Supplemental Tables

Supplemental Table 1 Study-specific characteristics for studies participating in the meta-analysis

Study	Sex	N	Age, yr	BMI, kg/m^2	Energy, kcal/d	Protein, g/d	Protein, %	Carbohydrate, g/d	Carbohydrate, %	Fat, g/d	Fat, %
ADIGEN_case	Men	161	42.5 (5.3)	35 (5.2)	2329.6 (700)	90.4 (25.6)	15.8 (2.5)	262.3 (84.7)	45.3 (6.7)	83.3 (31.0)	31.8 (5.5)
ADIGEN_control	Men	232	44.8 (6.3)	25.5 (3.2)	2498.2 (576)	93.9 (22.3)	15.2 (2.3)	262.7 (76.7)	42.0 (6.5)	90.5 (24.3)	32.5 (4.5)
ARIC_W	Women	4831	53.9 (5.7)	26.6 (5.4)	1502 (524)	68.5 (25.9)	18.5 (4.2)	186.4 (76.7)	49.5 (9.3)	55.1 (23.5)	32.8 (6.8)
	Men	4319	54.7 (5.7)	27.4 (4.0)	1802 (651)	75.8 (28.8)	17.1 (3.7)	213.1 (88.6)	47.3 (9.1)	68 (30)	33.6 (6.8)
ARIC_AA	Women	1929	53.2 (5.7)	30.7 (6.4)	1493 (574)	68.3 (28.0)	18.7 (4.5)	189.9 (85.9)	50.5 (9.6)	53.4 (23.6)	32.1 (6.5)
	Men	1133	53.8 (6.0)	27.9 (4.8)	1730 (653)	72.9 (28.2)	17.3 (3.9)	210.4 (92.2)	48.4 (9.3)	61.5 (26.2)	32.1 (6.3)
CHS_W	Women	1957	71.9 (5.2)	26.2 (4.9)	1953 (621)	94.8 (35.4)	19.3 (3.2)	253.6 (75.4)	52.8 (8)	69.9 (29)	31.6 (6)
	Men	1256	72.9 (5.6)	26.4 (3.6)	2112 (655)	98.8 (36.0)	18.6 (3.1)	267 (75.9)	51.4 (7.6)	79.7 (32)	33.4 (5.8)
CHS_AA	Women	329	74.4 (5.6)	29.2 (5.8)	1941 (702)	85.0 (34.9)	17.6 (3.5)	268.2 (97.9)	55.9 (8.8)	64.2 (31)	29.1 (6.5)
	Men	189	73.7 (4.9)	26.4 (4.0)	2193 (777)	93.8 (37.3)	17.2 (3.4)	287.6 (104.1)	53 (8.5)	77.3 (34.9)	31.1 (6.5)
CLHNS	Women	1612	48.4 (6.0)	24.5 (4.3)	1184 (466)	43.9 (22.6)	14.8 (4.5)	196.5 (70.9)	68.4 (12)	22.9 (22.8)	15.4 (10.6)
CoLaus	Women	1601	53.6 (10.5)	24.8 (4.6)	1657 (580)	63.2 (24.6)	15.4 (3.1)	197.5 (82.6)	47.4 (8.8)	63.3 (25.5)	34.4 (7)
	Men	1327	52.6 (10.7)	26.3 (3.8)	2042 (685)	78.0 (28.3)	15.4 (3.1)	232.5 (92.6)	45.4 (8.4)	77 (30.3)	33.9 (6.4)
DILGOM	Women	319	52.5 (13.8)	26.6 (5.3)	2109 (661)	91.5 (30.4)	17.5 (2.6)	251.9 (87.5)	47.6 (6)	73.3 (26)	31.3 (5)
	Men	292	53.9 (12.9)	26.9 (3.7)	2410 (659)	104.4 (29.7)	17.4 (2.5)	271.2 (85.1)	44.9 (5.8)	85.4 (27.6)	31.8 (5)
EPIC_NL_case	Women	1642	58.2 (7.7)	27.9 (4.7)	1754 (444)	72.1 (18.3)	16.6 (2.6)	196.2 (55.3)	44.9 (6.4)	70.5 (23.4)	35.8 (5.8)
	Men	593	51.8 (75.5)	27.8 (39.8)	2447 (603)	90.4 (21.5)	15.0 (2.2)	265.4 (73.6)	43.5 (6.2)	98.5 (30.8)	36 (5.2)
EPIC_NL_control	Women	2388	53.9 (10.2)	25.9 (4.3)	1845 (464)	72.7 (18.3)	15.9 (2.4)	206.9 (58.6)	44.9 (6.4)	73.6 (23.7)	35.6 (5.3)
	Men	543	44.3 (11.1)	26.2 (3.8)	2538 (632)	94.0 (24.9)	14.9 (2.1)	281.9 (77.8)	44.6 (6.2)	100.8 (30.6)	35.5 (5)
EPIC_Norfolk	Women	9622	59.1 (9.3)	26.1 (4.2)	1929 (545)	81.1 (20.9)	17.2 (3.2)	244.3 (76)	50.7 (6.3)	70.9 (27.1)	32.6 (6)
	Men	9483	59.7 (9.3)	26.5 (3.2)	2189 (617)	84.8 (21.8)	15.9 (2.9)	268.7 (85.6)	49 (6.6)	82.8 (30.7)	33.6 (5.8)
FamHS	Women	1895	52.4 (13.4)	27.5 (6.2)	1630 (615)	75.4 (30.9)	18.7 (4.1)	212.6 (93.1)	52.1 (10.1)	54.8 (26.5)	30 (7.4)
	Men	1698	52.1 (13.9)	28.0 (4.6)	1899 (673)	84.3 (35.3)	17.9 (4.1)	234.6 (95.1)	49.6 (9.9)	67.2 (30.9)	31.5 (7.3)
FDPS	Women	162	54.6 (6.9)	31.6 (4.6)	1626 (449)	70.5 (23.2)	17.4 (3.4)	174.8 (50.3)	43.5 (6.6)	68.8 (25.7)	37.5 (6.4)
	Men	76	55.5 (7.0)	29.8 (3.7)	2029 (571)	88.6 (24.2)	17.8 (3.4)	208 (55)	41.8 (6.9)	84.6 (33.8)	36.6 (6.6)
Fenland_Met	Women	1202	46.6 (7.0)	26.6 (5.6)	1897 (602)	84.5 (24.9)	18.2 (3.7)	231 (81.9)	48.6 (7)	72 (29.4)	33.7 (5.9)
	Men	1047	46.9 (7.2)	27.2 (4.2)	2116 (637)	89.3 (25.7)	17.2 (3.2)	248.1 (84.3)	46.9 (6.9)	81.6 (31)	34.3 (5.5)
Fenland_Taq	Women	788	45.4 (7.2)	26.7 (5.4)	1828 (546)	82.9 (24.3)	18.5 (3.6)	223.2 (74.6)	48.8 (6.8)	67.7 (26.9)	32.8 (5.9)
	Men	631	44.7 (7.4)	27.6 (4.0)	2093 (633)	86.6 (24.1)	17.0 (3.3)	248.7 (85.4)	47.5 (6.8)	80.4 (31)	34.1 (5.6)

FHS	All	3064	54.7 (9.8)	27.4 (4.9)	1881 (693)	77.9 (30.8)	16.8 (0.0)	239.8 (98.1)	50.9 (8.5)	57.6 (26.7)	27.4 (6.1)
GEMINAKAR	Women	614	37.9 (11.1)	24.0 (3.8)	2065 (578)	81.4 (22.2)	16.0 (2.6)	252.2 (85)	48.5 (6.8)	71.1 (25)	31 (5.8)
	Men	576	38.2 (11.8)	24.8 (3.1)	2665 (699)	106.7 (29.8)	16.2 (2.6)	294.6 (91.4)	44.2 (6.8)	99.9 (32.7)	33.6 (5.6)
Generation R	Women	2548	31.4 (4.3)	23.2 (4.0)	2149 (506)	79.4 (18.9)	14.9 (2.3)	261.6 (72.9)	48.5 (6.1)	86.7 (24.1)	36.3 (5.3)
GLACIER	Women	9465	51.4 (8.9)	25.7 (4.5)	1493 (476)	55.6 (18.4)	15.0 (2.1)	194.2 (65)	52.1 (6)	53.5 (20.8)	32.1 (5.9)
	Men	6263	53.1 (8.4)	26.2 (3.5)	2036 (653)	72.7 (24.8)	14.4 (2.1)	253 (87)	49.7 (6.2)	80.9 (30.3)	35.7 (6.3)
HBCS	Women	667	61.6 (3.0)	27.8 (5.1)	2011 (659)	85.5 (30.7)	17.1 (2.5)	237.2 (85.2)	47 (6.5)	73.5 (27.8)	32.9 (5.2)
	Men	667	61.4 (2.7)	27.6 (4.3)	2398 (723)	97.6 (30.2)	16.4 (2.4)	270.5 (94.3)	44.9 (6.2)	88.9 (30.7)	33.4 (5.5)
HCS	Women	931	66.6 (2.7)	27.6 (5.0)	1974 (449)	82.3 (17.8)	16.9 (2.4)	269.9 (66.6)	54.7 (5.5)	70.9 (20.8)	32.1 (4.8)
	Men	1174	65.9 (2.9)	27.1 (3.7)	2269 (536)	89.6 (19.1)	16.0 (2.3)	311.7 (81.8)	54.9 (5.3)	83 (24)	32.8 (4.5)
Health 2000	Women	1754	53.8 (17.1)	26.4 (5.1)	2166 (684)	91.5 (31.0)	17.0 (2.2)	240.6 (79.9)	44.5 (5.5)	88.1 (31.8)	36.4 (4.9)
	Men	1290	53.3 (15.4)	26.9 (4.1)	2380 (729)	97.6 (31.1)	16.5 (2.2)	257.7 (86.5)	43.3 (5.8)	98.3 (34)	37.1 (5.2)
Health ABC_W	Women	711	74.6 (2.8)	25.9 (4.5)	1635 (524)	59.9 (21.6)	14.8 (3.0)	216.6 (71.9)	53.4 (8.2)	61.3 (27.4)	33.2 (7.8)
	Men	798	74.9 (2.9)	26.9 (3.7)	1992 (674)	71.8 (26.7)	14.6 (2.8)	261.7 (91)	52.9 (8.1)	73.7 (33.4)	32.8 (7.3)
Health ABC_AA	Women	513	74.3 (3.0)	29.7 (6.0)	1780 (654)	63.0 (25.3)	14.3 (3.1)	236.7 (87.7)	53.7 (8.1)	68.4 (32)	34 (7.2)
	Men	370	74.6 (2.8)	27.1 (4.3)	2072 (760)	71.1 (29.3)	13.8 (3.1)	268.6 (103.1)	52.3 (8.9)	80.1 (35.2)	34.5 (7.3)
HERITAGE	All	497	35.8 (14.6)	25.8 (5.0)	2251 (904)	91.2 (35.0)	16.4 (3.0)	293.1 (123.3)	52.1 (7.5)	79.1 (38.2)	31.4 (5.6)
HPFS_case	Men	1949	55.1 (8.8)	26.8 (3.8)	2044 (625)	94.8 (30.4)	18.8 (3.3)	234.2 (82.1)	45.8 (8.0)	75.9 (29.2)	33.2 (6.2)
HPFS_control	Men	2597	55.4 (8.6)	25.1 (2.8)	2024 (610)	92.0 (30.1)	18.3 (3.2)	237.3 (83.8)	46.9 (8.5)	72.5 (28.1)	32.0 (6.3)
InCHIANTI	Women	618	68.4 (0.6)	27.3 (0.2)	1789 (20)	72.0 (0.8)	16.2 (0.1)	232.3 (2.9)	51.9 (0.3)	64.4 (0.8)	32.4 (0.2)
	Men	504	66.7 (0.7)	27.0 (0.2)	2296 (26)	86.6 (1.0)	15.2 (0.1)	293.3 (3.8)	51.1 (0.3)	74.4 (1)	29.2 (0.2)
INTER99	Women	2843	45.9 (7.9)	25.8 (5.1)	2075.8 (661.4)	76.5 (15.2)	15.2 (2.3)	269.4 (100.9)	50.0 (7.8)	72.9 (29.9)	31.0 (6.9)
	Men	2718	46.6 (7.8)	26.8 (4.0)	2497.2 (689.7)	91.1 (24.9)	15.0 (2.4)	288.4 (90.6)	44.8 (6.9)	97.4 (35.9)	34.2 (6.7)
MDC	Women	13584	57.5(8.1)	25.4 (4.2)	2028 (498)	76.2 (18.6)	16.0 (2.5)	219.4 (59.9)	45.5 (5.9)	83.7 (27.5)	38.6 (6)
	Men	9108	59.6 (7.0)	26.2 (3.4)	2604 (611)	94.2 (23.1)	15.6 (2.5)	273.7 (74.2)	44.7 (6.1)	109.2 (34.3)	39.7 (6.2)
MESA_W	Women	1192	62.5 (10.4)	27.5 (5.8)	1502 (631)	62.6 (27.7)	16.9 (3.9)	186.1 (79.1)	50.1 (8.5)	56.9 (30.3)	33.3 (7.3)
	Men	1116	62.9 (10.1)	28.0 (4.1)	1910 (750)	74.8 (32.0)	15.8 (3.4)	228.8 (89.7)	48.7 (8.7)	72.2 (35.5)	33.3 (7)
MESA_AA	Women	703	62.3 (9.9)	31.3 (6.2)	1595 (788)	62.8 (34.2)	15.8 (3.6)	203.3 (101.8)	51.6 (8.9)	61.5 (35)	34.1 (7.1)
	Men	610	62.8 (10.2)	28.5 (4.6)	1861 (868)	70.9 (37.4)	15.2 (3.4)	227.6 (105.1)	49.7 (8.9)	73.4 (40.6)	34.9 (7)
MRC Ely	Women	835	60.9(9.3)	27.3 (5.4)	1814 (515)	80.2 (23.0)	18.0 (3.4)	229.1 (70.6)	50.6 (6.5)	64.9 (24.5)	31.8 (5.8)
	Men	732	61.5 (9.2)	27.4 (4.0)	2044 (649)	82.5 (24.2)	16.5 (3.1)	251.2 (91.6)	49 (7)	76 (30.1)	33.1 (6.2)
NHAPC	Women	1782	58.5 (6.1)	24.7 (3.8)	2024 (551)	64.7 (23.0)	12.8 (2.6)	301.4 (96)	59.5 (9)	67.1 (25.7)	30 (8.1)
	Men	1363	58.9 (5.9)	24.1 (3.3)	2597 (695)	80.6 (26.1)	12.5 (2.6)	385.7 (126.6)	59.3 (10.1)	76 (28.8)	26.7 (8)

NHS_case	Women	3408	54.0 (6.7)	27.0 (5.5)	1797 (540)	84.1 (26.4)	19.0 (3.3)	217.9 (76.8)	48.3 (7.7)	65.6 (23.7)	32.8 (5.8)
NHS_control	Women	4149	54.0 (6.6)	24.9 (4.5)	1779 (512)	82.4 (25.3)	18.7 (3.3)	215.5 (72.1)	48.4 (7.8)	64.8 (23.1)	32.6 (5.8)
QFS	Women	436	40.5 (14.6)	27.8 (8.5)	2025 (503)	81.3 (22.5)	16.3 (3.2)	242.8 (64.4)	48.2 (7.1)	80.1 (27.3)	35.2 (6.3)
	Men	337	41.7 (15.2)	27.4 (6.5)	2703 (650)	106.3 (27.7)	15.9 (2.9)	315.9 (84)	47 (7.1)	106.9 (35.6)	35.2 (6.1)
ROTTERDAM	Women	2680	67.9 (8.0)	26.7 (4.0)	1789 (401)	76.6 (16.6)	17.4 (3.1)	195.8 (52.5)	43.9 (6.7)	72.8 (23.2)	36.2 (6.2)
	Men	1894	67.1 (7.2)	25.8 (2.9)	2244 (501)	88.6 (20.7)	16.0 (2.8)	236.9 (66)	42.2 (7.1)	91.9 (28.2)	36.5 (6.0)
SBCGWAS	Women	2551	49.9 (8.5)	23.9 (3.4)	1777 (432)	75.2 (23.0)	16.9 (2.8)	292.5 (71.5)	66.2 (7.1)	34.7 (15.3)	17.3 (5.1)
SDGWAS	Women	886	51.3 (6.3)	26.7 (3.7)	1758 (425)	69.5 (21.8)	15.7 (2.6)	303.4 (72.7)	69.4 (6.9)	29.6 (13.5)	14.9 (4.8)
SECGS	Women	826	54.8 (8.7)	25.7 (4.1)	1784 (429)	73.4 (23.1)	16.4 (2.8)	295.8 (71.1)	66.7 (7.3)	34.1 (15.5)	16.9 (5.3)
SP2_1M	Women	339	45.0 (9.4)	22.1 (3.6)	1882 (697)	72.0 (30.4)	15.2 (2.1)	254.4 (83.4)	55.2 (6.9)	63.8 (32.8)	29.5 (5.7)
	Men	558	48.2 (10.7)	23.3 (3.4)	2176 (712)	79.1 (28.2)	14.5 (1.8)	305.6 (94.2)	56.8 (6.3)	69.5 (31.4)	28 (5.5)
SP2_550	Women	78	50.1 (14.2)	23.0 (4.0)	1805 (689)	68.3 (28.2)	15.1 (1.9)	256.3 (103.9)	57 (6.4)	56.1 (24.7)	27.8 (5.5)
	Men	248	49.8 (12.4)	23.9 (3.4)	2163 (664)	78.6 (25.8)	14.6 (1.9)	301.8 (89.1)	56.4 (6.3)	69.9 (29.8)	28.4 (5.5)
SP2_610	Women	735	48.7 (10.9)	22.3 (3.8)	1802 (660)	68.7 (27.3)	15.3 (2.1)	247.7 (84.6)	55.8 (6.5)	59.4 (29)	28.9 (5.6)
	Men	185	48.8 (13.2)	23.7 (4.4)	2106 (796)	77.5 (31.2)	14.7 (1.8)	292.8 (101.6)	56.8 (7.2)	68.3 (36.2)	28 (6.4)
SWHS	Women	2308	49.6 (8.5)	23.4 (3.3)	1766 (421)	73.4 (21.7)	16.6 (3.0)	292.3 (72.2)	66.4 (7.1)	34.3 (14.5)	17.3 (5.1)
Takahata	Women	832	61.2 (10.0)	23.3 (3.4)	2112 (576)	76.8 (29.7)	14.4 (2.7)	307.7 (79.8)	58.9 (6.7)	58.8 (22.1)	24.7 (4.7)
	Men	624	63.3(10.2)	23.5 (2.9)	2403 (664)	77.4 (28.6)	12.8 (2.8)	345.2 (99.5)	57.8 (7.4)	56 (21.9)	20.8 (5.2)
THISEAS_case	Women	53	65.7 (10.8)	28.5 (4.6)	1892 (844)	82.6 (38.3)	17.6 (2.9)	215.2 (95.3)	46.3 (8.9)	77.4 (40.6)	36.2 (6.7)
	Men	175	61.3 (10.6)	27.4 (3.6)	2401 (869)	103.3 (38.9)	17.4 (2.9)	267.5 (107.6)	44.8 (8)	94.4 (39.5)	35 (5.9)
THISEAS_control	Women	221	51.8 (12.8)	29.4 (4.4)	2444 (819)	108.5 (39.9)	17.9 (3.1)	274.5 (112.2)	44.9 (9.7)	99.5 (38.9)	36.4 (6.6)
	Men	284	57.1 (14.4)	28.1 (5.2)	2189 (786)	94.8 (36.3)	17.4 (3.1)	265.3 (110)	48.5 (9.5)	87.2 (36.5)	35.5 (6.8)
WGHS	Women	22296	54.2 (7.1)	25.9 (4.9)	1733 (524)	81.2 (26.6)	18.9 (3.3)	222.6 (76.6)	51.3 (7.9)	58 (22.2)	30 (6.1)
YangPyeung	Women	1354	56.9 (12.9)	24.9 (3.4)	1637 (640)	61.1 (29.4)	NA	275.9 (102.1)	NA	33.3 (23.9)	NA
	Men	834	58.8 (12.1)	23.8 (3.0)	2069 (748)	81.2 (37.9)	NA	325.0 (117.3)	NA	45.5 (29.1)	NA
YFS	Women	917	37.8 (5.0)	25.2 (4.8)	2140 (596)	93.3 (27.7)	17.5 (2.3)	253.7 (79.6)	47.2 (5.6)	76.5 (24)	32.2 (4.7)
	Men	709	37.6 (5.0)	26.5 (4.0)	2592 (708)	113.1 (31.7)	17.6 (2.4)	287.1 (89.5)	44.2 (5.5)	96.8 (30.6)	33.6 (4.8)

Data are means ± SD.
W: white; AA: African American.

Supplemental Table 2 Results of meta-regression for the association of all study characteristics combined with the effect of *FTO* genetic variants on dietary intakes*

Study characteristic	Total energy, kcal/d		Protein, %		Carbohydrate, %		Fat, %	
	Effect†	*P*	Effect†	*P*	Effect†	*P*	Effect†	*P*
Sample size	+	0.24	-	0.64	+	0.82	-	0.34
Mean BMI	-	0.88	+	0.92	-	0.99	+	0.90
Mean age	-	0.13	-	0.46	+	0.95	-	0.20
Median of dietary intake	+	0.81	-	0.38	+	0.69	-	0.24
Gender								
Male (0) vs. female (1)	+	0.20	+	0.09	-	0.31	-	0.77
Study design								
Population- or family-based (0) vs. case-control (1)	-	0.93	+	0.36	-	0.06	+	0.32
Ethnicity								
White (0) vs. African American (1)	+	0.22	-	0.68	+	0.58	-	0.57
White (0) vs. Asian (1)	+	0.05	-	0.03	+	0.44	-	0.18
Geographic region								
North America (0) vs. Europe (1)	+	0.86	-	0.006	+	0.03	-	0.11
North America (0) vs. Asia (1)	+	0.05	-	0.03	+	0.44	-	0.18
Measurement of dietary intake								
FFQ (0) vs. dietary record or other (1)	-	0.12	+	0.26	-	0.28	+	0.20
Adjusted for physical activity								
No (0) vs. Yes (1)	+	0.63	-	0.06	+	0.33	-	0.71

*The results are for a meta-regression model where all the listed covariates were entered into the model simultaneously. Ethnicity and geographic region were entered into the model as indicator ('dummy') variables.

†Effect (+) indicates that an increase in the covariate value resulted as a stronger association between *FTO* genetic variants and dietary intakes, whereas effect (-) indicates the opposite.

Supplemental Table 3 Associations of *FTO* SNP rs9939609 or a proxy with absolutely intakes of protein, carbohydrate and fat in a meta-analysis of 177,330 adults*

	Fixed effects meta-analysis						Random effects meta-analysis			
	Model 1†			Model 2†			Model 1†		Model 2†	
	Beta (95% CI)	*P*	I^2	Beta (95% CI)	*P*	I^2	Beta (95% CI)	*P*	Beta (95% CI)	*P*
Protein (g/day)										
Whites	0.29 (0.20, 0.38)	8.6×10^{-11}	34%	0.20 (0.10, 0.27)	1.6×10^{-5}	28%	0.33 (0.20, 0.47)	4.9×10^{-7}	0.23 (0.10, 0.35)	1.9×10^{-4}
African Americans	0.75 (0.15, 1.35)	0.02	4%	0.71 (0.12, 1.31)	0.02	8%	0.75 (0.13, 1.37)	0.02	0.72 (0.08, 1.35)	0.03
Asians	0.20 (-0.20, 0.60)	0.32	51%	0.21 (-0.19, 0.61)	0.30	52%	0.20 (-0.41, 0.82)	0.52	0.21 (-0.40, 0.83)	0.50
All	0.30 (0.22, 0.39)	7.9×10^{-12}	36%	0.20 (0.12, 0.29)	2.2×10^{-6}	33%	0.36 (0.22, 0.49)	2.9×10^{-7}	0.25 (0.12, 0.38)	6.3×10^{-5}
Carbohydrate (g/day)										
Whites	-0.34 (-0.58, -0.10)	0.005	26%	-0.20 (-0.44, 0.04)	0.10	19%	-0.40 (-0.74, -0.08)	0.02	-0.25 (-0.56, 0.06)	0.12
African Americans	-0.63 (-2.07, 0.82)	0.39	52%	-0.59 (-2.03, 0.86)	0.43	52%	-0.09 (-2.43, 2.24)	0.94	-0.02 (-2.36, 2.32)	0.99
Asians	-0.26 (-1.42, 0.89)	0.66	19%	-0.37 (-1.52, 0.78)	0.53	18%	-0.13 (-1.49, 1.23)	0.85	-0.24 (-1.59, 1.11)	0.73
All	-0.35 (-0.58, -0.11)	0.003	26%	-0.22 (-0.45, 0.02)	0.07	21%	-0.40 (-0.73, -0.06)	0.02	-0.27 (-0.59, 0.05)	0.09
Fat (g/day)										
Whites	0.08 (-0.01, 0.17)	0.08	0%	0.04 (-0.06, 0.13)	0.44	0%	0.08 (-0.01, 0.17)	0.08	0.04 (-0.06, 0.13)	0.44
African Americans	0.12 (-0.35, 0.59)	0.62	10%	0.10 (-0.37, 0.57)	0.68	11%	0.06 (-0.46, 0.58)	0.82	0.03 (-0.50, 0.55)	0.92
Asians	0.14 (-0.25, 0.53)	0.48	0%	0.20 (-0.19, 0.59)	0.32	0%	0.14 (-0.25, 0.53)	0.48	0.20 (-0.19, 0.59)	0.32
All	0.09 (0.00, 0.18)	0.05	0%	0.05 (-0.04, 0.13)	0.30	0%	0.09 (0.00, 0.18)	0.05	0.05 (-0.04, 0.13)	0.30

*Data are beta (95% CI) per minor allele of rs9939609 or a proxy (r^2>0.8) for each trait. Analyses from individual studies were conducted separately in men and women, and then combined by meta-analysis of 177,330 adults (154,439 Whites, 5,776 African Americans, and 17,115 Asians).

†Model 1, adjusted for age, physical activity (if available), region (if available), eigenvectors (GWAS data only) and total energy intake.

‡Model 2, further adjusted for BMI.

Supplemental Table 4 Associations of *FTO* SNP rs9939609 or a proxy with BMI and intakes of total energy, protein, carbohydrate and fat in a random effects meta-analysis of up to 177,330 adults*

	Model 1†				Model 2‡		
	Beta (95% CI)	*P*	I^2		Beta (95% CI)	*P*	I^2
BMI (kg/m^2)							
Whites	0.33 (0.28,0.37)	3.4×10^{-35}	46%		-	-	-
African Americans	0.00 (-0.20, 0.20)	0.98	0%		-	-	-
Asians	0.27 (0.11, 0.43)	0.001	48%		-	-	-
All	0.30 (0.25, 0.35)	1.3×10^{-31}	47%		-	-	-
Total energy (kcal/day)							
Whites	-8.5 (-12.8, -4.1)	2.6×10^{-4}	5%		-7.2 (-11.2, -3.3)	3.7×10^{-4}	0%
African Americans	7.9 (-27.7, 43.5)	0.66	40%		8.3 (-26.9, 43.6)	0.643	39%
Asians	10.0 (-11.3, 31.3)	0.36	30%		8.1 (-12.5, 28.7)	0.442	26%
All	-7.0 (-12.0, -2.03)	0.006	18%		-6.4 (-11.1, -1.8)	0.007	13%
Protein (% of energy)							
Whites	0.08 (0.06, 0.11)	7.7×10^{-10}	26%		0.06 (0.03, 0.08)	4.4×10^{-6}	20%
African Americans	0.15 (0.01, 0.29)	0.04	0%		0.14 (0.00, 0.28)	0.05	5%
Asians	0.07 (-0.06, 0.21)	0.30	57%		0.07 (-0.06, 0.21)	0.30	57%
All	0.09 (0.06, 0.11)	1.5×10^{-9}	32%		0.06 (0.04, 0.09)	2.6×10^{-6}	29%
Carbohydrate (% of energy)							
Whites	-0.08 (-0.15, -0.01)	0.02	30%		-0.05 (-0.11, 0.02)	0.13	22%
African Americans	0.01 (-0.55, 0.58)	0.96	60%		0.04 (-0.52, 0.59)	0.90	59%
Asians	-0.07 (-0.32, 0.18)	0.57	0%		-0.08 (-0.33, 0.17)	0.53	0%
All	-0.08 (-0.15, -0.01)	0.02	29%		-0.05 (-0.12, 0.01)	0.12	23%
Fat (% of energy)							
Whites	0.02 (-0.02, 0.07)	0.30	1%		0.00 (-0.04, 0.05)	0.85	0%
African Americans	-0.06 (-0.41, 0.30)	0.75	43%		-0.07 (-0.42, 0.28)	0.70	42%
Asians	0.07 (-0.12, 0.26)	0.47	0%		0.08 (-0.11, 0.28)	0.39	0%
All	0.03 (-0.02, 0.07)	0.24	3%		0.01 (-0.03, 0.05)	0.69	0%

*Data are beta coefficients (95% CI) per minor allele of rs9939609 or a proxy (r^2>0.8) for each trait. Analyses from individual studies were conducted separately in men and women, and then combined by meta-analysis of up to 177,330 adults (154,439 Whites, 5,776 African Americans, and 17,115 Asians).

†Model 1, adjusted for age, physical activity (if available), region (if available) and eigenvectors (GWAS data only).

‡Model 2, further adjusted for BMI.

Supplemental Table 5 Associations of *FTO* SNP rs9939609 (or a proxy) and *MC4R* SNP rs17782313 (or a proxy) with BMI and intakes of total energy, protein, carbohydrate and fat in a fixed effects meta-analysis of up to 177,330 adults*

	FTO SNP rs9939609		*MC4R* SNP rs17782313		*FTO* SNP rs9939609†	*P* for difference‡
	β (95% CI)	*P*	β (95% CI)	*P*	Adjusted β (95% CI)	
BMI (kg/m^2)	0.33 (0.30, 0.35)	3.6×10^{-107}	0.23 (0.19, 0.26)	5.4×10^{-76}	0.23 (0.19, 0.26)	-
Total energy (kcal/day)	-6.4 (-10.1, -2.6)	0.001	-1.0 (-5.3, 3.4)	0.66	-4.5 (-7.3, -1.7)	0.27
Protein (% of energy)	0.08 (0.06, 0.10)	2.4×10^{-16}	0.02 (-0.01, 0.04)	0.10	0.06 (0.04, 0.07)	0.008
Carbohydrate (% of energy)	-0.07 (-0.11, -0.02)	0.004	0.02 (-0.04, 0.07)	0.59	-0.05 (-0.09, -0.02)	0.04
Fat (% of energy)	0.03 (-0.02, 0.07)	0.24	-0.04 (-0.09, 0.01)	0.08	0.02 (-0.01, 0.05)	0.04

*Data are beta coefficients (95% CI) per minor allele of the SNPs for each trait. Analyses from individual studies were conducted separately in men and women, and then combined by meta-analysis of up to 177,330 adults (154,439 Whites, 5,776 African Americans, and 17,115 Asians), adjusted for age, physical activity (if available), region (if available) and eigenvectors (GWAS data only).

† Adjusted for the strength of the effect of *MC4R* SNP on BMI: adjusted $\beta_{FTO\text{-diet}} = (\beta_{MC4R\text{-BMI}} / \beta_{FTO\text{-BMI}}) \times \beta_{FTO\text{-diet}}$; the variance of adjusted $\beta_{FTO\text{-diet}}$ was calculated as $\beta_{FTO\text{-diet}}^2 \times [(\beta_{MC4R\text{-BMI}}^2 / \beta_{FTO\text{-BMI}}^4) \times SE_{FTO\text{-BMI}}^2 + SE_{MC4R\text{-BMI}}^2 / \beta_{FTO\text{-BMI}}^2] + (\beta_{MC4R\text{-BMI}}^2 / \beta_{FTO\text{-BMI}}^2) \times SE_{FTO\text{-diet}}^2$.

‡ *P* for difference between the effect sizes of the *FTO* SNP rs9939609 (adjusted) and the *MC4R* SNP rs17782313 on dietary intake.

Supplemental Table 6 Associations between intakes of total energy, protein, carbohydrate and fat and BMI in a random effects meta-analysis of up to 177,330 adults

	Beta (95% CI)*	*P*	I^2
Total energy (kcal/day)			
Whites	-0.12 (-0.24, 0.00)	0.05	85%
African Americans	-0.39 (-0.77, -0.01)	0.05	40%
Asians	0.22 (0.05, 0.39)	0.01	55%
All	-0.07 (-0.17, 0.04)	0.21	83%
Protein (% of energy)			
Whites	0.76 (0.64 0.87)	2.1×10^{-36}	82%
African Americans	0.88 (0.43, 1.33)	1.2×10^{-4}	57%
Asians	0.12 (-0.09,0.32)	0.27	63%
All	0.66 (0.55,0.77)	2.6×10^{-29}	85%
Carbohydrate (% of energy)			
Whites	-0.38 (-0.50, -0.27)	1.2×10^{-10}	83%
African Americans	-0.21 (-0.73, 0.31)	0.42	67%
Asians	-0.01 (-0.29, 0.27)	0.96	81%
All	-0.31 (-0.42, -0.20)	4.3×10^{-8}	84%
Fat (% of energy)			
Whites	0.26 (0.11 0.41)	0.001	91%
African Americans	0.15 (-0.39, 0.68)	0.59	70%
Asians	-0.04 (-0.31,0.24)	0.80	80%
All	0.20 (0.07,0.34)	0.002	90%

*Beta represents difference in BMI (kg/m^2) comparing the high intake group to the low intake group (dichotomized at median of respective dietary intake variable), adjusted for age, physical activity (if available), region (if available) and eigenvectors (GWAS data only).

Supplemental Table 7 Results of meta-regression for the association of all study characteristics combined with the *FTO*-diet interaction effect on BMI

Study characteristic	Total energy, kcal/d		Protein, %		Carbohydrate, %		Fat, %	
	Effect	*P*	Effect	*P*	Effect	*P*	Effect	*P*
Sample size	+	0.02	+	0.52	-	0.06	+	0.04
Mean age	+	0.18	+	0.97	+	0.65	-	0.50
Mean BMI	+	0.16	+	0.24	+	0.95	+	0.92
Median of dietary intake	+	0.14	-	0.72	-	0.65	-	0.90
Gender								
Male (0) vs. female (1)	+	0.14	+	0.65	+	0.92	-	0.93
Study design								
Population- or family-based (0) vs. case-control (1)	+	0.27	+	0.43	-	0.64	+	0.91
Ethnicity								
White (0) vs. African American (1)	-	0.03	-	0.48	+	0.80	+	0.45
White (0) vs. Asian (1)	+	0.42	+	0.29	-	0.29	+	0.09
Geographic region								
North America (0) vs. Europe (1)	-	0.71	+	0.96	-	0.21	+	0.20
North America (0) vs. Asia (1)	+	0.42	+	0.29	-	0.29	+	0.09
Measurement of dietary intake								
FFQ (0) vs diet record or other (1)	-	0.07	+	0.25	+	0.64	-	0.07
Adjusted for physical activity								
No (0) vs. Yes (1)	-	0.93	-	0.27	-	0.46	+	0.13

The results are for a meta-regression model where all the listed covariates were entered into the model simultaneously. Ethnicity and geographic region were entered into the model as indicator ('dummy') variables.

*Effect (+) indicates that an increase in the covariate value resulted as a stronger association between *FTO* genetic variants and dietary intakes, whereas effect (-) indicates the opposite.

Supplemental Table 8 Interaction between *FTO* rs9939609 SNP or a proxy and dietary intakes on BMI in a random effects meta-analysis of up to177,330 adults*

	Beta for interaction (95% CI)	*P*	I^2
Total energy (kcal/day)			
Whites	0.04 (-0.02, 0.10)	0.20	5%
African Americans	-0.42 (-0.84, 0.00)	0.05	7%
Asians	0.02 (-0.25, 0.30)	0.86	34%
All	0.02 (-0.05, 0.09)	0.55	14%
Protein (% of energy)			
Whites	0.00 (-0.06, 0.06)	0.90	0%
African Americans	-0.11 (-0.51, 0.29)	0.58	0%
Asians	0.22 (-0.01, 0.44)	0.06	0%
All	0.01 (-0.05, 0.06)	0.80	0%
Carbohydrate (% of energy)			
Whites	0.00 (-0.05, 0.06)	0.94	0%
African Americans	0.23 (-0.17, 0.64)	0.26	1%
Asians	-0.19 (-0.42, 0.04)	0.10	0%
All	0.00 (-0.06, 0.05)	0.87	0%
Fat (% of energy)			
Whites	0.03 (-0.03, 0.09)	0.37	0%
African Americans	0.14 (-0.45, 0.73)	0.64	49%
Asians	0.30 (0.07, 0.52)	0.01	0%
All	0.04 (-0.03, 0.10)	0.24	7%

*Data are betas (95% CI) per minor allele of rs9939609 or a proxy (r^2>0.8), adjusted for age, physical activity (if available), region (if available) and eigenvectors (GWAS data only). Analyses from individual studies were conducted separately in men and women, and then combined by meta-analysis of up to 177,330 adults (154,439 Whites, 5,776 African Americans, and 17,115 Asians).

Supplemental Table 9 Studies participating in the meta-analysis

Study		Study design	Race/ethnic group	No. of participants			Region
Short name	Full name			All	Men	Women	
ADIGEN[1]	Adiposity and Genetics	Case-control	White	393	393	0	Europe
ARIC[2]	Atherosclerosis Risk in Communities study	Population-based cohort of adults	White	9,150	4,319	4,831	North America
			African American	3,062	1,133	1,929	
CHS[3]	Cardiovascular Health Study	Community-based cohort of older adults	White	3,213	1,256	1,957	North America
			African American	518	189	329	
CLHNS[4]	Cebu Longitudinal Health and Nutrition Survey	Cohort of women who gave birth in 1983-1984	Asian	1,612	0	1,612	Asia
CoLaus[5]	Cohorte Lausannoise	Population-based cohort of adults	White	2,928	1,327	1,601	Europe
DILGOM[6]	FINRISK/DILGOM 2007 Study	Population-based, cross-sectional study of adults	White	611	292	319	Europe
EPIC_NL[7]	European Prospective Investigation into Cancer and nutrition -Netherlands	Case-cohort	White	5,166	1,136	4,030	Europe
EPIC_Norfolk[8]	The European Prospective Investigation into Cancer and Nutrition - Norfolk Study	Population-based cohort of adults	White	19,105	9,483	9,622	Europe
FamHS[9]	NHLBI Family Heart Study	Family Study	White	3,593	1,698	1,895	North America
FDPS[10]	The Finnish Diabetes Prevention Study	Randomized controlled trial in adults with impaired glucose tolerance	White	238	76	162	Europe
Fenland[11]	The Fenland Study	Population-based cohort of adults	White	3,668	1,678	1,990	Europe
FHS[12]	Framingham Heart Study	Family Study	White	3,064	1,630	1,434	North America
GEMINAKAR[13]	Genes and environment in insulin resistance, adiposity and cardiovascular risk factors	Twin Study	White	1,190	576	614	Europe
Generation R[14]	The Generation R study	Population-based cohort of women	White	2,548	0	2,548	Europe
GLACIER[15]	Gene-Lifestyle Interactions and Complex Traits Involved in Elevated Disease Risk	Population-based cohort of adults	White	15,728	6,263	9,465	Europe
Health ABC[16]	Health, Aging and Body Composition Study	Population-based cohort of adults	White	1,509	798	711	North America
			African American	883	370	513	
HBCS[17]	Helsinki Birth Cohort Study	Birth Cohort	White	1,334	667	894	Europe
HCS[18]	Hertfordshire Cohort Study	Population-based, cross-sectional study of adults	White	2,105	1,174	931	Europe

Health 2000[19]	Health 2000 Survey	Population-based, cross-sectional study of adults	White	3,044	1,290	1,754	Europe
HERITAGE[20]	HERITAGE Family Study	Family Study	White	497	240	257	North America
HPFS[21]	Health Professionals Follow-up Study	Nested case-control	White	4,564	4,564	0	North America
InCHIANTI[22]	Invecchiare in Chianti	Population-based cohort of adults	White	1,122	504	618	Europe
INTER99[23]	The Inter99 Study	Population-based cohort of adults	White	2,718	2,843	5,561	Europe
MDC[24]	Malmö Diet and Cancer cohort	Population-based cohort of adults	White	22,692	9,108	13,584	Europe
MESA[25]	The Multi-Ethnic Study of Atherosclerosis	Population-based cohort of adults	White	2,308	1,116	1,192	North America
			African American	1,313	610	703	
MRC Ely[26]	The MRC Ely Study	Population-based cohort of adults	White	1,567	732	835	Europe
NHAPC[27]	Nutrition and Health of Aging Population in China	Population-based cohort of adults	Asian	3,145	1,363	1,782	Asia
NHS[28]	Nurses'' Health Study	Nested case-control	White	7,557	0	7,557	North America
QFS[29]	Quebec Family Study	Family Study	White	773	337	436	North America
ROTTERDAM[30]	The Rotterdam Study	Population-based cohort of adults	White	4,574	1,894	2,680	Europe
SP2[31]	Singapore Prospective Study Program	Population-based, cross-sectional study of adults	Asian	2,143	991	1,152	Asia
SBCGWAS[32]	Shanghai Breast Cancer GWAS Study	Case-control	Asian	2,551	0	2,551	Asia
SECGS[33]	Shanghai Endometrial Cancer Genetic Study	Case-control	Asian	826	0	826	Asia
SDGWAS[34]	Shanghai Diabetes GWAS	Case-control	Asian	886	0	886	Asia
SWHS[35]	Shanghai Women's Health Study	Case-control	Asian	2,308	0	2,308	Asia
Takahata[36]	Takahata Study	Population-based, cross-sectional study of adults	Asian	1,456	624	832	Asia
THISEAS[37]	The Hellenic study of Interactions between SNPs & Eating in Atherosclerosis Susceptibility	Case-control	White	733	396	337	Europe
WGHS[38]	Women's Genome Health Study	Cohort of US female health professionals	White	22,296	0	22,296	North America
YangPyeung[39]	YangPyeung Cardiovascular Cohort Study	Population-based, cross-sectional study of adults	Asian	2,188	834	1,354	Asia
YFS[40]	The Cardiovascular Risk in Young Finns	Population-based cohort of adults	White	1,626	709	917	Europe

Supplemental Table 10 Methods used for measuring BMI and dietary intakes for studies participating in the meta-analysis

Study	BMI measurement	Dietary intake measurement		BMI and dietary intake measured within 1 year
		Measurement	Description	
ADIGEN	Measured	Dietary record	A 7-day estimated dietary record developed by Danish Veterinary and Food administration (DVFA) was used.[41] This was based on a 7 day food registration diary.	Yes
ARIC	Measured	Food frequency questionnaire (FFQ)	An interviewer-administered, 66-item semi-quantitative FFQ that was modified from the validated Willett 61-item FFQ.[42] Participants were asked to indicate how often, on average, they consumed various foods and beverages over the past year according to 9 frequency categories, ranging from never or <1 time/month to ≥6 times/day. Standard portion sizes given as a reference for intake estimation. Supplementary questions included regarding frequency of fried food consumption and brand name of the breakfast cereal most commonly consumed (open-ended response).	Yes
CHS	Measured	FFQ	A picture-sort FFQ was used to assess dietary habits of 173 participants recruited at baseline (1989-90).[43] The Willett's FFQ[42] was used to assess dietary habits in 1995-96, and these data were used for the 345 participants recruited in 1992-93.	Yes
CLHNS	Measured	FFQ	A picture-sort FFQ was used to assess dietary habits at baseline (1989-90) which was validated against six detailed 24-h diet recall interviews.[43]	Yes
CoLaus	Measured	FFQ	Dietary intake was assessed using a FFQ validated for the French-speaking part of Switzerland.	Yes
DILGOM	Measured	FFQ	The validated FFQ was used to measure subject's usual diet over the last 12 months. The questionnaire listed 132 food items, mixed dishes and alcoholic beverages. The subjects were asked to estimate their use frequencies by a nine-point scale: never or rarely to 6+ times per day. The portion sizes were pre-fixed.	Yes.
EPIC_NL	Measured	FFQ	Food consumption was assessed using a self-administered FFQ including questions on the usual frequency of consumption of 77 main food categories during the year, preceding enrolment. Further information was collected on consumption frequency for selected sub-items (e.g. skimmed, semi-skimmed or full-fat milk), preparation methods, additions (e.g. sugar), use of dietary supplements, special diets and brand names of fats used on bread and for cooking. Color photographs were used to estimate portion size for 28 food items. Overall, the questionnaire allows the estimation of the average daily consumption of 178 foods.	Yes
EPIC_Norfolk	Measured	FFQ	Participants completed a validated 130-item semi-quantitative FFQ about their habitual diet and dietary supplement use in the past year. For all food items, respondents were asked to report the frequency of intake on a 9-point scale (ranging from 'never or less than once per month' to 'more than six times per day') for a 'medium serving or portion'.	Yes
FamHS	Measured	FFQ	At the baseline visit (1992-1995), trained interviewers obtained information on usual dietary consumption using a 66-item food questionnaire modified from the FFQ developed by Willett et al.[42] For each item the participant was asked how often, on average, s/he consumed the item during the previous year. Response categories were almost never, 1-3/month, 1/week, 2-4/week, 5-6/week, 1/day, 2-3/day, 4-6/day, and >6/day. Portion sizes were specified to facilitate determination of the number of typical servings and nutrient content.[44]	Yes
FDPS	Measured	Dietary record	The study subjects completed a 3-day food record at baseline. They were asked to write down everything they ate and drank (except plain drinking water) using a picture booklet of portion sizes of typical foods as the reference. The completeness of the food records was checked at the face-to-face session with the study nutritionist during the study visit.	Yes
Fenland	Measured	FFQ	Participants completed a validated 130-item semi-quantitative FFQ about their habitual diet and dietary supplement use in the past year. For all food items, respondents were asked to report the frequency of intake on a 9-point scale (ranging from 'never or less than once per month' to 'more than six times per day') for a 'medium serving or portion'.	Yes
FHS	Measured	FFQ	Dietary intake was assessed using the Willett FFQ.[42]	Yes
GEMINAKAR	Measured	FFQ	Information about the participants' dietary intake was obtained in 1997-2000 through an extensive	Yes

			FFQ initially designed for the Danish EPIC study and validated against two 7-day weighed diet records in that study. FFQ were obtained from 1212 subjects (600 complete twin pairs and 12 incomplete twin pairs). The FFQ was based on 1-month recall.	
Generation R	Measured	FFQ	We assessed dietary intake using a modified version of the validated semi-quantitative FFQ) of Klipstein-Grobusch et al.[45] This FFQ considered food intake over the prior three months. The FFQ consists of 293 items structured according to meal pattern. Questions include consumption frequency, portion size, preparation method, and additions. Portion sizes were estimated using Dutch household measures and photographs of foods showing different portion sizes. To calculate average daily nutritional values we used the Dutch food composition table 2006.	Yes
GLACIER	Measured	FFQ	Using a 66-item, self-administered FFQ,[46] participants were asked to indicate how often, on average, they consumed various foods and beverages over the past year according to 9 frequency categories, ranging from never to 4 or more a day. Participants indicated their average portion of (1) potato/pasta/rice, (2) vegetables and (3) meat/ground meat/sausages by comparison with four colour photos illustrating four plates with increasing portion sizes of potato, vegetables and meat. For the other food items, we assumed a standard portion size value (as described by the National Food administration's statistics database, www.slv.se). Dietary information was judged as unreliable and excluded from further analysis if estimated energy intake was <2.5% or >95% for the entire Northern Sweden FFQ database (N~93,000 observations).	Yes
Health ABC	Measured	FFQ	108-item interviewer-administered FFQ administered in 1998-99 (Block Dietary Data Systems, Berkeley, CA). The Health ABC FFQ food list was developed specifically for Health ABC using 24-hour recalls obtained in NHANES III from older (> 65 years) non-Hispanic white and black adults residing in the Northeast or the South. Trained interviewers used wood blocks, food models, standard kitchen measures, and flash cards to help participants estimate portion sizes for each food. Interviews were periodically monitored throughout the study to ensure the quality and consistency of the data collection procedures. The Health ABC FFQ was analyzed for micro- and macronutrient content by Block Dietary Data Systems.	Yes
HBCS	Measured	FFQ	The validated FFQ was used to measure subject's usual diet over the last 12 months. The questionnaire listed 128 food items, mixed dishes and alcoholic beverages. The subjects were asked to estimate their use frequencies by a nine-point scale: never or rarely to 6+ times per day. The portion sizes were pre-fixed.	Yes
HCS	Measured	FFQ	Diet was assessed using a FFQ, based on the EPIC questionnaire, which was administered by a trained research nurse. The FFQ included 129 foods and food groups and was used to assess an average frequency of consumption of the listed foods over a 3-month period preceding the home interview. Nutrient intakes were calculated by multiplying the frequency of consumption of a portion of each food by its nutrient content according to the UK national food composition database or manufacturers' composition data.	Yes
Health 2000	87.9% measured and 12.1% self-reported	FFQ	The validated FFQ was used to measure subject's usual diet over the last 12 months. The questionnaire listed 128 food items, mixed dishes and alcoholic beverages. The subjects were asked to estimate their use frequencies by a nine-point scale: never or rarely to 6+ times per day. The portion sizes were pre-fixed.	Yes
HERITAGE	Measured	FFQ	Dietary intake was assessed using the Willett FFQ.[42]	Yes
HPFS	Self-reported	FFQ	Dietary intake was assessed using the Willett FFQ.[42]	
InCHIANTI	Measured	FFQ	Dietary intake was assessed using a FFQ created for the European Prospective Investigation into Cancer and nutrition (EPIC) study, and has previously been validated to provide good estimates of dietary intake in this study population.	Yes
INTER99	Measured	FFQ	Food frequency questionnaire was used to record the dietary data.[47]	Yes
MDC	Measured	FFQ and dietary record	Combination of a quantitative 168-item food frequency questionnaire, a 7-day dietary dairy (of cooked lunch and dinner meals) and a 1-hour interview	Yes

MESA	Measured	FFQ	Block-style FFQ, modified from FFQ used in the IRAS cohort to include Chinese foods/culinary practices	Yes
MRC Ely	Measured	FFQ	Participants completed a validated 130-item semi-quantitative FFQ about their habitual diet and dietary supplement use in the past year. For all food items, respondents were asked to report the frequency of intake on a 9-point scale (ranging from 'never or less than once per month' to 'more than six times per day') for a 'medium serving or portion'.	Yes
NHAPC	Measured	FFQ	Dietary intake was assessed with a 74-item FFQ modified from the FFQ used in the national Survey on the Status of Nutrition and Health of the Chinese People in 2002. The food-composition values were obtained from the Chinese Food Composition Table.	Yes
NHS	Self-reported	FFQ	Dietary intake was assessed using the Willett FFQ.[42]	
QFS	Measured	Dietary record	Dietary intake was assessed by a 3-day dietary record, which was completed during 2 weekdays and 1 weekend day. Subjects were asked to record all food and beverage ingested,	Yes
ROTTERDAM	Measured	FFQ	Dietary assessment followed a two-step procedure: 1) A simple self-administered questionnaire was first completed at home, only questions were asked about which food items were consumed; no questions about portion sizes (or frequency) were asked during this step. 2) A subsequent structured interview was later conducted at the research center with a trained dietitian. Participants were asked to indicate how often, on average, they consumed various foods and beverages over the past year according to 9 frequency categories, ranging from never or <1 time/month to =6 times/day. Portion sizes were presented in natural units (eg. slices of bread) or household measures (e.g., cups, bowls, tablespoons, plates, etc.).[45]	Yes
SP2	Measured	Other	Whether and the reason of changing diet over the last 1 month was firstly asked. Then the questions about the food intake over the last 1 month was divided into several parts, including bread, rice and Porridge, noodles, soups, vegetables and bean curd, salad, fruits, poultry, meat, fish, desserts, eggs, Biscuits, Pastries and Cakes, fast foods, nuts, titbits/snacks, milk used with beverages with/without sugar, milk & dairy Products, soya products and alcohol. For each kind of food, the amount and frequency were both recorded. Finally, the oil or fat used in cooking was also questioned.	Yes
SBCGWAS	Measured	FFQ	Dietary intake was assessed using a validated 77-item semi-quantitative questionnaire that covers about 90% of commonly consumed foods in urban Shanghai in 1996.[48]	Yes
SECGS	Measured	FFQ	Dietary intake was assessed using a validated 77-item semi-quantitative questionnaire that covers about 90% of commonly consumed foods in urban Shanghai in 1996.[48]	Yes
SDGWAS	Measured	FFQ	Dietary intake was assessed using a validated 77-item semi-quantitative questionnaire that covers about 90% of commonly consumed foods in urban Shanghai in 1996.[48]	Yes
SWHS	Measured	FFQ	Dietary intake was assessed using a validated 77-item semi-quantitative questionnaire that covers about 90% of commonly consumed foods in urban Shanghai in 1996.[48]	Yes
Takahata	Measured	Other	The brief self-administered diet history questionnaire (BDHQ), which requires the recall of dietary habits over a 1-month period.[49]	Yes
WGHS	Self-report	FFQ	Dietary intake was assessed using the Willett FFQ.[42]	Yes
YangPyeung	Measured	FFQ and dietary record	Dietary intake was assessed using 24-h diet recall (n=1,065) and/or FFQ (n=1,123).	Yes
YFS	Measured	FFQ	Information on food consumption and nutrient intakes were collected using a modified 131-item FFQ.	Yes
THISEAS	Measured	FFQ	Dietary assessment data was collected through face to face interview by well-trained scientists. A semi-quantitative 172-item questionnaire was used to assess dietary intake. Participants were asked to indicate how often they consumed various foods and beverages, as well as the portion size by comparison with photos. Frequency response categories were: never; 1–3 times/month; 1–2 times/week; 3–4 times/week; 5-6 times/week; 1time/day.	Yes

Supplemental Table 11 Genotyping methods and quality control for the *FTO* SNP in all studies participating in the meta-analysis

Study	SNP	r^2	Genotyped or imputed	Imputation quality	Method	Minor allele	Men				Women			
							MAF	Call rate	P_{HWE}	Concordance rate	MAF	Call rate	P_{HWE}	Concordance rate
ADIGEN	rs3751812	1	Imputed	-	Illumina 610 K quad chips, MACH 1.0	T	0.46	0.88	0.44	0.99	-	-	-	-
ARIC_W	rs9939609	-	Genotyped	-	Affymetrix 6.0 chip	A	0.41	1	0.70	NA	0.40	1	0.37	NA
ARIC_AA	rs9939609	-	Genotyped	-	Affymetrix 6.0 chip	A	0.47	1	0.37	NA	0.47	1	0.37	NA
CHS_W	rs9939609	-	Imputed	1	MACH	A	0.39	NA	NA	NA	0.39	NA	NA	NA
CHS_AA	rs9939609	-	Genotyped	-	IBC Illumina iSELECT chip	A	0.50	0.95	0.38	NA	NA	0.95	NA	NA
CLHNS	rs9939609	-	Genotyped	-	TaqMan allelic discrimination	A	-	-	-	-	0.18	0.97	0.27	1
CoLaus	rs9939609	-	Imputed	1	IMPUTE 0.2.0	A	0.42	NA	0.74	NA	0.41	NA	0.35	NA
DILGOM	rs9939609	-	Imputed	1	MACH 1.0.10	A	0.39	1	0.62	NA	0.41	1	0.49	NA
EPIC_NL_control	rs9939609	-	Genotyped	-	IBC CVD chip	A	0.40	1	0.51	NA	0.39	1	0.55	NA
EPIC_NL_case	rs9939609	-	Genotyped	-	IBC CVD chip	A	0.38	1	0.13	NA	0.40	1	0.37	NA
EPIC_Norfolk	rs1121980	0.84	Genotyped	-	TaqMan SNP Genotyping Assays	A	0.43	0.98	0.72	0.99	0.43	0.98	0.72	0.98
FamHS	rs9939609	-	Imputed	1	MACH 1.0.16	A	0.41	NA	NA	NA	0.40	NA	NA	NA
FDPS	rs11075989	1	Genotyped	-	Illumina Cardio-Metabochip	T	0.42	1	0.87	NA	0.43	1	0.31	NA
Fenland	rs9939609	-	Genotyped	-	Metabochip	A	0.40	1	0.44	1	0.39	1	0.44	1
Fenland	rs1121980	0.84	Genotyped	-	TaqMan SNP Genotyping Assays	A	0.41	0.97	0.17	1	0.42	0.97	0.17	1
FHS*	rs9939609	-	Imputed	0.99	MACH 1.0.15	A	0.39	NA	NA	NA	-	-	-	-
GEMINAKAR	rs9939609	-	Genotyped	-	TaqMan SNP Genotyping Assays	T	0.41	0.99	0.84	NA	0.41	0.99	0.84	NA
Generation R	rs8050136	1	Genotyped	-	TaqMan allelic discrimination assay	A	-	-	-	-	0.38	0.97	0.90	0.93
GLACIER	rs9939609	-	Genotyped	-	TaqMan SNP Genotyping Assays	A	0.41	0.94	0.96	0.99	0.42	0.98	0.02	0.99
Health ABC_W	rs9939609	-	Imputed	1	MACH-1.0.16.a	A	0.42	NA	NA	NA	0.42	NA	NA	NA
Health ABC_AA	rs9939609	-	Imputed	1	MACH-1.0.16.a	A	0.45	NA	NA	NA	0.46	NA	NA	NA
HBCS	rs9939609	-	Imputed	1	MACH 1.0.10	A	0.39	1	0.14	NA	0.41	1	0.41	NA
HCS	rs9939609	-	Genotyped	-	Fluorescence-based competitive allele-specific PCR (KASPar)	A	0.40	0.98	0.44	1	0.4	0.98	0.44	1
Health 2000	rs9939609	-	Genotyped	-	Sequenom iPLEX Gold assay (Sequenom Inc.)	A	0.40	0.98	0.09	1	0.4	0.98	0.09	1
HERITAGE*	rs8050136	1	Genotyped	-	Illumina GoldenGate assay	A	0.38	1	0.27	1	-	-	-	-
HPFS-control	rs9939609	-	Genotyped	-	Affymetrix or Illumina chips	A	0.42	0.98	0.58	NA	-	-	-	-
HPFS-case	rs9939609	-	Genotyped	-	Affymetrix or Illumina chips	A	0.44	0.98	0.56	NA	-	-	-	-
InCHIANTI	rs9939609	-	Imputed	1	MACH1.0.	A	0.46	NA	NA	NA	0.44	NA	NA	NA
INTER99	rs9939609	1	Genotyped	-	Illumina Human Cardio-metabo Chip, GenCall	A	0.41	99.9	0.40	0.99	0.41	99.9	0.40	0.99

MDC	rs9939609	-	Genotyped	-	Sequenom MassARRAY platform or TaqMan SNP Genotyping Assays	A	0.41	0.98	0.66	NA	0.41	0.98	0.66	NA
MESA_W	rs9939609	-	Genotyped	-	Affymetrix 6.0 chip	A	0.42	1	0.76	NA	0.40	1	0.01	NA
MESA_AA	rs9939609	-	Genotyped	-	Affymetrix 6.0 chip	A	0.47	1	0.14	NA	0.49	1	0.37	NA
MRC Ely	rs9939609	-	Genotyped	-	Metabochip	A	0.39	1	0.64	1	0.39	1	0.64	1
NHAPC	rs9939609	-	Genotyped	-	GenomeLab SNPstream Genotyping System (Beckman Coulter)	A	0.11	0.99	0.01	0.99	0.11	1	0.22	0.99
NHS-control	rs9939609	-	Genotyped	-	Affymetrix or Illumina chips	A	-	-	-	-	0.40	0.98	0.60	NA
NHS-case	rs9939609	-	Genotyped	-	Affymetrix or Illumina chips	A	-	-	-	-	0.41	0.98	0.59	NA
QFS	rs9939609	-	Genotyped	-	Sequenom iPLEX Gold Assay (Sequenom, Cambridge, MA)	A	0.39	NA	0.40	NA	0.39	NA	0.40	NA
ROTTERDAM	rs9939609	-	Imputed	1	MACH	A	0.37	NA	0.28	NA	0.38	NA	0.55	NA
SP2	rs9939609	-	Imputed	1	IMPUTE v0.5	A	NA	NA	NA	NA	NA	NA	NA	NA
SWHS	rs9939609	-	Genotyped	-	Affymetrix 6.0 chip	A	-	-	-	-	0.12	1	0.004	NA
Takahata*	rs9939609	-	Genotyped	-	Fluorogenic polymerase chain reaction (TaqMan)	A	0.20	0.89	0.19	NA	-	-	-	-
WGHS	rs9939609	-	Imputed	0.99	MACH 1.0.15	A	-	-	-	-	0.4	0.98	0.10	NA
YangPyeung	rs9939609	-	Genotyped	-	TaqMan SNP Genotyping Assays	A	0.12	1	0.54	NA	0.12	1	0.75	NA
YFS	rs9939609	1	Imputed	1	MACH 1.0	A	0.40	NA	NA	NA	0.40	NA	NA	NA
THISEAS_control	rs9939609	-	Genotyped	-	Metabochip	A	0.45	0.92	0.05	NA	0.40	0.89	0.19	NA
THISEAS_case	rs9939609	-	Genotyped	-	Metabochip	A	0.46	0.89	0.63	NA	0.44	0.85	0.37	NA

r^2: correlation coefficient with rs9939609; MAF: minor allele frequency; P_{HWE}: *P*-values for Hardy–Weinberg equilibrium.

*These studies provided data in men and women combined.

Supplemental Table 12 Genotyping methods and quality control for the *MC4R* SNP in all studies participating in the meta-analysis

Study	SNP	r^2	Genotyped or imputed	Imputation quality	Method	Minor allele	Men				Women			
							MAF	Call rate	P_{HWE}	Concordance rate	MAF	Call rate	P_{HWE}	Concordance rate
ADIGEN	rs10871777	0.96	Imputed	-	Illumina 610 K quad chips, MACH 1.0	G	0.27	0.88	0.41	0.99	-	-	-	-
ARIC_W	rs17782313	-	Genotyped	-	Affymetrix 6.0 chip	C	0.23	1	0.70	NA	0.23	1	0.70	NA
ARIC_AA	rs17782313	-	Genotyped	-	Affymetrix 6.0 chip	C	0.28	1	0.70	NA	0.30	1	0.70	NA
CHS_W	rs17782313	-	Imputed	0.94	MACH	C	0.24	NA	NA	NA	0.24	NA	NA	NA
CLHNS	rs17782313	-	Genotyped	-	Affymetrix Genome-Wide Human SNP Array 5.0	C	-	NA	-	NA	0.12	1	0.11	1
CoLaus	rs17782313	-	Genotyped	1	Affimetrix GeneChip® Human Mapping 500K array set	C	0.23	1	0.32	NA	0.25	1	0.89	NA
DILGOM	rs17782313	-	Imputed	1	MACH 1.0.10f	C	0.17	1	0.54	NA	0.21	1	0.49	NA
EPIC_NL_control	rs17782313	-	Genotyped	-	IBC CVD chip	C	0.23	1	0.84	NA	0.26	1	0.88	NA
EPIC_NL_case	rs17782313	-	Genotyped	-	IBC CVD chip	C	0.28	1	0.07	NA	0.27	1	0.89	NA
EPIC_Norfolk	rs17782313	-	Genotyped	-	TaqMan SNP Genotyping Assays	C	0.24	0.99	0.38	0.99	0.23	0.99	0.38	0.99
FamHS	rs17782313	-	Imputed	1	MACH 1.0.16	C	0.47	NA	NA	NA	0.40	NA	NA	NA
FDPS	rs10871777	1	Genotyped	-	Illumina Cardio-Metabochip	G	0.17	1	0.17	NA	0.19	1	0.59	NA
Fenland	rs17782313	-	Genotyped	-	Metabochip	C	0.25	1	0.15	1	0.23	1	0.15	1
Fenland	rs17782313	-	Genotyped	-	TaqMan SNP Genotyping Assays	C	0.24	0.96	0.88	1	0.26	0.96	0.88	1
FHS*	rs17782313	-	Imputed	1.02	MACH 1.0.15	C	0.22	NA	NA	NA	-	-	-	-
GEMINAKAR	rs17782313	-	Genotyped	-	TaqMan SNP Genotyping Assays	T	0.21	0.99	0.91	NA	0.21	0.99	0.91	NA
GLACIER	rs17782313	-	Genotyped	-	TaqMan SNP Genotyping Assays	C	0.26	0.94	0.02	0.99	0.27	0.98	0.14	0.99
Health ABC_W	rs17782313	-	Imputed	1	MACH-1.0.16.a	C	0.22	NA	NA	NA	0.24	NA	NA	NA
Health ABC_AA	rs17782313	-	Imputed	1	MACH-1.0.16.a	C	0.31	NA	NA	NA	0.31	NA	NA	NA
HBCS	rs17782313	-	Imputed	1	MACH 1.0.10	C	0.18	1	0.36	NA	0.19	1	0.02	NA
HCS	rs17782313	-	Genotyped	-	TaqMan® SNP genotyping assay	C	0.24	0.98	0.01	1	0.24	0.98	0.01	1
Health 2000	rs17782313	-	Genotyped	-	Sequenom iPLEX Gold assay (Sequenom Inc.)	C	0.18	0.98	0.32	1	0.18	0.98	0.32	1
HERITAGE*	rs17782313	1	Imputed	-	MACH	C	0.24	1	0.91	1	-	-	-	-
HPFS-control	rs17782313	-	Genotyped	-	Affymetrix or Illumina chips	C	0.24	1	0.56	1	-	-	-	-
HPFS-case	rs17782313	-	Genotyped	-	Affymetrix or Illumina chips	C	0.24	1	0.78	1	-	-	-	-
InCHIANTI	rs17782313	-	Imputed	1	MACH1.0.	C	0.26	NA	NA	NA	0.30	NA	NA	NA
INTER99	rs17782313	1	Genotyped		Illumina Human Cardio-metabo Chip, GenCall	C	0.25	1	0.94	1				
MDC	rs17782313	-	Genotyped	-	Sequenom MassARRAY platform or TaqMan SNP Genotyping Assays	C	0.23	1	0.44	NA	0.23	1	0.12	NA

MESA_W	rs17782313	-	Genotyped	-	Affymetrix 6.0 chip	C	0.24	1	0.29	NA	0.22	1	0.32	NA
MESA_AA	rs17782313	-	Genotyped	-	Affymetrix 6.0 chip	C	0.28	1	0.69	NA	0.29	1	0.20	NA
MRC Ely	rs17782313	-	Genotyped	-	Metabochip	C	0.23	1	0.60	1	0.27	1	0.60	1
NHAPC	rs17782313	-	Genotyped	-	TaqMan® 7900HT SNP Genotyping System (ABI PRISM 7900HT)	T	0.23	0.99	0.95	-	0.23	0.98	0.74	-
NHS-control	rs17782313	-	Genotyped	-	Affymetrix or Illumina chips	C	-	-	-	-	0.24	1	0.65	1
NHS-case	rs17782313	-	Genotyped	-	Affymetrix or Illumina chips	C	-	-	-	-	0.24	1	0.43	1
QFS	rs17782313	-	Imputed	1	MACH	C	0.28	NA	0.78	NA	0.28	NA	0.78	NA
ROTTERDAM	rs17782313	-	Imputed	1	MACH	C	0.25	NA	0.63	NA	0.25	NA	0.98	NA
SP2	rs17782313	-	Imputed	1	IMPUTE v0.5	C	NA	NA	NA	NA	NA	NA	NA	NA
SWHS	rs17782313	-	Genotyped	-	Affymetrix 6.0 chip	C	-	-	-	-	0.21	1	0.16	NA
WGHS	rs17782313	-	Imputed	0.96	MACH 1.0.15	C	-	-	-	-	0.24	0.98	0.10	NA
YangPyeung	rs17782313	-	Genotyped	-	TaqMan SNP Genotyping Assays	C	0.24	1	0.47	NA	0.25	1	0.15	NA
YFS	rs17782313	1	Imputed	1	MACH 1.0	C	0.17	NA	NA	NA	0.17	NA	NA	NA
THISEAS_control	rs17782313	-	Genotyped	-	Metabochip	G	0.23	1	0.62	NA	0.23	1	1	NA
THISEAS_case	rs17782313	-	Genotyped	-	Metabochip	G	0.27	1	0.71	NA	0.28	1	1	NA

r^2: correlation coefficient with rs9939609; MAF: minor allele frequency; P_{HWE}: *P*-values for Hardy–Weinberg equilibrium.

*These studies provided data in men and women combined.

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