Supplemental Online Content

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This supplemental material has been provided by the authors to give readers additional information about their work.

eTable 1. Android-to-Gynoid-Fat (A/G) Ratio at 6, 12, and 26 Weeks Postintervention Among Female and Males Adolescents

			FMT		Placebo			
		Visit (weeks)	**N**	**mean ± SD**	**N**	**mean ± SD**	**aMD (95% CI)**	**p-value**
Females	**A/G ratio**	**0**	25	1·027 ± 0·088	26	1·032 ± 0·057		
		6	24	1·013 ± 0·085	26	1·047 ± 0·074	-0·029 (-0·053, -0·005)	0·018
		12	23	1·015 ± 0·084	23	1·054 ± 0·064	-0·028 (-0·054, -0·003)	0·027
		26	22	1·008 ± 0·084	24	1·050 ± 0·059	-0·030 (-0·055, -0·006)	0·017
Males	**A/G ratio**	**0**	17	1·189 ± 0·078	19	1·131 ± 0·082		
		6	15	1·191 ± 0·103	18	1·146 ± 0·106	-0·015 (-0·051, 0·021)	0·41
		12	15	1·188 ± 0·078	18	1·148 ± 0·110	-0·023 (-0·060, 0·013)	0·20
		26	15	1·173 ± 0·094	17	1·142 ± 0·095	-0·035 (-0·072, 0·003)	0·071

Adjusted mean differences (aMD) and 95% confidence intervals (CI).
FMT, fecal microbiome transfer; SD, standard deviation.
P-values <0.05 were deemed statistically significant.

eTable 2. Secondary Outcomes at 6, 12, and 26 Weeks Postintervention

			FMT		Placebo			
		Visit (weeks)	N	mean ± SD	N	mean ± SD	aMD (95% CI)	p-value
24hAMBP	Awake SBP (mmHg)	0	42	118·5 ± 8·7	45	118·4 ± 10·0		
		6	40	119·4 ± 9·6	43	116·4 ± 8·6	3·0 (0·6, 5·5)	0·015
	Awake DBP (mmHg)	0	42	69·3 ± 5·0	45	69·8 ± 5·8		
		6	40	69·1 ± 6·3	43	68·4 ± 5·9	1·1 (-1·0, 3·2)	0·30
	Asleep SBP (mmHg)	0	42	107·0 ± 10·9	45	105·4 ± 8·2		
		6	40	107·5 ± 10·9	43	105·2 ± 9·3	1·2 (-1·7, 4·2)	0·40
	Asleep DBP (mmHg)	0	42	57·0 ± 6·1	45	57·4 ± 6·4		
		6	40	58·8 ± 7·4	43	57·7 ± 7·1	1·4 (-1·1, 3·8)	0·27
	Systolic dip (%)	0	42	9·8 ± 6·9	45	10·7 ± 7·1		
		6	40	9·9 ± 7·6	43	9·6 ± 6·1	0·7 (-1·9, 3·3)	0·60
	Diastolic dip (%)	0	42	17·7 ± 8·1	45	17·7 ± 9·3		
		6	40	14·7 ± 9·9	43	15·6 ± 9·1	-0·9 (-4·6, 2·8)	0·63
Lipid profile	Total cholesterol (mmol/L)	0	42	4·33 ± 0·97	45	4·41 ± 0·84		
		6	39	4·44 ± 0·87	43	4·42 ± 0·86	0·03 (-0·34, 0·40)	0·87
		12	37	4·08 ± 0·86	40	4·29 ± 0·82	-0·16 (-0·54, 0·22)	0·41
		26	36	4·21 ± 0·84	40	4·23 ± 0·83	0·05 (-0·33, 0·43)	0·80
	LDL (mmol/L)	0	42	2·61 ± 0·84	45	2·73 ± 0·68		
		6	39	2·73 ± 0·77	43	2·74 ± 0·72	0·01 (-0·31, 0·34)	0·94
		12	37	2·48 ± 0·77	40	2·77 ± 0·67	-0·23 (-0·56, 0·10)	0·16
		26	36	2·62 ± 0·79	40	2·74 ± 0·70	-0·04 (-0·37, 0·29)	0·81
	HDL (mmol/L)	0	42	1·20 ± 0·27	45	1·23 ± 0·32		
		6	39	1·26 ± 0·30	43	1·22 ± 0·25	0·04 (-0·05, 0·14)	0·39
		12	37	1·19 ± 0·25	40	1·19 ± 0·25	-0·01 (-0·11, 0·09)	0·88
		26	36	1·24 ± 0·26	40	1·17 ± 0·24	0·06 (-0·03, 0·16)	0·20
	TG (mmol/L)	0	42	1·53 ± 0·80	45	1·23 ± 0·73		
		6	39	1·39 ± 0·77	43	1·33 ± 0·77	-0·10 (-0·39, 0·19)	0·48
		12	37	1·33 ± 0·82	40	1·23 ± 0·65	0·00 (-0·29, 0·30)	0·98
		26	36	1·37 ± 0·90	40	1·31 ± 0·66	-0·04 (-0·34, 0·25)	0·78
Liver function	ALT (U/L)	0	42	26·6 ± 14·6	45	22·1 ± 11·6		
		6	39	28·8 ± 20·0	43	26·4 ± 15·6	1·1 (-6·0, 8·3)	0·76
		12	37	28·9 ± 20·6	40	25·3 ± 15·5	2·6 (-4·8, 9·9)	0·49
		26	36	32·1 ± 20·3	40	25·9 ± 15·8	4·2 (-3·2, 11·7)	0·26
	AST (U/L)	0	42	29·0 ± 9·1	45	26·3 ± 10·2		
		6	39	28·3 ± 11·7	43	27·9 ± 7·0	0·4 (-3·7, 4·5)	0·86
		12	37	28·0 ± 11·9	40	24·8 ± 7·7	2·9 (-1·3, 7·2)	0·17
		26	36	28·1 ± 11·6	40	27·4 ± 9·5	-0·2 (-4·5, 4·1)	0·92
	GGT (U/L)	0	42	33·6 ± 21·7	45	28·0 ± 16·3		
		6	39	34·7 ± 26·9	43	25·3 ± 12·0	6·6 (-0·1, 13·2)	0·052
		12	37	32·8 ± 27·2	40	24·9 ± 10·7	5·1 (-1·7, 11·9)	0·14
		26	36	32·9 ± 24·4	40	24·9 ± 12·8	5·0 (-1·9,11·9)	0·15
Inflammatory markers	Uric acid (umol/L)	0	42	418 ± 88	45	394 ± 73		

			FMT		Placebo			
		Visit (weeks)	**N**	**mean ± SD**	**N**	**mean ± SD**	**aMD (95% CI)**	**p-value**
		6	39	396 ± 90	43	404 ± 84	-8 (-40, 25)	0·64
		12	37	391 ± 107	40	404 ± 76	-13 (-46, 20)	0·44
		26	36	398 ± 85	40	410 ± 85	-10 (-44, 23)	0·54
	hsCRP (mg/L)	**0**	42	3·32 ± 3·50	45	3·30 ± 3·69		
		6	39	3·54 ± 3·54	43	3·64 ± 4·37	-0·10 (-1·75, 1·56)	0·91
		12	37	3·02 ± 2·93	40	3·45 ± 3·47	-0·68 (-2·37, 1·02)	0·43
		26	36	3·52 ± 3·48	40	4·12 ± 4·57	-0·81 (-2·53, 0·92)	0·36

Adjusted mean differences (aMD) and 95% confidence intervals (CI).

24hAMBP, 24-hour ambulatory blood pressure monitoring; ALT, alanine transaminase; AST, aspartate transaminase; DBP, diastolic blood pressure; GGT, gamma-glutamyl transferase; FMT, fecal microbiome transfer; HDL; high-density lipoprotein cholesterol; hsCRP, high-sensitivity C-reactive protein; LDL, low-density lipoprotein cholesterol; SBP, systolic blood pressure; SD, standard deviation; TG, triglycerides.

P-values <0.05 were deemed statistically significant.

eTable 3: BMI SDS and Glucose Metabolism of Participants With Metabolic Syndrome at Baseline

			FMT		Placebo			
		Visit (weeks)	N	mean (95% CI)	N	mean (95% CI)	aMD (95% CI)	p-value
Anthropometry	**BMI SDS**	**0**	18	4.01 (3.63, 4.38)	13	3.09 (2.66, 3.53)	0.91 (0.34, 1.49)	<0.0001
		6	17	3·72 (3·63, 3·80)	13	3·70 (3·60, 3·81)	0·01 (-0·13, 0·15)	0·88
		12	17	3·70 (3·61, 3·79)	12	3·71 (3·60, 3·82)	-0·01 (-0·15, 0·14)	0·93
		26	17	3·74 (3·65, 3·82)	12	3·71 (3·60, 3·82)	-0·01 (-0·15, 0·14)	0·93
Glucose metabolism	**Fasting insulin (µU/ml)**	**0**	18	35·5 (27·2, 46·2)	13	28·8 (21·2, 39·2)	1·23 (0·82, 1·84)	0·30
		6	16	27·7 (22·3, 34·4)	13	39·0 (30·5, 49·9)	0·71 (0·51, 0·99)	0·042
		12	13	36·1 (28·6, 45·5)	12	33·4 (26·0, 43·0)	1·08 (0·77, 1·52)	0·66
		26	15	31·2 (25·0, 39·0)	12	35·4 (27·5, 45·6)	0·88 (0·63, 1·23)	0·45
	Fasting glucose (mmol/L)	**0**	18	5·42 (5·21, 5·64)	13	5·58 (5·33, 5·83)	-0·16 (-0·49, 0·17)	0·33
		6	16	5·15 (4·92, 5·39)	13	5·53 (5·28, 5·79)	-0·38 (-0·73, -0·03)	0·033
		12	13	5·22 (4·96, 5·47)	12	5·51 (5·24, 5·78)	-0·29 (-0·66, 0·08)	0·12
		26	15	5·44 (5·20, 5·68)	12	5·55 (5·29, 5·82)	-0·12 (-0·48, 0·24)	0·52
	HOMA-IR	**0**	18	8·53 (6.49, 11.22)	13	7·12 (5.18, 9.79)	1·20 (0·79, 1·82)	0·38
		6	16	6·29 (5.00, 7.92)	13	9·60 (7·41, 12·43)	0·66 (0·46, 0·93)	0·018
		12	13	8·27 (6·47, 10·58)	12	8·13 (6·23, 10·61)	1·02 (0·71, 1·46)	0·93
		26	15	7·49 (5·92, 9·48)	12	8·69 (6·66, 11·34)	0·86 (0·60, 1·23)	0·41
	Matsuda index	**0**	18	1·14 (0.87, 1.51)	13	1·25 (0.90, 1.72)	0·92 (0·60, 1·40)	0·68
		6	16	1·45 (1.21, 1.73)	13	1·11 (0·91, 1·35)	1·30 (1·00, 1·71)	0·053
		12	13	1·13 (0·93, 1·38)	12	1·31 (1·07, 1·62)	0·86 (0·65, 1·15)	0·30
		26	15	1·14 (0·95, 1·38)	12	1·16 (0·94, 1·43)	0·98 (0·74, 1·30)	0·90

Group data for BMI SDS and fasting glucose are adjusted means and 95% confidence intervals (CI), adjusted for sex; for the same parameters, the adjusted mean differences (aMD) are means and 95% CI adjusted for sex and the baseline value of the outcome (except for the aMD for baseline).

Group data for fasting insulin, HOMA-IR, and Matsuda index are the geometric means and 95% CI (back-transformed from logged data), adjusted for sex; the aMD for the same parameters are also geometric means and 95% CI, adjusted for sex and the baseline value of the outcome.

BMI SDS, body mass index standard deviation score; FMT, fecal microbiome transfer; HOMA-IR, homeostatic model assessment of insulin resistance.

P-values <0.05 were deemed statistically significant.

eTable 4: Changes in Prevalence of Metabolic Syndrome Among Participants with Metabolic Syndrome at Baseline

		FMT	Placebo		
	Visit (weeks)	**n (%)**	**n (%)**	**aOR (95% CI)**	**p-value**
Metabolic syndrome ♦	**0**	18 (100%)	13 (100%)		
	6	13 (81%)	9 (69%)	2.00 (0·32, 12.69)	0·45
	12	5 (38%)	7 (58%)	0.42 (0·07, 2·50)	0·33
	26	4 (27%)	10 (83%)	0·06 (0·01, 0.45)	0·0074

Adjusted odds ratios (aOR) and 95% confidence intervals (CI).
FMT, fecal microbiome transfer
♦ Metabolic syndrome outcome is defined in eTable 6.
P-values <0.05 were deemed statistically significant.

eTable 5. Variance of Species Taxonomic Profiles (Bray-Curtis Dissimilarity) Explained by Each Covariate in Cross-Sectional PERMANOVA

	Baseline (n = 84)			Week 6 (n = 82)			Week 12 (n = 77)			Week 26 (n = 73)		
Covariates	**R^2**	**p-value**	**q-value**	**R^2**	**p-value**	**q-value**	**R^2**	**p-value**	**q-value**	**R^2**	**p-value**	**q-value**
Sequence batch	4·71%	0·057	0·15	3·21%	0·086	0·18	n/a	n/a	n/a	n/a	n/a	n/a
Sex	1·29%	0·31	0·40	3·70%	0·001	**0·013**	1·32%	0·37	0·46	1·71%	0·18	0·28
Age	1·53%	0·16	0·28	0·55%	0·96	0·96	1·69%	0·17	0·28	3·30%	0·008	**0·055**
Ethnicity	6·45%	0·032	0·14	6·23%	0·050	0·15	6·86%	0·060	0·15	5·98%	0·22	0·31
Antibiotics	NA	NA	NA	1·49%	0·18	0·28	1·03%	0·64	0·71	1·22%	0·49	0·57
Treatment group	0·59%	0·95	0·96	2·73%	0·006	0·055	2·94%	0·011	0·060	2·23%	0·063	0·15

Table contain R^2 (the proportion of variance explained), nominal p-value based on 10,000 permutation tests, and FDR-adjusted p-values (q-values) after multiple comparisons.
q-values <0.1 are statistically significant.
n/a, not applicable.

eTable 6. Variance of Species Taxonomic Profiles (Bray-Curtis Dissimilarity) Explained by Each Covariate in PERMANOVA for Donors and Recipients at Baseline

Covariates	R^2	p-value	q-value
Sex	0.91%	0·566	0·566
Ethnicity	5.55%	0·045	**0·068**
Participant type*	1.80%	0·042	**0·068**

Table contain R^2 (the proportion of variance explained), nominal p-value based on 10,000 permutation tests, and FDR-adjusted p-values (q-values) after multiple comparisons.
Significant findings are highlighted in bold (q value <0·1).

*Participant type compared the microbiomes of 9 donors with 87 participants at baseline.

eTable 7. Definitions of Abnormal Outcomes

OUTCOMES	THRESHOLDS FOR ABNORMAL OUTCOMES	REFERENCE
Abnormal glycaemia	Fasting glucose ≥5.6 mmol/L or 2-hour glucose ≥7.8 mmol/L or HbA1c ≥39 mmol/mol	American Diabetes Association 2018[1]
Elevated clinic BP	<16 years: SBP and/or DBP ≥90th for age and sex	Lurbe et al. 2016[2]
	≥16 years: SBP ≥130 and/or DBP ≥85 mmHg	
Low HDL	<16 years: <1.03 mmol/L	Zimmet et al. 2007[3]
	≥16 years: males <1.03 mmol/L; females <1.29 mmol/L	
High LDL	>2.6 mmol/L	NCEP 2001[4]
High triglycerides	≥1.7 mmol/L	Zimmet et al. 2007[3]
High total cholesterol	>5.2 mmol/L	European Atherosclerosis Society 1987[5]
Dyslipidaemia	Low HDL or high LDL or high triglycerides or high total cholesterol	
Elevated ALT	Males >41 U/L; females >33 U/L	Klein et al. 1994[6]
Elevated AST	Males >40 U/L, females >32 U/L	Thefeld et al. 1974[7]
Elevated GGT	Males ≥60 U/L, females ≥40 U/L	Thomas et al. 2005[8]
Abnormal liver function	Elevated ALT or elevated AST or elevated GGT	
Metabolic syndrome	≥10 but <16 years: Waist circumference ≥90th percentile (or adult cut-off if the latter is lower); AND any 2 of the following 4 criteria: 1. triglycerides ≥1.7 mmol/L 2. HDL <1.03 mmol/L 3. SBP ≥130 and/or DBP ≥85 mmHg 4. Fasting glucose ≥5.6 mmol/L and/or previously diagnosed type 2 diabetes	Zimmet et al. 2007[3]
	≥16 years: Waist circumference ≥94 cm for males and ≥80 cm for females; AND any 2 of the following 4 criteria: 1. triglycerides ≥1.7mmol/L 2. HDL <1.03 mmol/L in males and <1.29 mmol/L in females; or specific treatment for these lipid abnormalities 3. SBP ≥130 mmHg and/or DBP ≥85 mmHg, or treatment for previously diagnosed hypertension 4. Fasting glucose ≥5.6 mmol/L and/or previously diagnosed type 2 diabetes	

24hABPM, 24-hour ambulatory blood pressure monitoring; ALT, alanine transaminase; AST, aspartate transaminase; BP, blood pressure; DBP, diastolic blood pressure; GGT, gamma-glutamyl transferase; hsCRP, high-sensitivity C-reactive protein; HbA1c, haemoglobin A1c; HDL; high-density lipoprotein cholesterol; LDL, low-density lipoprotein cholesterol; SBP, systolic blood pressure.

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