

Online Supporting Material

Supplemental Table 1: Participant characteristics at screening¹

	Screening value
N, <i>M/F</i>	47/111
Age, <i>y</i>	38 ± 12
Weight, <i>kg</i>	94.8 ± 15.0
BMI, <i>kg/m²</i>	33.9 ± 3.8
Body fat, %	41.9 ± 6.9
Waist circumference, <i>cm</i>	104 ± 11
SBP, <i>mm Hg</i>	119 ± 13
DBP, <i>mm Hg</i>	71 ± 10
TG, <i>mmol/L</i>	1.65 ± 0.87
TC, <i>mmol/L</i>	4.77 ± 0.85
LDL-C, <i>mmol/L</i>	2.87 ± 0.70
HDL-C, <i>mmol/L</i>	0.50 ± 0.11
Glucose, <i>mmol/L</i>	5.23 ± 0.46
Insulin, <i>pmol/L</i>	124 ± 46
HOMA-IR	4.2 ± 1.7

¹Values are mean ± SD.

Supplemental Table 2. Body weight, waist circumference, glucose metabolism, and plasma lipid and lipoprotein concentrations in overweight and obese adults after consuming 4-wk of the baseline diet, prior to the start of the experimental diets¹

	High Protein			Moderate Protein		P value ²
	Control	High SF	Low SF	High SF	Low SF	
Sample, M/F	8/23	8/24	16/20	5/24	10/20	
Weight, kg	90.4 ± 15.4	92.4 ± 19.3	98.4 ± 15.2	95.8 ± 11.1	95.4 ± 11.7	0.35
BMI, kg/m ²	32.9 ± 3.6	33.1 ± 4.5	33.7 ± 3.8	35.0 ± 3.9	34.0 ± 3.0	0.27
Body fat, %	42.3 ± 6.4	42.5 ± 7.2	40.2 ± 7.24	44.6 ± 6.4	41.1 ± 7.6	0.68
Waist, cm	100 ± 10	102 ± 13	106 ± 11	103 ± 10	103 ± 8	0.53
Glucose, mmol/L	4.72 ± 0.41	4.81 ± 0.53	4.82 ± 0.67	4.69 ± 0.57	5.09 ± 0.65	0.09
Insulin ³ , pmol/L	89.6 ± 43.8	90.3 ± 36.8	84.7 ± 38.2	94.5 ± 34.7	97.9 ± 51.4	0.70
S _I ³ , x 10 ⁻⁵ min ⁻¹ per pmol/L	2.4 ± 1.2	3.1 ± 1.6	3.2 ± 1.9	2.7 ± 2.1	3.3 ± 2.5	0.16
AIRg ³ , pmol/L x 10 min	637 ± 570	515 ± 270	515 ± 375	701 ± 413	413 ± 316	0.13
DI ³	1310 ± 899	1625 ± 1902	1266 ± 782	1355 ± 1054	1067 ± 748	0.47
MCRi, L/min	6.1 ± 2.5	6.7 ± 2.5	7.4 ± 4.1	5.9 ± 2.7	6.0 ± 2.4	0.16
TG ³ , mmol/L	1.65 ± 0.73	1.47 ± 0.75	1.70 ± 1.28	1.50 ± 0.67	1.74 ± 0.85	0.76
TC, mmol/L	4.45 ± 0.78 ^{ab}	4.17 ± 0.78 ^{ab}	4.07 ± 0.75 ^b	4.27 ± 0.78 ^{ab}	4.66 ± 0.91 ^a	0.03
LDL-C, mmol/L	2.75 ± 0.62	2.51 ± 0.70	2.46 ± 0.60	2.56 ± 0.62	2.87 ± 0.75	0.08
HDLC, mmol/L	0.96 ± 0.20	0.99 ± 0.22	0.87 ± 0.22	1.01 ± 0.21	1.00 ± 0.20	0.15
ApoB, mmol/L	0.79 ± 0.14	0.74 ± 0.15	0.75 ± 0.13	0.75 ± 0.15	0.83 ± 0.17	0.08
ApoAI, mmol/L	1.00 ± 0.14	1.01 ± 0.14	0.94 ± 0.15	1.02 ± 0.13	1.03 ± 0.13	0.16
Lipoprotein(a) ³ , μmol/L	4.43 ± 4.37	4.73 ± 5.19	6.10 ± 5.58	5.20 ± 4.91	4.96 ± 6.92	0.70
Total LDL ³ , nmol/L	1463 ± 362	1330 ± 364	1308 ± 375	1303 ± 411	1501 ± 468	0.12
Large LDL ³ , nmol/L	623 ± 206	600 ± 220	605 ± 247	637 ± 262	632 ± 202	0.90
Medium LDL ³ , nmol/L	303 ± 117	271 ± 103	264 ± 122	270 ± 110	323 ± 125	0.12
Small LDL ³ , nmol/L	290 ± 165	252 ± 156	234 ± 143	225 ± 161	321 ± 203	0.13
Very small LDL ³ , nmol/L	248 ± 176	207 ± 140	205 ± 151	171 ± 93	225 ± 135	0.27
LDL peak diameter, nm	21.7 ± 0.6	21.8 ± 0.6	21.8 ± 0.7	21.9 ± 0.5	21.7 ± 0.5	0.73

¹Values are mean ± SD. AIRg, acute insulin reponse to glucose; DI, disposition index; MCRi, metabolic clearance rate of insulin; S_I, insulin sensitivity index.

²Calculated from one-way ANCOVA comparing all 5 diets adjusted for sex, where p-value refers to the equality of the groups. Means

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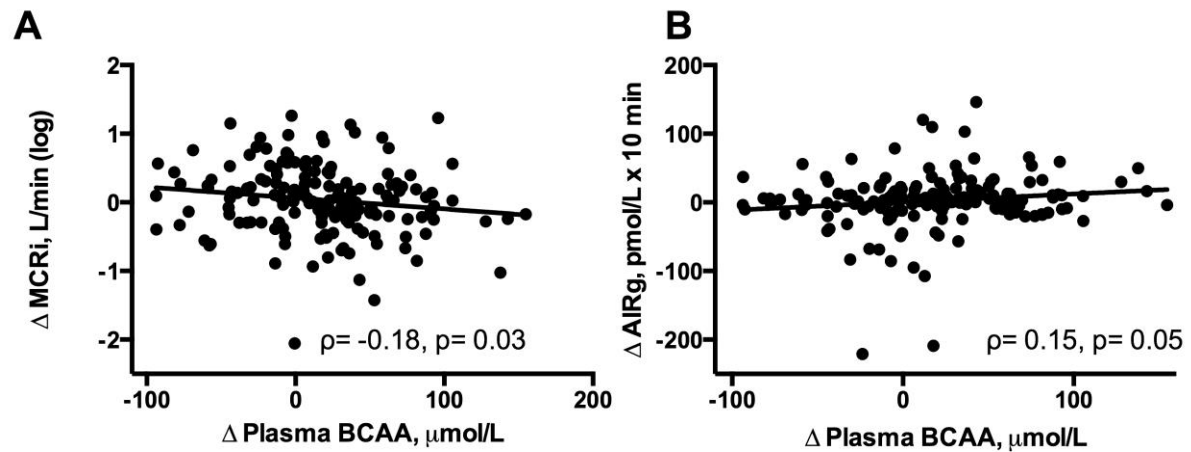
within a row without a common letter are significantly different, $P < 0.05$.

³ANCOVA were repeated using the log-transformed data and the levels of significance was only negligibly improved.

Supplemental Table 3. Changes in plasma apolipoproteins B, AI, and LDL subclass concentrations in overweight and obese adults after 4-wk of consuming diets containing different levels of protein and saturated fat, adjusted for sex¹

	Control	High Protein		Moderate Protein		Mean difference for protein and SF fat effects (95% CI) ²	
		High SF	Low SF	High SF	Low SF	High-Mod Protein	High-Low SF
	N=31	N=35	N=35	N=36	N=36		
ApoB, <i>mmol/L</i>	-0.02 ± 0.01	-0.03 ± 0.01	-0.05 ± 0.01	-0.03 ± 0.02	-0.02 ± 0.01	-0.01 (-0.04, 0.02)	0.00 (-0.03, 0.03)
ApoAI, <i>mmol/L</i>	0.00 ± 0.02	-0.03 ± 0.02	-0.01 ± 0.01	0.02 ± 0.02	0.00 ± 0.02	-0.03 (-0.06, 0.01)	0.00 (-0.03, 0.03)
Lipoprotein(a), <i>μmol/L</i>	-0.03 ± 0.29	0.45 ± 0.29	0.88 ± 0.28	0.48 ± 0.31	0.65 ± 0.30	0.10 (-0.47, 0.68)	-0.30 (-0.88, 0.28)
Total LDL, <i>nmol/L</i>	-8 ± 57	-100 ± 42	-25 ± 47	10 ± 55	-58 ± 59	-55 (-160, 51)	7 (-96, 111)
Large LDL, <i>nmol/L</i>	32 ± 36	17 ± 36	19 ± 34	47 ± 38	-39 ± 37	-14 (-57, 84)	42 (-29, 113)
Medium LDL, <i>nmol/L</i>	8 ± 16	-18 ± 15	-17 ± 15	5 ± 16	-6 ± 16	-17 (-48, 13)	5 (-26, 36)
Small LDL, <i>nmol/L</i>	-18 ± 21	-45 ± 20	-26 ± 19	-15 ± 22	-3 ± 21	-26 (-66, 14)	-16 (-56, 25)
Very small LDL, <i>nmol/L</i>	-28 ± 18	-51 ± 18	-10 ± 17	-19 ± 19	-12 ± 19	-15 (-50, 21)	-24 (-60, 12)
LDL peak diam, <i>nm</i>	0.1 ± 0.1	0.2 ± 0.1	0.1 ± 0.1	0.1 ± 0.1	0.0 ± 0.1	0.1 (-0.0, 0.2)	0.1 (-0.0, 0.2)

¹Values are mean ± SE.
²Mean differences and 95% CI for comparison of high vs. moderate protein and comparison of high vs. low saturated fat.



Supplemental Figure 1: Spearman's correlation between changes in plasma BCAA and MCRi (A) and AIRg (B) in overweight and obese adults after 4-wk of consuming diets containing different levels of protein and saturated fat. N= 158. AIRg, acute insulin response to glucose; BCAA, branched chain amino acids; MCRi, metabolic clearance of insulin.