

Supplemental Table S1: High Fat, High Sugar Diet
Formulation¹

	High Fat, High Sugar (g)
<u>Protein Source</u>	
Casein	140
L-Cysteine	1.8
<u>Carbohydrates</u>	
Corn Starch	21.5
Maltodextrin 10	125
Sucrose	223
Cellulose	50
<u>Fat</u>	
Soybean Oil	40
Lard	146
TBHQ	0.008
<u>Micronutrients</u>	
Mineral Mix S10022M	35
Vitamin Mix V10037	10
Choline Bitartrate	2.5
Energy, kcal g	4.6
Protein, % kcal	14
Carbohydrate, % kcal	41
Fat, % kcal	45

¹TBHQ: tert-Butylhydroquinone, Research Diets Inc: D15053103

Supplemental Table S2. Nutritional Analysis of Freeze-Dried Lean Beef Powder¹

<u>Amino Acid Profile*</u>		<u>Fatty Acid Profile (% of Total Fat)</u>	
Taurine	0.14	Myristic (14:0)	2.60
Aspartic Acid	0.26	Myristoleic (9c-14:1)	0.73
Threonine	7.29	C15:0	0.38
Serine	3.50	Palmitic (16:0)	23.37
Glutamic Acid	2.75	Palmitoleic (9c-16:1)	3.37
Proline	12.17	Margaric (17:0)	1.17
Glycine	2.94	10c-17:1	0.00
Alanine	0.00	Stearic (18:0)	11.96
Cysteine	3.57	Elaidic (9t-18:1)	0.44
Valine	4.54	Oleic (9c-18:1)	41.31
Methionine	0.82	Vaccenic (11c-18:1)	0.00
Isoleucine	4.16	Linoleic (18:2n6)	3.83
Leucine	2.13	Linolenic (18:3n3)	0.18
Tyrosine	3.94	Stearidonic (18:4n3)	0.00
Phenylalanine	6.57	Arachidic (20:0)	0.10
Ornithine	3.50	Gonodic (20:1n9)	0.71
Lysine	3.33	Homo-a-linolenic(20:3n3)	0.00
Histidine	0.12	Arachidonic [20:4n6]	0.68
Arginine	0.03	3n-Arachidonic (20:4n3)	0.04
Tryptophan	7.19	EPA (20:5n3)	0.00
Total Amino Acid	77.92	Behenoic (22:0)	0.22
		Erucic [22:1n9]	0.00
Crude Protein*	75.27	Clupanodonic (22:5n3)	0.18
Crude Total Fat	16.94	DHA (22:6n3)	0.02
Percent Fat [#]	5.6%	Lignoceric (24:0)	0.01
Ash	3.64	Nervonic (24:1n9)	0.00

¹Grams per 100g Freeze-dried beef; *Percentage Nitrogen X 6.25, includes all nitrogen compounds;[#]Calculated from the fresh, unfreeze-dried sample

Supplemental Table S3. Main effect of weight loss on bone microarchitecture following 12-weeks of energy restriction¹

	Baseline	Weight Loss Effect ²	Diet Effect ²			
<u>Distal Metaphysis</u>						
VcaBMD (mg HA/ccm)	800 ± 10	0.488	NP-Control 0.431	HP-Beef 0.569	HP-Milk 0.578	HP-Soy 0.816
Tb BMC (mg HA x 10 ²)	1.94 ± 0.28	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
BV/TV x 10 ²	23.58 ± 3.71	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Tb.N (mm ⁻¹)	2.26 ± 0.39	<0.001	<0.001	0.001	0.003	0.015
Tb.Th (mm)	0.11 ± 0.01	0.859	0.996	0.847	0.989	0.997
Tb.Sp (mm)	0.49 ± 0.08	0.019	0.108	0.009	0.267	0.597
SMI	1.34 ± 0.25	0.001	0.025	<0.001	0.005	0.067
Conn.D (mm ³) ⁻¹	46.79 ± 10.67	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
<u>Midshaft Diaphysis</u>						
VctBMD (mg HA/ccm)	1300 ± 5	0.109	0.999	0.999	0.996	0.449
TA (mm ²)	9.86 ± 0.44	0.164	0.539	0.343	0.679	0.108
Ct.A (mm ²)	6.68 ± 0.30	0.906	0.880	0.995	0.960	0.968
Ct.A/TA	0.68 ± 0.04	0.067	0.119	0.189	0.282	0.036
Ma.Ar (mm ²)	3.38 ± 0.34	0.065	0.210	0.189	0.391	0.033
Ct.Th (mm)	0.69 ± 0.03	0.179	0.195	0.754	0.340	0.197
pMOI (mm ⁴)	15.99 ± 1.10	0.786	0.977	0.980	0.908	0.746
<u>Vertebral Body</u>						
VcaBMD (mg HA/ccm)	923 ± 11	0.957	0.954	0.972	0.996	0.998
Tb BMC (mg HA x 10 ²)	32.51 ± 16.26	0.128	0.249	0.068	0.348	0.310
BV/TV x 10 ²	40.04 ± 5.26	0.106	0.173	0.059	0.359	0.235
Tb.N (mm ⁻¹)	3.55 ± 0.43	0.328	0.492	0.225	0.458	0.467
Tb.Th (mm)	0.108 ± 0.005	0.328	0.765	0.263	0.925	0.814
Tb.Sp (mm)	0.273 ± 0.035	0.437	0.769	0.317	0.826	0.772
SMI	0.33 ± 0.16	0.162	0.998	0.523	0.998	0.957
Conn.D (mm ³) ⁻¹	45.51 ± 3.84	0.555	0.936	0.829	0.598	0.550

¹Mean ± SEM. Conn.D, connectivity density; Ct.A/TA, cortical area fraction; Ct.A, cortical bone area; Ct.Th, cortical thickness; pMOI, polar moment of inertia; Ma.Ar, marrow area; SMI, structural model index; TA, total area; Tb BMC, trabecular BMC; Tb.N, trabecular bone number; Tb.Sp, trabecular bone separation; Tb.Th, trabecular bone thickness; BV/TV; trabecular bone volume fraction; VcaBMD, volumetric cancellous BMD; VctBMD, volumetric cortical BMD

²Two-Way ANOVA: Main effect of Weight Loss & Diet. Significance denoted by bolding (p<0.05); Post-hoc analysis utilized Tukey's HSD