

Group	Trait	<i>n</i>	Genotyped data		Imputed data		^c h_G^2	^d Heritability
			^a h_G^2 (SE)	<i>P</i>	^b h_G^2 (SE)	<i>P</i>		
Obesity	Height	717	0.316 (0.042)	2.1e-15	0.283 (0.040)	1.0E-13	-	0.8~0.9[1]
	BMI	716	0.147 (0.041)	1.1e-04	0.132 (0.039)	2.0E-04	-	0.25~0.40, 0.70[2]
	Waist	716	0.105 (0.040)	4.1e-03	0.098 (0.039)	5.0E-03	-	0.72~0.82[3], 0.77[4]
	Hip	716	0.126 (0.040)	7.0e-04	0.157 (0.039)	1.0E-05	-	0.45~0.69[5]
	WHR	716	0.082 (0.040)	2.0e-02	0.131 (0.038)	1.0E-04	-	0.36~0.61[3]
	Weight	716	0.161 (0.040)	1.8e-05	0.152 (0.038)	1.0E-05	-	0.78[6]
	SUB	713	0.203 (0.041)	1.0e-07	0.232 (0.039)	2.0E-10	-	0.40~0.77[7]
	SUP	657	0.089 (0.043)	1.7e-02	0.169 (0.041)	4.0E-06	-	0.48, 0.49[8]
Blood Pressure	SBP0	717	0.221 (0.041)	1.1e-08	0.198 (0.039)	6.0E-08	0.005	0.34[9], 0.64[10]
	SBP	716	0.250 (0.041)	5.8e-11	0.227 (0.039)	7.0E-10	0.009	0.38[11]
	DBP0	716	0.217 (0.041)	3.7e-08	0.154 (0.039)	2.0E-05	0.005	0.29[9], 0.45~0.58[10]
	DBP	717	0.171 (0.041)	6.7e-06	0.189 (0.040)	8.0E-07	0.005	0.36[11]
	Pulse	716	0.119 (0.041)	1.6e-03	0.092 (0.039)	8.0E-03		0.13[9], 0.19, 0.22, 0.40[12]
BMD	DS	675	0.135 (0.043)	6.0e-04	0.157 (0.042)	7.0E-05	0.012	0.61[13], 0.51[14]
	MS	677	0.107 (0.042)	4.3e-03	0.099 (0.040)	6.0E-03	0.005	0.46[14]
Lipids	HDL	716	0.172 (0.041)	8.5e-06	0.190 (0.040)	5.0E-07	0.037	0.328[15], 0.56[16], 0.66[17]
	TCHL	716	0.156 (0.040)	2.3e-05	0.196 (0.039)	4.0E-08	0.020	0.42[18], 0.44[15]
	TG	716	0.216 (0.041)	1.5e-08	0.236 (0.039)	9.0E-11	0.030	0.117[15], 0.53[17]
	LDL	696	0.134 (0.041)	3.8e-04	0.178 (0.040)	1.0E-06	0.012	0.88[17], 0.54[19]
	NONHD	716	0.157 (0.040)	1.9e-05	0.191 (0.039)	6.0E-08	0.025	
	THDL	716	0.162 (0.040)	1.4e-05	0.173 (0.039)	1.0E-06	0.025	
Diabetes	GLU0	700	0.112 (0.041)	2.9e-03	0.134 (0.040)	3.0E-04	-	0.26[6], 0.28[20], 0.58[21]
	GLU60	682	0.104 (0.043)	7.2e-03	0.100 (0.041)	6.0E-03	0.014	0.24[22]
	GLU120	683	0.118 (0.042)	1.5e-03	0.102 (0.040)	4.0E-03	-	0.52[6], 0.60[21]
	INS0	700	0.000 (0.040)	5.0e-01	0.000 (0.038)	5.0E-01	-	0.26[6], 0.08[20], 0.43[21]
	INS60	682	0.074 (0.042)	3.9e-02	0.104 (0.040)	4.0E-03	-	0.50[6]
	INS120	682	0.144 (0.043)	3.8e-04	0.234 (0.041)	2.0E-10	0.005	0.57[21]
	HBA1C	716	0.126 (0.040)	5.8e-04	0.124 (0.039)	5.0E-04	0.008	0.37[23]
	HOMA	700	0.000 (0.040)	5.0e-01	0.000 (0.038)	5.0E-01	-	0.29~0.31[22], 0.48[24],
Blood Cell Count	WBC	716	0.162 (0.041)	2.3e-05	0.155 (0.039)	3.0E-05	0.005	0.62[23]
	RBC	716	0.186 (0.041)	1.1e-06	0.173 (0.039)	2.0E-06	0.020	0.42[23]
	PLAT	716	0.196 (0.041)	3.5e-07	0.216 (0.039)	5.0E-09	0.009	0.57[23]
	HCT	716	0.091 (0.040)	9.6e-03	0.076 (0.038)	2.0E-02	-	0.4~0.64[25-27]
Blood Ions	SONA	716	0.063 (0.039)	4.7e-02	0.075 (0.038)	2.0E-02	0.016	0.5[28]
	POTA	716	0.047 (0.039)	1.2e-01	0.057 (0.038)	7.0E-02	-	0.6[28]
	CHL	716	0.113 (0.039)	9.1e-04	0.136 (0.038)	8.0E-05	-	
Liver Functions	CRP	716	0.109 (0.039)	1.1e-03	0.131 (0.038)	9.0E-05	0.011	0.06[15], 0.28[29], 0.45[30]
	HB	716	0.064 (0.039)	4.9e-02	0.050 (0.037)	8.0E-02	-	0.37[23]
	AST	716	0.072 (0.040)	3.0e-02	0.073 (0.038)	2.0E-02	0.005	0.14[15]
	ALT	716	0.146 (0.040)	7.4e-05	0.129 (0.038)	2.0E-04	-	0.19[15]
	RGTP	716	0.109 (0.040)	2.9e-03	0.089 (0.039)	1.0E-02	0.038	
Lung Functions	SP1	700	0.226 (0.043)	2.1e-08	0.251 (0.041)	7.0E-11	-	0.39[31], 0.54[32],
	SP2	700	0.134 (0.041)	4.2e-04	0.166 (0.040)	6.0E-06	-	0.46[31],
	SP3	701	0.148 (0.041)	1.0e-04	0.132 (0.040)	3.0E-04	-	0.45[32], 0.46, 0.16[33], 0.26[
Kidney Functions	RENIN	716	0.076 (0.039)	2.3e-02	0.110 (0.038)	1.0E-03	0.018	0.27[35]
	Bun	716	0.102 (0.040)	4.7e-03	0.092 (0.038)	7.0E-03	0.013	0.31[11]
	Creatine	716	0.048 (0.040)	1.1e-01	0.143 (0.037)	9.0E-06	0.017	0.24~0.53[36]
	SG	714	0.034 (0.039)	1.9e-01	0.047 (0.038)	1.0E-01	-	
	pH	714	0.039 (0.040)	1.7e-01	0.048 (0.038)	1.0E-01	-	

^a Estimate of h_G^2 (SE) using genotyped data; ^b Estimate of h_G^2 (SE) using imputed data (data were imputed to HapMap2 CHB and JPT panels); ^c Estimate of variance explained by the top SNPs at $P < 5\text{e-}8$ in KARE GWAS. ^d Estimate of h^2 from pedigree analysis in literatures.

References

1. Visscher PM, Hill WG, Wray NR (2008) Heritability in the genomics era - concepts and misconceptions. *Nature Reviews Genetics* 9: 255-266.
2. Schousboe K, Willemsen G, Kyvik KO, Mortensen J, Boomsma DI, et al. (2003) Sex differences in heritability of BMI: a comparative study of results from twin studies in eight countries. *Twin Research* 6: 409-421.
3. Rose KM, Newman B, Mayer-Davis E, Selby JV (1998) Genetic and behavioral determinants of waist-hip ratio and waist circumference in women twins. *Obesity research* 6: 383.
4. Wardle J, Carnell S, Haworth C, Plomin R (2008) Evidence for a strong genetic influence on childhood adiposity despite the force of the obesogenic environment. *The American journal of clinical nutrition* 87: 398-404.
5. Jian WX, Long JR, Deng HW (2004) High heritability of bone size at the hip and spine in Chinese. *Journal of human genetics* 49: 87-91.
6. Poulsen P, Ohm Kyvik K, Vaag A, Beck-Nielsen H (1999) Heritability of type II (non-insulin-dependent) diabetes mellitus and abnormal glucose tolerance—a population-based twin study. *Diabetologia* 42: 139-145.
7. Selby J, Newman B, Quesenberry Jr C, Fabsitz R, King M, et al. (1989) Evidence of genetic influence on central body fat in middle-aged twins. *Human biology; an international record of research* 61: 179.
8. Schousboe K, Visscher P, Erbas B, Kyvik KO, Hopper J, et al. (2003) Twin study of genetic and environmental influences on adult body size, shape, and composition. *International Journal of Obesity* 28: 39-48.
9. Adeyemo AA, Omotade OO, Rotimi CN, Luke AH, Tayo BO, et al. (2002) Heritability of blood pressure in Nigerian families. *Journal of hypertension* 20: 859.
10. Snieder H, Harshfield GA, Treiber FA (2003) Heritability of blood pressure and hemodynamics in African- and European-American youth. *Hypertension* 41: 1196.
11. Chen YC, Guo X, Raffel LJ, Xiang AH, Fang B, et al. (2008) Carotid intima-media thickness (cIMT) cosegregates with blood pressure and renal function in hypertensive Hispanic families. *Atherosclerosis* 198: 160-165.
12. Hsu FC, Zaccaro DJ, Lange LA, Arnett DK, Langefeld CD, et al. (2005) The impact of pedigree structure on heritability estimates for pulse pressure in three studies. *Human heredity* 60: 63-72.
13. Arden N, Baker J, Hogg C, Baan K, Spector T (1996) The heritability of bone mineral density, ultrasound of the calcaneus and hip axis length: a study of postmenopausal twins. *Journal of Bone and Mineral Research* 11: 530-534.
14. Wang X, Wheeler VW, Patrick AL, Bunker CH, Zmuda JM (2007) Genetic and Environmental Determinants of Volumetric and Areal BMD in Multi-Generational Families of African Ancestry: The Tobago Family Health Study. *Journal of Bone and Mineral Research* 22: 527-536.
15. Heribeth B, Samara A, Ndiaye C, Marteau JB, Berrahmoune H, et al. (2010) Metabolic syndrome-related

- composite factors over 5 years in the STANISLAS Family Study: Genetic heritability and common environmental influences. *Clinica Chimica Acta* 411: 833-839.
16. Cohen J, Wang Z, Grundy S, Stoesz M, Guerra R (1994) Variation at the hepatic lipase and apolipoprotein AI/CIII/AIV loci is a major cause of genetically determined variation in plasma HDL cholesterol levels. *Journal of Clinical Investigation* 94: 2377.
 17. AUSTIN MA, KING MC, BAWOL RD, HULLEY SB, FRIEDMAN GD (1987) Risk factors for coronary heart disease in adult female twins. *American journal of epidemiology* 125: 308.
 18. HUNT SC, HASSTEDT SJ, KUIDA H, STULTS BM, HOPKINS PN, et al. (1989) Genetic heritability and common environmental components of resting and stressed blood pressures, lipids, and body mass index in Utah pedigrees and twins. *American journal of epidemiology* 129: 625.
 19. Austin MA, Newman B, Selby JV, Edwards K, Mayer EJ, et al. (1993) Genetics of LDL subclass phenotypes in women twins. Concordance, heritability, and commingling analysis. *Arteriosclerosis, thrombosis, and vascular biology* 13: 687-695.
 20. Henkin L, Bergman RN, Bowden DW, Ellsworth DL, Haffner SM, et al. (2003) Genetic Epidemiology of Insulin Resistance and Visceral Adiposity* 1:: The IRAS Family Study Design and Methods. *Annals of epidemiology* 13: 211-217.
 21. Wu KD, Hsiao CF, Ho LT, Sheu W, Pei D, et al. (2002) Clustering and heritability of insulin resistance in Chinese and Japanese hypertensive families: a Stanford-Asian Pacific Program in Hypertension and Insulin Resistance sibling study. *Hypertension research: official journal of the Japanese Society of Hypertension* 25: 529.
 22. Mills G, Avery P, McCarthy M, Hattersley A, Levy J, et al. (2004) Heritability estimates for beta cell function and features of the insulin resistance syndrome in UK families with an increased susceptibility to type 2 diabetes. *Diabetologia* 47: 732-738.
 23. Garner C, Tatu T, Reittie J, Littlewood T, Darley J, et al. (2000) Genetic influences on F cells and other hematologic variables: a twin heritability study. *Blood* 95: 342.
 24. Bayoumi RA, Al-Yahyaee SAS, Albarwani SA, Rizvi SG, Al-Hadabi S, et al. (2007) Heritability of Determinants of the Metabolic Syndrome among Healthy Arabs of the Oman Family Study&ast. *Obesity* 15: 551-556.
 25. Whitfield J, Martin N, Rao D (1985) Genetic and environmental influences on the size and number of cells in the blood. *Genetic epidemiology* 2: 133-144.
 26. Evans DM, Frazer IH, Martin NG (1999) Genetic and environmental causes of variation in basal levels of blood cells. *Twin Research* 2: 250-257.
 27. Garner C, Mitchell J, Hatzis T, Reittie J, Farrall M, et al. (1998) Haplotype mapping of a major quantitative-trait locus for fetal hemoglobin production, on chromosome 6q23. *The American Journal of Human Genetics* 62: 1468-1474.
 28. Whitfield J, Martin N, Rao D (1985) Genetic and environmental causes of variation in renal tubular handling of sodium and potassium: a twin study. *Genetic epidemiology* 2: 17-27.
 29. Rhodes B, Meek J, Whittaker J, Vyse T (2008) Quantification of the Genetic Component of Basal C-

- Reactive Protein Expression in SLE Nuclear Families. *Annals of human genetics* 72: 611-620.
- 30. Fox ER, Benjamin EJ, Sarpong DF, Rotimi CN, Wilson JG, et al. (2008) Epidemiology, heritability, and genetic linkage of C-reactive protein in African Americans (from the Jackson Heart Study). *The American journal of cardiology* 102: 835-841.
 - 31. Palmer L, Knuiman M, Divitini M, Burton P, James A, et al. (2001) Familial aggregation and heritability of adult lung function: results from the Busselton Health Study. *European Respiratory Journal* 17: 696-702.
 - 32. Wilk JB, Djousse L, Arnett DK, Rich SS, Province MA, et al. (2000) Evidence for major genes influencing pulmonary function in the NHLBI family heart study. *Genetic epidemiology* 19: 81-94.
 - 33. Hukkinen M, Kaprio J, Broms U, Viljanen A, Kotz D, et al. (2011) Heritability of Lung Function: A Twin Study Among Never-Smoking Elderly Women. *Twin Research and Human Genetics* 14: 401-407.
 - 34. DeMeo D, Campbell E, Brantly M, Barker A, Eden E, et al. (2009) Heritability of lung function in severe alpha-1 antitrypsin deficiency. *Hum Hered* 67: 38-45.
 - 35. Alvarez-Madrazo S, Padmanabhan S, Mayosi BM, Watkins H, Avery P, et al. (2009) Familial and phenotypic associations of the aldosterone renin ratio. *Journal of Clinical Endocrinology & Metabolism* 94: 4324.
 - 36. Pattaro C, Aulchenko YS, Isaacs A, Vitart V, Hayward C, et al. (2009) Genome-wide linkage analysis of serum creatinine in three isolated European populations. *Kidney international* 76: 297-306.