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SUPPLEMENTARY INFORMATION

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You are what you eat: diet, health and the gut microbiota

Niv Zmora, Jotham Suez and Eran Elinav

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Supplementary table 1 | Diet–microbiome–host interactions

Ref	Organism	Diet, nutrient or feeding pattern	Microbiota member(s)	Phenotype	Causative/associative	Method(s) of confirmation
1	Mouse	HFD, NC	Various bacteria	Weight gain	Causative	GF mice
2	Mouse	HFD	Various bacteria *(Down: Lactobacillus* spp., *Bifidobacterium* spp., *Bacteroides/Prevotella* spp.)	Glucose intolerance, weight gain, adiposity	Causative	Antibiotics
3	Mouse	HFD	Decrease in Bacteroides-like bacteria, Eubacterium rectale-Clostridium coccoides group and bifidobacteria	Obesity, diabetes, insulin resistance	Associative	
4	Mouse	HFD	Various bacteria	Random plasma glucose and GTT	Causative	FMT in GF mice
5	Mouse	HFD	Up: Firmicutes, Down: Proteobacteria	Weight gain, increased adiposity	Associative	
6	Mouse	HFD	Up: Firmicutes, *Ruminococcaceae*, *Rikenellaceae*, Down: Bacteriodetes, Proteobacteria, *Bacteroidaceae*, Clostridiales, *Provotellaceae*	Weight gain, increased adiposity	Associative	
7	Mouse	HFD	Down: Bacteroidetes, Up: Firmicutes, Proteobacteria	Weight gain	Causative	KO model
8	Rat	HFD	Up: Firmicutes, Down: Bacteroidetes	Hyperphagia, obesity	Causative	Antibiotics, FMT in GF mice, metabolite supplementation
9	Mouse	HFD	Down: *Akkermansia muciniphila*	Akkermanis reverses HFD-induced fat-mass gain, metabolic endotoxemia, adipose tissue inflammation and insulin resistance	Causative	Administration of causative agent
10	Mouse	HFD	Up: *Desulfovibrio*, Down: S24–7, *Lachnospiraceae*	Exacerbated colitis	Associative	
11	Mouse	HFD	Up: Firmicutes, Deferribacteres, Down: Bacteroidetes, Actinobacteria, Proteobacteria	(KO model) Increased energy expenditure and reduced weight gain	Causative	FMT in GF mice

12	Mouse	parental HFD	Up: ratio Firmicutes/Bacteriodetes, *Lachnospiraceae*, Clostridiales	Exacerbated infection, EAE and allergic sensitization	Causative	Co-housing experiments
13	Mouse	HFD (+ parental HFD)	Up: *Tenericutes*, *Verrucomicrobia*, Down: *Coriobacteriaceae*, *Peptococcaceae*	Weight gain, fatty liver	Associative	
14	Mouse	HFD + grape polyphenols	Up: *Akkermansia muciniphila*, Down: Firmicutes/Bacteroidetes ratio	Attenuated weight gain, adiposity, serum TNF, IL-6, LPS, glucose intolerance.	Associative	
15	Mouse	HFD + milk sphingomyelin	Up: Firmicutes, *Bifidobacterium*, Down: Bacteroidetes, Actinobacteria	Altered lipid metabolism genes, reduced serum LPS	Associative	
16	Mouse	HFD + FOS	Up: *Bifidobacterium*	Reduced endotoxemia and inflammatory cytokines, improved glycemic control	Associative	
17	Mouse	HFD + GOS	Up: *S24-7*, *Parabacteroides*, Down: *Coriobacteriaceae*, *Olsenella*, *Mucispirillum*	Modulation of HFD phenotype: serum triglycerides, plasma LPS, inflammatory cytokines	Asssociative	
18	Mouse	HFD + wheat arabinoxylan	Up: *Bacteroides/Prevotella* spp., *Roseburia*, *Bifidobacterium animalis lactis*	Ameliorated effects of HFD	Associative	
19	Human, mouse	HFD, feeding time-shifted	Various bacteria	Weight gain, glucose intolerance	Causative	Antibiotics, FMT in GF mice
20	Mouse	HFD, time-restricted feeding	Down: *Lactobacillus*, *Lactococcus*, Up: *Oscillibacter*	Weight gain, glucose intolerance, increased cholesterol levels	Associative	
21	Mouse	NC, circadian clock manipulation	Various bacteria	Elevated plasma TG, FFA, insulin and glucose	Causative	Antibiotics, GF mice, KO models, metabolite deprivation
22	Mouse	HFD + vitamin D deficiency	Up: *Helicobacter hepaticus*, Down: *Akkermansia muciniphila*	Insulin resistance and NAFLD	Associative	
23	Human	HFHSD	Various bacteria	Obesity	Causative	FMT in GF mice

23	Human	HFHSD	Up: *Erysipelotrichi*	Increased adiposity	Causative	FMT in GF mice
24	Mouse	HFHSD	Up: Firmicutes, Down: Bacteroidetes	Weight gain	Associative	
25	Mouse	High-fat, high-cholesterol diet	Down: *Prevotella*	Osteomyelitis	Causative (inverse)	Antibiotics, FMT in GF mice
26	Mouse	HFHSD + FOS	Up: Bacteroidetes, Down: Firmicutes	Elevated propionate and butyrate, IGN activation, reduced weight gain, improved glycemic control	Causative	Metabolite supplementation
27	Mouse	HFHSD + cranberry extract	Up: *Akkermansia* spp.	Reduced weight gain, adiposity, improved insulin sensitivity, glucose tolerance	Associative	
28	Mouse	Western diet	Up: *Mollicutes*	Increased adiposity	Causative	FMT in GF mice
29	Human	Caloric restriction	Up: *Akkermansia muciniphila*	Improved Disse index, reduced total and LDL cholesterol, decrease in waist circumference	Associative	
30	Human	Caloric restriction	Down: *Clostridium histolyticum*, *Eubacterium rectale/Clostridium coccoides*, *Clostridium lituseburense*, Up: *Bacteroides/Prevotella*	Weight loss	Associative	
31	Human	Caloric restriction	Increase in Bacteroides fragilis, Clostridium leptum, Bifidobacterium catenulatum, decrease in Clostridium coccoides, Lactobacillus, Bifidobacterium	Weight loss	Associative	
32	Human	Caloric restriction	Down: Actinobacteria, Up: Bacteroidetes (among other)	Weight loss, insulin sensitivity	Associative	
33	Mouse	Caloric restriction	Up: *Lactobacillus*	Prolonged lifespan, decreased body weight and adiposity, improved metabolic profile	Associative	

34	Mouse	High-fiber diet	Up: *Bacteroidaceae*, *Bifidobacteriaceae*	Decreased susceptibility allergic airway inflammation, elevated SCFA	Causative	Metabolite supplementation
35	Mouse	High-fiber diet	Down: *Bacteroidiaceae*	Chemically-induced colitis	Causative (inverse)	FMT in GF mice, metabolite supplementation
36	Human	high-fibre diet	Up: *Coprococcus*, *Prevotella* and *Catenibacterium*	Frailty in elderly	Associative (inverse)	
37	Mouse	AhR ligands (cruciferous vegetables)	(in KO model) Up: Bacteroidetes phylum, bacterial load	Exacerbated colitis	Associative (inverse)	KO model, metabolite supplementation and deprivation
38	Human	Fiber-deprived diet	Up: *Akkermansia muciniphila*, *Bacteroides caccae*, Down: *Bacteroides ovatus*, *Eubacterium rectale*	Mucus degradation, susceptibility to infection, weight loss	Causative	FMT in GF mice
39	Mouse	Flavonoids	Various bacteria	Accelerated weight regain	Causative (inverse)	Antibiotics, FMT to GF mice, metabolite supplementation
40	Human	Grain supplementation	Up: Firmicutes/Bacteroidetes ratio, *Blautia*, *Bifidobacterium*, *Dialister*, *Eubacterium rectale*, *Roseburia faecis*, *Roseburia intestinalis*	Reduced plasma IL-6, reduced postprandial glucose	Associative	
41	Mouse	Low carbohydrate diet	Down: *Clostridiaceae*, *Lachnospiraceae*, *Ruminococcaceae*, *Coprococcus*, *Roseburia*, *Anaerotruncus*	Reduced polyp frequency in CRC susceptible mice, reduced butyrate	Associative	
42	Human	Low-fat, high carbohydrate-diet, high glycemic index-diet	Up: *Bifidobacterium*, *Bacteroides*	Weight loss, reduced fasting glucose and cholesterol	Associative	
43	Human	Malawian diet	Up: Caudovirales order, *Inoviridae* family	Weight loss	Causative	FMT in GF mice
44	Human	Malawian diet + bovine milk oligosaccharides	25 distinct strains derived from Malawian microbiota	Anabolism in infancy	Causative	FMT in GF mice and piglets

45	Human	Malawian diet	Up: *Bilophila wadsworthia*, members of *Desulfovibrio*, *Clostridium innocuum*	Weight loss	Causative	FMT in GF mice
45	Human	Malawian diet + therapeutic food	Up: *Bifidobacterium*, *Lactobacillus*, *Ruminococcus*, *Faecalibacterium prausnitzii*, Down: Bacteroidales	Weight gain	Associative	
46	Mouse	Malnutrition + inulin	Up: *Lactobacillus*	Ameliorate giardiasis	Associative	
47	Human	Dietary emulsifiers	Up: Proteobacteria, *Enterobacteriaceae*, Down: *Bacteroidaceae*	Elevated fasting glucose, LPS, faecal Lcn2 levels, shortened thickened colons, mild splenomegaly, increased adiposity	Causative	FMT in GF mice
48	Mouse	Dietary emulsifiers	Down: Bacteroidales, Up: *Ruminococcus gnavus*; Up: *Akkermansia muciniphila* in IL10 KO mice	Low-grade inflammation and adiposity	Causative	FMT in GF mice
49	Human, mouse	NAS	Up: Bacteroidales, *Bacteroides*, Down: Clostridiales, *Clostridium*	Glucose intolerance, elevated acetate and propionate	Causative	Antibiotics, FMT in GF mice, in vitro culture
50	Mouse	Sucralose	Down: *Clostridium* cluster XIVa	Increased hepatic cholesterol and cholic acid, luminal butyrate and secondary/primary bile acids ratio	Associative	
51	Mouse	Saccharin	Up: *Corynebacterium*, *Roseburia*, *Turicibacter*, Down: *Ruminococcus*, *Adlercreutzia, Dorea*	Elevated hepatic iNOS, TNF	Associative	
52	Rat	Aspartame + HFD / NC	(NC) Up: total bacteria, *Enterobacteriaceae*, *Clostridium leptum*, (HFD) Up: *Roseburia* spp., Down: Firmicutes/Bacteroidetes ratio	Impaired glucose and insulin sensitivity	Associative	
53	Rat	Splenda (sucralose-glucose-maltodextrin)	Down: total anaerobes, *Bifidobacterium*, *Lactobacillus*, *Bacteroides*, *Clostridium*	Weight gain	Associative	
54	Mouse	Increased omega-3 : omega-6 fatty	Up: Proteobacteria, *Prevotella*, *Fusobacterium*, *Clostridium* cluster XI, SFB, Down: *Bifidobacterium*, *Akkermansia muciniphila*, *Lactobacillus*, *Clostridium*	Metabolic endotoxemia	Causative (inverse)	Antibiotics, co-hosing experiments

		acids ratio	clusters IV and XIVa, *Enterococcus faecium*			
55	Mouse	Saturated fat	Up: *Bacteroides*, *Turicibacter*, *Bilophila*	Weight gain, increased fasting insulin and glucose levels, insulin resistance	Causative	KO models, FMT in GF mice, pathway inhibitor
56	Mouse	Palmitate	Down: *Prevotellaceae*, *S24-7*	EAE, decrease in SCFA	Causative	FMT in GF mice, metabolite supplementation
57	Human	Saturated fat	Up: *Anaerotruncus*, *Desulfovibrio* and *Coprobacillus*	Frailty in elderly	Associative	
57	Mouse	Saturated fat	Up: *Bilophila wadsworthia*	Genetically-induced colitis	Associative	
58	Mouse	Linoleic acid	Up: *Bacteroides/Prevotella*, *Akkermansia*	Elevated stomach leptin protein, elevated stomach gene expression	Associative	
59	Human, mouse	*L-carnitine*	Various bacteria	Atherosclerosis	Causative	Antibiotics, metabolite supplementation
60	Mouse	TMAO, choline	Up: *Allobaculum*, Down: SFB, *Lachnospiraceae*	Platelet hyperreactivity, enhanced thrombosis	Causative	FMT in GF mice
61	Human	Choline levels manipulation	Down: Gammaproteobacteria	Increase in liver fat	Asociative	
62	Mouse	Low-nitrite/nitrate diet	Up: Actinobacteria, Bifidobacteriales, Down: Betaproteobacteria, Burkholderiales, Bacillales (among others)	Metabolic syndrome	Associative	
63	Mouse	Vitamin D-deficient diet	Up: Bacteroidetes	Severity of infectious and chemically-induced colitis	Associative	
64	Human	Vitamin D-deficient diet	Up: *Prevotella*, Down: *Haemophilus*, *Veillonella*	Increased LPS	Associative	
65	Mouse	Vitamin D-deficient diet	Up: Bacteroidetes, Firmicutes, Actinobacteria, Gammaproteobacteria	Severity of infectious colitis	Associative	

66	Mouse	Selenium-deficient diet	*Coxsackievirus* B3	Myocarditis	Associative	
67	Mouse	Heme	Up: *Akkermansia muciniphila*	Differential expression of oncogenes, tumor suppressors, epithelial proliferation	Causative	Antibiotics
68	Mouse	Iron sulfate	Up: *Bifidobacterium*, *Succinivibrio*, *Turicibacter*, *Clostridium*, Down: *Desulfovibrio*, *Bacteroides*	Terminal ileitis	Associative	
69	Mouse	Elemental diet	*Nippostrongylus brasiliensis*, *Giardia muris*	Exacerbted infection, mucosal damage	Associative	
70	Mouse	Acesulfame-potassium	Up: *Bacteroides, Anaerostipes* and *Sutterella*	Weight gain, increase in LPS synthesis genes, increase pyruvic acid, cholic acid in feces	Associative	
71	Human	Long-stay care diet	Various bacteria	Frailty in elderly	Associative	
72	Human	Vegetable/fruit juice restricted diet	Up: Bacteroidetes, Cyanobacteria, Down: Firmicutes, Proteobacteria	Reduced body weight, increased plasma and urine nitric oxide	Associative	
73	Rat	Pterostilbene	Down: Firmicutes, Up: *Akkermansia, Odoribacter*	Reduced weight gain, adipocity, insulin resistance and cholesterol	Associative	
74	Human	Synbiotic (FOS/inulin mix, Bifidobacterium longum)	Up: *Bifidobacterium longum*	Reduced sigmoidoscopy score, reduced inflammatory markers, reduced beta-defensins	Associative	
75	Human	Barley-kernel bread	Up: *Prevotella copri*	Improved postprandial glucose metabolism	Causative	GF colonized with causative agent
76	Human	Personally-tailored diet	Up: *Roseburia inulinivorans*, *Eubacterium eligens*, *Bacteroides vulgatus*, *Alistipes puterdinis*, Down: *Anaerostipes*	Improved glycemic response	Associative	

A list of prominent studies linking dietary practices, nutrient deprivation or supplementation or dietary patterns with members of the microbiota and an observed phenotype in the host. The column "Organism" displays the host which originally harboured the studied microbiota (can be different than the experimental animal in cases of gnotobiotic models). "Microbiota members" includes the major taxa which differed between the interventional group to control or before and after treatment, where "Up:" indicates taxa which were relatively more abundant or that increased following intervention, and "Down:" indicates taxa which were less adundant or that decreased following intervention. The column "Phenotype" usually refers to observed clinical features. "Causative / associative" indicates the nature of the link found between the diet and the microbiota to the phenotype (if an inverse correlation is found or if the phenotype is attenuated by the diet and the microbiota, the word "inverse" appears in brackets). "Methods of confirmation" are specified in case of a causative interactions. CRC, colorectal cancer; EAE, Experimental autoimmune encephalomyelitis; FFA, free-fatty acids; FMT, faecal microbiota transplantation; FOS, fructooligosaccharides; GF, germ-free; GTT, glucose tolerance test; HFD, high-fat diet; HFHSD, high-fat high-sugar diet; IGN, intestinal gluconeogenesis; IL, interleukin; iNOS, Inducible nitric oxide synthase; KO, knock-out; LPS, lipopolysaccharide; NAS, non-caloric artificial sweeteners; NC, normal chow; SCFA, short-chain fatty acids; TG, triglycerides; TMAO, trimethylamine oxide; TNF, tumor necrosis factor.

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