

Table S1. Descriptive measures of nutrient intake in recorded units (grams) pre- and post intervention for young women, by treatment group.

	GOS n = 23					
	T1 M	(SD)	T2 M	(SD)	ΔM	(SD)
Protein	65.88	35.17	62.32	32.64	-5.03	13.13
Fat	65.68	34.38	67.63	37.53	1.28	16.19
Monounsaturated fat	20.83	11.22	22.46	13.28	0.96	7.62
Saturated Fat	23.12	12.98	23.62	14.06	0.45	6.61
Carbohydrate	184.79	94.33	167.67	95.85	-20.36	40.09
Free Sugars	36.53	27.31	28.29	20.11	-9.82	21.58
Sugars	78.96	48.65	65.34	41.18	-16.54	27.34
Fibre	18.37	9.92	17.82	10.47	-0.70	4.24
	Placebo n = 23					
Protein	73.59	38.62	67.83	34.82	-6.33	13.53
Fat	75.66	37.50	65.42	33.93	-10.60	21.79
Monounsaturated fat	26.18	14.06	22.21	11.28	-4.46	9.67
Saturated Fat	25.30	13.92	22.96	13.40	-2.34	6.94
Carbohydrate	225.18	102.34	208.41	105.04	-18.61	42.06
Free Sugars	40.52	25.96	38.93	31.17	-3.00	20.54
Sugars	89.53	48.38	84.85	55.62	-5.91	23.06
Fibre	18.57	9.86	18.23	9.63	-0.72	6.26

Note. Average (mean, M) nutrient intakes in grams at T1 and T2, and difference (T2 minus T1) with standard deviations (SD) presented for each group separately. GOS = galacto-oligosaccharides. Arrows are illustrative indications of change direction ↑ increase, ↓ decrease.

Table S2. ANCOVA model statistics of intervention effects on nutrient outcomes

Measure	term	df	Model results			Estimated marginal means	
			F	p	η^2	M	SE
Carbohydrate	T1	1	29.193	0	0.368		
	BMI	1	1.621	0.21	0.02		
	Treatment	1	6.546	0.014	0.082	GOS	43.28% 1.19
	Residuals	42				Placebo	47.66% 1.19
Sugars	T1	1	13.755	0.001	0.233		
	BMI	1	0.281	0.599	0.005		
	Treatment	1	6.41	0.015	0.09	GOS	15.90% 1.13
	Residuals	42				Placebo	20.05% 1.16
Fat	T1	1	7.94	0.007	0.135		
	BMI	1	0.489	0.488	0.008		
	Treatment	1	8.278	0.006	0.141	GOS	39.10% 1.23
	Residuals	42				Placebo	34.05% 1.23
MUF	T1	1	2.525	0.12	0.053		
	BMI	1	0.486	0.49	0.01		
	Treatment	1	2.468	0.124	0.052		
	Residuals	42					
SFA	T1	1	22.646	0	0.342		
	BMI	1	0.182	0.672	0.003		
	Treatment	1	1.407	0.242	0.021		
	Residuals	42					
Protein	T1	1	72.313	0	0.632		
	BMI	1	0.027	0.87	0		
	Treatment	1	0.098	0.756	0.001		
	Residuals	42					
Fiber	T1	1	24.465	0	0.365		
	BMI	1	0.509	0.48	0.008		
	Treatment	1	0.046	0.832	0.001		
	Residuals	42					
Free Sugars	T1	1	7.984	0.007	0.154		
	BMI	1	0.073	0.788	0.001		
	Treatment	1	1.87	0.179	0.036		
	Residuals	42					
Energy Kcal.	T1	1	31.885	0	0.427		
	BMI	1	0.486	0.49	0.007		
	Treatment	1	0.28	0.599	0.004		
	Residuals	42					

Note. Treatment effect was comparison of GOS group in reference to the placebo group at T2.

Outcome measure collected at time 1 and body mass index were included as covariates. Distribution of residuals for significant models were all normal; carbohydrate, $w = 0.981$, $p = .666$; sugar, $w = 0.952$ $p = .063$ and fat, $w = 0.96$, $p = .120$.

Table S3. Stepwise regression models of gut microbiota on each nutrient outcome

Carbohydrate model							
	β	2.5%	97.5%	t	p	Partial r	Part r
(Intercept)	12.200	-2.041	26.441	1.737	0.091		
BMI	-0.521	-1.172	0.131	-1.620	0.114	-0.261	-0.220
<i>Bifidobacterium</i> : Treatment Placebo	-0.426	-1.738	0.886	-0.658	0.515	-0.109	-0.089
<i>Bifidobacterium</i>: Treatment Active	-2.696	-4.686	-0.705	-2.747	0.009	-0.416	-0.373
Treatment Placebo: <i>Barnesiella</i>	-0.201	-1.970	1.568	-0.231	0.819	-0.038	-0.031
Treatment Active: <i>Barnesiella</i>	-1.598	-3.274	0.077	-1.934	0.061	-0.307	-0.263
Treatment Placebo: <i>Desulfovibrio</i>	1.353	-0.331	3.036	1.630	0.112	0.262	0.221
Treatment Active: <i>Desulfovibrio</i>	3.257	0.024	6.489	2.043	0.048	0.322	0.277

Model fit $F(7,36) = 2.603, p = 0.028, R^2 = 0.336$
 Distribution of residuals: $W = 0.977 p = 0.505$

Fiber model							
	β	2.5%	97.5%	t	p	Partial r	Part r
(Intercept)	0.078	-0.094	0.251	0.920	0.363		
<i>Bifidobacterium</i> : Treatment Placebo	-0.247	-0.357	-0.137	-4.543	0.000	-0.579	-0.576
<i>Bifidobacterium</i>: Treatment Active	0.066	-0.098	0.230	0.811	0.422	0.126	0.103

Model fit $F(2,41) = 10.64, p < 0.001, R^2 = 0.342$
 Distribution of residuals: $W = 0.980 p = 0.808$

Protein model							
	β	2.5%	97.5%	t	p	Partial r	Part r
(Intercept)	0.042	-0.797	0.881	0.101	0.920		
<i>Bifidobacterium</i> : Treatment Placebo	-0.681	-1.217	-0.146	-2.569	0.014	-0.372	-0.355
<i>Bifidobacterium</i>: Treatment Active	0.855	0.057	1.653	2.162	0.036	0.320	0.299

Model fit $F(2,41) = 5.63, p = 0.007, R^2 = 0.216$
 Distribution of residuals: $W = 0.99 p = 0.963$

Free sugar model							
	β	2.5%	97.5%	t	p	Partial r	Part r
(Intercept)	-0.794	-2.221	0.633	-1.128	0.267		
<i>Bifidobacterium</i> : Treatment Placebo	0.921	0.053	1.790	2.149	0.038	0.333	0.293
<i>Bifidobacterium</i> : Treatment Active	-0.470	-1.778	0.837	-0.729	0.471	-0.119	-0.099
Treatment Placebo: <i>Peptoniphilus</i>	1.037	0.036	2.038	2.099	0.043	0.326	0.287
Treatment Active: <i>Peptoniphilus</i>	0.815	-0.508	2.138	1.248	0.220	0.201	0.170
Treatment Placebo: <i>Sporobacter</i>	1.596	-0.530	3.723	1.521	0.137	0.243	0.208
Treatment Active: <i>Sporobacter</i>	1.342	-0.235	2.920	1.725	0.093	0.273	0.235

Model fit $F(6,37) = 2.77, p = 0.025, R^2 = 0.310$
 Distribution of residuals: $W = 0.95 p = 0.053$

Saturated fatty acid model							
	β	2.5%	97.5%	t	p	Partial r	Part r
(Intercept)	1.102	0.264	1.940	2.656	0.011		
Treatment Placebo: <i>Peptoniphilus</i>	-0.927	-1.537	-0.317	-3.071	0.004	-0.432	-0.422
Treatment Active: <i>Peptoniphilus</i>	-0.656	-1.497	0.186	-1.573	0.123	-0.239	-0.216

Model fit $F(2,41) = 5.975, p = 0.005, R^2 = 0.226$
 Distribution of residuals: $W = 0.980 p = 0.770$