

**Table S3. Sequencing data statistics for 16S rRNA amplicons of rat fecal microbiomes**

| Sample name                            | Number of reads classified by WIMP | Number of taxa identified | Notes                                   |
|--|------------------------------------|---------------------------|---|
| <b>Single probiotic administration</b> |                                    |                           |   |
| 1s                                     | 412,314                            | 1,044                     | Control                                 |
| 2s                                     | 387,546                            | 1,037                     | Control                                 |
| 3s                                     | 348,957                            | 726                       | Control                                 |
| 4s                                     | 357,285                            | 591                       | Control                                 |
| 5s                                     | 401,905                            | 663                       | Control                                 |
| 6s                                     | 162,361                            | 626                       | Control                                 |
| 7s                                     | 79,039                             | 768                       | Control                                 |
| 8s                                     | 209,944                            | 916                       | Control                                 |
| 9s                                     | 156,105                            | 833                       | Control                                 |
| 13s                                    | 715,583                            | 1,163                     | Following 24 h after feeding            |
| 14s                                    | 272,461                            | 978                       | Following 24 h after feeding            |
| 15s                                    | 105,860                            | 855                       | Following 24 h after feeding            |
| 16s                                    | 369,737                            | 624                       | Following 24 h after feeding            |
| 17s                                    | 475,914                            | 658                       | Following 24 h after feeding            |
| 18s                                    | 738,178                            | 882                       | Following 24 h after feeding            |
| 19s                                    | 80,383                             | 792                       | Following 24 h after feeding            |
| 20s                                    | 89,838                             | 760                       | Following 24 h after feeding            |
| 21s                                    | 179,526                            | 832                       | Following 24 h after feeding            |
| 25s                                    | 851,062                            | 1,177                     | Following 48 h after feeding            |
| 26s                                    | 439,167                            | 1,070                     | Following 48 h after feeding            |
| 28s                                    | 483,084                            | 679                       | Following 48 h after feeding            |
| 33s                                    | 489,578                            | 1,048                     | Following 48 h after feeding            |
| 37s                                    | 457,789                            | 1,064                     | Following 72 h after feeding            |
| 38s                                    | 132,651                            | 777                       | Following 72 h after feeding            |
| 41s                                    | 459,653                            | 691                       | Following 72 h after feeding            |
| 45s                                    | 463,060                            | 1,013                     | Following 72 h after feeding            |
| 49s                                    | 365,947                            | 1,088                     | Following 14 days after feeding         |
| 50s                                    | 59,116                             | 663                       | Following 14 days after feeding         |
| 52s                                    | 537,726                            | 656                       | Following 14 days after feeding         |
| 53s                                    | 454,820                            | 728                       | Following 14 days after feeding         |
| 57s                                    | 505,977                            | 995                       | Following 14 days after feeding         |
| 1s_48 h_GM                             | 371,712                            | 770                       | Control after 48 h outgrowth in GMM     |
| 3s_48 h_GM                             | 301,319                            | 603                       | Control after 48 h outgrowth in GMM     |
| 3s_48 h_Pr                             | 192,838                            | 542                       | Following 48 h outgrowth with probiotic |
| 6s_24 h_GM                             | 424,186                            | 562                       | Control after 24 h outgrowth in GMM     |

|  |           |       |   |
|--|-----------|-------|---|
| 6s_24 h_Pr                               | 221,242   | 460   | Following 24 h outgrowth with probiotic |
| 6s_48 h_GM                               | 232,389   | 565   | Control after 48 h outgrowth in GMM     |
| 6s_48 h_Pr                               | 267,744   | 583   | Following 48 h outgrowth with probiotic |
| 7s_48 h_GM                               | 149,138   | 424   | Control after 48 h outgrowth in GMM     |
| 7s_48 h_Pr                               | 163,048   | 523   | Following 48 h outgrowth with probiotic |
| 8s_48 h_GM                               | 206,810   | 569   | Control after 48 h outgrowth in GMM     |
| 8s_48 h_Pr                               | 150,803   | 601   | Following 48 h outgrowth with probiotic |
| 9s_48 h_GM                               | 321,719   | 761   | Control after 48 h outgrowth in GMM     |
| <b>Multiple probiotic administration</b> |           |       |   |
| 1m                                       | 658,171   | 721   | Control                                 |
| 2m                                       | 603,233   | 812   | Control                                 |
| 3m                                       | 849,834   | 732   | Control                                 |
| 4m                                       | 1,410,558 | 831   | Control                                 |
| 5m                                       | 547,532   | 787   | Control                                 |
| 6m                                       | 769,544   | 870   | Control                                 |
| 7m                                       | 449,313   | 835   | Control                                 |
| 8m                                       | 1,251,954 | 773   | Control                                 |
| 9m                                       | 412,215   | 749   | Control                                 |
| 10m                                      | 803,606   | 741   | Control                                 |
| 11m                                      | 379,094   | 737   | Control                                 |
| 12m                                      | 424,142   | 802   | Control                                 |
| 13m                                      | 577,356   | 652   | Following 24 h after feeding            |
| 14m                                      | 206,977   | 591   | Following 24 h after feeding            |
| 15m                                      | 264,550   | 747   | Following 24 h after feeding            |
| 16m                                      | 87,948    | 559   | Following 24 h after feeding            |
| 17m                                      | 1,155,941 | 892   | Following 24 h after feeding            |
| 18m                                      | 1,376,484 | 1,115 | Following 24 h after feeding            |
| 19m                                      | 940,402   | 831   | Following 24 h after feeding            |
| 21m                                      | 218,470   | 621   | Following 24 h after feeding            |
| 23m                                      | 161,349   | 619   | Following 24 h after feeding            |
| 24m                                      | 698,270   | 854   | Following 24 h after feeding            |
| 25m                                      | 444,933   | 593   | Following 48 h after feeding            |
| 26m                                      | 202,506   | 648   | Following 48 h after feeding            |
| 27m                                      | 101,139   | 589   | Following 48 h after feeding            |
| 28m                                      | 222,208   | 729   | Following 48 h after feeding            |
| 33m                                      | 247,657   | 656   | Following 48 h after feeding            |
| 35m                                      | 377,733   | 569   | Following 48 h after feeding            |
| 37m                                      | 668,193   | 984   | Following 72 h after feeding            |
| 38m                                      | 326,271   | 971   | Following 72 h after feeding            |
| 39m                                      | 172,977   | 791   | Following 72 h after feeding            |

|             |           |       |   |
|-------------|-----------|-------|---|
| 40m         | 134,643   | 733   | Following 72 h after feeding            |
| 45m         | 437,903   | 1,017 | Following 72 h after feeding            |
| 47m         | 380,901   | 929   | Following 72 h after feeding            |
| 59m         | 520,027   | 644   | Following 14 days after feeding         |
| 1m_24 h_GM  | 397,031   | 648   | Control after 24 h outgrowth in GMM     |
| 1m_24 h_Pr  | 422,797   | 649   | Following 24 h outgrowth with probiotic |
| 1m_48 h_GM  | 257,683   | 635   | Control after 48 h outgrowth in GMM     |
| 1m_48 h_Pr  | 293,448   | 658   | Following 48 h outgrowth with probiotic |
| 5m_24 h_GM  | 470,880   | 620   | Control after 24 h outgrowth in GMM     |
| 5m_24 h_Pr  | 1,138,929 | 676   | Following 24 h outgrowth with probiotic |
| 5m_48 h_GM  | 484,348   | 566   | Control after 48 h outgrowth in GMM     |
| 5m_48 h_Pr  | 600,823   | 592   | Following 48 h outgrowth with probiotic |
| 6m_24 h_GM  | 428,719   | 713   | Control after 24 h outgrowth in GMM     |
| 6m_24 h_Pr  | 421,086   | 712   | Following 24 h outgrowth with probiotic |
| 6m_48 h_GM  | 251,829   | 661   | Control after 48 h outgrowth in GMM     |
| 6m_48 h_Pr  | 326,559   | 711   | Following 48 h outgrowth with probiotic |
| 7m_24 h_GM  | 524,362   | 668   | Control after 24 h outgrowth in GMM     |
| 7m_24 h_Pr  | 700,920   | 745   | Following 24 h outgrowth with probiotic |
| 12m_24 h_GM | 535,503   | 452   | Control after 24 h outgrowth in GMM     |
| 12m_24 h_Pr | 611,090   | 490   | Following 24 h outgrowth with probiotic |