Table S1. Effects of monosaccharide and disaccharide intake on gut microbiota

Sugar	**Fermentation**	**Gut microbiota** [a]		**Other metabolites**	**Ref**
		Abundance up	**Abundance down**		
Glucose	Mice/ In vivo	**Genus:** *Enterobacteria*	**Genus:** *Lactobacillus*	**Fecal:** acetate↑, aspartate↓, formate↑, methanol↑, propionate↑, pyruvate↑	[1]
	Mice/ In vivo [b]	**Phylum:** *Firmicutes, Verrucomicrobia, Proteobacteria*	**Phylum:** *Deferribacteres, Bacteroidetes*	**Serum:** total cholesterol↑, low-density lipoprotein (LDL)-cholesterol↑, endotoxin↑	[2]
Fructose	Mice/ In vivo	**Phylum:** *Firmicutes, Verrucomicrobia, Proteobacteria, Deferribacteres* **Family:** *Lachnospiraceae Ruminococcaceae*	**Phylum:** *Bacteroidetes* **Family:** *Deferribacteraceae, Helicobacteraceae*	**Fecal:** total SCFAs↓, Acetate↓, propionate↓, butyrate↓ **Serum:** endotoxin↑	[3]
	Mice/ In vivo	**Genus:** *Enterobacteria*	**Genus:** *Lactobacillus*	**Fecal:** acetate↑, formate↑, aspartate↓, butyrate↓, xylose↑, pyruvate↑, glutamate↓, methanol↑, succinate↑, taurine↑	[1]
Sucrose	Rats/ In vivo	**Phylum:** *Bacteroidetes* **Family:** *Bacteroidaceae*, *Erysipelotricgaceae*, *Turicibacteraceae*	**Phylum:** *Firmicutes* **Family:** *Ruminococcaceae*, *Clostridiales Lactobacillacae*	—	[4]
	Mice/ In vivo	**Phylum:** *Firmicutes, Proteobacteria* **Genus:** *Alistipes*, *Bacteroides*	**Phylum:** *Bacteroidetes* **Genus:** *Lactobacillus, Alloprevotella, Akkermansia*	—	[5]
	Mice/ In vivo	**Order:** *Clostridiales*, *Erysipelotrichales Lactobacillales*	**Order:** *Bacteroidales* **Genus:** *Alistipes*, *Ruminococcus*,	—	[6]

			Butyricicoccus		
	Mice/ In vivo	**Phylum:** *Verrucomicrobia* **Family：** *Verrucomicrobiaceae* *Porphyromonadaceae*	**Phylum:** *Firmicutes, Tenericutes* *Proteobacteria* **Family：** *Prevotellaceae* *Lachnospiraceae, Anaeroplasmataceae*	**Fecal:** total SCFA↓ acetate↓, butyrate↓	[7]
Sucrose mimics [c)]	Rats/ In vivo	**Phylum:** *Firmicutes, Proteobacteria* **Genus：** *Sutterella Parabacteroides,* *Bacteroides, Lactobacillus, Oscillosoira*	**Phylum:** *Verrucomicrobia, Bacteroidetes* **Genus：** *Prevotella, Akkernansia,* *Paraprevotella, Mucisoirillum*	—	[8]
	Rats/ In vivo	**Family：** *Rikenellaceae, Bacteroidaceae* *Enterobacteriaceae, Bifidobacteriaceae* *Clostridiaceae.1, Lactobacillaceae* **Genus：** *Bacteroides, Clostridium sensu* *stricto, Alistipes, Lactobacillus,* *Parasutterella, Bifidobacteriaceae,*	**Family：** *Prevotellaceae, Ruminococcaceae* *Lachnospiraceae* **Genus：** *Prevotella*， *Lachnospiracea incertae sedis*	—	[9]

Notes：

a) This column only lists the level of discussion highlighted in the references.

b) In this study, both high glucose/fructose diets were fed, both of which caused the same trend of change compared to normal diet.

c) In some references, glucose and fructose are mixed in certain proportions, and such "mixed sugars" are classified as "sucrose mimics" in this table.

—: Not tested; ↑: increased; ↓: decreased.

Table S2. Effects of starch with different digestive properties intake on gut microbiota

Type	Starch origin	Fermentation	Gut microbiota		SCFA	Ref
			Abundance up	**Abundance down**		
RDS	Maltodextrin	Mice/ In vivo	cecal bacterial loads↑ chronic inflammation↑ disease susceptibility↑ gut microbes dysbiosis suppressed intestinal anti-microbial defense mechanisms			[10,11]
	Pregelatinized maize starch	Mice/ In vivo	**Phylum:** *Proteobacteria, Firmicutes* **Genus:** *Alistipes, Oscillibacter, Ruminiclostridium-9*	**Phylum:** *Bacteroidetes* **Genus:** *bacteroides, Streptococcus*	isovalerate↓ valerate↓	[12]
SDS	Starch yields modified with 1,4-α-glucan branching enzyme	Mice/ In vivo	**Phylum:** *Verrucomicrobia* **Genus:** *Lactobacillus, Lachnodpiraceae, Akkermamsia, Mucispirillum, Bifidobacterium*	**Phylum:** *Proteobacteria* **Genus:** *Enterococcus, Alistipes, Odoribacter, Ruminiclostridium*	acetate↑ butyrate↑ valerate↑	[12]
	Starch-entrapped microspheres	Mice/ In vivo	**Phylum:** *Firmicutes*	**Phylum:** *Bacteroidetes*	total SCFAs↑ acetate↓ butyrate↓	[13]
			(compared with RSII, raw potato starch)			
RMD [a)]	Cassava starch modified with α-amylase and branching enzyme	Human Feces/ In vitro	**Genus:** *Bifidobacteria, Lactobacillus*	**Genus:** *Clostridia, Bacteroids*	Acetic↑ Butyric↑	[14]
			(compared with glucose)			
	Resistant maltodextrin	Mice/ In vivo	**Phylum:** *Firmicutes, Proteobacteria, Actinobacteria*	**Phylum:** *Bacteroidetes* **Genus:** *Bacteroides,*	—	[15]

			Genus: *Lactobacillus, Bifidobacterium*	*Oscillibacter, Alistipes, Prevotella, Prevotellaceae Ruminococcaceae, Ruminococcus*		
RSI	Isolated intact cotyledon cells from pinto bean seeds	Human Feces/ In vitro	**Phylum:** *Firmicutes* **Family：** *Lachnospiraceae, Ruminococcaceae,* ***Genus:*** *Clostridiales*	**Phylum:** *Bacteroidetes* **Family：** *Faecalibacterium* **Genus:** *Megamonas*	total SCFAs↓ acetate↓ pyruvate↓ butyrate↓	[16]
	Intact cotyledon cells isolated from red kidney beans	human intestinal microbial ecosystem	**Phylum:** *Actinobacteria* **Family：** *Coriobacteriaceae, Bifidobacteriaceae*	**Phylum:** *Firmicutes*， *Bacteroidetes* **Family：** *Bacteroidaceae, Selenomonadaceae*	butyrate↑	[17]
			(compared with microbiota taken before the application of bean treatment)			
RSII	High-amylose maize starch	Mice/ In vivo	**Phylum:** *Verrucomicrobia, Bacteroidetes, Actinobacteria* **Genus:** *Bifidobacterium, Akkermansia, Allobaculum*	**Phylum:** *Firmicutes* **Genus:** *Butyrivibrio, Turicibacter*	—	[18]
	Highly resistant starch rice	Feces/ In vitro	**Phylum:** *Bacteroidetes* **Genus:** *Prevotellacea Faecalibacterium*	**Phylum:** *Firmicutes, Proteobacteria* **Genus:** *Escherichia, Megamonas*	Acetate↑ propionate↑ butyrate↑ isobutyric↓ isovaleric↓	[19]
	High amylose maize starch	Human/ In vivo	**Phylum:** *Bacteroidetes, Actinobacteria* **Family:** *Ruminococcaceae, Porphyromonadaceae*	**Phylum:** *Firmicutes* **Family:** *Erysipelotrichaceae* **Genus:** *Faecalibacterium,*	—	[20]

			Genus: *Parabacteroides, Bifidobacterium*	*Dorea*		
	Buckwheat-resistant starch	Mice/ In vivo	**Phylum:** *Bacteroidetes* **Genus:** *Bacteroides, Ruminiclostridium, Blautia*	**Phylum:** *Firmicutes*, *Proteobacteria* **Genus:** *Turicibacter, Erysipelatoclostridium, Escherichia-Shigella*	Propionate↑ Butyrate↑	[21]
RSIII	Lotus seed resistant starch	Mice/ In vivo	**Family:** *Lachnospiraceae, Clostridium, Ruminococcaceae* **Genus:** *Lactobacillus, Bifidobacterium*	**Family:** *Rikenellaceae, Porphyromonadaceae*	Formic acid↑ Acetic acid↑ Propionic acid↓ Butyrate↑	[22]
	Buckwheat-resistant starch	Mice/ In vivo	**Genus:** *Lactobacillus, Bifidobacterium, Enterococcus*	**Genus:** *Escherichia Coli*	Acetic acid↑ Butyrate↑ Propionic acid↑	[23]
	Retrograded tapioca starch	Young pigs/ In vivo	**Family:** *Strptococcaceae, Bacteroidales* **Family:** *Ruminococcaceae*	**Family:** *Lachnospiraceae*	—	[24]
RSIV	Chemically modified phosphorylated cross-linked RSIV	Human/ In vivo	**Phylum:** *Actinobacteria, Bacteroidetes* **Genus:** *Veillonellaceae*， *Lachnospiraceae*, *Erysipelotrichaceae*	**Phylum:** *Firmicutes* **Family:** *Ruminococcaceae*	—	[20]
		Human Feces/ In vitro	**Genus:** *Clostridiales, Bacteroides Ruminococcus*	**Genus:** *Blautia, Roseburia, Faecalibacterium*	total SCFAs↓ acetate↓ propionic↓ butyrate↓	[25]
			(compared with high-amylose maize starch, which is the raw material of RSIV)			
		Human/ In vivo	**Species:** *Ruminococcus lactaris, Bacteroides acidifaciens, Blautia glucerasea, Christensenella minuta, Eubacterium*	**Species:** *Enterococcus casseliflavus, Streptococcus cristatus*	butyric↑ propionic↑ valeric↑	[26]

			oxidoreducens, Parabacteroides distasonis		isovaleric↓	
RSV	Debranched high-amylose starch and palmitic acid	Human Feces/ In vitro	**Phylum:** *Actinobacteria, Firmicutes* **Genus:** *Blautia, Anaerostipes, Holdemanella, Bifidobacterium, Streptococcus, Collinsella, Dialister, Megamonas, Faecalibacterium*	**Phylum:** *Proteobacteria, Bacteroidetes* **Genus:** *Parasutterella, Alistipes, Barnesiella, Clostridiales, Bilophila, Parabacteroides, Sutterella, Dorea, Lachnoclostridium, Flavonifractor, Phascolarctobacterium*	acetic acid↑ butyric acid↑ lactic acid↑ valeric acid↓	[27]
			(compared with high-amylose maize starch, which is the raw material of RSII)			
	High-amylose maize starches complexed with saturated fatty acids	Human Feces/ In vitro	**Phylum:** *Bacterioidetes* **Genus:** *Prevotella, Megamonas, Bacteroides*	**Phylum:** *Firmicutes* **Genus:** *Roseburia, Lachnospiraceae, Ruminococcus*	total SCFAs↑ acetate↑ butyrate↑ propionate↑	[28]
			(compared with high-amylose maize starch, which is the raw material of RSII)			

Notes:

a) RMD: Resistant maltodextrin

Unless otherwise noted, any upward or downward adjustments that appear in the table are compared to the normal diet or normal corn starch.

—: Not tested; ↑: increased; ↓: decreased.

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