

**Supplementary Table 1: Mean, standard deviation, and standard error of mean for most abundant phyla across exposure, diet, and probiotic treatment groups.**

|                        |      | LF+CON | LF+DEP | HF+CON | HF+DEP | HF+CON+PRO | HF+DEP+PRO |
|------------------------|------|--------|--------|--------|--------|------------|------------|
| <b>Firmicutes</b>      | Mean | 50.980 | 60.380 | 68.660 | 62.040 | 62.600     | 62.060     |
|                        | SD   | 20.230 | 14.700 | 15.440 | 27.570 | 16.380     | 10.270     |
|                        | SEM  | 7.151  | 5.196  | 5.459  | 10.420 | 6.192      | 3.881      |
| <b>Proteobacteria</b>  | Mean | 28.030 | 21.890 | 19.930 | 34.710 | 23.990     | 24.350     |
|                        | SD   | 27.060 | 22.130 | 14.490 | 27.280 | 21.510     | 15.620     |
|                        | SEM  | 9.567  | 7.824  | 5.124  | 10.310 | 8.130      | 5.902      |
| <b>Actinobacteria</b>  | Mean | 18.060 | 6.548  | 9.380  | 1.347  | 11.480     | 10.530     |
|                        | SD   | 12.040 | 8.200  | 9.033  | 0.939  | 5.481      | 5.413      |
|                        | SEM  | 4.259  | 2.899  | 3.194  | 0.355  | 2.072      | 2.046      |
| <b>Verrucomicrobia</b> | Mean | 2.469  | 5.355  | 1.101  | 0.275  | 1.333      | 1.138      |
|                        | SD   | 3.175  | 4.247  | 1.749  | 0.314  | 2.352      | 1.499      |
|                        | SEM  | 1.122  | 1.501  | 0.618  | 0.119  | 0.889      | 0.567      |
| <b>Bacteroidetes</b>   | Mean | 0.131  | 5.231  | 0.566  | 0.990  | 0.350      | 1.095      |
|                        | SD   | 0.071  | 13.420 | 0.821  | 1.809  | 0.316      | 1.196      |
|                        | SEM  | 0.025  | 4.743  | 0.290  | 0.684  | 0.120      | 0.452      |
| <b>Deferribacteres</b> | Mean | 0.113  | 0.375  | 0.066  | 0.309  | 0.018      | 0.136      |
|                        | SD   | 0.277  | 0.967  | 0.154  | 0.719  | 0.029      | 0.231      |
|                        | SEM  | 0.098  | 0.342  | 0.054  | 0.272  | 0.011      | 0.087      |
| <b>Thermi</b>          | Mean | 0.045  | 0.056  | 0.202  | 0.176  | 0.119      | 0.489      |
|                        | SD   | 0.043  | 0.047  | 0.331  | 0.185  | 0.105      | 1.033      |
|                        | SEM  | 0.015  | 0.017  | 0.117  | 0.070  | 0.040      | 0.390      |
| <b>Tenericutes</b>     | Mean | 0.050  | 0.076  | 0.037  | 0.017  | 0.023      | 0.130      |
|                        | SD   | 0.042  | 0.057  | 0.048  | 0.018  | 0.032      | 0.275      |
|                        | SEM  | 0.015  | 0.020  | 0.017  | 0.007  | 0.012      | 0.104      |

DEP, diesel exhaust particles; CON, saline controls; LF, low fat diet; HF, high fat diet; PRO, probiotic treatment; SD, standard deviation; SEM, standard error of mean.