Electronic supplementary material

Methods

Phenotypic measurements Between February 1997 and April 2000, the twins visited the research centre in Leuven for a 2 h examination, which started in the morning after an overnight fast. Participants were measured barefoot and lightly clothed. Standing height (cm) was measured to the nearest 0.1 cm with a Harpenden fixed stadiometer (Holtain, Crosswell, UK). Body mass (kg) was measured on a balance scale (SECA, Hamburg, Germany) to the nearest 0.1 kg. BMI was calculated as body mass divided by the square of height (kg/m^2). Waist and hip circumferences were measured with a flexible steel tape to 1 mm accuracy. Waist circumference was taken at the smallest point between the costal margin and the iliac crest and hip circumference at the widest part of the hips, generally at the level of the greater trochanters. WHR was expressed as a percentage. Lean body mass was measured using a bioelectrical impedance analyser (BIA310; Biodynamics, Seattle, WA, USA). Fat mass (kg) was calculated by subtracting the value for lean body mass from total body mass. Four skinfold thicknesses were taken in duplicate, to 0.1 mm accuracy with a Harpenden skinfold calliper (British Indicators, St Albans, UK) at the biceps, triceps, subscapular and suprailiac. The four skinfold thickness measurements were summed to evaluate the overall subcutaneous fat level. Blood samples were drawn to measure plasma hormone concentrations. Plasma leptin was measured with an immunoradiometric assay in a coated tube (Diagnostic Systems Laboratories, Webster, TX, USA). Plasma lipids (triacylglycerol, total cholesterol and HDL-cholesterol) were measured on an auto-analyser (AU600; Olympus, Kyoto, Japan). LDL-cholesterol was estimated using Friedewald's formula [1]. NEFA were measured using a colorimetric assay with the optical density measured at 550 nmol/l. Plasma glucose was measured using the hexokinase method (Olympus AU600). Plasma insulin was determined using a microparticle enzyme immunoassay (Axsym; Abbott Laboratories, Chicago, IL,

USA). IGFBP-1 was measured by radioimmunoassay, as described [2]. Homeostasis model assessment (HOMA) was used to assess insulin resistance and beta cell function [3].

References

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3. Levy JC, Matthews DR and Hermans MP (1998) Correct homeostasis model assessment (HOMA) evaluation uses the computer program. Diabetes Care 21:2191–2192

ESM Table 1 Twin studies (>200 twin pairs) estimating heritabilities (H^2, expressed in percentage) of obesity parameters, fasting glucose, fasting insulin and lipid levels in adults

Reference	Registry	Pairs (*n*)	Age (years)		Adjustment	Sex	H^2										
			Mean	Range			BM	BMI	WHR	S4SF	FATM	FG	FI	TC	HDL	LDL	TRG
[4][a]	Eight registries[b]	36,295	–	20–39	Age	M	–	45–84	–	–	–	–	–	–	–	–	–
					Age	W	–	64–85	–	–	–	–	–	–	–	–	–
[5]	Virginia	5,588	–	–	–	M	–	72	–	–	–	–	–	–	–	–	–
					–	W	–	75	–	–	–	–	–	–	–	–	–
[5][a]	Australia	3,569	–	–	–	M	–	70–80	–	–	–	–	–	–	–	–	–
					–	W	–	69–78	–	–	–	–	–	–	–	–	–
[6][a]	Danish	1,233	–	46–76	Age, zygosity	M	–	46–61	–	–	–	–	–	–	–	–	–
					Age, zygosity	W	–	75–77	–	–	–	–	–	–	–	–	–
[7]	Danish	303	67	55–74	–	M	–	58	22	–	–	–	36	–	56	–	50
					–	W	–	90	10	–	–	–	14	–	84	–	34
[8]	Danish	624	38	18–67	Age	M	–	63	–	65	63	–	–	–	–	–	–
					Age	W	–	58	–	61	59	–	–	–	–	–	–
[9]	Finnish	7245	31	18–54	Age	M	–	72	–	–	–	–	–	–	–	–	–
					Age	W	–	68	–	–	–	–	–	–	–	–	–
[10][c]	KPWTS	434	42	–	Age	W	–	89	–	–	–	–	–	–	68	98	80
					Age, environment, BMI	W	–	–	–	–	–	–	–	–	69	91	51
[11][a]	KPWTS	315	41, 51	18–91	–	W	–	79–80	–	–	–	–	–	–	–	–	–
[12][a]	Minnesota	1,033	–	18–81	Sex	M/W	70–86	63–82	–	–	–	–	–	–	–	–	–
[13][c]	NAS-NRC	514	–	42–56	–	M	56	64	–	–	–	–	–	43	46	57	56
[14][a,c]	NAS-NRC	4,071	–	15–53	–	M	78–81	77–84	–	–	–	–	–	–	–	–	–
[15][c]	NAS-NRC	265	–	59–70	BMI	M	–	63	31	–	–	–	–	–	–	–	–
[16][a]	NAS-NRC	243	–	20–63	–	M	–	73–82	–	–	–	–	–	–	–	–	–
[17]	Swedish	289	66	52–86	Sex, age	M/W	–	52	–	–	–	–	–	–	54	–	43
[18]	Swedish	318	65	45–85	Age	M	–	58	28	–	–	–	27	–	–	–	–
					Age	W	–	73	49	–	–	–	49	–	–	–	–
[19]	Swedish	673	59	–	Age	M	–	74	–	–	–	–	–	–	–	–	–
					Age	W	–	69	–	–	–	–	–	–	–	–	–
[20]	Norwegian	2,570	–	18–25	–	M	–	71	–	–	–	–	–	–	–	–	–
					–	W	–	79	–	–	–	–	–	–	–	–	–
[21]	German	222	34	–	–	M/W	89	97	–	–	–	–	–	64	59	66	72
[22]	Danish	607	38	18–67	Age	M	–	–	–	–	–	38	37	–	–	–	–
					Age	W	–	–	–	–	–	12	54	–	–	–	–
[23]	Dutch	209	44	34–63	Sex, assay batch, truncation	M/W	–	–	–	–	–	50	20–25	–	–	–	–

[24][c]	KPWTS	278	51	30–91	Age, behaviour, BMI	W	–	–	–	–	–	–	54	–	–	–	–
[25][a]	Three registries[d]	1,859	–	28–92	Sex, age	M/W	–	–	–	–	–	–	–	57–77	62–72	61–77	48–62
[26]	Australia	205	23	18–34	–	M	–	–	–	–	–	–	–	54	24	–	53
					–	W	–	–	–	–	–	–	–	54	24	–	51
[27]	Dutch	203	44	34–63	Sex, age	M/W	–	–	–	–	–	–	–	68	71	69	59
[28][a]	KPWTS	348	41, 51	–	Age	W	–	–	–	–	–	–	–	63–66	73	65	50–65
[29]	St Thomas', UK	1,733	48	18–79	Age, fas, HRT, MPS	W	–	–	–	–	–	–	–	42	42	46	63
[30][a]	Swedish	302	66	52–86	Sex , age	M/W	–	–	–	–	–	–	–	32–63	55–76	–	28–72
[31][a]	Swedish	725	–	17–85	Med, fas, dia, sex, age	M/W	–	–	–	–	–	–	–	49–65	–	–	19–62
[32]	Pittsburgh	204	21	18–30	Age, sex, eth, BMI, nut	M/W	–	–	–	–	–	–	–	68	67	78	51
[33][a]	Australia	208	–	18–47	Sex, age	M/W	–	–	–	–	–	–	–	50–83	–	–	–
[34]	Danish	756	–	–	Age	M	–	–	–	–	–	–	–	74	34	71	0
					Age	W	–	–	–	–	–	–	–	74	54	71	60
[39]	KPWTS	340	52	31–90	Age	W	–	–	52	–	–	–	–	–	–	–	–
[40]	Minnesota	4,020	40	28–52	Age	M	61	–	–	–	–	–	–	–	–	–	–
					Age	W	73	–	–	–	–	–	–	–	–	–	–
Present study	Belgian	378	25	18–34	See Table 3	M	84	85	70	74	81	67	49	75	76	78	58
	(EFPTS)					W	74	75	70	74	70	67	49	75	76	78	58

[a]In these studies heritabilities between different age groups are compared; in the table the range is presented
[b]Australian, Danish, Finnish, Italian, Dutch, Norwegian, Swedish and the St Thomas' UK twin registry
[c]Classical heritability estimates: calculated as twice the difference of the MZ and DZ intra-class correlations
[d]Australian, Swedish and the Dutch twin registry
behav, behaviour; BM, body mass; dia, diabetes; env, environment; eth, ethnicity; fas, fasting; FATM, fat mass; FG, fasting glucose; FI, fasting insulin; HRT, hormone replacement therapy; KPWTS, Kaiser-Permanente Women Twins Study; Med, medication; MPS, menopausal status; NAS-NRC, National Academy of Sciences—National Research Council; nut, nutrition; S4SF, sum of four skinfold thicknesses; TC, total cholesterol; TRG, triacylglycerol
–, not determined or unknown