

Supplementary Table 1. Study 1: Energy, macronutrient, calcium intakes before and after a 12-wk period of energy-restriction*

Parameter	Group	Baseline	Post
Energy [†] (kcal/d)	normal protein	1807±122	1419±46
	higher protein	2234±151	1516±62
Protein [‡] (g/d)	normal protein	75±6	62±2
	higher protein	94±5	114±4
Protein [‡] (% energy)	normal protein	17±1	17±0
	higher protein	17±1	30±0
Fat [†] (% energy)	normal protein	37±2	25±0
	higher protein	35±1	26±0
Carbohydrate [†] (% energy)	normal protein	44±2	58±0
	higher protein	49±2	45±0
Calcium [†] (mg/d)	normal protein	706 ± 68	2030±46
	higher protein	1158±147	2210±55

Notes: *Mean±SEM; normal protein, n=15; higher protein, n=13.

[†]Significant change over time (pre to post), P< 0.0001.

[‡]Significant group-by-time interaction, P< 0.0001.

Supplementary Table 2. Protein sources in Study 1 and Study 2*

	Group	Meat	Dairy	Egg	Legumes	Grains	Other
Study 1 [†]	normal protein	0	36(53)	4(5)	4(6)	14(20)	10(15)
	higher protein	46(40)	42(36)	5(4)	4(4)	9(8)	10(8)
Study 2	CARB	0	20(33)	0	0	17(28)	23(38)
	CHICKEN	25(30)	20(24)	0	0	15(18)	22(27)
	BEEF	25(30)	20(24)	0	0	15(18)	22(27)

Notes: *Values are presented as g/d (% of total protein intake). BEEF=moderate protein beef group (n=14), CHICKEN=moderate protein chicken group (n=15), CARB=lower protein, lacto-ovo vegetarian group (n=14), CONTROL=non-intervention control group (n=11).

[†]Based on a typical 1550 kcal/d diet.

Supplementary Table 3. Study 2: Energy, macronutrient, and bone parameters before and after a 12-wk period of energy-restriction *

Parameter	Group	Baseline	Post
Energy [†] (kcal/d)	CONTROL	1698±147	1570±191
	CARB	1699±125	1158±91 [‡]
	CHICKEN	1579±126	1098±52 [‡]
	BEEF	1862±175	1114±41 [‡]
Protein [†] (g/d)	CONTROL	71±7	70±12
	CARB	75±5	51±5 [‡]
	CHICKEN	68±9	67±3
	BEEF	80±9	67±2
Protein [†] (% energy)	CONTROL	16±1	20±2
	CARB	18±1	17±1
	CHICKEN	17±1	25±1 [‡]
	BEEF	17±1	24±1 [‡]
Fat (% energy)	CONTROL	36±2	33±2
	CARB	34±2	24±2
	CHICKEN	36±2	24±1
	BEEF	38±2	30±1
Carbohydrate [†] (% energy)	CONTROL	49±2	47±1
	CARB	49±2	59±2 [‡]
	CHICKEN	48±3	51±1
	BEEF	45±2	46±2

Calcium (mg/d)	CONTROL	765±72	928±126
	CARB	780±102	897±92
	CHICKEN	647±87	783±80
	BEEF	741±101	630±65

Notes: * Mean±SEM; BEEF=moderate protein beef group (n=14), CHICKEN=moderate protein chicken group (n=15), CARB=lower protein, lacto-ovo vegetarian group (n=14), CONTROL=non-intervention control group (n=11).

†Significant group-by-time interaction $P < 0.05$.

‡Significant difference compared with control $P < 0.05$.

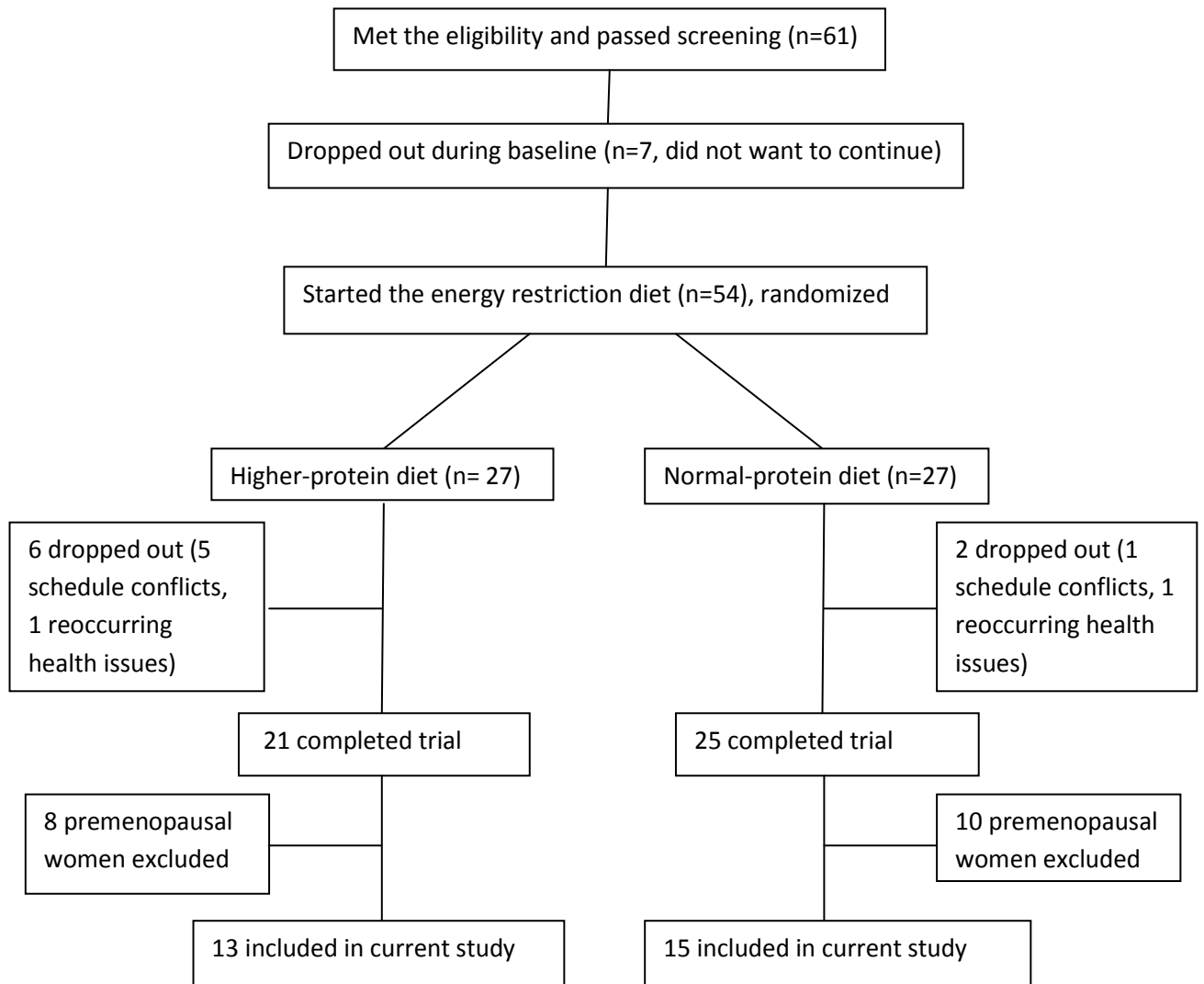
Supplementary Table 4. Study 2: Markers of calcium metabolism and bone homeostasis before and after a 9-wk energy-restricted diet intervention in post-menopausal women*

Parameter	Group	Baseline	Post	Change ²
Osteocalcin, S, ng/mL	CONTROL	6.0±1.0	6.3±1.0	0.4±0.5
	CARB	7.4±1.2	6.6±1.4	-0.8±0.9
	CHICKEN	6.2±0.7	7.7±0.9	1.5±1.1
	BEEF	7.7±1.5	8.2±1.6	0.5±0.9
B-S Alk Phos, S, ng/mL	CONTROL	11.2±0.8	10.0±1.2	-1.1±0.9
	CARB	12.5±0.8	11.0±0.8	-1.6±0.9
	CHICKEN	12.8±0.7	12.1±0.7	-0.7±0.5
	BEEF	10.7±0.6	11.6±1.0	1.0±1.0
N-telepeptide cross-links, U, µml/g CR	CONTROL	279±45	300±52	21±27
	CARB	330±42	399±79	68±48
	CHICKEN	451±52	431±63	-21±47
	BEEF	365±43	369±59	3.2±47
Deoxypyridinoline, U, mg/g CR	CONTROL	49±4.2	49±4.0	0.52±2.35
	CARB	44±3.0	47±4.4	3.2±3.2
	CHICKEN	48±4.1	53±4.5	4.4±3.8
	BEEF	51±3.2	46±3.2	-4.7±2.1
Parathyroid hormone [†] , S, pg/mL	CONTROL	38±5	34±3	-3.8±4.7

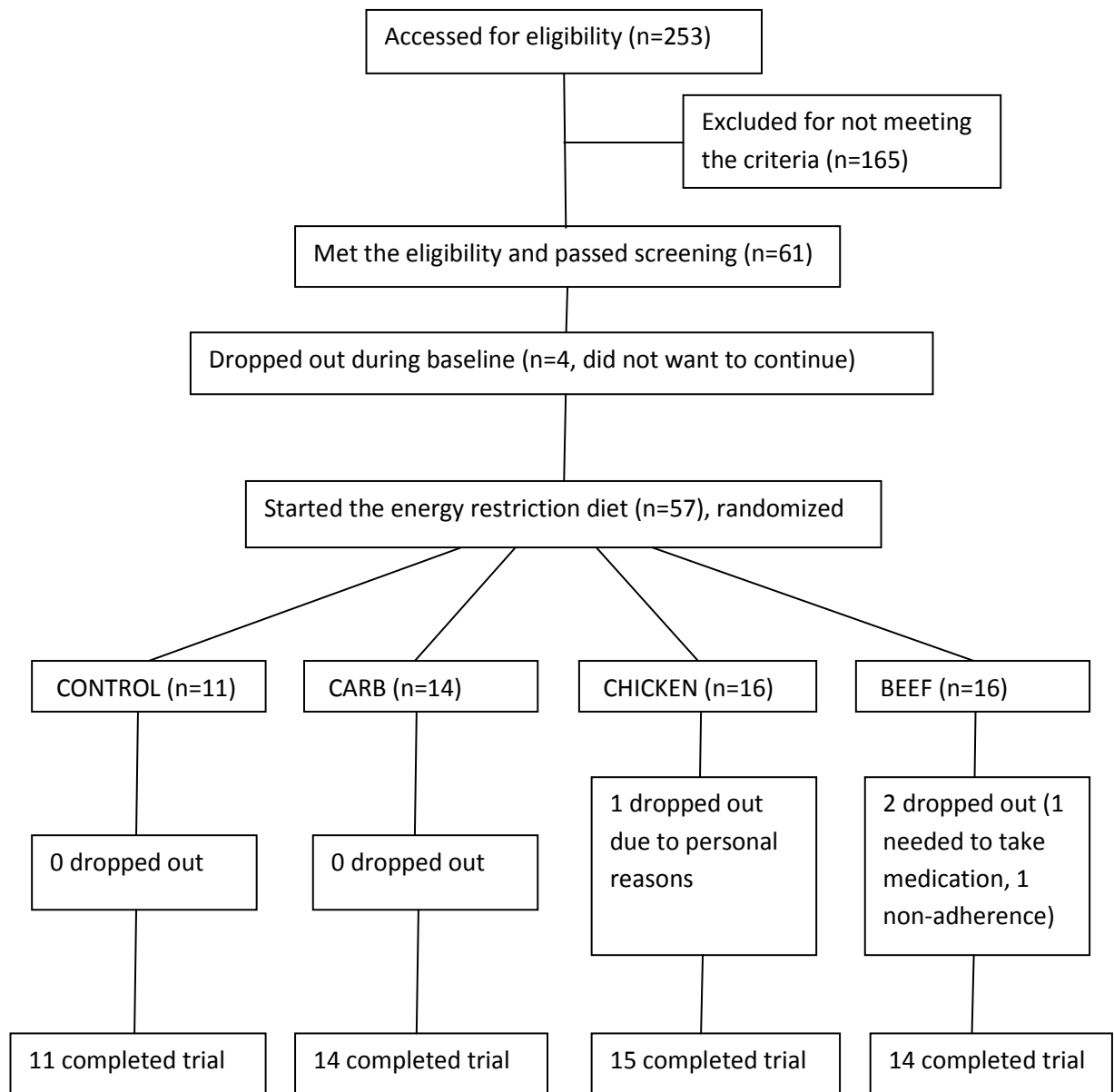
	CARB	54±8	39±5	-15±5
	CHICKEN	32±3	40±3	7.4±3.0
	BEEF	56±5	48±5	-7.7±5.0
Calcium, U, mg/g CR	CONTROL	104±18	124±23	20±24
	CARB	132±21	157±26	18±16
	CHICKEN	155±21	147±21	-7.4±13.2
	BEEF	92±13	124±12	32±14
Calcium:creatinine ratio	CONTROL	0.09±0.020	0.12±0.024	0.03±0.023
	CARB	0.13±0.021	0.16±0.026	0.018±0.017
	CHICKEN	0.15±0.021	0.15±0.021	-0.008±0.013
	BEEF	0.09±0.013	0.12±0.012	0.03±0.014
Phosphorous, U, mg/g CR	CONTROL	698±64	748±52	50±73
	CARB	753±87	748±74	-41±96
	CHICKEN	834±67	637±39	-197±55
	BEEF	723±69	674±42	-49±71
IGF-1, S, ng/mL	CONTROL	215±26	224±23	8.5±27
	CARB	222±24	182±26	-40±24
	CHICKEN	222±38	225±41	3.3±23.3
	BEEF	242±34	244±39	2.2±18.5

Notes: * Mean±SEM; BEEF=moderate protein beef group (n=14), CHICKEN=moderate protein chicken group (n=15), CARB=lower protein, lacto-ovo vegetarian group (n=14), CONTROL=non-intervention control group (n=11); CR, creatinine; U, 24-hour urine; S, serum; B-S Alk Phos, Bone-specific alkaline phosphatase.

†Serum parathyroid hormone level of CHICKEN group was different from CARB and BEEF groups.



Supplementary figure 1. Recruitment and retention of participants of Study 1. NP: normal protein group, HP: higher-protein group.



Supplementary figure 2. Recruitment and retention of participants of Study 2. CONTROL: non-intervention control group, CARB: lower protein, lacto-ovo vegetarian group, CHICKEN: higher-protein, chicken group, BEEF: higher-protein, beef group.