

Table S1 Associations of baseline characteristics, lifestyle and dietary habits with *FTO* (*rs9939609*)

	<i>FTO</i> (<i>rs9939609</i>)			<i>P</i>	
	<i>TT</i>	<i>TA</i>	<i>AA</i>		
	<i>N</i> = 91	<i>N</i> = 158	<i>N</i> = 58		
<i>Characteristics and lifestyle factors</i>					
Gender, female	54 (59.3)	99 (62.7)	40 (69.0)	0.49	
Age (years)	38.61 ± 13.37	41.28 ± 14.53	37.99 ± 13.11	0.18	
Crowding index	1.52 ± 0.88	1.54 ± 0.88	1.60 ± 0.76	0.86	
Levels of physical activity	Low	33 (36.3)	75 (47.5)	29 (50.0)	0.40
	Moderate	34 (37.4)	47 (29.8)	18 (31.0)	
	High	24 (26.4)	36 (22.8)	11 (19.0)	
Physical activity	None	12 (13.2)	22 (13.9)	10 (17.2)	0.77
	Any	79 (86.8)	136 (86.1)	48 (82.8)	
Cigarette smoker	Never	46 (50.6)	75 (47.5)	27 (46.6)	0.44
	Current	35 (38.5)	70 (44.3)	29 (50.0)	
	Past	10 (11.0)	13 (8.2)	2 (3.5)	
Narghileh smoker	Never	49 (53.9)	94 (59.5)	34 (58.6)	0.93
	Current	32 (35.2)	50 (31.7)	18 (31.0)	
	Past	10 (11.0)	14 (8.9)	6 (10.3)	
Alcohol drinker	Never	63 (69.2)	113 (71.5)	46 (79.3)	0.15
	Current	23 (25.3)	37 (23.4)	6 (10.3)	
	Past	5 (5.5)	8 (5.1)	6 (10.3)	
<i>Body mass and composition</i>					
Body mass index (BMI) (kg/m²)	28.56 ± 5.56	27.07 ± 5.43	28.64 ± 5.99	0.06	
Body fat (kg)	27.48 ± 11.56	24.91 ± 10.93	28.28 ± 11.99	0.08	
Muscle mass (kg)	27.41 ± 6.66	26.22 ± 6.21	25.40 ± 6.27	0.15	
<i>Daily macronutrient intake</i>					
Total energy (Kcal)	3739.09 ± 2043.47	3499.87 ± 2049.69	3619.59 ± 1968.32	0.67	
Carbohydrates (g)	465.62 ± 266.87	432.46 ± 263.16	424.93 ± 208.40	0.53	
Percent Kcal from carbohydrates (%)	50.87 ± 8.80	50.04 ± 7.77	48.96 ± 10.07	0.41	
Proteins (g)	115.44 ± 65.10	111.94 ± 66.53	128.71 ± 113.47	0.37	
Percent Kcal from proteins (%)	12.46 ± 2.65	13.06 ± 3.49	13.50 ± 5.17	0.21	
Sugar (g)	143.44 ± 164.05	126.88 ± 96.44	127.81 ± 74.14	0.54	
Percent Kcal from sugar (%)	14.80 ± 6.89	14.65 ± 6.12	15.04 ± 6.85	0.93	
Total Fat (g)	150.35 ± 86.79	145.94 ± 86.74	158.84 ± 104.62	0.65	
Percent Kcal from total fat (%)	37.92 ± 7.58	39.29 ± 7.50	39.79 ± 9.27	0.29	
Saturated fat (g)	43.59 ± 27.77	41.08 ± 28.89	46.18 ± 31.84	0.50	
Percent Kcal from saturated fat (%)	10.30 ± 2.68	10.27 ± 2.76	10.70 ± 2.86	0.58	
Monounsaturated fat (MUFA) (g)	55.84 ± 33.26	53.73 ± 32.85	57.92 ± 40.19	0.71	
Percent kcal from MUFA (%)	13.62 ± 4.02	13.85 ± 3.93	14.00 ± 4.39	0.84	
Polyunsaturated fat (PUFA) (g)	38.13 ± 21.80	39.13 ± 24.54	41.63 ± 31.02	0.70	
Percent kcal from PUFA (%)	9.31 ± 3.09	10.31 ± 3.95	10.28 ± 4.14	0.11	
Cholesterol (mg)	408.11 ± 458.46	343.35 ± 273.28	440.40 ± 449.40	0.17	

Data are presented as mean ± SD or *N* (%)

P values: chi-square, t-test or one way ANOVA as appropriate

Table S2. Interaction between daily dietary intake and *FTO* (*rs9939609*) genotypes on BMI (Kg/m²)

	No. of subjects by genotype (TT/TA/AA)	TT Mean (95% CI) (N = 91)	TA Mean (95% CI) (N = 158)	AA Mean (95% CI) (N = 58)	P-trend ¹	P-trend ²	P-trend ³	P- interaction ¹	P- interaction ²	P- interaction ³
Among ALL	91/158/58	28.56 (27.40 – 29.71)	27.07 (26.21 – 27.92)	28.64 (27.07 – 30.22)	0.93	0.95	0.87	–	–	–
Carbohydrates (% of energy)										
Tertile 1 (<47.317)	30/48/25	28.87 (26.99 – 30.75)	27.30 (25.84 – 28.76)	29.42 (26.86 – 31.99)	0.70	0.96	0.96	0.46	0.60	0.59
Tertile 2 (47.317 – 53.984)	29/64/15	27.63 (25.64 – 29.62)	26.82 (25.43 – 28.20)	27.58 (24.20 – 30.96)	0.98	0.99	0.99			
Tertile 3 (>53.984)	32/46/18	29.10 (26.82 – 31.38)	27.18 (25.46 – 28.89)	28.44 (25.59 – 31.29)	0.71	0.66	0.66			
Fat (% of energy)										
Tertile 1 (<35.131)	32/43/17	28.83 (26.47 – 31.19)	26.84 (25.00 – 28.67)	29.07 (25.68 – 32.46)	0.90	0.94	0.94	0.49	0.57	0.46
Tertile 2 (35.131 – 41.333)	30/63/18	28.06 (26.28 – 29.84)	27.51 (26.14 – 28.88)	26.33 (24.15 – 28.51)	0.26	0.25	0.25			
Tertile 3 (>41.333)	29/52/23	28.77 (26.76 – 30.78)	26.72 (25.32 – 28.12)	30.13 (27.41 – 32.86)	0.39	0.43	0.43			
Protein (% of energy)										
Tertile 1 (<11.700)	39/58/23	29.27 (27.79 – 30.74)	26.73 (25.49 – 27.96)	28.53 (25.88 – 31.18)	0.57	0.40	0.40	0.94	0.77	0.76
Tertile 2 (11.700 – 13.985)	31/50/15	26.36 (24.50 – 28.21)	26.83 (25.21 – 28.46)	28.66 (25.45 – 31.87)	0.19	0.17	0.17			
Tertile 3 (>13.985)	21/50/20	30.48 (27.30 – 33.67)	27.70 (26.01 – 29.40)	28.76 (25.82 – 31.70)	0.38	0.23	0.23			
Saturated fat (% of energy)										
Tertile 1 (<8.595)	26/42/17	28.53 (26.82 – 30.24)	27.07 (25.12 – 29.02)	29.63 (26.29 – 32.97)	0.54	0.40	0.40	0.30	0.26	0.30
Tertile 2 (8.595 – 11.034)	29/65/10	28.22 (25.81 – 30.63)	27.00 (25.63 – 28.37)	30.74 (25.90 – 35.58)	0.25	0.31	0.31			
Tertile 3 (>11.034)	36/51/31	28.85 (26.87 – 30.83)	27.15 (25.85 – 28.46)	27.42 (25.47 – 29.38)	0.27	0.19	0.19			
MUFA (% of energy)										
Tertile 1 (<11.890)	30/41/21	28.99 (26.54 – 31.44)	26.48 (24.90 – 28.05)	29.00 (26.27 – 31.73)	1.00	0.93	0.93	0.75	0.87	0.81
Tertile 2 (11.890 – 14.571)	29/66/15	28.05 (26.10 – 30.00)	27.72 (26.40 – 29.05)	27.12 (23.64 – 30.60)	0.59	0.89	0.89			
Tertile 3 (>14.571)	32/51/22	28.61 (26.80 – 30.42)	26.69 (25.05 – 28.34)	29.33 (26.73 – 31.94)	0.64	0.95	0.95			
PUFA (% of energy)										
Tertile 1 (<8.426)	39/47/21	28.88 (26.09 – 30.94)	27.17 (25.19 – 29.14)	28.03 (25.11 – 30.94)	0.63	0.74	0.74	0.35	0.46	0.44
Tertile 2 (8.426 – 10.930)	29/61/18	28.18 (26.13 – 30.23)	26.91 (25.74 – 28.08)	28.39 (25.99 – 30.79)	0.89	0.44	0.44			
Tertile 3 (>10.930)	23/50/19	28.49 (26.61 – 30.38)	27.18 (25.71 – 28.64)	29.56 (26.34 – 32.78)	0.52	0.56	0.56			

¹p-value crude²p-value adjusted for age and sex³p-value adjusted for age, sex and physical activity

Table S3. Interaction between daily dietary intake and *FTO* (*rs1558902*) genotypes on **body fat** (kg)

	No. of subjects by genotype (<i>TT/TA/AA</i>)	<i>TT</i> Mean (95% CI) (<i>N</i> = 85)	<i>TA</i> Mean (95% CI) (<i>N</i> = 165)	<i>AA</i> Mean (95% CI) (<i>N</i> = 58)	<i>P</i> -trend ¹	<i>P</i> -trend ²	<i>P</i> -trend ³	<i>P</i> - interaction ¹	<i>P</i> - interaction ²	<i>P</i> - interaction ³
Among ALL	85/165/58	27.48 (24.95 – 30.00)	25.30 (23.59 – 27.00)	27.12 (24.01 – 30.24)	0.86	0.76	0.61	–	–	–
Carbohydrates (% of energy)										
Tertile 1 (<47.317)	25/53/26	26.06 (21.56 – 30.56)	25.19 (22.15 – 28.23)	27.50 (22.27 – 32.73)	0.66	0.86	0.83	0.16	0.26	0.24
Tertile 2 (47.317 – 53.984)	29/64/15	24.89 (20.90 – 28.89)	24.23 (21.48 – 26.99)	26.52 (20.02 – 33.02)	0.64	0.45	0.49			
Tertile 3 (>53.984)	31/48/17	31.03 (26.32 – 35.75)	26.84 (23.56 – 30.11)	27.08 (21.54 – 32.63)	0.27	0.32	0.26			
Fat (% of energy)										
Tertile 1 (<35.131)	31/45/16	29.23 (24.04 – 34.42)	24.22 (20.85 – 27.59)	29.90 (23.39 – 36.41)	0.86	0.89	0.98	0.61	0.63	0.49
Tertile 2 (35.131 – 41.333)	27/67/17	24.87 (20.81 – 28.94)	26.66 (23.90 – 29.42)	21.50 (17.28 – 25.72)	0.31	0.46	0.40			
Tertile 3 (>41.333)	27/53/25	28.06 (24.19 – 31.94)	24.49 (21.54 – 27.44)	29.17 (23.91 – 34.43)	0.72	0.84	0.84			
Protein (% of energy)										
Tertile 1 (<11.700)	39/57/25	29.44 (26.15 – 32.73)	25.54 (22.92 – 28.17)	25.48 (20.43 – 30.54)	0.14	0.09	0.07	0.29	0.20	0.18
Tertile 2 (11.700 – 13.985)	27/54/15	23.92 (20.17 – 27.67)	24.58 (21.47 – 27.69)	28.97 (22.87 – 35.06)	0.15	0.09	0.09			
Tertile 3 (>13.985)	19/54/18	28.49 (20.65 – 36.33)	25.76 (22.45 – 29.06)	27.87 (21.77 – 33.97)	0.89	0.52	0.39			
Saturated fat (% of energy)										
Tertile 1 (<8.595)	26/42/17	27.69 (24.00 – 31.38)	27.09 (23.17 – 31.01)	28.46 (21.68 – 35.24)	0.84	0.65	0.68	0.60	0.53	0.59
Tertile 2 (8.595 – 11.034)	28/65/11	26.96 (22.11 – 31.82)	25.12 (22.31 – 27.93)	28.28 (19.90 – 36.66)	0.75	0.98	0.87			
Tertile 3 (>11.034)	31/58/30	37.75 (22.93 – 32.58)	24.20 (21.68 – 26.72)	25.94 (21.81 – 30.08)	0.52	0.37	0.35			
MUFA (% of energy)										
Tertile 1 (<11.890)	29/44/19	30.61 (25.38 – 35.84)	23.63 (20.40 – 26.86)	29.84 (24.43 – 35.25)	0.83	0.94	0.80	0.54	0.58	0.48
Tertile 2 (11.890 – 14.571)	27/65/18	24.94 (20.52 – 29.36)	26.34 (23.75 – 28.92)	23.56 (17.69 – 29.42)	0.68	0.84	0.92			
Tertile 3 (>14.571)	29/56/21	26.70 (23.09 – 30.31)	25.40 (22.15 – 28.66)	27.73 (22.18 – 33.28)	0.76	0.98	0.87			
PUFA (% of energy)										
Tertile 1 (<8.426)	36/51/21	28.46 (23.97 – 32.94)	24.86 (21.27 – 28.45)	26.59 (20.92 – 32.26)	0.60	0.87	0.73	0.30	0.39	0.31
Tertile 2 (8.426 – 10.930)	26/66/16	27.75 (22.65 – 32.86)	24.83 (22.38 – 27.29)	26.79 (21.53 – 32.06)	0.78	0.42	0.20			
Tertile 3 (>10.930)	23/48/21	25.63 (22.33 – 28.92)	26.40 (23.27 – 29.52)	27.91 (21.97 – 33.84)	0.48	0.49	0.48			

¹*p*-value crude²*p*-value adjusted for age and sex³*p*-value adjusted for age and sex and physical activity

Table S4. Interaction between daily dietary intake and *TCF7L2* (*rs7903146*) genotypes on **body fat** (kg)

	No. of subjects by genotype (CC/CT/TT)	CC Mean (95% CI) (N = 134)	CT Mean (95% CI) (N = 130)	TT Mean (95% CI) (N = 43)	P- trend ¹	P- trend ²	P- trend ³	P- interaction ¹	P- interaction ²	P- interaction ³
Among ALL	134/130/43	26.27 (24.27 – 28.28)	26.15 (24.26 – 28.05)	26.32 (22.54 – 30.10)	0.98	0.94	0.95	–	–	–
Carbohydrates (% of energy)										
Tertile 1 (<47.317)	43/46/15	27.53 (23.83 – 31.22)	25.67 (22.52 – 28.82)	22.47 (15.77 – 29.17)	0.14	0.14	0.13	0.19	0.20	0.20
Tertile 2 (47.317 – 53.984)	44/49/15	22.81 (19.39 – 26.23)	26.20 (23.19 – 29.20)	25.57 (19.32 – 31.82)	0.40	0.31	0.26			
Tertile 3 (>53.984)	47/35/13	28.37 (25.02 – 31.73)	26.73 (22.57 – 30.90)	31.64 (24.00 – 39.28)	0.38	0.45	0.47			
Fat (% of energy)										
Tertile 1 (<35.131)	47/28/16	27.06 (23.24 – 30.87)	27.62 (22.19 – 33.05)	24.95 (20.03 – 29.87)	0.57	0.64	0.64	0.33	0.38	0.36
Tertile 2 (35.131 – 41.333)	46/51/14	22.98 (19.97 – 25.99)	26.03 (23.41 – 28.65)	31.34 (22.69 – 39.98)	0.010	0.031	0.023			
Tertile 3 (>41.333)	41/51/13	29.07 (25.52 – 32.62)	25.47 (22.48 – 28.46)	22.61 (15.64 – 29.58)	0.07	0.11	0.09			
Protein (% of energy)										
Tertile 1 (<11.700)	53/50/18	27.16 (23.90 – 30.42)	26.47 (23.68 – 29.27)	26.56 (22.09 – 31.04)	0.84	0.80	0.76	0.76	0.64	0.59
Tertile 2 (11.700 – 13.985)	45/36/14	25.50 (22.11 – 28.88)	23.68 (20.65 – 26.70)	26.98 (18.74 – 35.22)	0.66	0.62	0.61			
Tertile 3 (>13.985)	36/44/11	25.94 (21.76 – 30.12)	27.82 (23.81 – 31.82)	25.09 (14.90 – 35.28)	0.85	0.94	0.89			
Saturated fat (% of energy)										
Tertile 1 (<8.595)	40/33/11	26.54 (22.93 – 30.15)	26.82 (22.73 – 30.91)	33.15 (24.26 – 42.05)	0.10	0.10	0.11	0.030	0.012	0.013
Tertile 2 (8.595 – 11.034)	47/42/15	24.43 (21.16 – 27.71)	28.21 (24.58 – 31.83)	24.37 (16.91 – 31.82)	0.99	0.52	0.50			
Tertile 3 (>11.034)	47/55/17	27.89 (24.18 – 31.59)	24.18 (21.54 – 26.82)	23.62 (18.87 – 28.38)	0.17	0.10	0.10			
MUFA (% of energy)										
Tertile 1 (<11.890)	43/37/12	27.77 (24.05 – 31.49)	26.79 (22.41 – 31.17)	25.75 (19.51 – 31.99)	0.62	0.60	0.55	0.91	0.91	0.84
Tertile 2 (11.890 – 14.571)	54/39/16	24.64 (21.46 – 27.82)	25.18 (22.28 – 28.08)	29.14 (22.72 – 35.56)	0.15	0.11	0.07			
Tertile 3 (>14.571)	37/54/15	26.92 (23.11 – 30.72)	26.42 (23.51 – 29.33)	23.77 (15.82 – 31.72)	0.37	0.60	0.55			
PUFA (% of energy)										
Tertile 1 (<8.426)	49/41/18	26.93 (23.20 – 30.67)	26.18 (22.16 – 30.19)	25.43 (18.80 – 32.06)	0.67	0.81	0.76	0.97	0.71	0.74
Tertile 2 (8.426 – 10.930)	49/43/15	24.33 (21.43 – 27.24)	27.06 (23.64 – 30.49)	26.88 (20.59 – 33.17)	0.42	0.32	0.31			
Tertile 3 (>10.930)	36/46/10	28.02 (24.00 – 32.04)	25.28 (22.63 – 27.94)	27.09 (17.87 – 36.31)	0.81	0.49	0.50			

¹p-value crude

²p-value adjusted for age and sex

³p-value adjusted for age and sex and physical activity

Table S5. Interaction between daily dietary intake and *FTO* (*rs9939609*) genotypes on **body fat** (kg)

	No. of subjects by genotype (<i>TT/TA/AA</i>)	<i>TT</i> Mean (95% CI) (<i>N</i> = 91)	<i>TA</i> Mean (95% CI) (<i>N</i> = 158)	<i>AA</i> Mean (95% CI) (<i>N</i> = 58)	<i>P</i> - trend ¹	<i>P</i> - trend ²	<i>P</i> - trend ³	<i>P</i> - interaction ¹	<i>P</i> - interaction ²	<i>P</i> - interaction ³
Among ALL	91/158/58	27.47 (25.07 – 29.88)	24.91 (23.19 – 26.62)	28.28 (25.12 – 31.43)	0.67	0.86	0.97			
Carbohydrates (% of energy)										
Tertile 1 (<47.317)	30/48/25	26.08 (22.23 – 29.93)	24.78 (21.65 – 27.90)	28.89 (23.36 – 34.43)	0.36	0.71	0.71	0.14	0.21	0.20
Tertile 2 (47.317 – 53.984)	29/64/15	24.80 (20.68 – 28.92)	24.13 (21.42 – 26.83)	27.17 (20.62 – 33.71)	0.50	0.53	0.53			
Tertile 3 (>53.984)	32/46/18	31.21 (26.65 – 35.77)	26.12 (22.75 – 29.50)	28.34 (23.08 – 33.60)	0.41	0.37	0.37			
Fat (% of energy)										
Tertile 1 (<35.131)	32/43/17	29.42 (24.39 – 34.45)	24.17 (20.73 – 27.60)	29.05 (22.58 – 35.52)	0.92	0.77	0.77	0.32	0.32	0.24
Tertile 2 (35.131 – 41.333)	30/63/18	25.46 (21.61 – 29.30)	25.58 (22.71 – 28.45)	24.89 (20.20 – 29.58)	0.86	0.71	0.71			
Tertile 3 (>41.333)	29/52/23	27.41 (23.70 – 31.13)	24.70 (21.84 – 27.57)	30.36 (24.65 – 36.07)	0.33	0.40	0.40			
Protein (% of energy)										
Tertile 1 (<11.700)	39/58/23	29.49 (26.13 – 32.84)	24.81 (22.30 – 27.32)	28.05 (22.83 – 33.27)	0.60	0.30	0.30	0.52	0.32	0.31
Tertile 2 (11.700 – 13.985)	31/50/15	23.56 (20.06 – 27.06)	25.36 (22.10 – 28.61)	27.30 (20.86 – 33.74)	0.28	0.25	0.25			
Tertile 3 (>13.985)	21/50/20	29.52 (22.69 – 36.35)	24.57 (21.14 – 28.00)	29.27 (23.32 – 35.21)	0.95	0.57	0.57			
Saturated fat (% of energy)										
Tertile 1 (<8.595)	26/42/17	28.33 (24.67 – 31.99)	25.90 (21.97 – 29.83)	30.43 (23.97 – 36.89)	0.57	0.60	0.60	0.50	0.49	0.54
Tertile 2 (8.595 – 11.034)	29/65/10	27.11 (22.38 – 31.84)	24.44 (21.77 – 27.11)	32.38 (22.22 – 42.54)	0.22	0.21	0.21			
Tertile 3 (>11.034)	36/51/31	27.15 (22.86 – 31.44)	24.68 (21.94 – 27.42)	25.77 (21.86 – 29.68)	0.61	0.35	0.35			
MUFA (% of energy)										
Tertile 1 (<11.890)	30/41/21	30.37 (25.30 – 35.44)	23.65 (20.28 – 27.02)	29.23 (23.99 – 34.46)	0.74	0.61	0.61	0.36	0.42	0.37
Tertile 2 (11.890 – 14.571)	29/66/15	25.12 (20.83 – 29.41)	25.84 (23.26 – 28.41)	25.03 (18.40 – 31.67)	0.98	0.86	0.86			
Tertile 3 (>14.571)	32/51/22	26.90 (23.53 – 30.26)	24.72 (21.40 – 28.03)	29.58 (24.00 – 35.16)	0.39	0.79	0.79			
PUFA (% of energy)										
Tertile 1 (<8.426)	39/47/21	28.22 (23.96 – 32.48)	25.16 (21.46 – 28.85)	26.69 (20.90 – 32.47)	0.66	0.71	0.71	0.31	0.38	0.37
Tertile 2 (8.426 – 10.930)	29/61/18	27.36 (22.62 – 32.10)	24.03 (21.57 – 26.49)	29.46 (24.42 – 34.51)	0.51	0.68	0.68			
Tertile 3 (>10.930)	23/50/19	26.35 (23.35 – 29.36)	25.74 (22.64 – 28.85)	28.91 (22.56 – 35.27)	0.44	0.47	0.47			

¹*p*-value crude²*p*-value adjusted for age and sex³*p*-value adjusted for age, sex and physical activity

Table S6. Interaction between daily dietary intake and *FTO* (*rs1558902*) genotypes on muscle mass (kg)

	No. of subjects by genotype (<i>TT/TA/AA</i>)	<i>TT</i> Mean (95% CI) (<i>N</i> = 85)	<i>TA</i> Mean (95% CI) (<i>N</i> = 165)	<i>AA</i> Mean (95% CI) (<i>N</i> = 58)	<i>P</i> -trend ¹	<i>P</i> - trend ²	<i>P</i> - trend ³	<i>P</i> - interaction ¹	<i>P</i> - interaction ²	<i>P</i> - interaction ³
Among ALL	85/165/58	27.41 (25.96 – 28.85)	26.35 (25.40 – 27.30)	25.21 (23.57 – 26.85)	0.043	0.06	0.039	–	–	–
Carbohydrates (% of energy)										
Tertile 1 (<47.317)	25/53/26	29.48 (26.44 – 32.52)	27.79 (26.21 – 29.37)	26.08 (23.67 – 28.48)	0.05	0.14	0.13	0.55	0.97	1.00
Tertile 2 (47.317 – 53.984)	29/64/15	26.98 (24.50 – 29.46)	26.01 (24.33 – 27.69)	24.60 (21.04 – 28.16)	0.26	0.29	0.25			
Tertile 3 (>53.984)	31/48/17	26.14 (23.89 – 28.38)	25.20 (23.53 – 26.87)	24.42 (20.95 – 27.90)	0.35	0.26	0.22			
Fat (% of energy)										
Tertile 1 (<35.131)	31/45/16	27.39 (25.28 – 29.49)	26.87 (24.91 – 28.82)	25.62 (21.43 – 29.81)	0.38	0.69	0.63	0.83	0.96	0.80
Tertile 2 (35.131 – 41.333)	27/67/17	28.56 (25.37 – 31.75)	26.45 (24.91 – 27.99)	24.90 (21.77 – 28.03)	0.08	0.020	0.016			
Tertile 3 (>41.333)	27/53/25	26.27 (23.79 – 28.76)	25.78 (24.17 – 27.38)	25.16 (22.93 – 27.39)	0.49	0.61	0.60			
Protein (% of energy)										
Tertile 1 (<11.700)	39/57/25	27.52 (25.37 – 29.67)	24.80 (23.28 – 26.31)	24.51 (21.99 – 27.03)	0.06	0.13	0.08	0.86	0.72	0.75
Tertile 2 (11.700 – 13.985)	27/54/15	25.17 (22.95 – 27.39)	26.11 (24.40 – 27.82)	25.83 (21.97 – 29.68)	0.74	0.92	0.92			
Tertile 3 (>13.985)	19/54/18	30.36 (26.79 – 33.92)	28.22 (26.52 – 29.92)	25.67 (22.63 – 28.71)	0.029	0.07	0.05			
Saturated fat (% of energy)										
Tertile 1 (<8.595)	26/42/17	28.10 (25.17 – 31.04)	26.36 (24.53 – 28.19)	26.42 (22.32 – 30.51)	0.43	0.59	0.62	0.60	0.39	0.44
Tertile 2 (8.595 – 11.034)	28/65/11	25.36 (23.25 – 27.48)	25.76 (24.25 – 27.26)	22.86 (20.33 – 25.40)	0.22	0.37	0.25			
Tertile 3 (>11.034)	31/58/30	28.66 (26.09 – 31.24)	27.00 (25.28 – 28.73)	25.39 (23.21 – 27.56)	0.05	0.039	0.037			
MUFA (% of energy)										
Tertile 1 (<11.890)	29/44/19	27.82 (25.47 – 30.17)	25.98 (24.09 – 27.86)	24.65 (21.01 – 28.28)	0.10	0.26	0.20	0.65	0.65	0.55
Tertile 2 (11.890 – 14.571)	27/65/18	27.63 (24.81 – 30.45)	27.12 (25.52 – 28.71)	26.27 (23.33 – 29.21)	0.50	0.28	0.35			
Tertile 3 (>14.571)	29/56/21	26.79 (24.12 – 29.45)	25.75 (24.17 – 27.33)	24.81 (22.35 – 27.26)	0.26	0.38	0.30			
PUFA (% of energy)										
Tertile 1 (<8.426)	36/51/21	27.63 (25.56 – 29.70)	26.55 (24.67 – 28.43)	25.64 (22.23 – 29.06)	0.28	0.20	0.17	0.48	0.25	0.20
Tertile 2 (8.426 – 10.930)	26/66/16	29.38 (26.20 – 32.55)	26.95 (25.38 – 28.52)	24.80 (22.37 – 27.23)	0.029	0.040	0.017			
Tertile 3 (>10.930)	23/48/21	24.83 (22.44 – 27.21)	25.31 (23.76 – 26.85)	25.09 (22.24 – 27.94)	0.94	0.69	0.59			

¹*p*-value crude

²*p*-value adjusted for age and sex

³*p*-value adjusted for age and sex and physical activity

Table S7. Interaction between daily dietary intake and *TCF7L2* (*rs7903146*) genotypes on muscle mass (kg)

	No. of subjects by genotype (CC/CT/TT)	CC Mean (95% CI) (N = 134)	CT Mean (95% CI) (N = 130)	TT Mean (95% CI) (N = 43)	P-trend ¹	P-trend ²	P-trend ³	P- interaction ¹	P- interaction ²	P- interaction ³
Among ALL	134/130/43	26.32 (25.27 – 27.37)	26.17 (25.07 – 27.27)	27.25 (25.07 – 29.43)	0.41	0.59	0.60	–	–	–
Carbohydrates (% of energy)										
Tertile 1 (<47.317)	43/46/15	29.03 (27.12 – 30.94)	26.67 (24.84 – 28.49)	27.54 (23.94 – 31.14)	0.43	0.18	0.17	0.23	0.05	0.05
Tertile 2 (47.317 – 53.984)	44/49/15	25.26 (26.56 – 26.97)	26.01 (24.12 – 27.90)	28.69 (23.77 – 33.61)	0.08	0.21	0.18			
Tertile 3 (>53.984)	47/35/13	24.84 (23.12 – 26.56)	25.75 (23.58 – 27.93)	25.26 (22.10 – 28.43)	0.82	0.41	0.42			
Fat (% of energy)										
Tertile 1 (<35.131)	47/28/16	25.72 (23.95 – 27.49)	27.55 (24.74 – 30.35)	28.13 (25.03 – 31.23)	0.20	0.59	0.59	0.19	0.08	0.07
Tertile 2 (35.131 – 41.333)	46/51/14	27.06 (25.06 – 29.06)	26.24 (24.49 – 27.99)	27.39 (22.19 – 32.60)	0.87	0.08	0.07			
Tertile 3 (>41.333)	41/51/13	26.19 (24.42 – 27.95)	25.35 (23.70 – 27.00)	26.02 (22.07 – 29.96)	0.93	0.24	0.20			
Protein (% of energy)										
Tertile 1 (<11.700)	53/50/18	26.36 (24.72 – 28.01)	24.75 (23.07 – 26.43)	25.79 (22.06 – 29.53)	0.74	0.95	0.99	0.29	0.78	0.73
Tertile 2 (11.700 – 13.985)	45/36/14	24.57 (22.95 – 26.19)	26.91 (24.64 – 29.17)	26.08 (22.56 – 29.60)	0.41	0.99	0.96			
Tertile 3 (>13.985)	36/44/11	28.45 (26.18 – 30.72)	27.18 (25.26 – 29.10)	31.13 (26.64 – 35.61)	0.24	0.33	0.32			
Saturated fat (% of energy)										
Tertile 1 (<8.595)	40/33/11	25.86 (23.90 – 27.81)	27.85 (25.36 – 30.35)	26.89 (21.84 – 31.94)	0.65	0.21	0.20	0.06	0.029	0.032
Tertile 2 (8.595 – 11.034)	47/42/15	24.64 (23.27 – 26.01)	24.87 (23.06 – 26.68)	28.89 (24.74 – 33.05)	0.011	0.13	0.11			
Tertile 3 (>11.034)	47/55/17	28.40 (26.37 – 30.44)	26.16 (24.50 – 27.81)	26.04 (22.66 – 29.41)	0.20	0.20	0.21			
MUFA (% of energy)										
Tertile 1 (<11.890)	43/37/12	25.73 (23.88 – 27.57)	27.21 (24.90 – 29.53)	25.42 (20.86 – 29.97)	0.89	0.81	0.84	0.86	0.38	0.42
Tertile 2 (11.890 – 14.571)	54/39/16	27.06 (25.32 – 28.79)	26.04 (24.14 – 27.94)	29.19 (25.06 – 33.33)	0.24	0.37	0.22			
Tertile 3 (>14.571)	37/54/15	25.95 (23.93 – 27.96)	25.56 (23.86 – 27.26)	26.65 (23.22 – 30.07)	0.71	0.69	0.65			
PUFA (% of energy)										
Tertile 1 (<8.426)	49/41/18	26.57 (24.67 – 28.47)	26.93 (24.70 – 29.17)	26.72 (23.72 – 29.72)	0.94	0.36	0.35	0.40	0.94	0.97
Tertile 2 (8.426 – 10.930)	49/43/15	26.37 (24.63 – 28.11)	26.70 (24.73 – 28.66)	30.77 (26.34 – 35.20)	0.023	0.027	0.026			
Tertile 3 (>10.930)	36/46/10	25.92 (23.98 – 27.86)	25.01 (23.38 – 26.63)	22.92 (19.42 – 26.42)	0.13	0.41	0.46			

¹p-value crude

²p-value adjusted for age and sex

³p-value adjusted for age and sex and physical activity

Table S8. Interaction between daily dietary intake and *FTO* (*rs9939609*) genotypes on muscle mass (kg)

	No. of subjects by genotype (TT/TA/AA)	TT Mean (95% CI) (N = 91)	TA Mean (95% CI) (N = 158)	AA Mean (95% CI) (N = 58)	P-trend ¹	P-trend ²	P-trend ³	P- interaction ¹	P- interaction ²	P- interaction ³
Among ALL	91/158/58	27.41 (26.02 – 28.80)	26.22 (25.24 – 27.20)	25.40 (23.75 – 27.05)	0.06	0.11	0.07	–	–	–
Carbohydrates (% of energy)										
Tertile 1 (<47.317)	30/48/25	29.14 (26.37 – 31.92)	27.39 (25.76 – 29.02)	26.79 (24.31 – 29.28)	0.17	0.38	0.38	0.59	0.88	0.89
Tertile 2 (47.317 – 53.984)	29/64/15	27.89 (25.44 – 30.34)	25.60 (23.93 – 27.27)	24.60 (21.10 – 28.10)	0.12	0.036	0.036			
Tertile 3 (>53.984)	32/46/18	25.35 (23.30 – 27.40)	25.86 (24.04 – 27.67)	24.14 (20.89 – 27.39)	0.50	0.63	0.63			
Fat (% of energy)										
Tertile 1 (<35.131)	32/43/17	27.17 (25.09 – 29.26)	27.03 (25.00 – 29.06)	25.65 (21.72 – 29.58)	0.44	0.83	0.83	0.84	0.99	0.88
Tertile 2 (35.131 – 41.333)	30/63/18	28.55 (25.66 – 31.44)	26.42 (24.80 – 28.04)	24.75 (21.83 – 27.67)	0.06	0.014	0.014			
Tertile 3 (>41.333)	29/52/23	26.49 (24.04 – 28.94)	25.30 (23.74 – 26.86)	25.73 (23.27 – 28.19)	0.64	0.75	0.75			
Protein (% of energy)										
Tertile 1 (<11.700)	39/58/23	27.00 (24.90 – 29.10)	25.22 (23.65 – 26.80)	24.11 (21.49 – 26.74)	0.08	0.27	0.27	0.94	0.49	0.50
Tertile 2 (11.700 – 13.985)	31/50/15	26.27 (24.08 – 28.46)	25.50 (23.76 – 27.25)	25.83 (22.04 – 29.62)	0.82	0.71	0.71			
Tertile 3 (>13.985)	21/50/20	29.86 (26.40 – 33.32)	28.09 (26.32 – 29.86)	26.56 (23.70 – 29.42)	0.11	0.07	0.07			
Saturated fat (% of energy)										
Tertile 1 (<8.595)	26/42/17	28.25 (25.40 – 31.11)	26.60 (24.74 – 28.46)	25.59 (21.48 – 29.69)	0.21	0.90	0.90	0.73	0.32	0.36
Tertile 2 (8.595 – 11.034)	29/65/10	25.37 (23.36 – 27.39)	25.25 (23.74 – 26.76)	25.88 (22.31 – 29.45)	0.81	0.64	0.64			
Tertile 3 (>11.034)	36/51/31	28.44 (26.03 – 30.86)	27.14 (25.31 – 26.97)	25.15 (23.03 – 27.26)	0.041	0.035	0.035			
MUFA (% of energy)										
Tertile 1 (<11.890)	30/41/21	27.55 (25.23 – 29.88)	26.02 (24.02 – 28.01)	24.98 (21.68 – 28.29)	0.17	0.13	0.13	0.81	0.56	0.52
Tertile 2 (11.890 – 14.571)	29/66/15	27.67 (24.94 – 30.39)	27.04 (25.48 – 28.59)	26.31 (22.96 – 29.66)	0.51	0.75	0.75			
Tertile 3 (>14.571)	32/51/22	27.04 (24.60 – 29.49)	25.32 (23.65 – 26.99)	25.19 (22.70 – 27.67)	0.28	0.37	0.37			
PUFA (% of energy)										
Tertile 1 (<8.426)	39/47/21	27.62 (25.57 – 29.67)	26.40 (24.45 – 28.35)	25.73 (22.32 – 29.14)	0.30	0.24	0.24	0.66	0.40	0.38
Tertile 2 (8.426 – 10.930)	29/61/18	28.43 (25.56 – 31.31)	27.29 (25.62 – 28.96)	24.99 (22.49 – 27.48)	0.22	0.08	0.08			
Tertile 3 (>10.930)	23/50/19	25.76 (23.17 – 28.34)	24.74 (23.28 – 26.20)	25.43 (22.46 – 28.41)	0.85	0.95	0.95			

¹p-value crude

²p-value adjusted for age and sex

³p-value adjusted for age, sex and physical activity

Table S9. Interaction between **physical activity** and the three SNPs on **BMI (kg/m²)**, **body fat (kg)**, and **muscle mass (kg)**

	Mean (95% CI)	Mean (95% CI)	Mean (95% CI)	P-trend ¹	P-trend ²	P-interaction ¹	P-interaction ²
<i>FTO (rs1558902)</i>	<i>TT</i>	<i>TA</i>	<i>AA</i>				
	BMI (kg/m²)						
Low level of exercise	29.29 (27.06 – 31.52)	28.69 (27.27 – 30.11)	27.82 (25.72 – 29.93)	0.33	0.29	0.47	0.36
Moderate level of exercise	28.94 (27.33 – 30.54)	27.05 (25.78 – 28.32)	28.29 (25.79 – 30.79)	0.65	0.87		
High level of exercise	26.73 (24.17 – 29.29)	25.26 (23.76 – 26.76)	27.82 (21.99 – 33.65)	0.61	0.38		
	Body fat (kg)						
Low level of exercise	28.80 (24.51 – 33.10)	28.01 (25.21 – 30.82)	27.46 (23.44 – 31.49)	0.65	0.49	0.94	0.72
Moderate level of exercise	27.42 (23.96 – 30.88)	24.99 (22.34 – 27.64)	26.89 (21.73 – 32.05)	0.86	0.84		
High level of exercise	25.52 (19.64 – 31.40)	20.60 (17.41 – 23.80)	26.55 (14.92 – 38.19)	0.82	0.63		
	Muscle mass (kg)						
Low level of exercise	27.39 (25.17 – 29.62)	26.68 (25.23 – 28.13)	24.52 (22.03 – 27.01)	0.07	0.07	0.48	0.79
Moderate level of exercise	28.26 (25.54 – 30.99)	26.11 (24.39 – 27.83)	26.26 (22.96 – 29.56)	0.32	0.69		
High level of exercise	26.42 (23.39 – 29.45)	26.06 (24.06 – 28.05)	25.47 (22.14 – 28.81)	0.68	0.43		
<i>TCF7L2 (rs7903146)</i>	<i>CC</i>	<i>CT</i>	<i>TT</i>				
	Body mass index (BMI) (kg/m²)						
Low level of exercise	28.87 (27.08 – 30.67)	28.54 (27.17 – 29.91)	28.46 (25.05 – 31.86)	0.80	0.84	0.38	0.47
Moderate level of exercise	27.17 (25.88 – 28.46)	28.51 (26.83 – 30.20)	28.07 (25.56 – 30.57)	0.52	0.65		
High level of exercise	26.17 (24.15 – 28.20)	25.08 (23.18 – 26.97)	28.61 (23.54 – 33.68)	0.23	0.33		
	Body fat (kg)						
Low level of exercise	26.94 (25.49 – 32.38)	27.64 (24.91 – 30.38)	27.42 (21.11 – 33.73)	0.64	0.67	0.69	0.64
Moderate level of exercise	24.78 (21.99 – 27.57)	28.07 (24.99 – 31.16)	24.86 (18.94 – 30.79)	0.98	0.99		
High level of exercise	24.42 (19.78 – 29.07)	20.20 (16.14 – 24.27)	26.38 (16.44 – 36.32)	0.65	0.58		
	Muscle mass (kg)						
Low level of exercise	26.51 (24.75 – 28.27)	26.54 (24.92 – 28.16)	25.48 (22.56 – 28.40)	0.56	0.33	0.16	0.24
Moderate level of exercise	26.90 (25.25 – 28.56)	25.35 (23.33 – 27.38)	28.64 (23.18 – 34.09)	0.38	0.40		
High level of exercise	25.16 (22.86 – 27.45)	26.28 (23.91 – 28.64)	28.38 (24.91 – 31.85)	0.14	0.19		
<i>FTO (rs9939609)</i>	<i>TT</i>	<i>TA</i>	<i>AA</i>				
	Body mass index (BMI) (kg/m²)						
Low level of exercise	29.53 (27.21 – 31.85)	28.37 (27.00 – 29.73)	28.40 (26.16 – 30.63)	0.46	0.46	0.48	0.48
Moderate level of exercise	28.76 (27.37 – 30.14)	26.51 (25.13 – 27.90)	29.22 (26.89 – 31.56)	0.72	0.72		
High level of exercise	26.93 (24.45 – 29.41)	25.09 (23.56 – 26.63)	28.34 (22.74 – 33.93)	0.49	0.41		
	Body fat (kg)						
Low level of exercise	28.98 (24.40 – 33.55)	27.60 (24.96 – 30.24)	28.37 (23.99 – 31.76)	0.84	0.82	0.94	0.89
Moderate level of exercise	27.11 (24.12 – 30.09)	24.01 (21.09 – 26.93)	29.00 (24.23 – 33.76)	0.49	0.67		
High level of exercise	25.93 (20.25 – 31.62)	20.47 (17.25 – 23.69)	26.85 (15.45 – 38.25)	0.83	0.93		
	Muscle mass (kg)						
Low level of exercise	27.60 (25.32 – 29.89)	26.24 (24.82 – 27.66)	25.39 (22.77 – 28.02)	0.17	0.04	0.88	0.78
Moderate level of exercise	27.98 (25.60 – 30.37)	25.94 (24.05 – 27.82)	26.40 (23.35 – 29.45)	0.40	0.94		
High level of exercise	26.33 (23.44 – 29.23)	26.54 (24.47 – 28.62)	23.79 (20.63 – 26.96)	0.26	0.48		

¹p-value crude ²p-value adjusted for age and sex