Supplemental Tables

Table S1, Related to Figure 1. Demographics table.

	High fermented food diet (n=18)	High fiber diet (n=18)
Demographics (% of diet arm)		
Female	13 (72%)	12 (67%)
Male	5 (28%)	6 (33%)
Non-hispanic	18 (100%)	18 (100%)
Hispanic	0 (0%)	0 (0%)
Asian	4 (22%)	2 (11%)
White	14 (78%)	16 (89%)
Married/Partnered	9 (50%)	11 (61%)
Divorced	7 (39%)	1 (6%)
Single/Never married	2 (11%)	6 (33%)
Some college	2 (11%)	0 (0%)
College graduate	5 (28%)	6 (33%)
Some post-graduate school	2 (11%)	3 (17%)
Post-graduate degree	9 (50%)	9 (50%)
Working full-time	14 (78%)	15 (83%)
Working part-time	1 (6%)	2 (11%)
Unemployed	0 (0%)	1 (6%)
Retired	3 (17%)	0 (0%)
Smokers	0 (0%)	0 (0%)
Non-smokers	18 (100%)	16 (89%)
Anthropometrics (average±SD)		
HEIGHT (m)	1.7 ± 0.1	1.7 ± 0.1
WEIGHT (kg)	70 ± 12	73 ± 14
BMI	25 ± 4	25 ± 3
WAIST (cm)	35 ± 4	35 ± 4
Systolic BP	121 ± 14	120 ± 13
Diastolic BP	77 ± 7	76 ± 6
Blood Values (average±SD)		
Glucose (mg/dL)	95 ± 9	95 ± 14
Insulin (uU/mL)	9.9 ± 3.8	9.4 ± 2.9
Triglycerides (mg/dL)	112 ± 52	108 ± 57
Total Cholesterol (mg/dL)	215 ± 27	200 ± 24
HDL Cholesterol (mg/dL)	65 ± 17	61 ± 20
Calculated LDL Chol (mg/dL)	128 ± 26	117 ± 27

Table S2, Related to Figure 1. Number of participants per data type (% of all participants).

	Time (weeks)									
	Baseline			Ramp		Maintenance			Choice	
	-3	**-2**	**0**	**2**	**4**	**6**	**8**	**10**	**12**	**14**
Food logs	0 (0%)	36 (100%)	36 (100%)	36 (100%)	36 (100%)	36 (100%)	36 (100%)	36 (100%)	36 (100%)	36 (100%)
16S ASVs	0 (0%)	32 (89%)	28 (78%)	28 (78%)	31 (86%)	33 (92%)	33 (92%)	33 (92%)	32 (89%)	31 (86%)
Metagenomics	0 (0%)	27 (75%)	30 (83%)	0 (0%)	0 (0%)	0 (0%)	26 (72%)	27 (75%)	0 (0%)	0 (0%)
Proteomics	0 (0%)	27 (75%)	27 (75%)	27 (75%)	0 (0%)	0 (0%)	27 (75%)	27 (75%)	0 (0%)	0 (0%)
SCFAs	0 (0%)	36 (100%)	36 (100%)	0 (0%)	0 (0%)	0 (0%)	36 (100%)	36 (100%)	0 (0%)	0 (0%)
Inflammatory cytokines	35 (97%)	0 (0%)	35 (97%)	0 (0%)	0 (0%)	33 (92%)	35 (97%)	35 (97%)	0 (0%)	0 (0%)
Endogenous cell signaling	35 (97%)	0 (0%)	30 (83%)	0 (0%)	0 (0%)	28 (78%)	34 (94%)	33 (92%)	0 (0%)	0 (0%)
Cell signaling capacity	36 (100%)	0 (0%)	36 (100%)	0 (0%)	0 (0%)	0 (0%)	36 (100%)	36 (100%)	0 (0%)	0 (0%)
Serum Metabolomics (% high-fermented food diet arm)	17 (94%)	0 (0%)	1 (6%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	18 (100%)	0 (0%)	0 (0%)

Table S3, Related to Figure 1. Nutrient data from participant diets.

A) High-fiber diet arm nutrient intake

Nutrient	**Baseline (average±SD)**	**End of Maintenance (average±SD)**	**adjusted q-value**
Magnesium (mg)	341.2+/-104.8	462.4+/-150.7	**4.59E-04**
Potassium (mg)	2726.4+/-549.1	3377+/-944.3	**4.59E-04**
Vitamin C (ascorbic acid) (mg)	77.3+/-54.9	166+/-118	**4.59E-04**
Vitamin K (phylloquinone) (mcg)	166.9+/-106.2	308.1+/-188.6	**4.59E-04**
Total Dietary Fiber (g)	22+/-7.4	43.3+/-15	**2.49E-03**
Insoluble Dietary Fiber (g)	15.7+/-5.6	33.1+/-11.9	**2.86E-03**
Sodium (mg)	2989.7+/-691.4	2603.1+/-1011.5	**2.86E-03**
Animal Protein (g)	49.1+/-17	32.9+/-15.4	**3.67E-03**
Beta-Carotene (provitamin A carotenoid) (mcg)	4574.8+/-3743.2	6532.1+/-4729.9	**5.94E-03**
Total Sugars (g)	79.7+/-28.8	97.6+/-35.8	**6.14E-03**
Vegetable Protein (g)	29.8+/-6.4	40.9+/-14.2	**7.77E-03**
Calcium (mg)	949.9+/-286	1026.7+/-275.5	**7.92E-03**
Total Carbohydrate (g)	224+/-58.1	248.1+/-63.3	**8.11E-03**
Lutein + Zeaxanthin (mcg)	3580.9+/-4969.5	4590.6+/-3312.1	**1.10E-02**
Iron (mg)	13.7+/-4.6	19+/-5.6	**1.13E-02**
Energy (kcal)	1880.4+/-366.2	1952.9+/-462.4	**1.16E-02**
Alpha-Carotene (provitamin A carotenoid) (mcg)	808.2+/-923.5	1009.6+/-1353	**1.17E-02**
Soluble Dietary Fiber (g)	6.3+/-2.4	10.1+/-4.8	**1.17E-02**
Added Sugars (by Total Sugars) (g)	36.7+/-23.9	37.8+/-25.3	>.05
Beta-Cryptoxanthin (provitamin A carotenoid) (mcg)	354.4+/-728.1	296.1+/-348.3	>.05
Cholesterol (mg)	224.9+/-61.8	196.3+/-131.5	>.05
Lycopene (mcg)	3992.5+/-4108.2	3720.7+/-4969.1	>.05
Pectins (g)	2.8+/-1.3	5.8+/-2.8	>.05
Refined Grains (ounce equivalents)	4.8+/-2.5	2.9+/-1.1	>.05
Total Fat (g)	71+/-17.7	77.5+/-25.9	>.05
Total Grains (ounce equivalents)	7.4+/-3	6+/-2.2	>.05
Total Monounsaturated Fatty Acids (MUFA) (g)	24.5+/-6.6	27.9+/-11.6	>.05
Total Polyunsaturated Fatty Acids (PUFA) (g)	16.4+/-5.2	19.7+/-6.6	>.05
Total Protein (g)	78.9+/-18.6	73.9+/-20.1	>.05
Total Saturated Fatty Acids (SFA) (g)	23.8+/-7.4	23.2+/-10.7	>.05
Whole Grains (ounce equivalents)	2.6+/-3.6	3.1+/-2	>.05

B) High-fermented diet arm nutrient intake

Nutrient	Baseline (average±SD)	End of Maintenance (average±SD)	adjusted q-value
Animal Protein (g)	45.4+/-18.9	58.3+/-20.1	**1.49E-02**
Added Sugars (by Total Sugars) (g)	37.7+/-17.5	50+/-19.1	> .05
Alpha-Carotene (provitamin A carotenoid) (mcg)	632.3+/-785.3	456.4+/-566	> .05
Beta-Carotene (provitamin A carotenoid) (mcg)	4876.1+/-3673.7	4465.6+/-2331.8	> .05
Beta-Cryptoxanthin (provitamin A carotenoid) (mcg)	383.4+/-737.4	345.3+/-684.8	> .05
Calcium (mg)	783.7+/-253.5	927.5+/-283.8	> .05
Cholesterol (mg)	238.5+/-134.8	252.7+/-128.2	> .05
Energy (kcal)	1801.1+/-437.9	1656.8+/-292.9	> .05
Insoluble Dietary Fiber (g)	13.9+/-5.1	14.2+/-7.1	> .05
Iron (mg)	11.6+/-2.4	10.8+/-2.9	> .05
Lutein + Zeaxanthin (mcg)	2281.9+/-1873.4	3868.5+/-3240	> .05
Lycopene (mcg)	2072.3+/-2152.5	1976.1+/-3023.9	> .05
Magnesium (mg)	306.9+/-99.1	320.2+/-98.2	> .05
Pectins (g)	2.9+/-1	3.4+/-1.5	> .05
Potassium (mg)	2602.6+/-618.3	2822.8+/-803.9	> .05
Refined Grains (ounce equivalents)	4.5+/-2.5	2.5+/-1.7	> .05
Sodium (mg)	2534.6+/-798.2	2532.8+/-557.2	> .05
Soluble Dietary Fiber (g)	6.7+/-2.4	6.2+/-2.7	> .05
Total Carbohydrate (g)	205.3+/-54.3	188.6+/-46.9	> .05
Total Dietary Fiber (g)	21.3+/-7.3	20.6+/-9.5	> .05
Total Fat (g)	72.3+/-20.5	64.2+/-18	> .05
Total Grains (ounce equivalents)	6.1+/-2	4+/-1.6	> .05
Total Monounsaturated Fatty Acids (MUFA) (g)	27+/-7.4	23.4+/-6.6	> .05
Total Polyunsaturated Fatty Acids (PUFA) (g)	17.4+/-6.4	14.1+/-6.9	> .05
Total Protein (g)	74.1+/-21	81.2+/-18.2	> .05
Total Saturated Fatty Acids (SFA) (g)	21.9+/-8.4	21.1+/-7.5	> .05
Total Sugars (g)	78.7+/-27.4	93.2+/-28.3	> .05
Vegetable Protein (g)	28.7+/-9.1	22.9+/-9.1	> .05
Vitamin C (ascorbic acid) (mg)	92+/-60.2	107.1+/-51.7	> .05
Vitamin K (phylloquinone) (mcg)	150+/-84.9	215.4+/-145.3	> .05
Whole Grains (ounce equivalents)	1.6+/-1.6	1.5+/-1	> .05

Table S7, Related to Figure 4. ZIBR coefficients for High-fiber diet arm inflammation clusters.

Comparison	Phylogenetic assignment			Joint model		Beta regression model				Logarithmic model			
				Adjusted p-value		Group		Baseline		Group		Baseline	
	Family	Genus	Species	Group	Baseline	Coefficient	Adjusted p-val	Coefficient	Adjusted p-val	Coefficient	Adjusted p-val	Coefficient	Adjusted p-val
High v Low i	*Lachnospiraceae*	*Coprococcus*	UA	**0.01**	0.07	0.31	0.82	0.38	1.00	3.09	**0.01**	-2720.24	0.05
	Ruminococcaceae	*Oscillospira*	UA	0.08	0.72	-44.88	1.00	105.10	0.45	2.46	**0.04**	-413.64	0.59
	Ruminococcaceae	*Ruminococcus*	UA	0.11	0.25	0.03	1.00	-10.74	0.92	1.56	**0.04**	264.09	0.16
	Lachnospiraceae	*Anaerostipes*	UA	**0.01**	0.35	-0.19	0.74	-19.88	0.63	1.22	0.59	320.80	0.28
High v Low ii	*Verrucomicrobiaceae*	*Akkermansia*	*muciniphila*	0.20	1.00	-1.35	**0.04**	0.26	1.00	-6.03	0.40	-2.71	1.00
Low i v Low ii	*Lachnospiraceae*	UA	UA	1.00	0.17	-2.75	**0.00**	69.55	0.34	0.26	1.00	191.17	0.16

Note: UA = Unassigned taxa, significant p-values bolded.

ZIBR coefficients on the tip glommeration for fiber inflammation groups. Beta-regression model refers to the change in relative abundance of taxa. Logarithmic model refers to presence/absence of taxa. A significant coefficient for the grouping variable indicates a significant difference between the inflammation groups indicated in the comparison column. Baseline coefficients indicate a difference in the taxonomic relative abundance or presence/absence at the baseline timepoint (Week 0). Taxa with significant baseline coefficients were filtered out to focus on the significant differences induced by the dietary intervention.