

**Table S1: The impact of HFD rich in saturated fats on gut microbiota composition in animals. Most significant and relevant changes are reported.**

Ref.	Model	Lipid source	$\alpha$ -Diversity	Phylum				Family								Genus					
				Firmicutes	Bacteroidetes	Proteobacteria	Actinobacteria	Ruminococcaceae	Lachnospiraceae	Rikenellaceae	Desulfovibrionaceae	Bacteroidaceae	Erysipelotrichaceae	Prevotellaceae	Enterobacteriaceae	<i>Bifidobacterium</i>	<i>Lactobacillus</i>	<i>Allobaculum</i>	<i>Clostridium</i> spp.	<i>Bilophila</i>	<i>Turicibacter</i>
1	mice	Palm oil	/	↑	↓	↑	↓		↑			↓	↑								
2	mice	Lard	/								↑					↓				↑	
3	mice	SFA	/						↑				↑			↓	↑	↓		↑	
4	mice	Palm oil	↓	↑	↓														↑		
5	mice	Milk fats	/	↑	↓	↑															
6	mice	HFD	/												↓	↓			↑		
7	mice	butter	↓		↓						↑						↑				
8	mice	Lard	↑					↑	↓	↓	↑										
8	mice	Palm oil	↑					↑	↑	↓	↑										
9	mice	HFD	/	↑	↓	↓		↑		↑		↓		↓	↑	↓					
10	mice	HFD	↓	↑	↓	↑		↑	↑							↓					
11	mice	HFD	/									↓			↑	↓		↓	↑		↑

12	hens	HFD	/	↑	↓								↑								
13	rats	HFD	↓											↑							
14	mice	Coconut oil	/	↑	↓											↑	↑	↑	↑		
15	mice	Rapeseed oil	/	↓	↑	↓			↓								↓				
16	rats	Coconut oil	↓	↓	↑											↑		↑			

/ no significant difference or not analysed; ↑ increase; ↓ decrease

**Table S2: The impact of TFA (trans fatty acids) on gut microbiota composition in animals. Most significant and relevant changes are reported.**

Ref.	Model	Lipid source	$\alpha$ -diversity	Phylum				Family							Genus
				Firmicutes	Bacteroidetes	Proteobacteria	Actinobacteria	Deferribacteres	Ruminococcaceae	Lachnospiraceae	Rikenellaceae	Bacteroidaceae	Desulfovibrionaceae	Lactobacillaceae	<i>Lactobacillus</i> spp.
17	mice	hydrogenated soybean oil	↓		↓	↑	↑	↓	↓	↓	↓	↓	↑	↑	↑
18	rats	hydrogenated soybean oil	/	↑	↓	↑									

/ no significant difference or not analysed; ↑ increase; ↓ decrease

Table S3: The impact of MUFA (monounsaturated fatty acids) on gut microbiota composition in animals. Most significant and relevant changes are reported.

Ref.	Model	Lipid source	$\alpha$ -diversity	Phylum				Family				Genus		
				Firmicutes	Bacteroidetes	Proteobacteria	Actinobacteria	Ruminococcaceae	Lachnospiraceae	Erysipelotrichaceae	Prevotellaceae	<i>Bifidobacterium</i> spp.	<i>Lactobacillus</i> spp.	<i>Clostridium</i> spp.
1	mice	Olive oil	/	↑	↓	↓	↓			↑				
7	mice	Olive oil	↓							↑	↑			↑
19	rats	Olive oil	↑	↑	↓		↓	↑	↑				↑	
20	mice	Oleic acid compounds	/	↓	↑							↑	↓	
4	mice	Olive oil	/	↓	↑									↓

/ no significant difference or not analysed; ↑ increase; ↓ decrease

**Table S4: The impact of PUFA-n-3 (polyunsaturated fatty acids-omega3) on gut microbiota composition in animals. Most significant and relevant changes are reported.**

Ref.	Model	Lipid source	$\alpha$ -diversity	Phylum				Family								Genus									
				Firmicutes	Bacteroidetes	Proteobacteria	Actinobacteria	Deltaproteobact	Ruminococcae	Lachnospiracea	Rikenellaceae	Bacteroidaceae	Enterobacteriaceae	Blfidobacteriaceae	Erysipelotrichac	<i>Bifidobacterium</i>	<i>Lactobacillus</i> spp.	<i>Allobaculum</i>	<i>Turicibacter</i>	<i>Clostridium</i> spp.	<i>Akkermansia</i>	<i>Bilophila</i>	<i>Helicoacter</i>	<i>Pseudomonas</i>	
21	mice	n-3	/													↑	↑								
1	mice	Flaxseed/fish oil	↑			↓	↑		↑	↑		↓		↑	↑	↑		↑							
22	mice	Fish oil	/	↓																		↓	↓		
23	mice	Fish oil	↓		↓		↑	↑								↑	↑			↑	↑	↑			
3	mice	n-3	/													↑	↑	↑	↑	↑	↓	↓			
24	mice	n-3	↓	↓	↑							↓				↑									
20	mice	EPA/DHA	/	↑												↑	↑								
25	Rats	Low n-6/n-3	↑				↓											↑							

/ no significant difference or not analysed; ↑ increase; ↓ decrease

**Table S5: The impact of PUFA-n-6 (polyunsaturated fatty acids-omega6) on gut microbiota composition in animals. Most significant and relevant changes are reported.**

Ref.	Model	Lipid source	$\alpha$ -diversity	Phylum				Family							Genus								
				Firmicutes	Bacteroidetes	Proteobacteria	Actinobacteria	Ruminococcaceae	Lachnospiraceae	Rikenellaceae	Bacteroidaceae	Erysipelotrichaceae	Prevotellaceae	Enterobacteriaceae	<i>Bifidobacterium</i> spp.	<i>Lactobacillus</i> spp.	<i>Allobaculum</i>	<i>Turicibacter</i>	<i>Clostridium</i> spp.	<i>Akkermansia</i>	<i>Oscillibacter</i>	<i>Bilophila</i>	
26	Weaning mice	Soy oil	/												↓	↓			↑				
14	mice	Soy oil	/													↑				↑			
21	mice	n-6	/											↑					↑				
1	mice	Safflower oil	/					↑	↓	↓	↑				↑		↑				↑		
3	mice	n-6	/						↑			↑			↓	↓	↓				↑	↑	
4	mice	Safflower oil	/		↑														↑				
5	mice	Safflower oil	/	↑	↓	↑	↑																
25	rats	High n-6/n-3	↑			↓											↓						

/ no significant difference or not analysed; ↑ increase; ↓ decrease

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