

Supplementary Data 13

Reference	Intervention	Study Subjects and Design	Major Findings
Frost et al. [3]	Complex weight loss program	Low-calorie formula diet for six weeks, followed by nine weeks of food reintroduction in type 2 diabetic patients, N = 12.	<ul style="list-style-type: none"> All participants lost weight during the program. Phylogenetic diversity increased parallel to weight loss. <i>Collinsella</i> abundance significantly decreased by end of the study compared to baseline.
Ozkul et al. [4]	Ramadan fasting	Ramadan fasting in healthy subjects, N = 9.	<ul style="list-style-type: none"> Ramadan fasting did not alter alpha diversity (Shannon index) or phylogenetic diversity, but significantly changed the gut microbiome between baseline and after 29 days, according to unweighted UniFrac analysis. Ramadan fasting resulted in the enrichment of <i>Butyrivicoccus</i>, <i>Bacteroides</i>, <i>Faecalibacterium</i>, <i>Roseburia</i>, <i>Allobaculum</i>, <i>Eubacterium</i>, <i>Dialister</i> and <i>Erysipelotrichici</i>, compared to baseline.
Louis et al. [5]	Complex weight loss program	Multidisciplinary weight-loss program lasting for 52 weeks followed by 12 months of follow-up in MetS/obese patients (N = 9, 7, respectively).	<ul style="list-style-type: none"> At species level no significant difference could be observed between baseline and 24 months, yet at genera level <i>Akkermansia</i> was enriched significantly at 24 months compared to baseline. Patients with persistent weight loss success were enriched at baseline in <i>Alistipes</i>, <i>Pseudoflavonifractor</i>.
Velikonja et al. [6]	Beta-glucan supplementation for four weeks	Double blind, placebo-controlled study involving patients with MetS/ high risk for MetS, N = 43.	<ul style="list-style-type: none"> Beta-glucan group significantly decreased the total cholesterol. Body weight significantly decreased in both groups. Fecal propionate increased in the beta-glucan group. In the beta-glucan group fecal diversity and richness (Chao, Shannon, respectively) decreased upon intervention. Cholesterol responders showed a higher baseline abundance of <i>Akkermansia muciniphila</i> and <i>Bifidobacterium</i> spp.
Roager et al. [7]	Whole grain vs. refined grain dietary intervention	Crossover clinical study with patients at risk of developing MetS with 8 weeks of intervention and 8 weeks of subsequent wash-out, N = 60.	<ul style="list-style-type: none"> Intervention did not alter glucose homeostasis or fecal microbiome. Whole grain diet significantly decreased body weight compared to refined grain diet. The whole grain intervention induced weight loss, and decreased serum IL-6 and CRP.

Liu et al. [8]	db/db mouse experiment	28 days of intermittent fasting in rodents.	<ul style="list-style-type: none"> • Intermittent fasting decreased obesity-induced cognitive impairment and insulin resistance. • Alpha diversity significantly increased and significantly changed beta-diversity • Intermittent fasting improved Lactobacillus and the butyrate-producer <i>Odoribacter</i> abundances, meanwhile reduced the abundance of <i>Enterococcus</i>, <i>Streptococcus</i> and an unknown <i>Enterococcaceae</i>.
Kopf et al. [9]	Whole grain, fruit-vegetable supplementation vs. refined grain diet, 3 servings/day	Randomized, parallel arm study, involving overweight or obese patients, N = 49.	<ul style="list-style-type: none"> • Whole grain and fruit-vegetable diet both decreased the level of serum lipopolysaccharide binding protein, and increased alpha diversity. • Fruit-vegetable and whole grain diet decreased serum IL-6 and TNFα levels, respectively, and these changes were correlated with the baseline microbiome composition. • Fruit-vegetable group increased alpha diversity. • BMI did not change significantly in any groups at the end of the study compared to baseline.
Guevara-Cruz et al. [10]	Complex weight loss, low saturated fat, 500 kcal/day dietary intervention	75-day long complex weight loss intervention program involving a MetS subpopulation of a cross-sectional study, N = 146.	<ul style="list-style-type: none"> • Intervention significantly decreased gut dysbiosis and increased the abundance of <i>Akkermansia muciniphila</i> and <i>F. parusnitzii</i> and with a reduction of <i>Prevotella/Bacteroides</i> ratio. • The intervention improved the clinical phenotype; blood pressure, BMI, waist circumference, HOMA, HbA1c, LDL-c, glucose intolerance, LPS, BCAA decreased.