Table S1 Previous associations of single nucleotide polymorphisms/gene product and muscle related phenotypes/performance

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| Single nucleotide polymorphisms | Muscle phenotypes studied/physical performance | Main results | References |
| *ACTN3* rs1815739 | Lower mid-thigh cross sectional area  KE shortening and lengthening peak torque  Sarcopenia | XX demonstrated significantly lower area than RX/RR  XX group had significantly reduced strength than RR/RX groups  XX as risk group for sarcopenia | (Zempo et al., 2010)  (Walsh et al., 2008)  (Cho et al., 2017) |
| *ACE* rs4341  (I/D) | Lean mass, and body weight; appendicular fat free mass in older women  Handgrip strength and vertical jump ability in adolescents | Higher body mass measures were associated with D allele  II genotype is associated with higher strength and jump performance | (Charbonneau et al., 2008)    (Moran et al., 2006) |
| *CNTF* rs1800169 | Concentric peak torque knee extensors and elbow flexors  Concentric knee flexors strength in middle aged women  Handgrip strength | Heterozygotes GA were stronger than GG individuals  A-allele carriers were weaker than GG  AA homozygotes had 3.8 kg weaker handgrip strength than G-allele carriers. | (Roth et al., 2001)  (De Mars et al., 2007)  (Arking et al., 2006) |
| *CNTFR* rs2070802 | 60-78 years male | T-allele carriers possessed higher Knee extension and knee flexion in male | (De Mars et al., 2007) |
| *ESR1*  rs1999805  rs4870044 | Lean mass  Bone Mineral Density (BMD) | Loss of oestrogen after menopause was associated with low lean mass  ESR1 rs4870044 TT genotype was associated with low BMD | (Poehlman et al., 1995)  (Luo et al., 2014) |
| *FTO* rs9939609 | BMI  Calf circumference | AA was associated with higher BMI, muscle mass, and obesity related phenotypes | (Jacobsson et al., 2012, Al-Serri et al., 2018) |
| *HIF1A* rs11549465 | Maximal oxygen consumption with exercise training in elderly  Frequency distribution of genotypes | TT was associated with higher V02 max  TT genotype was over represented in weightlifters and wrestlers compared to controls | (Prior et al., 2003)  (Ahmetov et al., 2008) |
| *ID3* rs11574 | Fat mass, BMI, waist circumference (WC), and waist‐hip ratio (WHR) in humans | A-allele was associated with changes in cross sectional BMI and fat mass | (Svendstrup et al., 2018) |
| *IGF1* rs35767 | Body composition | CC genotype was associated with higher trunk and total fat and lower lean and muscle mass | (Kostek et al., 2010) |
| *IL6* rs1800795 | Weightlifters and jumpers  Knee muscle strength and frailty  Exceptional longevity | G allele was overrepresented  No association  No association | (Ruiz et al., 2010)  (Walston et al., 2005, Pereira et al., 2011)  (Fuku et al., 2015) |
| *MTHFR*  rs1801131  rs1537516  rs17421511 | Sprint and strength athletes  VO2max post training | *MTHFR* rs1801131 C-allele overrepresentation  C-allele carriers had significantly improvement in VO2 Max | (Zarebska et al., 2014)  (Cięszczyk et al., 2016) |
| *PTK2*  rs7843014,  rs7460 | Exceptional longevity  Specific force in healthy men | rs7843014 CC and rs7460 TT association with longevity  AA homozygotes had higher VL specific force | (Garatachea et al., 2014)  (Erskine et al., 2012, Stebbings et al., 2017) |
| *TRHR* rs7832552 | Lean body mass  Exceptional longevity | T allele was associated with higher lean body mass  No association | (Liu et al., 2009, Lunardi et al., 2013)  (Fuku et al., 2015) |
| *TTN* rs10497520 | Marathon running performance and muscle fascicle length  Isometric knee strength in CAD patients  Isometric knee extension | T-allele carriers had better marathon personal best times.  No association with strength  C-allele is predisposing allele for knee strength in elderly population | (Stebbings et al., 2018)  (Thomaes et al., 2013)  (He et al., 2018) |
| *VDR* rs2228570 | Quadriceps strength, hamstring strength, peak torque, FFM  Knee strength  FFM/Sarcopenia | F (C) allele has been linked to reduced fat-free-mass and men  F allele with reduced concentric and isometric knee strength than f-allele carriers  FF homozygotes in higher risk of sarcopenia than f-allele carriers and f allele associated with higher FFM | (Roth et al., 2004)  (Windelinckx et al., 2007)  (Roth et al., 2004, Walsh et al., 2016) |
| *MSTN* rs1805086 | Muscle strength/muscle size | R153 allele of MSTN with decreased strength  A negative influence of 1RM leg press and muscle mass of women at old age  R allele linked to maximal isometric contraction of elbow muscle flexors and ability to produce peak power during muscle contractions  No association  KR has significantly higher increment in bicep and quadriceps thickness than KK genotypes | (Seibert et al., 2001, Corsi et al., 2002)  (González-Freire et al., 2010)  (Kostek et al., 2009, Santiago et al., 2011)  (Fuku et al., 2015)  (Li et al., 2014, Santiago et al., 2011) |
| *COL1A1* rs1800012 | Hand grip strength and biceps strength in elderly 70+ population | s allele is associated with the lower strength | (Van Pottelbergh et al., 2001) |
| *ACVR1B*  rs2854464  *ACVR1B*  rs10783485 |  | rs2854464 A allele associated with higher knee strength  over representation of A allele in sprint and power Caucasians athletes  A-allele with SMM  C-allele as strength increasing allele for isometric knee flexion | (Windelinckx et al., 2011)  (Voisin et al., 2016)  (He et al., 2018)  (Windelinckx et al., 2011) |
| *NOS3* rs1799983 | Distribution in athletic population and long distance swimmers  Stroke volume | T allele was overrepresented in the power athletes  T-allele was associated with higher stroke volume and lower HR during submaximal dynamic exercise in postmenopausal women | (Gómez-Gallego et al., 2009, Sessa et al., 2011, Zmijewski et al., 2018, Eider et al., 2014)  (Hand et al., 2006) |

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