

Table S1. Diet Composition of LF, HF, HF/Pro and HF/Pca diets¹

Diet Ingredient	LF - D12450H	HF - D12451	HF/Pro - D12451	HF/Pca - D12451
	g			
Casein, 30 Mesh	200	200	200	200
L-Cystine	3	3	3	3
Corn Starch	452.2	72.8	72.8	72.8
Maltodextrin 10	75	100	100	100
Sucrose	172.8	172.8	172.8	172.8
Cellulose, BW200	50	50	50	50
Soybean Oil	25	25	25	25
Lard	20	177.5	177.5	177.5
Mineral Mix S10026	10	10	10	10
Dicalcium Phosphate	13	13	13	13
Calcium Carbonate	5.5	5.5	5.5	5.5
Potassium Citrate, 1 H2O	16.5	16.5	16.5	16.5
Vitamin Mix V10001	10	10	10	10
Choline Bitartrate	2	2	2	2
FD&C Yellow Dye #5	0.04	0	0	0
FD&C Red Dye #40	0.01	0.05	0.05	0.05
Intact <i>L. casei</i> W8			0.0076	
Microencapsulated <i>L. casei</i> W8				8.58
Total	1055.03	858.15	858.1576	866.7315

¹*Lactobacillus paracasei* subsp. *paracasei* *L. casei* W8® (*L. casei* W8) was microencapsulated with pectin beads, consisting of low methyl pectin, water, CaCl₂, and *L. casei* w8. HF, high fat; LF, low fat; HF, high fat; HF/Pca, HF with supplemented with encapsulated *L. casei* W8 (4x10⁷ cfu /g diet); HF/Pro, HF supplemented with non-encapsulated *L. casei* W8 (4x10⁷ cfu/g diet).

Table S2. Macronutrient composition of LF, HF, and HF_BB diets as a percent of energy¹

Diet Ingredient	LF - D12450H	HF - D12451	HF/Pro - D12451	HF/Pca - D12451
	% Kcal			
Protein	20	20	20	20
Carbohydrate	10	35	35	35
Sucrose	17	17	17	17
Fat	70	45	45	45
Total	100	100	100	100
	Kcal/g diet			
	3.82	4.7	4.7	4.7

¹Diets prepared by Research Diets, Inc. HF, high fat; LF, low fat; HF, high fat; HF/Pca, HF with supplemented with encapsulated *L. casei* W8 (4×10^7 cfu /g diet); HF/Pro, HF supplemented with non-encapsulated *L. casei* W8 (4×10^7 cfu/g diet).

Table S3. Primer sequences used for qPCR¹

Gene*	Forward primers (5' to 3')	Reverse primers (5' to 3')	Accession number
β-actin	ACGGTCAGGTCATCACTATC	GATGCCACAGGATTCCATAC	NM_031144.3
CD68	AAACAGTCCAGGCTTCTC	ATGGCTGGGAACCATTAG	NM_001031638.1
GAPDH	GAGCATCTCCCTCACAATTC	GGGTGCAGCGAACTTTAT	NM_017008.4
GLP1	CCAAGCAAGGAGAGAGAAAC	GATGACCAAGGCAGAGAAAG	NM_012728.1
IL-1β	CATTGTGGCTGTGGAGAA	GCAGTGCAGCTGTCTAAT	NM_031512.2
IL-6	TGTTGTGGGTGGTATCCT	CCTTCTTGGGACTGATGTTG	NM_012589.2
MCP1	GGCTGGAGAACTACAAGAG	TCTGGACCCATTCTTATTG	NM_031530.1
MUC2	CTGAGGAAGGCCAAGTTTAC	CAGGTCCCAGAGAGGAAATA	U68172
TNFα	TCTACTCCCAGGTTCTCTTC	GCTGACTTCTCCTGGTATG	NM_012675.3

¹Cd68, cluster of differentiation 68; GAPDH, glyceraldehyde 3-phosphate dehydrogenase; GLP1, glucagon-like peptide-1; GPR41, -43, G protein-coupled receptor 41, -43; IL-1β, interleukin-1 beta; IL-6, interleukin-6; MCP1, monocyte chemotactic protein 1; MUC2, mucin 2; TNFα, tumor necrosis factor alpha.

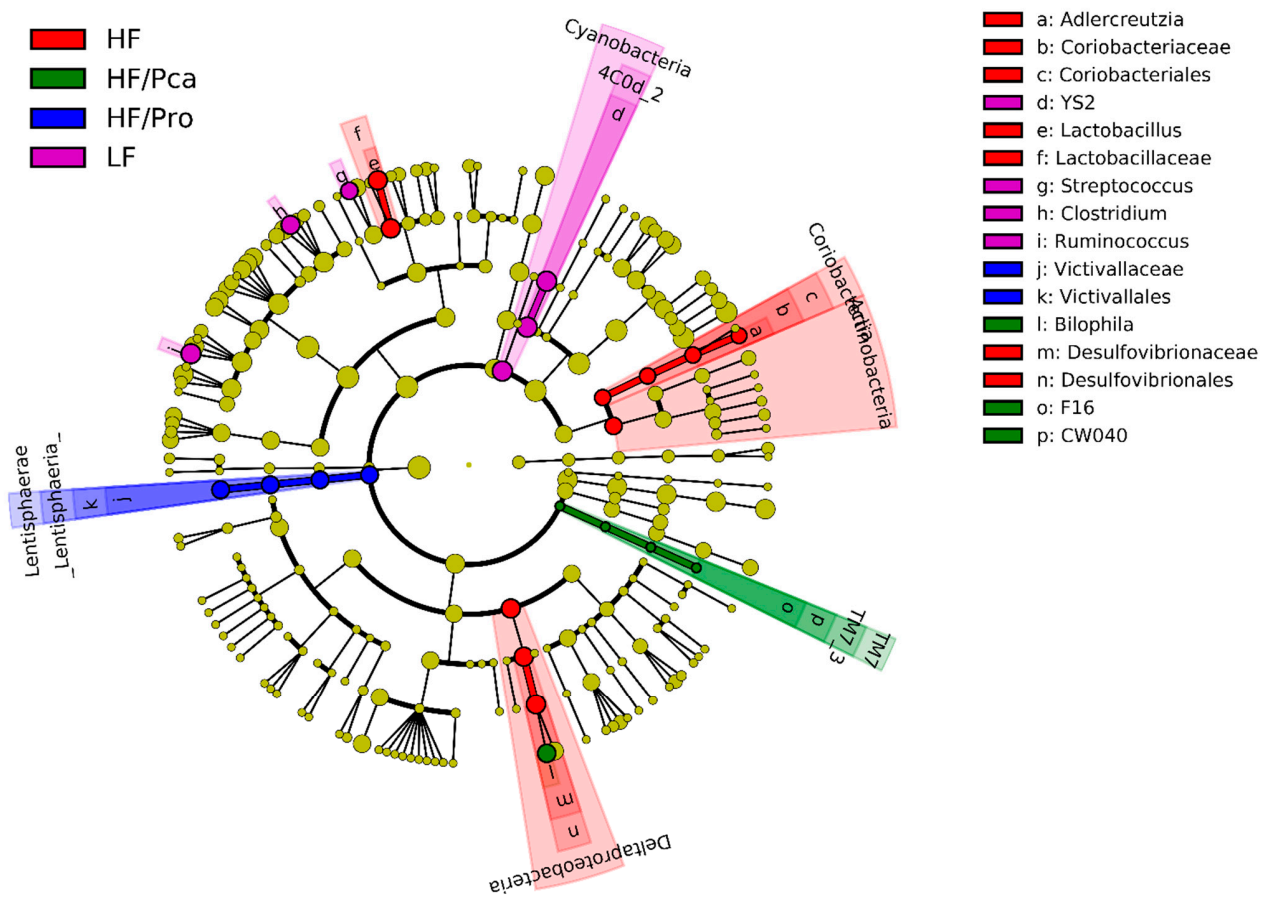


Figure S1. Cladogram generated from LDA score of 2.5 shows the most differentially abundant taxa enriched in microbiota from rats fed an LF, HF, HF/Pro, or HF/Pca diet for 7 weeks (green indicating LF, red HF, magenta HF/Pro, blue HF/Pca, and yellow indicating non-significance). $n = 8/\text{group}$. The six rings of the cladogram stand for domain (innermost), phylum, class, order, family and genus. LEfSe analysis was performed on log-transformed abundances using the Galaxy online module to identify discriminant taxa among groups. HF, high fat; LF, low fat; LEfSe, linear discriminant analysis (LDA) effect size; HF/Pca, HF with supplemented with encapsulated *L. casei* W8 (4×10^7 cfu /g diet); HF/Pro, HF supplemented with non-encapsulated *L. casei* W8 (4×10^7 cfu/g diet).