**Supplementary material**

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# Figures

## Figure S1. Summary of the process for selecting studies that investigated the effect of an intervention with restriction of carbohydrate, fat or protein on the human gut microbiome.

**Identification of studies via databases**

Records removed *before screening*:

Duplicate records removed (n = 100)

Records identified

(n = 1178)

**Identification**

Records excluded

(n = 938)

Records screened

(n = 1078)

Reports not retrieved

(n = 4)

**Screening**

Reports sought for retrieval

(n = 140)

Reports excluded

(n = 100)

* 23 Protocols
* 20 Comments/meeting abstracts
* 5 Full-text not accessible or not in English
* 26 Wrong intervention
* 14 Wrong outcome measures
* 8 Wrong study design
* 4 Wrong population

Reports assessed for eligibility

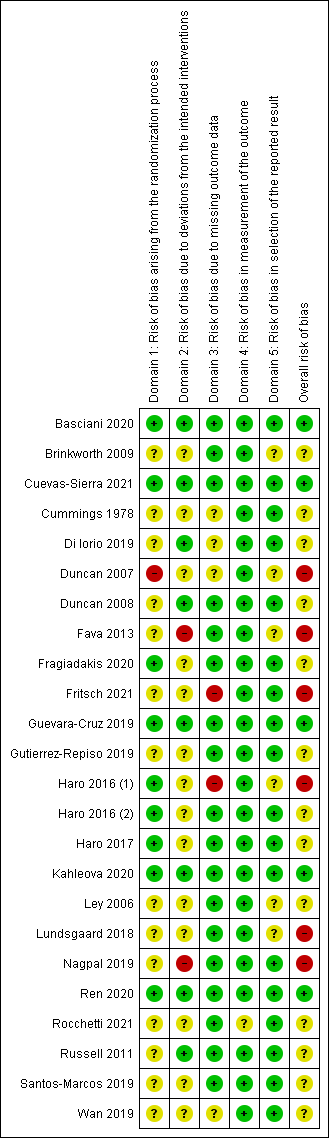
(n = 136)

Studies included in review

(n = 36)

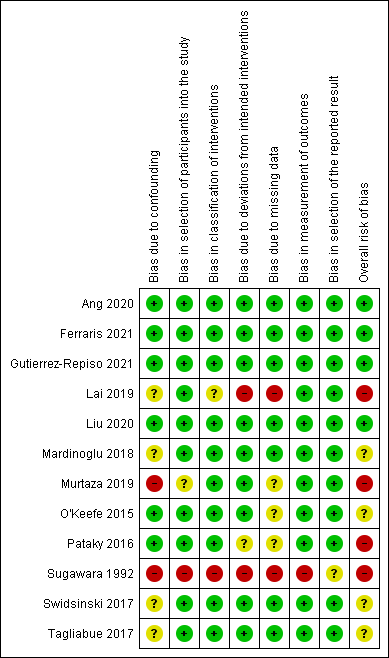
**Included**

## Figure S2. Risk of bias judgement of included randomised trials



Trials are assessed with the Cochrane risk-of-bias tool for randomised trials (RoB 2) on the risk of bias on several domains. The overall risk of bias is displayed in the rightmost column. Green circles indicate low risk, yellow circles indicate moderate risk, and red circles indicate high risk of bias.

## Figure S3. Risk of bias judgement of included non-randomised trials



Trials are assessed with the Cochrane risk-of-bias tool for non-randomised trials (ROBINS-I) on the risk of bias on several domains. The overall risk of bias is displayed in the rightmost column. Green circles indicate low risk, yellow moderate risk, and red high risk of bias.

# Tables

## Table S1. Change in the relative abundance of gut bacteria after a low-carbohydrate diet compared to baseline

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  | **Author** | **Ang** | **Basciani** | **Brinkworth** | **Duncan** | **Duncan** | **Fragiadakis** | **Gutierrez-Repiso** | **Ley** | **Lundsgaard (PUFA group)** | **Lundsgaard (SFA group)** | **Mardinoglu** | **Murtaza** | **Nagpal** | **O'Keefe** | **Pataky** | **Russell** | **Swidsinski** | **Tagliabue** |
|  |  |  |  |  | **Year** | **2020** | **2020** | **2009** | **2008** | **2007** | **2020** | **2021** | **2006** | **2018** | **2018** | **2018** | **2019** | **2019** | **2015** | **2016** | **2011** | **2017** | **2016** |
| ***Phylum*** | ***Class*** | ***Order*** | ***Family*** | ***Genus*** | ***Species*** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| ***Actinobacteria***  ***(Actinomycetota)*** |  |  |  |  |  | **↓** | **=** |  |  |  |  |  |  |  |  |  |  | **=** |  |  |  |  |  |
| *Actinobacteria* | *Actinomycetales* | *Actinomycetaceae* | *Mobiluncus* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **↓** |  |
| *Microbacteriaceae* | *Clavibacter* |  |  |  |  |  |  |  |  |  |  |  | **↑** |  |  |  |  |  |  |  |
| *Bifidobacteriales* | *Bifidobacteriaceae* |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **↓** |  |  |  |  |  |
| *Bifidobacterium* |  |  |  | **↓** | **↓** | **=** |  |  |  | **↓** | **=** | **↓** |  | **↓** |  |  |  | **↓** | **=** |
| *B. bifidum* |  |  |  |  |  |  |  |  |  |  | **↓** |  |  |  |  |  | **=** |  |
| *B. longum* |  |  |  |  |  |  |  |  |  |  | **↓** |  |  |  |  |  | **=** |  |
| *Parascardovia* |  |  |  |  |  |  |  |  |  |  |  | **↓** |  |  |  |  |  |  |  |
| *Eubacteriaceae* | *Eubacterium* |  |  |  |  |  |  |  |  |  |  |  | **↓** |  |  |  |  |  |  |  |
| *E. cylindroides* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **↓** |  |
| *E. hallii* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **↑** |  |
| *E. ramulus* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **↑** |  |
| *Coriobacteriales* | *Coriobacteriaceae* |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **=** |  |  |  |  |  |
| *Coriobacterium* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **↓** |  |
| *Eggerthella* |  |  |  |  |  |  |  |  |  |  |  | **↑** |  |  |  |  |  |  |  |
| *Actinomycetales* | *Corynebacterineae* | *Mycobacteriaceae* | *Mycobacterium* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **=** |  |
| *Coriobacteriia* | *Coriobacteriales* | *Coriobacteriaceae* | *Atopobium* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **=** |  |
| *Slackia* |  |  |  |  |  |  |  |  |  |  |  |  |  | **=** |  |  |  |  |  |
| ***Bacteroidetes***  ***(Bacteroidota)*** |  |  |  |  |  | **↑** | **=** |  |  |  | **↑** |  | **↑** |  |  |  |  |  |  |  |  |  | **=** |
| *Bacteroidia* |  |  |  |  |  |  |  |  |  | **↑** |  |  |  |  |  |  |  |  |  |  |  |  |
| *Bacteroidales* |  |  |  |  |  |  |  |  | **↑** |  |  |  |  |  |  |  |  |  |  |  |  |
| *Bacteroidaceae* |  |  |  |  |  |  |  | **↑** |  |  |  |  |  |  |  |  |  |  |  |  |
| *Bacteroides* |  |  |  |  | **=** |  | **↑** |  |  | **↑** | **=** |  | **↑** |  |  | **↓** | **↓** | **=** |  |
| *B. fragilis* |  |  |  |  |  |  |  |  |  |  |  |  |  | **↑** |  |  |  |  |
| *B. putredenis* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **=** |  |
| *B. uniformis* |  |  |  |  |  |  |  |  |  |  |  |  |  | **↑** |  |  |  |  |
| *Prevotella* |  | **↑** |  |  |  |  |  |  |  |  |  |  |  | **=** |  |  |  |  |  |
| *P. nigrescens* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **=** |  |
| *Bacteroidaceae + Prevotellaceae* | *Bacteroides + Prevotella* |  |  |  |  |  | **=** |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *Odoribacteraceae* |  |  |  |  |  |  |  | **↑** |  |  |  |  |  |  |  |  |  |  |  |  |
| *Butyricimonas* |  |  |  |  |  |  | **↑** |  |  |  |  |  |  |  |  |  |  |  |  |
| *Prevotellaceae* |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **=** |  |  |  |  |  |
| *Porphyromonadaceae* |  |  |  |  |  |  |  | **↑** | **↑** |  |  |  |  |  |  |  |  |  |  |  |
| *Rikenellaceae* |  |  |  |  |  |  |  | **↑** | **↑** |  |  |  |  |  |  |  |  |  |  |  |
| *Alistipes* |  |  |  |  |  |  |  | **↑** |  |  |  |  |  |  | **↓** |  |  |  |  |
| *A. onderdonkii* |  |  |  |  |  |  | **↑** |  |  |  |  |  |  |  |  |  |  |  |
| *Tannerellaceae* | *Parabacteroides* |  |  |  |  |  |  | **↑** | **↑** |  |  |  |  |  |  |  | **↓** |  |  |  |
| *P. distansonis* |  |  |  |  |  |  | **↑** |  |  |  |  |  |  |  |  |  |  |  |
| ***Firmicutes***  ***(Bacillota)*** |  |  |  |  |  | **↓** | **↓** |  | **=** |  |  |  | **↓** |  |  |  |  |  |  |  |  |  | **=** |
| *Bacilli* | *Bacillales* | *Listeriaceae* | *Listeria* |  |  |  |  |  |  |  |  |  |  |  | **↑** |  |  |  |  |  |  |  |
| *Planococcaceae* | *Sporosarcina* |  |  |  |  |  |  |  |  |  |  |  | **↓** |  |  |  |  |  |  |  |
| *Staphylococcaceae* | *Staphylococcus* |  |  |  |  |  |  |  |  |  |  |  | **↑** |  |  |  |  |  |  |  |
| *Macrococcus* |  |  |  |  |  |  |  |  |  |  |  | **↑** |  |  |  |  |  |  |  |
| *Lactobacillales* | *Enterococcaceae* | *Tetragenococcus* |  |  |  |  |  |  |  |  |  |  |  | **↑** |  |  |  |  |  |  | **=** |
| *Lactobacillaceae* | *Lactobacillus* |  |  |  | **=** |  |  |  | **↓** |  |  |  |  |  |  |  |  |  |  | **=** |
| *L. rogosae* |  |  |  |  |  |  | **↓** |  |  |  |  |  |  |  |  |  |  |  |
| *Weissella* |  |  |  |  |  |  |  |  |  |  |  | **↑** |  |  |  |  |  |  |  |
| *Lactobacillaceae + Enterocollaceae* | *Lactobacillus+Enterococcus* |  |  |  |  |  | **=** |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *Streptococcaceae* | *Lactococcus* |  |  |  |  |  |  |  |  |  |  |  | **↑** |  |  |  |  |  |  |  |
| *Streptococcus* |  |  |  |  |  |  |  |  |  |  |  | **↑** |  |  |  |  |  | **=** |  |
| *Clostridia* | *Eubacteriales* | *Clostridiaceae* |  |  |  |  |  |  |  |  | **↑** |  |  |  |  |  |  |  |  |  |  |  |
| *Butyricicoccus* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **↑** |  |  | **=** |
| *Clostridium* |  |  |  |  |  |  |  | **↑** |  |  |  | **↓** |  |  |  |  |  |  |  |
| *C. difficile* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **=** |  |
| *C. histolyticum* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **=** |  |
| *C. lituseburense* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **=** |  |
| *C. nexile (et rel)* |  |  |  |  |  |  |  |  |  |  |  |  |  | **↑** |  |  |  |  |
| *C. orbiscindens (et rel)* |  |  |  |  |  |  |  |  |  |  |  |  |  | **↑** |  |  |  |  |
| *C. perfringens* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **=** |
| *C. viride* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **↑** |  |
| *Christensenellaceae* |  |  |  |  |  |  |  |  | **↑** |  |  |  |  |  |  |  |  |  |  |  |
| *Eubacteriaceae* | *Eubacterium* | *E. rectale* |  |  |  | **↓** |  |  |  |  |  |  |  |  |  |  |  |  | **↑** |  |
| *E. ventriosum* |  |  |  |  |  |  | **↓** |  |  |  |  |  |  |  |  |  |  |  |
| *Roseburia + Eubacterium* |  |  |  |  |  | **↓** |  |  |  |  |  |  |  |  |  |  | **↓** |  |  |
| *Eubacteriales incertae sedis* | *Intestinimonas* |  | **↑** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *Lachnospiraceae* |  |  | **↓** |  |  |  |  |  | **↓** |  |  |  |  |  |  |  |  | **=** |  |  |
| *Blautia* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **↑** |  |  |  |
| *B. luti* |  |  |  |  |  |  | **↓** |  |  |  |  |  |  |  |  |  |  |  |
| *Butyrivibrio* |  |  |  |  |  |  |  |  |  |  |  | **↓** |  |  |  |  |  |  |  |
| *B. crossotus (et rel)* |  |  |  |  |  |  |  |  |  |  |  |  |  | **=** |  |  |  |  |
| *Clostridium* | *C. colinum (et rel)* |  |  |  |  |  |  |  |  |  |  |  |  |  | **↑** |  |  |  |  |
| *Coprococcus* |  |  |  |  |  |  |  |  |  |  |  | **↓** |  |  |  |  |  |  |  |
| *C. eutactus* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **=** |  |
| *Dorea* |  |  |  |  |  |  |  | **↑** |  |  |  |  | **↑** |  |  |  |  |  |  |
| *D. formicigenerans (et rel)* |  |  |  |  |  |  | **↓** |  |  |  |  |  |  | **↑** |  |  |  |  |
| *D. longicatena* |  |  |  |  |  |  | **↑** |  |  |  |  |  |  |  |  |  |  |  |
| *Lachnobacterium* |  |  |  |  |  |  |  |  |  |  |  |  |  | **=** |  |  |  |  |  |
| *Lachnospira* |  |  |  |  |  |  | **↑** |  |  | **↑** | **=** |  |  |  |  | **↓** |  |  |  |
| *Roseburia* |  |  |  |  | **↓** |  |  | **↓** |  |  |  |  |  |  |  |  |  |  |  |
| *R. faecis* |  |  |  |  |  |  | **↓** |  |  |  |  |  |  |  |  |  |  |  |
| *R. inulinivorans* |  |  |  |  |  |  | **↓** |  |  |  |  |  |  |  |  |  |  |  |
| *R. intestinales* |  |  |  |  |  |  | **↓** |  |  |  |  |  |  |  |  |  |  |  |
| *Shuttleworthia* |  |  |  |  |  |  |  |  |  |  |  | **↓** |  |  |  |  |  |  |  |
| *Cluster XIVa+b* |  |  |  |  |  | **=** |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *Peptostrepococcaceae* | *Intestinibacter* |  | **↑** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *Peptostreptococcus* |  |  |  |  |  |  |  |  |  |  |  | **↓** |  |  |  |  |  |  |  |
| *Oscillospiraceae* |  |  | **↓** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *Faecalibacterium* |  |  |  |  |  |  |  |  |  |  |  |  | **↓** |  |  |  |  |  |  |
| *F. prausnitzii* |  |  |  |  | **=** |  |  |  |  |  |  |  |  |  |  | **=** | **↑** | **=** |
| *Flavonifractor* |  | **↑** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *Oscillibacter* | *Oscillibacter sp* |  |  |  |  |  |  | **↓** |  |  |  |  |  |  |  |  |  |  |  |
| *Ruminococcus* |  |  |  |  |  |  |  |  |  |  |  | **↓** |  |  |  |  |  |  |  |
| *R. albus* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **=** |  |
| *R. bromii* |  |  |  |  |  |  | **↓** |  |  |  |  |  |  |  |  |  |  |  |
| *R. bromii + R. flavefaciens* |  |  |  |  | **=** |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *R. obeum (et rel)* |  |  |  |  |  |  |  |  |  |  |  |  |  | **=** |  |  |  |  |
| *R. obeum-like* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **=** |  |
| *R. productus* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **↑** |  |
|  | *Cluster IX* |  |  |  |  |  | **=** |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *Cluster XI* | *A. odorimutans (et rel)* |  |  |  |  |  |  |  |  |  |  |  |  |  | **↑** |  |  |  |  |
| *Cluster XIV* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **=** |
| *Cluster XIVa and XIVb and Roseburia and eubacterium* |  |  |  |  |  | **↑** |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | *Uncultured clostridiales II* |  |  |  |  |  |  |  |  |  |  |  |  |  | **↑** |  |  |  |  |
| *Erysipelotrichia* | *Erysipelotrichales* | *Erysipelotrichaceae* | *Eubacterium* | *E. biforme (et rel)* |  |  |  |  |  |  |  |  |  |  | **↓** |  |  |  |  |  |  |  |
| *Erysipelatoclostridium* |  | **↑** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *Feacalitalea* |  | **↑** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *Firmicutes sensu stricto incertae sedis* |  |  | *Negativibacillus* |  | **↓** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *Negativicutes* | *Acidaminococcales* | *Acidaminococcaceae* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **=** |  |
| *Phascolarctobacterium* | *P. faecium* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **=** |  |
| *Selenomonadales* | *Selenomonadaceae* | *Megamonas* |  | **↑** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *Veillionellales* | *Veillonellaceae* | *Dialister* |  | **↓** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *Megasphaera* |  |  |  |  |  |  |  |  |  |  |  | **↓** |  |  |  |  |  |  |  |
| *Veillonella* |  |  |  |  |  |  |  |  |  |  |  | **↓** |  |  |  |  |  | **=** |  |
| *Tissierellia* | *Tissierelliales* | *Peptoniphilaceae* | *Parvimonas* |  |  |  |  |  |  |  |  |  |  |  | **↑** |  |  |  |  |  |  |  |
| ***Fusobacteria***  ***(Fusobacteriota)*** | *Fucobacteriia* | *Fusobacteriales* | *Fusobacteriaceae* | *Fusobacterium* |  | **↑** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| ***Proteo bacteria***  ***(Pseudomonadota)*** |  |  |  |  |  | **↑** | **=** |  |  |  |  |  |  |  |  |  |  | **=** |  |  |  |  |  |
| *Betaproteobacteria* |  |  |  |  |  |  |  |  |  | **↑** |  |  |  |  |  |  |  |  |  |  |  |  |
| *Burkholderiales* |  |  |  |  |  |  |  |  | **↑** |  |  |  |  |  |  |  |  |  |  |  |  |
| *Alcaligenaceae* |  |  |  |  |  |  |  | **↑** |  |  |  |  |  |  |  |  |  |  |  |  |
| *Burkholderiaceae* | *Burkholderia* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **=** |  |
| *Burkholderiales genera incertae sedis* | *Sphaerotilus* | *S. natans* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **↑** |  |
| *Sutterellaceae* | *Parasutterella* |  | **↑** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *Deltaproteobacteria* |  |  |  |  |  |  |  |  |  | **↑** |  |  |  |  |  |  |  |  |  |  |  |  |
| *Desulfovibrionales* |  |  |  |  |  |  |  |  | **↑** |  |  |  |  |  |  |  |  |  |  |  |  |
| *Desulfovibrionaceae* |  |  |  |  |  |  |  | **↑** |  |  |  |  |  |  |  |  |  |  |  |  |
| *Bilophila* |  |  |  |  |  |  | **↑** |  |  |  |  |  |  |  |  |  |  |  |  |
| *Desulfovibrio* |  |  |  |  |  |  | **↑** |  |  |  |  |  |  |  |  |  |  |  | **↑** |
| *Epsilonproteobacteria* | *Campylobacterales* | *Campylobacteraceae* | *Campylobacter* |  |  |  |  |  |  |  |  |  |  |  | **↓** |  |  |  |  |  |  |  |
| *Gammaproteobacteria* | *Enterobacteriales* | *Enterobacteriaceae* |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **=** |  |  |  | **=** | **=** |
| *Escherichia* |  | **↑** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *E. coli* |  |  | **=** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| ***Tenericutes***  ***(Mycoplasmatota)*** | *Mollicutes* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **=** |  |  |  |  |  |
| ***Verruco microbia***  ***(Verruco***  ***microbiota)*** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **=** |  |  |  |  |  |
| *Verrucomicrobiae* | *Verrucomicrobiales* | *Akkermansiaceae* | *Akkermansia* |  |  |  |  |  |  |  |  |  |  |  |  |  | **=** |  |  |  | **=** |  |
| *A. muciniphila* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **=** |  |
| *Verrucomicrobiaceae* |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **=** |  |  |  |  |  |
| *Verrucomicrobium* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **=** |  |

## Table S2. Change in the relative abundance of gut bacteria after a low-fat diet compared to baseline

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  | **Author** | **Cuevas-Sierra** | **Cummings** | **Fava** | **Fava** | **Fragiadakis** | **Fritsch** | **Gutierrez-Repiso** | **Gutierrez-Repiso** | **Haro** | **Haro** | **Haro** | **Haro** | **Haro** | **Haro** | **Kahleova** | **Ley** | **Liu** | **Murtaza** | **Murtaza** | **Nagpal** | **O'Keefe** | **Ren** | **Santos-Marcos** | **Santos-Marcos** | **Wan** |
|  |  |  |  |  | **Year** | **2021** | **1978** | **2013** | **2013** | **2020** | **2021** | **2019** | **2021** | **2015** | **2015** | **2016** | **2017** | **2017** | **2017** | **2020** | **2006** | **2020** | **2019** | **2019** | **2019** | **2015** | **2020** | **2019** | **2019** | **2019** |
|  |  |  |  |  | **Note** |  |  | **HGI** | **LGI** |  |  |  |  | **MetS** | **Non-MetS** |  | **MetS-OB** | **NonMetS-OB** | **NonMetS-nonOB** |  |  |  | **non-periodised** | **periodised** |  |  |  | **Women** | **Men** |  |
| ***Phylum*** | ***Class*** | ***Order*** | ***Family*** | ***Genus*** | ***Species*** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| ***Actinobacteria***  ***(Actinomycetota)*** |  |  |  |  |  |  |  |  |  | **↓** | **↑** |  |  |  |  |  |  |  |  | **=** |  |  |  |  | **=** |  |  |  |  |  |
| *Actinomycetia* | *Corynebacteriales* | *Corynebacteriaceae* | *Corynebacterium* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **=** |  |  |  |  |  |  |  |  |
| *Micrococcales* | *Intrasporangiaceae* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **=** |  |  |  |  |  |  |  |  |
| *Actinobacteria* |  |  |  |  |  |  |  |  | **↓** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *Bifidobacteriales* |  |  |  |  |  |  |  | **↓** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *Bifidobacteriaceae* |  |  |  |  |  |  | **↓** |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **=** |  |  |  |  |  |
| *Bifidobacterium* |  |  |  | **↑** | **↑** | **↓** |  |  |  |  |  |  |  |  |  | **=** |  |  |  | **=** | **=** |  |  |  |  | **=** |
| *B. adolescentis* |  |  |  |  |  |  |  |  | **=** | **=** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *B. longum* |  |  |  |  |  |  |  |  | **=** | **=** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *Eubacteriaceae* | *Eubacterium* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **=** |  |  |  |  |  |  | **=** |  |  |  |
| *E. coprostanoligenes* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **=** |
| *E. hallii* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **=** |
| *Coriobacteriia* | *Coriobacteriales* | *Coriobacteriaceae* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **=** |  |  |  |  |  |
| *Collinsella* | *C. aerofaciens* | **↓** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *Slackia* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **=** |  |  |  |  |  |
| ***Bacteroidetes***  ***(Bacteroidota)*** |  |  |  |  |  |  |  |  |  | **↑** | **↑** |  |  |  |  |  | **↑** | **=** | **=** | **=** | **↑** |  |  |  |  |  | **=** |  |  |  |
| *Bacteroidia* |  |  |  |  |  |  |  |  | **↑** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *Bacteroidales* |  |  |  |  |  |  |  | **↑** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *Bacteroidaceae* |  |  |  |  |  |  | **↑** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *Bacteroides* |  |  | **=** | **↑** |  | **↑** |  |  |  |  |  | **=** | **↑** | **↑** | **=** |  |  |  |  |  |  |  | **=** |  |  | **=** |
| *B. clarus* | **↓** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *B. fragilis* |  |  |  |  |  |  |  |  | **=** | **=** |  |  |  |  | **↓** |  |  |  |  |  | **=** |  |  |  |  |
| *B. ovatus* |  |  |  |  |  |  |  |  |  |  | **=** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *B. plebeius* |  |  |  |  |  |  |  |  |  |  | **=** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *B. thetaiotaomicron* |  |  |  |  |  |  |  |  | **=** | **=** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *B. uniformis* |  |  |  |  |  |  |  |  |  |  | **=** |  |  |  |  |  |  |  |  |  | **=** |  |  |  |  |
| *Odoribacteraceae* | *Butyricimonas* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **↑** |  |  |  |  |  |  |  |  |
| *Odoribacter* |  |  |  |  |  |  |  |  |  |  |  | **=** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *Paludibacteraceae* | *Paludibacter* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **=** |  |  |  |  |  |  |  |  |
| *Prevotellaceae* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **=** |  |  |  |  |  |
| *Paraprevotella* |  |  |  |  |  |  |  |  |  |  |  | **=** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *Prevotella* |  |  |  |  |  |  | **↑** |  |  |  |  | **=** | **↑** | **=** | **=** | **=** |  |  |  |  | **=** |  |  |  |  | **=** |
| *Porphyromonadaceae* |  |  |  |  |  |  | **↑** |  |  | **↑** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *Parabacteroides* |  |  |  |  |  | **↑** |  |  | **↑** |  |  | **=** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *P. distasonis* |  |  |  |  |  |  |  | **↑** | **=** | **↓** | **=** | **=** | **=** | **=** |  |  |  |  |  |  |  |  |  |  |  |
| *Rikenellaceae* |  |  |  |  |  |  |  |  |  | **↑** |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **↑** | **=** |  |
| *Alistipes* |  |  |  |  |  |  |  |  | **↑** |  |  |  |  |  |  |  |  |  |  |  |  | **=** |  |  |  | **=** |
| *A. onderdonkii* |  |  |  |  |  |  |  | **↑** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *Sphingobacteriia* | *Shingobacteriales* | *Sphingobacteriaceae* | *Spinghobacterium* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **=** |  |  |  |  |  |  |  |  |
| ***Euryarchaeota*** | *Methanobacteria* | *Methanobacteriales* | *Methanobacteriaceae* | *Methanobrevibacter* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **=** |  |  |  |  |  |  |  |  |  |  |
| ***Firmicutes***  ***(Bacillota)*** |  |  |  |  |  |  |  |  |  | **↓** |  |  |  |  |  |  |  |  |  | **=** | **↓** |  |  |  |  |  | **↑** |  |  |  |
| *Bacilli* |  |  |  |  | **↑** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *Lactobacillales* |  |  |  | **↑** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *Enterococcaceae* | *Enterococcus* |  |  | **=** |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **=** |  |  |  |  |  |  |  |  |
| *Lactobacillaceae* | *Lactobacillus* |  |  | **=** |  |  |  |  |  | **↓** |  |  |  |  |  |  |  |  |  |  |  |  |  | **=** |  |  |  |
| *L rogosae* | **↓** |  |  |  |  |  |  | **↓** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *Streptococcaceae* | *Streptococcus* |  |  | **=** |  |  |  |  |  |  |  |  |  | **↓** | **=** | **=** |  |  |  |  | **=** |  |  |  |  |  | **=** |
| *Clostridia* |  |  |  |  |  | **=** |  |  | **↓** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *Eubacteriales* |  |  |  |  |  |  |  | **↓** |  |  |  |  |  |  |  |  |  |  |  | **=** |  |  |  |  |  |  |  |  |
| *Clostridiaceae* |  |  |  |  |  |  |  |  |  | **↑** |  |  |  |  |  |  |  |  |  | **=** |  |  |  |  |  |  |  |
| *Clostridium* |  |  |  |  |  |  |  |  | **↑** |  |  |  | **↓** | **=** | **=** | **=** |  |  |  |  |  |  |  |  |  |  |
| *C. nexile (et rel)* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **=** |  |  |  |  |
| *C. orbiscindens (et rel)* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **=** |  |  |  |  |
| *Undefined genus* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **↑** |  |  |  |  |  |  |  |  |
| *Christenellaceae* |  |  |  |  |  |  |  |  |  | **↑** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *Eubacteriaceae* | *Eubacterium* | *E. rectale* |  |  |  |  |  |  |  |  | **=** | **=** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *E. ventriosum* |  |  |  |  |  |  |  | **↓** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *Lachnospiraceae* |  |  |  |  |  |  | **↓** |  |  | **↓** |  |  |  |  |  |  | **↓** |  |  | **=** |  |  |  |  |  |  | **=** |
| *Anaerostipes* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **=** |  |  |  |  |  |  |  |  |  | **=** |
| *Blautia* |  |  |  |  |  | **↓** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **↑** |
| *B. luti* |  |  |  |  |  |  |  | **↓** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *Butyrivibrio* | *B. crossotus (et rel)* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **↑** |  |  |  |  |
| *Clostridium* | *C. colinum (et rel)* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **=** |  |  |  |  |
| *Coprococcus* |  |  |  |  |  |  |  |  |  |  |  | **=** |  |  |  |  |  |  |  | **=** |  |  |  |  |  |  |
| *C. eutactus* |  |  |  |  |  |  |  |  |  |  | **=** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *Dorea* |  |  |  |  |  | **↓** |  |  | **↑** |  |  | **=** |  |  |  |  |  |  |  |  |  |  |  |  |  | **=** |
| *D. formicigenerans (et rel)* |  |  |  |  |  |  |  | **↓** |  |  |  |  |  |  |  |  |  |  |  |  | **=** |  |  |  |  |
|  | *D. longicatena* |  |  |  |  |  |  |  | **↑** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *Epulopiscium* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **=** |  |  |  |  |  |  |  |  |
| *Lachnobacterium* |  |  |  |  |  |  |  |  |  |  |  | **=** |  |  |  |  |  |  |  |  | **=** |  |  |  |  |  |
| *Lachnoclostridium* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **=** |
| *Lachnospira* |  |  |  |  |  |  |  |  |  |  |  | **=** |  |  |  |  |  | **↑** |  |  |  |  |  |  |  |  |
| *L. pectinoachiza* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *Pseudobutyrivibrio* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **=** |
| *Roseburia* |  |  |  |  |  |  |  |  | **↓** |  |  | **=** | **=** | **=** | **=** | **=** |  | **=** |  |  |  |  | **↓** | **↓** | **=** | **=** |
| *R. faecis* |  |  |  |  |  |  |  | **↓** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *R. inulinivorans* |  |  |  |  |  |  |  | **↓** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *R. intestinales* |  |  |  |  |  |  |  | **↓** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *Ruminococcus* |  |  |  |  |  | **↓** |  |  |  |  |  | **=** | **=** | **=** | **=** |  |  |  |  |  |  |  | **↓** |  |  | **=** |
| *R. bromii* |  |  |  |  |  |  |  | **↓** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *R. obeum (et rel)* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **↓** |  |  |  |  |
| *Mogibacteriaceae* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **=** |  |  |  |  |  |  |  |  |
| *Oscillospiraceae* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **=** |  |  | **=** | **=** |  |  |  |  |  |  |
| *Anaerotruncus* | *A. colihominis* | **↓** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **=** |  |  |  |  |  |  |  |  |
| *Faecalibacterium* |  |  |  |  |  |  |  |  |  |  |  | **=** | **↑** | **=** | **=** |  |  |  |  |  |  |  |  |  |  | **↑** |
| *F. prausnitzii* |  |  | **=** | **↑** |  | **↑** |  |  | **=** | **=** | **↑** | **=** | **=** | **=** | **↑** |  |  |  |  |  |  |  |  |  |  |
| *Oscillibacter* | *Oscillibacter sp* |  |  |  |  |  |  |  | **↓** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *Oscillospira* |  |  |  |  |  |  |  |  |  |  |  | **=** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *O. capillosus* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *Ruminococcus* | *R. flavefaciens* |  |  |  |  |  |  |  |  | **=** | **=** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *Subdoligranulum* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **=** |
|  |  | *Peptostreptococcaceae* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **=** |  |  |  |  |  |  |  |  |
|  |  | *Romboutsia* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **=** |
| *Erysipelotrichia* | *Erysipelotrichales* | *Erysipelotrichaceae* | *Holdemania* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **↓** | **=** |  |
| *Negativicutes* | *Selenomodales* | *Selenomonadaceae* | *Megamonas* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **=** |
| *Veillonellales* | *Veillonellaceae* | *Dialister* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **↑** |  |  |  |  |  |  |  | **↓** |
| *Megasphaera* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **=** |  |  |  |  |  |  |  |  |  |  |
| ***Fusobacteria (Fusobacteriota)*** | *Fusobacteriia* | *Fusobacteriales* | *Fusobacteriaceae* | *Fusobacterium* | *F. nucleatum* |  |  |  |  |  |  |  |  | **=** | **=** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| ***Proteobacteria***  ***(Pseudomonadota)*** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **↓** |  |  |  |  | **=** |  |  |  |  |  |
| *Alphaproteobacteria* | *Rhodobacterales* | *Rhodobacteraceae* | *Paracoccus* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **=** |  |  |  |  |  |  |  |  |
| *Sphingomonadales* | *Sphingomonadaceae* | *Sphingobium* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **=** |  |  |  |  |  |  |  |  |
| *Betaproteobacteria* | *Burkholderiales* | *Sutterellaceae* | *Sutterella* |  |  |  |  |  |  |  |  |  |  |  | **=** |  |  |  |  |  |  | **=** |  |  |  |  |  |  |  |
| *S. wadsworthensis* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *Neisseriales* | *Neisseriaceae* | *Neisseria* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **=** |  |  |  |  |  |  |  |  |
| *Deltaproteobacteria* | *Desulfovibrionales* | *Desulfovibrionaceae* | *Bilophila* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **=** |  |  |  |  |  |  |
| *Desulfovibrio* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **=** | **↑** |  |
| *Epsilonproteobacteria* | *Campylobacterales* | *Camppylobacteraceae* | *Campylobacter* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **=** |  |  |  |  |  |  |  |  |
| *Helicobacteraceae* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **=** |  |  |  |  |  |  |  |  |
| *Helicobacter* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **=** |  |  |  |  |  |  |  |  |
| *Gammaproteobacteria* | *Aeromonadales* | *Aeromonadaceae* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **=** |  |  |  |  |  |  |  |  |
| *Enterobacteriales* | *Enterobacteriaceae* |  |  |  | **=** |  |  |  |  |  |  |  |  |  |  |  |  | **=** |  |  |  |  | **=** |  |  |  |  |  |
| *Escherichia-Shigella* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **=** |
|  | *Pasteurellales* | *Pasteurellaceae* | *Gallibacterium* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **=** |  |  |  |  |  |  |  |  |
|  | *Pseudomonadales* | *Pseudomonadaceae* | *Pseudomonas* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **↑** |  |  |  |  |  |  |  |  |
|  | *Mollicutes* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **=** |  |  |  |  |  |
| ***Verrucomicrobia (Verrucomicrobiota)*** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **=** |  |  |  |  |  |
| *Verrucomicrobiae* | *Verrucomicrobiales* | *Akkermansiaceae* | *Akkermansia* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **=** |  |  |  | **=** | **=** |  |  |  |  |  |
| *A. muciniphila* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **=** |  |  |  |  |  |  |  |
| *Verrucomicrobiaceae* |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **=** |  |  |  |  |  |

## Table S3. Change in the relative abundance of gut bacteria after a low-protein diet compared to baseline

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  | **Author** | **Di Iorio** | **Lai** | **Lai** | **Kahleova** |
|  |  |  |  |  | **Year** | **2019** | **2019** | **2019** | **2020** |
|  |  |  |  |  | **Note** | **amino acids** | **no inulin** | **inulin** |  |
| **Phylum** | **Class** | **Order** | **Family** | **Genus** | **Species** |  |  |  |  |
| ***Actinobacteria***  ***(Actinomycetota)*** | *Actinomycetia* | *Bifidobacteriales* | *Bifidobacteriaceae* |  |  |  | **=** | **↑** | **=** |
| *Bifidobacterium* |  |  |  |  | **=** |
| *B. adolescentis* | **=** |  |  |  |
| *B. catenulatum* | **=** |  |  |  |
| *B. pseudolongum* | **↑** |  |  |  |
| *Coriobacteriia* | *Coriobacteriales* | *Coriobacteriaceae* | *Collinsella* | *C. aerofaciens* | **↓** |  |  |  |
| *Eggerthellales* | *Eggerthellaceae* | *Eggerthella* | *E. sinensis* | **=** |  |  |  |
| ***Bacteroidetes (Bacteroidota)*** |  |  |  |  |  |  |  |  | **=** |
| *Bacteroidia* | *Bacteroidales* | *Bacteroidaceae* |  |  |  | **↑** | **↑** |  |
| *Bacteroides* | *B. coprocola* | **↑** |  |  |  |
| *B. eggerthii* | **=** |  |  |  |
| *B. fragilis* |  |  |  | **↓** |
| *B. stercoris* | **=** |  |  |  |
| *B. thetaiotaomicron* | **↑** |  |  |  |
| *B. vulgatus* | **↓** |  |  |  |
| *B. uniformis* | **↓** |  |  |  |
| *Prevotellaceae* | *Prevotella* |  |  |  |  | **=** |
| *Tannerellaceae* | *Parabacteroides* | *P. merdae* | **↓** |  |  |  |
| ***Euryarchaeota*** | *Methanobacteria* | *Methanobacteriales* | *Methanobacteriaceae* | *Methanobrevibacter* |  |  |  |  | **=** |
| *M. smithii* | **=** |  |  |  |
| ***Firmicutes***  ***(Bacillota)*** |  |  |  |  |  | **↑** |  |  | **=** |
| *Bacilli* | *Lactobacillales* | *Enterococcaceae* | *Enterococcus* | *E. durans* | **↑** |  |  |  |
| *E. lactis* | **=** |  |  |  |
| *Lactobacillaceae* |  |  | **↓** | **↓** | **↓** |  |
| *Lactobacillus* | *L. delbrueckii* | **↓** |  |  |  |
| *L. equi* | **=** |  |  |  |
| *L. fermentum* | **↓** |  |  |  |
| *L. gasseri* | **↓** |  |  |  |
| *L. intermedius* | **=** |  |  |  |
| *L. oris* | **=** |  |  |  |
| *L. salivarius* | **=** |  |  |  |
| *L. taiwanensus* | **↓** |  |  |  |
| *L. ultunensis* | **↓** |  |  |  |
| *Streptococcaceae* |  |  | **↓** |  |  |  |
| *Lactococcus* | *L. garvieae* | **↓** |  |  |  |
| *Streptococcus* | *S. anginosus* | **=** |  |  |  |
| *S. bovis* | **↓** |  |  |  |
| *S. milleri* | **=** |  |  |  |
| *S. mutans* | **↓** |  |  |  |
| *S. parasanguinis* | **↓** |  |  |  |
| *S. sobrinus* | **=** |  |  |  |
| *S. vestibularis* | **↓** |  |  |  |
| *Clostridia* | *Eubacteriales* | *Christensenellaceae* |  |  |  | **↓** | **↓** |  |
| *Clostridiaceae* |  |  |  | **↓** | **↓** |  |
| *Clostridium* |  |  |  |  | **=** |
| *C. cadaveris* | **=** |  |  |  |
| *C. perfringens* | **↓** |  |  |  |
| *Sarcina* | *S. maxima* | **↑** |  |  |  |
| *Eubacteriaceae* | *Eubacterium* |  |  |  |  | **=** |
| *E. cylindroides* | **↓** |  |  |  |
| *Lachnospiraceae* |  |  |  |  |  | **↓** |
| *Anaerostipes* |  |  |  |  | **=** |
| *Blautia* | *B. coccoides* | **↑** |  |  |  |
| *B. hydrogenotrophica* | **↑** |  |  |  |
| *B. obeum* | **=** |  |  |  |
| *B. wexlarea* | **↓** |  |  |  |
| *Coprococcus* | *C. eutactus* | **↑** |  |  |  |
| *Dorea* | *D. formicigenerans (et rel)* | **↓** |  |  |  |
| *Lachnospira* | *L. pectinoachiza* | **↑** |  |  |  |
| *Pseudobutyrivibrio* | *P. xylanivorans* | **↑** |  |  |  |
| *Roseburia* |  |  |  |  | **=** |
| *R. faecis* | **↑** |  |  |  |
| *Proteinivoraceae* | *Anaerobranca* | *A. zavarzinii* | **↓** |  |  |  |
| *Oscillospiraceae* |  |  |  |  |  | **=** |
| *Faecalibacterium* | *F. prausnitzii* | **↑** |  |  | **↑** |
| *Ruminococcus* | *R. callidus* | **↓** |  |  |  |
| *Ruminococcus* | *R. gnavus* | **=** |  |  |  |
| *Negativicutes* | *Acidaminococcales* | *Acidaminococcaceae* | *Phascolarctobacterium* | *P. succinatutens* | **=** |  |  |  |
| *Veillonellales* | *Veilonellaceae* | *Megasphaera* |  |  |  |  | **=** |
| ***Proteobacteria***  ***(Pseudomonadota)*** |  |  |  |  |  | **↓** |  |  | **↓** |
| *Gammaproteobacteria* | *Enterobacteriales* | *Enterobacteriaceae* |  |  | **↓** | **=** | **↓** | **=** |
| *Escherichia* | *E. albertii* | **↓** |  |  |  |
| *Yersiniaceae* | *Serratia* | *S. entomophila* | **↓** |  |  |  |
| *Pasteurellales* | *Pasteurellaceae* |  |  |  | **↓** | **↓** |  |
| ***Verrucomicrobia (Verrucomicrobiota)*** |  |  |  |  |  | **↓** |  |  |  |
| *Verrucomicrobiae* | *Verrucomicrobiales* | *Akkermansiaceae* |  |  |  | **↑** | **↑** |  |
| *Akkermansia* |  |  |  |  | **=** |
| *A. muciniphila* | **↓** |  |  |  |
| *Verrucomicrobiaceae* |  |  | **↓** |  |  |  |

## Table S4. Faecal metabolite change after a low-carbohydrate diet compared to baseline

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **Author** | **Ang** | **Brinkworth** | | **Duncan** | | **Ferraris** | **Mardinoglu** | **O'Keefe** | **Russell** | | |
|  |  | **Year** | **2020** | **2009** | | **2007** | | **2021** | **2018** | **2015** | **2011** | | |
|  |  | **Unit of measurement** | **mg/g** | **mmol/l** | **mmol/d** | **mmol/l** | **proportion of total SCFA** | **mg/g** | **mmol/l** | **mmol/d** | **mmol/l** | **proportion of total SCFA** | **mg/l** |
| **SCFAs** |  | Total SCFAs |  | ↓ | ↓ | ↓ |  | ↓ | ↓ |  | ↓ |  |  |
|  | Acetate | = | ↓ | ↓ | ↓ | ↑ | ↓ |  | ↓ | ↓ | = |  |
|  | Butyrate | = | ↓ | ↓ | = | ↓ | ↓ |  | ↓ | ↓ | ↓ |  |
|  | Formate |  |  |  | = |  |  |  | ↓ |  |  |  |
|  | Propionate | = | = | ↓ | ↓ | = | ↓ |  | ↓ | ↓ | = |  |
|  | Valerate |  |  |  | ↓ |  |  |  | ↓ | = | ↑ |  |
| **BCFA** | Isobutyrate | = |  |  | = |  | ↓ |  |  | ↑ | ↑ |  |
| Isovalerate |  |  |  | ↓ |  | = |  |  | ↑ | ↑ |  |
| **Bile acids** |  | Total bile acids | = |  |  |  |  |  |  | ↑ |  |  |  |
|  | Free bile acids | = |  |  |  |  |  |  |  |  |  |  |
|  | Conjugated bile acids | = |  |  |  |  |  |  |  |  |  |  |
| **P\*** | Cholic acid |  |  |  |  |  |  |  | ↑ |  |  | = |
| **Secondary** | Deoxycholic acid |  |  |  |  |  |  |  | ↑ |  |  | = |
| Chenodeoxycholic acid |  |  |  |  |  |  |  |  |  |  | = |
| Glycocholic acid |  |  |  |  |  |  |  |  |  |  | = |
| Glycodeoxycholic acid |  |  |  |  |  |  |  |  |  |  | = |
| Chlycoursodeoxycholic acid |  |  |  |  |  |  |  |  |  |  | = |
| Clycochenodeoxycholic acid |  |  |  |  |  |  |  |  |  |  | = |
| Lithocholic acid |  |  |  |  |  |  |  | ↑ |  |  | = |
| Taurocholic acid |  |  |  |  |  |  |  |  |  |  | = |
| Tauroursodeoxycholic acid |  |  |  |  |  |  |  |  |  |  | = |
| Taurochenodeoxycholic acid |  |  |  |  |  |  |  |  |  |  | = |
| **Tryptophan/**  **Indoles** | | Indole |  |  |  |  |  |  |  |  |  |  | = |
| Indole-3-acetic acid |  |  |  |  |  |  |  |  |  |  | = |
| Indole-3-acrylic acid |  |  |  |  |  |  |  |  |  |  | = |
| Indole-3-pyruvic acid |  |  |  |  |  |  |  |  |  |  | = |
| Indole-3-propionic acid |  |  |  |  |  |  |  |  |  |  | = |
| Indole-3-carboxylic acid |  |  |  |  |  |  |  |  |  |  | = |
|  |  | 2-Methylbutanoate | = |  |  |  |  |  |  |  |  |  |  |
|  |  | 3-Methylbutyric acid | = |  |  |  |  |  |  |  |  |  |  |
|  |  | Ammonia |  |  |  | ↓ |  |  |  |  |  |  |  |
|  |  | Pentanoic acid | = |  |  |  |  |  |  |  |  |  |  |
|  |  | Hexanoic acid | = |  |  |  |  |  |  |  |  |  |  |
|  |  | 2-Methylhexanoic acid | = |  |  |  |  |  |  |  |  |  |  |
|  |  | Lactate |  |  |  | = |  |  |  | ↓ | = | = |  |
|  |  | Succinate |  |  |  | = |  |  |  |  |  |  |  |
|  |  | Choline |  |  |  |  |  |  |  | ↑ |  |  |  |
|  |  | Hypoxanthine |  |  |  |  |  |  |  | ↓ |  |  |  |
|  |  | Fumarate |  |  |  |  |  |  |  | ↓ |  |  |  |
|  |  | β-Xylose |  |  |  |  |  |  |  | ↓ |  |  |  |
|  |  | β-Arabinose |  |  |  |  |  |  |  | ↓ |  |  |  |
|  |  | Nicotinate |  |  |  |  |  |  |  | ↓ |  |  |  |
|  |  | Threonine |  |  |  |  |  |  |  | ↓ |  |  |  |

P\*: primary

↓ : significantly lower post-intervention

↑ : significantly higher post-intervention

= : no significant difference post-intervention

SCFA: short-chain fatty acids

## Table S5. Faecal metabolite change after a low-fat diet compared to baseline

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **Author** | **Cummings** | **Fava (HGI)** | **Fava (LGI)** | **Fritsch** | **Haro** | **O'Keefe** | **Wan** |
|  |  | **Year** | **1978** | **2013** | **2013** | **2021** | **2016** | **2015** | **2019** |
|  |  | **Unit of measurement** | **mg/day** | **mmol/l** | **mmol/l** | **relative abundance** | **abundance** | **mmol/d** | **ng/mg** |
| **SCFAs** | | Total SCFAs |  |  |  |  |  |  | ↑ |
| Acetate |  | = | = | ↑ |  | ↑ |  |
| Butyrate |  | = | = | = |  | ↑ |  |
| Propionate |  | = | = | = |  | ↑ |  |
| Valerate |  | = | = |  |  |  |  |
| **Bile acids** |  | Total bile acids | ↓ |  |  |  |  | ↓ |  |
| **P\*** | Cholic acid |  |  |  | = |  | = |  |
| **Secondary** | Chenodeoxycholic acid |  |  |  | = |  |  |  |
| Deoxycholic acid |  |  |  | ↑ |  | ↓ |  |
| Glycocholic acid |  |  |  | ↑ |  |  |  |
| Glycodeoxycholic acid |  |  |  | = |  |  |  |
| Glycochenodeoxycholic acid |  |  |  | = |  |  |  |
| Lithocholic acid |  |  |  | = |  | ↓ |  |
| Taurocholic acid |  |  |  | = |  |  |  |
| Taurochenoxycholic acid |  |  |  | = |  |  |  |
| Taurodeoxycholic acid |  |  |  | = |  |  |  |
| **Tryptophan/**  **indoles** | | Trypthophan |  |  |  | ↑ |  |  | = |
| Indole |  |  |  |  |  |  | ↓ |
| Indoleacetic acid |  |  |  |  |  |  | = |
| 1H-Indole-3-acetamide |  |  |  |  |  |  | = |
| 3-indolepropionic acid |  |  |  |  |  |  | ↑ |
| 3-indoleaceetonnitrile |  |  |  |  |  |  | = |
| 3-Methylindole |  |  |  |  |  |  | = |
|  |  | Adipic acid |  |  |  |  |  |  | = |
|  |  | Alanine |  |  |  | = |  | ↑ | = |
|  |  | Alpha-aminobutyric acid |  |  |  |  |  |  | = |
|  |  | Alpha-Linolenic acid |  |  |  |  |  |  | = |
|  |  | Asparagine |  |  |  | = |  |  | = |
|  |  | Aspartic acid |  |  |  | = |  |  | = |
|  |  | Arachidic acid |  |  |  |  |  |  | = |
|  |  | Arachidonic acid |  |  |  |  |  |  | = |
|  |  | Arginine |  |  |  | = |  |  |  |
|  |  | Behenic acid |  |  |  |  |  |  | = |
|  |  | Beta-Alanine |  |  |  |  |  |  | = |
|  |  | Butyric acid |  |  |  |  |  |  | ↑ |
|  |  | Capric acid |  |  |  |  |  |  | = |
|  |  | Caproic acid |  |  |  |  |  |  | = |
|  |  | Caprylic acid |  |  |  |  |  |  | = |
|  |  | Cinnamic acid |  |  |  |  |  |  | = |
|  |  | cis-Aconitic acid |  |  |  |  |  |  | = |
|  |  | Citraconic acid |  |  |  |  |  |  | = |
|  |  | Citramalic acid |  |  |  |  |  |  | ↑ |
|  |  | Citric acid |  |  |  |  |  |  | = |
|  |  | Docosahexaenoic acid |  |  |  |  |  |  | = |
|  |  | Docosapentaenoic acid n6 |  |  |  |  |  |  | = |
|  |  | Docosatrienoic acid |  |  |  |  |  |  | = |
|  |  | Dodecanoic acid |  |  |  |  |  |  | = |
|  |  | Dopamine |  |  |  |  |  |  | ↑ |
|  |  | Eicosenoic acid |  |  |  |  |  |  | = |
|  |  | Eicosatrienoic acid |  |  |  | = |  |  |  |
|  |  | Erucic acid |  |  |  |  |  |  | = |
|  |  | Ethylmethylacetic acid |  |  |  |  |  |  | = |
|  |  | Fumaric acid |  |  |  |  |  |  | = |
|  |  | Gamma-Aminobutyric acid |  |  |  |  |  |  | = |
|  |  | Glutamic acid |  |  |  | = |  |  | = |
|  |  | Glutamate |  |  |  |  |  | ↑ |  |
|  |  | Glutamine |  |  |  | = |  |  |  |
|  |  | Glutaric acid |  |  |  |  |  |  | = |
|  |  | Glutathione |  |  |  |  |  |  | = |
|  |  | Glyceric acid |  |  |  |  |  |  | = |
|  |  | Glycine |  |  |  | = |  | ↑ | = |
|  |  | Glycolic acid |  |  |  |  |  |  | = |
|  |  | Heptadecanoic acid |  |  |  |  |  |  | = |
|  |  | Heptanoic acid |  |  |  |  |  |  | = |
|  |  | Histidine |  |  |  | = |  |  | = |
|  |  | Homocysteine |  |  |  |  |  |  | = |
|  |  | Homoserine |  |  |  |  |  |  | = |
|  |  | Hydrocinnamic acid |  |  |  |  |  |  | = |
|  |  | Hydroxyphenyllactic acid |  |  |  |  |  |  | = |
|  |  | Hydroxypropionic acid |  |  |  |  |  |  | = |
|  |  | Isoleucine |  |  |  |  |  | ↑ | = |
|  |  | Itaconic acid |  |  |  |  |  |  | ↑ |
|  |  | Isovaleric acid |  |  |  | = |  |  |  |
|  |  | Lactate |  |  |  |  |  | ↑ |  |
|  |  | Lauric acid |  |  |  | ↓ |  |  |  |
|  |  | Leucine |  |  |  | = |  |  | = |
|  |  | Linoleic acid |  |  |  |  |  |  | = |
|  |  | Lysine |  |  |  | = |  |  | = |
|  |  | Malic acid |  |  |  |  |  |  | = |
|  |  | Malinic acid |  |  |  |  |  |  | = |
|  |  | Methionine |  |  |  | = |  |  | = |
|  |  | Methylsuccinic acid |  |  |  |  |  |  | = |
|  |  | Myristic acid |  |  |  | = |  |  | = |
|  |  | Myristoleic acid |  |  |  |  |  |  | ↑ |
|  |  | N-acetyltryptophan |  |  |  |  |  |  | = |
|  |  | n-Caproate |  | = | = |  |  |  |  |
|  |  | Nervonic acid |  |  |  |  |  |  | = |
|  |  | Nicotinic acid |  |  |  |  |  |  | = |
|  |  | Nonadecanoic acid |  |  |  |  |  |  | = |
|  |  | Norleucine |  |  |  |  |  |  | = |
|  |  | Norvaline |  |  |  |  |  |  | = |
|  |  | Omithine |  |  |  | = |  |  |  |
|  |  | Ornithine |  |  |  |  |  |  | = |
|  |  | Oxalic acid |  |  |  |  |  |  | = |
|  |  | Oxoadipic acid |  |  |  |  |  |  | = |
|  |  | Oxoglutaric acid |  |  |  |  |  |  | = |
|  |  | Palmitic acid |  |  |  |  |  |  | ↓ |
|  |  | Palmitoleic acid |  |  |  |  |  |  | = |
|  |  | p-Cresol |  |  |  |  |  |  | ↓ |
|  |  | Pelargonic acid |  |  |  |  |  |  | = |
|  |  | Pentadecanoic acid |  |  |  |  |  |  | = |
|  |  | Phenylacetic acid |  |  |  |  |  |  | = |
|  |  | Phenylalamine |  |  |  | = |  |  | = |
|  |  | Phenyllactic acid |  |  |  |  |  |  | = |
|  |  | p-Hydroxyphenylacetic acid |  |  |  |  |  |  | = |
|  |  | Pimelic acid |  |  |  |  |  |  | = |
|  |  | Proline |  |  |  | = |  |  | = |
|  |  | Propionic acid |  |  |  |  |  |  | = |
|  |  | Purine |  |  |  |  |  |  | = |
|  |  | Putrescine |  |  |  |  |  |  | ↑ |
|  |  | Pyroglutamic acid |  |  |  |  |  |  | = |
|  |  | Serine |  |  |  | = |  |  | = |
|  |  | Stearic acid |  |  |  |  |  |  | = |
|  |  | Suberic acid |  |  |  |  |  |  | = |
|  |  | Succinic acid |  |  |  |  |  |  | = |
|  |  | Tartaric acid |  |  |  |  |  |  | = |
|  |  | Taurine |  |  |  | = |  |  |  |
|  |  | Tetracosanoic acid |  |  |  |  |  |  | = |
|  |  | Tyrosine |  |  |  | = |  | ↑ | = |
|  |  | Valeric acid |  |  |  |  |  |  | ↑ |
|  |  | Valine |  |  |  | = |  | ↑ | = |
|  |  | Vanillic acid |  |  |  |  |  |  | = |
|  |  | y-Aminobutyric acid |  |  |  | = |  |  |  |
|  |  | (1)-2-Methylpentanoic acid |  |  |  |  |  |  | ↑ |
|  |  | 2-Hydroxybutyric acid |  |  |  |  |  |  | = |
|  |  | 2-Phenylglycine |  |  |  |  |  |  | = |
|  |  | 3-Amino-octanooic acid |  |  |  | = |  |  |  |
|  |  | 3-Hydroxybutyric acid |  |  |  |  |  |  | = |
|  |  | 3-Hydroxyisovaleric acid |  |  |  |  |  |  | = |
|  |  | 3-Hydroxyphenylacetic acid |  |  |  |  |  |  | ↑ |
|  |  | 3-Methyl-2-oxovaleric acid |  |  |  |  |  |  | = |
|  |  | 3-Methylpentanoic acid |  |  |  |  |  |  | = |
|  |  | 4-Hydroxybenzoic acid |  |  |  |  |  |  | ↑ |
|  |  | 4-Hydroxycinnamic acid |  |  |  |  |  |  | = |
|  |  | 4-Hydroxyphenylpyruvic acid |  |  |  |  |  |  | = |
|  |  | 4-Methylhexanoic acid |  |  |  |  |  |  | ↑ |
|  |  | 5-Dodecenoic acid |  |  |  |  |  |  | = |
|  |  | 6-Aminosalicylic acid |  |  |  |  |  | ↑ |  |
|  |  | 8,11,14-Eicosatrienoic acid |  |  |  |  |  |  | = |

P\*: primary. ↓ : significantly lower post-intervention. ↑ : significantly higher post-intervention. = : no significant difference post-intervention. SCFA: short-chain fatty acids

## Table S6. Faecal metabolite change after a low-protein diet compared to baseline

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | **Author** | **Ferraris** |
|  |  | **Year** | **2021** |
|  |  | **Unit of measurement** | **mg/g** |
| **SCFAs** |  | Total SCFA | ↓ |
| Acetate | ↓ |
| Butyrate | ↓ |
| Propionate | ↓ |
| **BCFAs** | Isobutyrate | ↓ |
| Isovalerate | = |

↓ : significantly lower post-intervention

↑ : significantly higher post-intervention

= : no significant difference post-intervention

SCFA: short-chain fatty acids

# Search strategy performed on 03-06-2021

**Pubmed**

Low-carbohydrate diet

((**"Diet, Carbohydrate-Restricted"[Mesh] OR "low carbohydrate diet"[tw] OR "low carbohydrate diets"[tw] OR "Carbohydrate Restricted Diet"[tw] OR "Carbohydrate Restricted Diets"[tw] OR "low carbohydrate"[tw] OR low carbohydrat\*[tw] OR "carbohydrate low"[tw] OR "Carbohydrate Restricted"[tw] OR "Carbohydrate Restriction"[tw] OR "Ketogenic Diet"[tw] OR "Ketogenic Diets"[tw] OR (("Diet"[tw] OR "Diets"[tw] OR Diet\*[tw]) AND ("low carbohydrate"[tw] OR "Carbohydrate Restricted"[tw] OR "carbohydrate low"[tw] OR "Carbohydrate Restricted"[tw] OR "ketogenic"[tw]))) AND ("Gastrointestinal Microbiome"[mesh] OR "Gastrointestinal Microbiome"[tw] OR "gut microbiome"[tw] OR "gut microbiomes"[tw] OR "Gastrointestinal Microbiomes"[tw] OR "Gut Microflora"[tw] OR "Gut Microbiota"[tw] OR "Gut Microbiotas"[tw] OR "Gastrointestinal Flora"[tw] OR "Gut Flora"[tw] OR "Gastrointestinal Microbiota"[tw] OR "Gastrointestinal Microbiotas"[tw] OR "Gut Microbiome"[tw] OR "Gut Microbiomes"[tw] OR "Gastrointestinal Microflora"[tw] OR "Enteric Bacteria"[tw] OR "Intestinal Microbiome"[tw] OR "Intestinal Microbiomes"[tw] OR "Intestinal Microbiota"[tw] OR "Intestinal Microbiotas"[tw] OR "Intestinal Microflora"[tw] OR "Intestinal Flora"[tw] OR "Gut Metagenome"[tw] OR "Intestinal Metagenome"[tw] OR "Enteric Metagenome"[tw] OR "Gastrointestinal Metagenome"[tw] OR "Faecal Metagenome"[tw] OR "Faecal Microbiome"[tw] OR "Faecal Microbiota"[tw] OR "Faecal Bacteria"[tw] OR "Faecal Microflora"[tw] OR "Faecal Microbioma"[tw] OR (("gastrointestinal"[tw] OR "gut"[tw] OR "enteric"[tw] OR "intestinal"[tw] OR "Gastrointestinal Tract"[mesh] OR gastrointestin\*[tw] OR intestin\*[tw] OR "Cecum"[tw] OR "Appendix"[tw] OR "Colon"[tw] OR "Rectum"[tw] OR "Duodenum "[tw] OR "Ileum"[tw] OR "Jejunum"[tw] OR Cecum\*[tw] OR Appendi\*[tw] OR Colon\*[tw] OR Rectal\*[tw] OR Duodenal\*[tw] OR Ileal\*[tw] OR Jejunal\*[tw]) AND ("Microbiota"[mesh] OR "microbiome"[tw] OR "microbiomes"[tw] OR microbiom\*[tw] OR "microflora"[tw] OR "microfloras"[tw] OR "microbiota"[tw] OR "microbiotas"[tw] OR "flora"[tw] OR "floras"[tw] OR "Microbial"[tw]))) NOT ("Animals"[mesh] NOT "Humans"[mesh]) NOT (("veterinary"[ti] OR "rabbit"[ti] OR "rabbits"[ti] OR "animal"[ti] OR "animals"[ti] OR "mouse"[ti] OR "mice"[ti] OR "rodent"[ti] OR "rodents"[ti] OR "rat"[ti] OR "rats"[ti] OR "pig"[ti] OR "pigs"[ti] OR "porcine"[ti] OR "equine"[ti] OR "cow"[ti] OR "cows"[ti] OR "bovine"[ti] OR "goat"[ti] OR "goats"[ti] OR "sheep"[ti] OR "ovine"[ti] OR "canine"[ti] OR "dog"[ti] OR "dogs"[ti] OR "feline"[ti] OR "cat"[ti] OR "cats"[ti]) NOT "Humans"[mesh]))**

Low-fat diet

(**("Diet, Fat-Restricted"[Mesh] OR "low fat diet"[tw] OR "low fat diets"[tw] OR "Fat Restricted Diet"[tw] OR "Fat Restricted Diets"[tw] OR "low fat"[tw] OR "fat low"[tw] OR "Fat Restricted"[tw] OR "Fat Restriction"[tw] OR (("Diet"[tw] OR "Diets"[tw] OR Diet\*[tw]) AND ("low fat"[tw] OR "Fat Restricted"[tw] OR "fat low"[tw] OR "Fat Restricted"[tw]))) AND ("Gastrointestinal Microbiome"[mesh] OR "Gastrointestinal Microbiome"[tw] OR "gut microbiome"[tw] OR "gut microbiomes"[tw] OR "Gastrointestinal Microbiomes"[tw] OR "Gut Microflora"[tw] OR "Gut Microbiota"[tw] OR "Gut Microbiotas"[tw] OR "Gastrointestinal Flora"[tw] OR "Gut Flora"[tw] OR "Gastrointestinal Microbiota"[tw] OR "Gastrointestinal Microbiotas"[tw] OR "Gut Microbiome"[tw] OR "Gut Microbiomes"[tw] OR "Gastrointestinal Microflora"[tw] OR "Enteric Bacteria"[tw] OR "Intestinal Microbiome"[tw] OR "Intestinal Microbiomes"[tw] OR "Intestinal Microbiota"[tw] OR "Intestinal Microbiotas"[tw] OR "Intestinal Microflora"[tw] OR "Intestinal Flora"[tw] OR "Gut Metagenome"[tw] OR "Intestinal Metagenome"[tw] OR "Enteric Metagenome"[tw] OR "Gastrointestinal Metagenome"[tw] OR "Faecal Metagenome"[tw] OR "Faecal Microbiome"[tw] OR "Faecal Microbiota"[tw] OR "Faecal Bacteria"[tw] OR "Faecal Microflora"[tw] OR "Faecal Microbioma"[tw] OR (("gastrointestinal"[tw] OR "gut"[tw] OR "enteric"[tw] OR "intestinal"[tw] OR "Gastrointestinal Tract"[mesh] OR gastrointestin\*[tw] OR intestin\*[tw] OR "Cecum"[tw] OR "Appendix"[tw] OR "Colon"[tw] OR "Rectum"[tw] OR "Duodenum "[tw] OR "Ileum"[tw] OR "Jejunum"[tw] OR Cecum\*[tw] OR Appendi\*[tw] OR Colon\*[tw] OR Rectal\*[tw] OR Duodenal\*[tw] OR Ileal\*[tw] OR Jejunal\*[tw]) AND ("Microbiota"[mesh] OR "microbiome"[tw] OR "microbiomes"[tw] OR microbiom\*[tw] OR "microflora"[tw] OR "microfloras"[tw] OR "microbiota"[tw] OR "microbiotas"[tw] OR "flora"[tw] OR "floras"[tw] OR "Microbial"[tw]))) NOT ("Animals"[mesh] NOT "Humans"[mesh]) NOT (("veterinary"[ti] OR "rabbit"[ti] OR "rabbits"[ti] OR "animal"[ti] OR "animals"[ti] OR "mouse"[ti] OR "mice"[ti] OR "rodent"[ti] OR "rodents"[ti] OR "rat"[ti] OR "rats"[ti] OR "pig"[ti] OR "pigs"[ti] OR "porcine"[ti] OR "equine"[ti] OR "cow"[ti] OR "cows"[ti] OR "bovine"[ti] OR "goat"[ti] OR "goats"[ti] OR "sheep"[ti] OR "ovine"[ti] OR "canine"[ti] OR "dog"[ti] OR "dogs"[ti] OR "feline"[ti] OR "cat"[ti] OR "cats"[ti]) NOT "Humans"[mesh]))**

**Low-protein diet**

**(("Diet, Protein-Restricted"[Mesh] OR "low protein diet"[tw] OR "low protein diets"[tw] OR "Protein Restricted Diet"[tw] OR "Protein Restricted Diets"[tw] OR "low protein"[tw] OR "protein low"[tw] OR "Protein Restricted"[tw] OR "Protein Restriction"[tw] OR (("Diet"[tw] OR "Diets"[tw] OR Diet\*[tw]) AND ("low protein"[tw] OR "Protein Restricted"[tw] OR "protein low"[tw] OR "Protein Restriction"[tw]))) AND ("Gastrointestinal Microbiome"[mesh] OR "Gastrointestinal Microbiome"[tw] OR "gut microbiome"[tw] OR "gut microbiomes"[tw] OR "Gastrointestinal Microbiomes"[tw] OR "Gut Microflora"[tw] OR "Gut Microbiota"[tw] OR "Gut Microbiotas"[tw] OR "Gastrointestinal Flora"[tw] OR "Gut Flora"[tw] OR "Gastrointestinal Microbiota"[tw] OR "Gastrointestinal Microbiotas"[tw] OR "Gut Microbiome"[tw] OR "Gut Microbiomes"[tw] OR "Gastrointestinal Microflora"[tw] OR "Enteric Bacteria"[tw] OR "Intestinal Microbiome"[tw] OR "Intestinal Microbiomes"[tw] OR "Intestinal Microbiota"[tw] OR "Intestinal Microbiotas"[tw] OR "Intestinal Microflora"[tw] OR "Intestinal Flora"[tw] OR "Gut Metagenome"[tw] OR "Intestinal Metagenome"[tw] OR "Enteric Metagenome"[tw] OR "Gastrointestinal Metagenome"[tw] OR "Faecal Metagenome"[tw] OR "Faecal Microbiome"[tw] OR "Faecal Microbiota"[tw] OR "Faecal Bacteria"[tw] OR "Faecal Microflora"[tw] OR "Faecal Microbioma"[tw] OR (("gastrointestinal"[tw] OR "gut"[tw] OR "enteric"[tw] OR "intestinal"[tw] OR "Gastrointestinal Tract"[mesh] OR gastrointestin\*[tw] OR intestin\*[tw] OR "Cecum"[tw] OR "Appendix"[tw] OR "Colon"[tw] OR "Rectum"[tw] OR "Duodenum "[tw] OR "Ileum"[tw] OR "Jejunum"[tw] OR Cecum\*[tw] OR Appendi\*[tw] OR Colon\*[tw] OR Rectal\*[tw] OR Duodenal\*[tw] OR Ileal\*[tw] OR Jejunal\*[tw]) AND ("Microbiota"[mesh] OR "microbiome"[tw] OR "microbiomes"[tw] OR microbiom\*[tw] OR "microflora"[tw] OR "microfloras"[tw] OR "microbiota"[tw] OR "microbiotas"[tw] OR "flora"[tw] OR "floras"[tw] OR "Microbial"[tw]))) NOT ("Animals"[mesh] NOT "Humans"[mesh]) NOT (("veterinary"[ti] OR "rabbit"[ti] OR "rabbits"[ti] OR "animal"[ti] OR "animals"[ti] OR "mouse"[ti] OR "mice"[ti] OR "rodent"[ti] OR "rodents"[ti] OR "rat"[ti] OR "rats"[ti] OR "pig"[ti] OR "pigs"[ti] OR "porcine"[ti] OR "equine"[ti] OR "cow"[ti] OR "cows"[ti] OR "bovine"[ti] OR "goat"[ti] OR "goats"[ti] OR "sheep"[ti] OR "ovine"[ti] OR "canine"[ti] OR "dog"[ti] OR "dogs"[ti] OR "feline"[ti] OR "cat"[ti] OR "cats"[ti]) NOT "Humans"[mesh]))**

**Embase**

Low-carbohydrate diet

((exp **"low carbohydrate diet"/ OR "low carbohydrate diet".mp OR "low carbohydrate diets".mp OR "Carbohydrate Restricted Diet".mp OR "Carbohydrate Restricted Diets".mp OR "low carbohydrate".mp OR low carbohydrat\*.mp OR "carbohydrate low".mp OR "Carbohydrate Restricted".mp OR "Carbohydrate Restriction".mp OR "Ketogenic Diet".mp OR "Ketogenic Diets".mp OR (("Diet".mp OR "Diets".mp OR Diet\*.mp) AND ("low carbohydrate".mp OR "Carbohydrate Restricted".mp OR "carbohydrate low".mp OR "Carbohydrate Restricted".mp OR "ketogenic".mp))) AND (exp "intestine flora"/ OR "Gastrointestinal Microbiome".mp OR "gut microbiome".mp OR "gut microbiomes".mp OR "Gastrointestinal Microbiomes".mp OR "Gut Microflora".mp OR "Gut Microbiota".mp OR "Gut Microbiotas".mp OR "Gastrointestinal Flora".mp OR "Gut Flora".mp OR "Gastrointestinal Microbiota".mp OR "Gastrointestinal Microbiotas".mp OR "Gut Microbiome".mp OR "Gut Microbiomes".mp OR "Gastrointestinal Microflora".mp OR "Enteric Bacteria".mp OR "Intestinal Microbiome".mp OR "Intestinal Microbiomes".mp OR "Intestinal Microbiota".mp OR "Intestinal Microbiotas".mp OR "Intestinal Microflora".mp OR "Intestinal Flora".mp OR "Gut Metagenome".mp OR "Intestinal Metagenome".mp OR "Enteric Metagenome".mp OR "Gastrointestinal Metagenome".mp OR "Faecal Metagenome".mp OR "Faecal Microbiome".mp OR "Faecal Microbiota".mp OR "Faecal Bacteria".mp OR "Faecal Microflora".mp OR "Faecal Microbioma".mp OR (("gastrointestinal".mp OR "gut".mp OR "enteric".mp OR "intestinal".mp OR exp "Gastrointestinal Tract"/ OR gastrointestin\*.mp OR intestin\*.mp OR "Cecum".mp OR "Appendix".mp OR "Colon".mp OR "Rectum".mp OR "Duodenum ".mp OR "Ileum".mp OR "Jejunum".mp OR Cecum\*.mp OR Appendi\*.mp OR Colon\*.mp OR Rectal\*.mp OR Duodenal\*.mp OR Ileal\*.mp OR Jejunal\*.mp) AND (exp "microflora"/ OR "microbiome".mp OR "microbiomes".mp OR microbiom\*.mp OR "microflora".mp OR "microfloras".mp OR "microbiota".mp OR "microbiotas".mp OR "flora".mp OR "floras".mp OR "Microbial".mp))) AND exp "Humans"/)**

Low-fat diet

(**("low fat diet"/ OR "low fat diet".mp OR "low fat diets".mp OR "Fat Restricted Diet".mp OR "Fat Restricted Diets".mp OR "low fat".mp OR "fat low".mp OR "Fat Restricted".mp OR "Fat Restriction".mp OR (("Diet".mp OR "Diets".mp OR Diet\*.mp) AND ("low fat".mp OR "Fat Restricted".mp OR "fat low".mp OR "Fat Restricted".mp))) AND (exp "intestine flora"/ OR "Gastrointestinal Microbiome".mp OR "gut microbiome".mp OR "gut microbiomes".mp OR "Gastrointestinal Microbiomes".mp OR "Gut Microflora".mp OR "Gut Microbiota".mp OR "Gut Microbiotas".mp OR "Gastrointestinal Flora".mp OR "Gut Flora".mp OR "Gastrointestinal Microbiota".mp OR "Gastrointestinal Microbiotas".mp OR "Gut Microbiome".mp OR "Gut Microbiomes".mp OR "Gastrointestinal Microflora".mp OR "Enteric Bacteria".mp OR "Intestinal Microbiome".mp OR "Intestinal Microbiomes".mp OR "Intestinal Microbiota".mp OR "Intestinal Microbiotas".mp OR "Intestinal Microflora".mp OR "Intestinal Flora".mp OR "Gut Metagenome".mp OR "Intestinal Metagenome".mp OR "Enteric Metagenome".mp OR "Gastrointestinal Metagenome".mp OR "Faecal Metagenome".mp OR "Faecal Microbiome".mp OR "Faecal Microbiota".mp OR "Faecal Bacteria".mp OR "Faecal Microflora".mp OR "Faecal Microbioma".mp OR (("gastrointestinal".mp OR "gut".mp OR "enteric".mp OR "intestinal".mp OR exp "Gastrointestinal Tract"/ OR gastrointestin\*.mp OR intestin\*.mp OR "Cecum".mp OR "Appendix".mp OR "Colon".mp OR "Rectum".mp OR "Duodenum ".mp OR "Ileum".mp OR "Jejunum".mp OR Cecum\*.mp OR Appendi\*.mp OR Colon\*.mp OR Rectal\*.mp OR Duodenal\*.mp OR Ileal\*.mp OR Jejunal\*.mp) AND (exp "microflora"/ OR "microbiome".mp OR "microbiomes".mp OR microbiom\*.mp OR "microflora".mp OR "microfloras".mp OR "microbiota".mp OR "microbiotas".mp OR "flora".mp OR "floras".mp OR "Microbial".mp))) AND exp "Humans"/)**

Low-protein diet

**(("protein restriction"/ OR "low protein diet".mp OR "low protein diets".mp OR "Protein Restricted Diet".mp OR "Protein Restricted Diets".mp OR "low protein".mp OR "protein low".mp OR "Protein Restricted".mp OR "Protein Restriction".mp OR (("Diet".mp OR "Diets".mp OR Diet\*.mp) AND ("low protein".mp OR "Protein Restricted".mp OR "protein low".mp OR "Protein Restriction".mp))) AND (exp "intestine flora"/ OR "Gastrointestinal Microbiome".mp OR "gut microbiome".mp OR "gut microbiomes".mp OR "Gastrointestinal Microbiomes".mp OR "Gut Microflora".mp OR "Gut Microbiota".mp OR "Gut Microbiotas".mp OR "Gastrointestinal Flora".mp OR "Gut Flora".mp OR "Gastrointestinal Microbiota".mp OR "Gastrointestinal Microbiotas".mp OR "Gut Microbiome".mp OR "Gut Microbiomes".mp OR "Gastrointestinal Microflora".mp OR "Enteric Bacteria".mp OR "Intestinal Microbiome".mp OR "Intestinal Microbiomes".mp OR "Intestinal Microbiota".mp OR "Intestinal Microbiotas".mp OR "Intestinal Microflora".mp OR "Intestinal Flora".mp OR "Gut Metagenome".mp OR "Intestinal Metagenome".mp OR "Enteric Metagenome".mp OR "Gastrointestinal Metagenome".mp OR "Faecal Metagenome".mp OR "Faecal Microbiome".mp OR "Faecal Microbiota".mp OR "Faecal Bacteria".mp OR "Faecal Microflora".mp OR "Faecal Microbioma".mp OR (("gastrointestinal".mp OR "gut".mp OR "enteric".mp OR "intestinal".mp OR exp "Gastrointestinal Tract"/ OR gastrointestin\*.mp OR intestin\*.mp OR "Cecum".mp OR "Appendix".mp OR "Colon".mp OR "Rectum".mp OR "Duodenum ".mp OR "Ileum".mp OR "Jejunum".mp OR Cecum\*.mp OR Appendi\*.mp OR Colon\*.mp OR Rectal\*.mp OR Duodenal\*.mp OR Ileal\*.mp OR Jejunal\*.mp) AND (exp "microflora"/ OR "microbiome".mp OR "microbiomes".mp OR microbiom\*.mp OR "microflora".mp OR "microfloras".mp OR "microbiota".mp OR "microbiotas".mp OR "flora".mp OR "floras".mp OR "Microbial".mp))) AND exp "Humans"/)**

**Web of Science**

Low-carbohydrate diet

(ts=(**"low carbohydrate diet" OR "low carbohydrate diet" OR "low carbohydrate diets" OR "Carbohydrate Restricted Diet" OR "Carbohydrate Restricted Diets" OR "low carbohydrate" OR "low carbohydrat\*" OR "carbohydrate low" OR "Carbohydrate Restricted" OR "Carbohydrate Restriction" OR "Ketogenic Diet" OR "Ketogenic Diets" OR (("Diet" OR "Diets" OR Diet\*) AND ("low carbohydrate" OR "Carbohydrate Restricted" OR "carbohydrate low" OR "Carbohydrate Restricted" OR "ketogenic"))) AND ts=("intestine flora" OR "Gastrointestinal Microbiome" OR "gut microbiome" OR "gut microbiomes" OR "Gastrointestinal Microbiomes" OR "Gut Microflora" OR "Gut Microbiota" OR "Gut Microbiotas" OR "Gastrointestinal Flora" OR "Gut Flora" OR "Gastrointestinal Microbiota" OR "Gastrointestinal Microbiotas" OR "Gut Microbiome" OR "Gut Microbiomes" OR "Gastrointestinal Microflora" OR "Enteric Bacteria" OR "Intestinal Microbiome" OR "Intestinal Microbiomes" OR "Intestinal Microbiota" OR "Intestinal Microbiotas" OR "Intestinal Microflora" OR "Intestinal Flora" OR "Gut Metagenome" OR "Intestinal Metagenome" OR "Enteric Metagenome" OR "Gastrointestinal Metagenome" OR "Faecal Metagenome" OR "Faecal Microbiome" OR "Faecal Microbiota" OR "Faecal Bacteria" OR "Faecal Microflora" OR "Faecal Microbioma" OR (("gastrointestinal" OR "gut" OR "enteric" OR "intestinal" OR "Gastrointestinal Tract" OR gastrointestin\* OR intestin\* OR "Cecum" OR "Appendix" OR "Colon" OR "Rectum" OR "Duodenum " OR "Ileum" OR "Jejunum" OR Cecum\* OR Appendi\* OR Colon\* OR Rectal\* OR Duodenal\* OR Ileal\* OR Jejunal\*) AND ("microflora" OR "microbiome" OR "microbiomes" OR microbiom\* OR "microflora" OR "microfloras" OR "microbiota" OR "microbiotas" OR "flora" OR "floras" OR "Microbial"))) NOT ti=(veterinary OR rabbit OR rabbits OR animal OR animals OR mouse OR mice OR rodent OR rodents OR rat OR rats OR pig OR pigs OR porcine OR horse\* OR equine OR cow OR cows OR bovine OR goat OR goats OR sheep OR ovine OR canine OR dog OR dogs OR feline OR cat OR cats OR bird OR birds))**

Low-protein diet

**(ts=("protein restriction" OR "low protein diet" OR "low protein diets" OR "Protein Restricted Diet" OR "Protein Restricted Diets" OR "low protein" OR "protein low" OR "Protein Restricted" OR "Protein Restriction" OR (("Diet" OR "Diets" OR Diet\*) AND ("low protein" OR "Protein Restricted" OR "protein low" OR "Protein Restriction"))) AND ts=("intestine flora" OR "Gastrointestinal Microbiome" OR "gut microbiome" OR "gut microbiomes" OR "Gastrointestinal Microbiomes" OR "Gut Microflora" OR "Gut Microbiota" OR "Gut Microbiotas" OR "Gastrointestinal Flora" OR "Gut Flora" OR "Gastrointestinal Microbiota" OR "Gastrointestinal Microbiotas" OR "Gut Microbiome" OR "Gut Microbiomes" OR "Gastrointestinal Microflora" OR "Enteric Bacteria" OR "Intestinal Microbiome" OR "Intestinal Microbiomes" OR "Intestinal Microbiota" OR "Intestinal Microbiotas" OR "Intestinal Microflora" OR "Intestinal Flora" OR "Gut Metagenome" OR "Intestinal Metagenome" OR "Enteric Metagenome" OR "Gastrointestinal Metagenome" OR "Faecal Metagenome" OR "Faecal Microbiome" OR "Faecal Microbiota" OR "Faecal Bacteria" OR "Faecal Microflora" OR "Faecal Microbioma" OR (("gastrointestinal" OR "gut" OR "enteric" OR "intestinal" OR "Gastrointestinal Tract" OR gastrointestin\* OR intestin\* OR "Cecum" OR "Appendix" OR "Colon" OR "Rectum" OR "Duodenum " OR "Ileum" OR "Jejunum" OR Cecum\* OR Appendi\* OR Colon\* OR Rectal\* OR Duodenal\* OR Ileal\* OR Jejunal\*) AND ("microflora" OR "microbiome" OR "microbiomes" OR microbiom\* OR "microflora" OR "microfloras" OR "microbiota" OR "microbiotas" OR "flora" OR "floras" OR "Microbial"))) NOT ti=(veterinary OR rabbit OR rabbits OR animal OR animals OR mouse OR mice OR rodent OR rodents OR rat OR rats OR pig OR pigs OR porcine OR horse\* OR equine OR cow OR cows OR bovine OR goat OR goats OR sheep OR ovine OR canine OR dog OR dogs OR feline OR cat OR cats OR bird OR birds))**

Low-fat diet

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Cochrane Library

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Low-protein diet

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