-Duniec, A., Kaczmarczyk, M., Maciejewska-Skrendo, A., Żmijewski, P. and Trybek, G. Does the MTHFR A1298C Polymorphism Modulate the Cardiorespiratory Response to Training? *Journal of human kinetics.* **2016**, 54, 43–53.
8. Corsi, A.M., Ferrucci, L., Gozzini, A., Tanini, A. and Brandi, M.L. Myostatin polymorphisms and age-related sarcopenia in the Italian population. *Journal of the American Geriatrics Society.* **2002**, *50*, 1463.
9. De Mars, G., Windelinckx, A., Beunen, G., Delecluse, C., Lefevre, J. and Thomis, M.A.I. Polymorphisms in the CNTF and CNTF receptor genes are associated with muscle strength in men and women. *Journal of Applied Physiology.* **2007**, *102*, 1824–1831.
10. Drozdovska, S., Dosenko, V., Ahmetov, I. and Ilyin, V. The association of gene polymorphisms with athlete status in Ukrainians. *Biology of sport.* **2013**, *30*, 163.
11. Eider, J., Ficek, K., Kaczmarczyk, M., Maciejewska-Karłowska, A., Sawczuk, M. and Cięszczyk, P. Endothelial nitric oxide synthase g894t (rs1799983) gene polymorphism in polish athletes. *Open Life Sciences.* **2014**, *9*, 260–267.
12. Erskine, R.M., Williams, A.G., Jones, D.A., Stewart, C.E. and Degens, H. Do PTK2 gene polymorphisms contribute to the interindividual variability in muscle strength and the response to resistance training? A preliminary report. *Journal of applied physiology.* **2012**, *112*, 1329–1334.
13. Gómez-Gallego, F., Ruiz, J.R., Buxens, A., Artieda, M., Arteta, D., Santiago, C., Rodríguez-Romo, G., Lao, J.I. and Lucia, A. The− 786 T/C polymorphism of the NOS3 gene is associated with elite performance in power sports. *European journal of applied physiology.* **2009**, *107*, 565–569.
14. González-Freire, M., Rodríguez-Romo, G., Santiago, C., Bustamante-ARA, N., Yvert, T., Gómez-Gallego, F., Rexach, J.A.S., Ruiz, J.R. and Lucia, A. The K153R variant in the myostatin gene and sarcopenia at the end of the human lifespan. *Age.* **2010**, *32*, 405–409.
15. Hand, B.D., Mccole, S.D., Brown, M.D., Park, J.J., Ferrell, R.E., Huberty, A., Douglass, L.W. and Hagberg, J.M. NOS3 gene polymorphisms and exercise hemodynamics in postmenopausal women. *International journal of sports medicine.* **2006**, *27*, 951–958.
16. He, L., Khanal, P., Morse, C.I., Williams, A. and Thomis, M. Associations of combined genetic and epigenetic scores with muscle size and muscle strength: A pilot study in older women. *Journal of Cachexia, Sarcopenia and Muscle*. **2020**.
17. He, L., Van Roie, E., Bogaerts, A., Morse, C.I., Delecluse, C., Verschueren, S. and Thomis, M. Genetic predisposition score predicts the increases of knee strength and muscle mass after one-year exercise in healthy elderly. *Experimental gerontology.* **2018**, *111*, 17–26.
18. Hopkinson, N.S., Li, K.W., Kehoe, A., Humphries, S.E., Roughton, M., Moxham, J., Montgomery, H. and Polkey, M.I. Vitamin D receptor genotypes influence quadriceps strength in chronic obstructive pulmonary disease. *The American journal of clinical nutrition.* **2008**, *87*, 385–390.
19. Khanal, P., He, L., Stebbings, G., Onambele-Pearson, G.L., Degens, H., Williams, A., Thomis, M. and Morse, C.I. Prevalence and association of single nucleotide polymorphisms with sarcopenia in older women depends on definition. *Scientific reports.* **2020**, *10*, 1–9.
20. Kostek, M.C., Devaney, J.M., Gordish-Dressman, H., Harris, T.B., Thompson, P.D., Clarkson, P.M., Angelopoulos, T.J., Gordon, P.M., Moyna, N.M. and Pescatello, L.S. A polymorphism near IGF1 is associated with body composition and muscle function in women from the Health, Aging, and Body Composition Study. *European journal of applied physiology.* **2010**, *110*, 315–324.
21. Liu, X.-G., Tan, L.-J., Lei, S.-F., Liu, Y.-J., Shen, H., Wang, L., Yan, H., Guo, Y.-F., Xiong, D.-H. and Chen, X.-D. Genome-wide association and replication studies identified TRHR as an important gene for lean body mass. *The American Journal of Human Genetics.* **2009**, *84*, 418–423.

22. Lunardi, C.C., Lima, R.M., Pereira, R.W., Leite, T.K.M., Siqueira, A.B.M. and Oliveira, R.J. Association between polymorphisms in the TRHR gene, fat-free mass, and muscle strength in older women. *Age.* **2013**, *35*, 2477–2483.
23. Prior, S.J., Hagberg, J.M., Phares, D.A., Brown, M.D., Fairfull, L., Ferrell, R.E. and Roth, S.M. Sequence variation in hypoxia-inducible factor 1α (HIF1A): Association with maximal oxygen consumption. *Physiological genomics.* **2003**, *15*, 20–26.
24. Roth, S.M., Zmuda, J.M., Cauley, J.A., Shea, P.R. and Ferrell, R.E. Vitamin D receptor genotype is associated with fat-free mass and sarcopenia in elderly men. *The Journals of Gerontology Series A: Biological Sciences and Medical Sciences.* **2004**, *59*, B10–B15.
25. Ruiz, J.R., Buxens, A., Artieda, M., Arteta, D., Santiago, C., Rodríguez-Romo, G., Lao, J.I., Gómez-Gallego, F. and Lucia, A. The− 174 G/C polymorphism of the IL6 gene is associated with elite power performance. *Journal of science and medicine in sport.* **2010**, *13*, 549–553.
26. Seibert, M.J., Xue, Q.L., Fried, L.P. and Walston, J.D. Polymorphic variation in the human myostatin (GDF-8) gene and association with strength measures in the women's health and aging study II cohort. *Journal of the American Geriatrics Society.* **2001**, *49*, 1093–1096.
27. Sessa, F., Chetta, M., Petito, A., Franzetti, M., Bafunno, V., Pisanelli, D., Sarno, M., Iuso, S. and Margaglione, M. Gene polymorphisms and sport attitude in Italian athletes. *Genetic testing and molecular biomarkers.* **2011**, *15*, 285–290.
28. Stebbings, G.K., Williams, A.G., Herbert, A.J., Lockey, S.J., Heffernan, S.M., Erskine, R.M., Morse, C.I. and DAY, S.H. TTN genotype is associated with fascicle length and marathon running performance. *Scandinavian journal of medicine & science in sports.* **2018**, *28*, 400–406.
29. Stebbings, G.K., Williams, A.G., Morse, C.I. and Day, S.H. Polymorphisms in PTK2 are associated with skeletal muscle specific force: An independent replication study. *European journal of applied physiology.* **2017**, *117*, 713–720.
30. Svendstrup, M., Appel, E.V.R., Sandholt, C.H., Ahluwalia, T.S., Ängquist, L.H., Thuesen, B.H., Jørgensen, M.E., Pedersen, O., Grarup, N. and Hansen, T. Prospective studies exploring the possible impact of an ID3 polymorphism on changes in obesity measures. *Obesity.* **2018**, *26*, 747–754.
31. Van Pottelbergh, I., Goemaere, S., Nuytinck, L., De Paepe, A. and Kaufman, J.M. Association of the type I collagen alpha1 Sp1 polymorphism, bone density and upper limb muscle strength in community-dwelling elderly men. *Osteoporosis International.* **2001**, *12*, 895–901.
32. Voisin, S., Guilherme, J.P.F.L., Yan, X., Pushkarev, V.P., Cieszczyk, P., Massidda, M., Calò, C.M., Dyatlov, D.A., Kolupaev, V.A. and Pushkareva, Y.E. ACVR1B rs2854464 is associated with sprint/power athletic status in a large cohort of Europeans but not Brazilians. *PLoS ONE.* **2016**, *11*, e0156316.
33. Walsh, S., Liu, D., Metter, E.J., Ferrucci, L. and Roth, S.M. ACTN3 genotype is associated with muscle phenotypes in women across the adult age span. *Journal of Applied Physiology.* **2008**, *105*, 1486–1491.
34. Windelinckx, A., De Mars, G., Beunen, G., Aerssens, J., Delecluse, C., Lefevre, J. and Thomis, M.A.I. Polymorphisms in the vitamin D receptor gene are associated with muscle strength in men and women. *Osteoporosis International.* **2007**, *18*, 1235–1242.
35. Windelinckx, A., De Mars, G., Huygens, W., Peeters, M.W., Vincent, B., Wijmenga, C., Lambrechts, D., Delecluse, C., Roth, S.M. and Metter, E.J. Comprehensive fine mapping of chr12q12-14 and follow-up replication identify activin receptor 1B (ACVR1B) as a muscle strength gene. *European Journal of Human Genetics.* **2011**, *19*, 208.
36. Zarebska, A., Ahmetov, I.I., Sawczyn, S., Weiner, A.S., Kaczmarczyk, M., Ficek, K., Maciejewska-Karlowska, A., Sawczuk, M., Leonska-Duniec, A. and Klocek, T. Association of the MTHFR 1298A> C (rs1801131) polymorphism with speed and strength sports in Russian and Polish athletes. *Journal of sports sciences.* **2014**, *32*, 375–382.
37. Zempo, H., Tanabe, K., Murakami, H., Iemitsu, M., Maeda, S. and Kuno, S. ACTN3 polymorphism affects thigh muscle area. *International journal of sports medicine.* **2010**, *31*, 138–142.
38. Zmijewski, P., Cieszczyk, P. and Ahmetov, II. The NOS3 G894T (rs1799983) and-786T/C (rs2070744) polymorphisms are associated with elite swimmer status. *Biol Sport.* **2018**, *35*, 313–319.