**S1 Table. ANOVA main effects summary at the genus level.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Effect** | **PHYLUM** | **Genus** | **Post-FDR p value** | **Direction** |
| **Time** | Bacteroides | Bacteroides spp. | 0.027 | Decreased across time |
| Prevotella spp. | 0.046 | Decreased across time |
| Deferribacteres | Mucispirillum spp. | 0.012 | Decreased across time |
| Firmicutes | Lactobacillus spp. | 0.032 | Decreased across time |
| Anaerofustis spp. | 0.048 | Increased across time |
| Coprococcus spp. | 0.048 | Decreased across time |
| Peptococcaceae g\_\_ | 0.05 | Decreased across time |
| Eubacterium spp. | 0.037 | Decreased across time |
| Allobaculum spp. | 0.012 | Decreased across time |
| Christensenellaceae g\_ | 0.02 | Decreased across time |
| Clostridiales f\_ g\_ | 0.02 | Increased across time |
| Proteobacteria | Sutterella spp. | 0.046 | Decreased across time |
| Desulfovibrio spp. | 0.003 | Decreased across time |
| **Age** | Actinobacteria | Bifidobacteria spp. | 0.048 | Increased in juveniles |
| Adlercreutzia spp. | 0.012 | Increased in adults |
| Bacteroidetes | Prevotella spp. | 0.012 | Increased in juveniles |
| Rikenellaceae g\_ | 0.048 | Increased in juveniles |
| Firmicutes | Coprococcus spp. | 0.046 | Increased in juveniles |
| Bacillaceae g\_ | 0.012 | Increased in adults |
| Streptococcus spp. | 0.046 | Increased in adults |
| Clostridium spp. | 0.032 | Increased in adults |
| Erysipelotrichaceae g\_ | 0.012 | Increased in adults |
| **Exercise** | Euryarchaeota | Methanosphaera spp. | 0.042 | Increased by exercise |
| Firmicutes | Turicibacter spp. | 0.02 | Increased by exercise |
| Dehalobacteriaceae g\_ | 0.048 | Increased by exercise |
| Lactococcus spp. | 0.02 | Increased by exercise |
| Oscillospira spp. | 0.037 | Decreased by exercise |

Summary of main effects observed following ANOVA at the genus level of taxonomy. These genera were differentially impacted by time, age, and exercise.