



**Supplemental Figure S1.**  $\beta$ -diversity analysis between RA mice and healthy controls. (A) Principal coordinate analysis plot constructed by using the Jaccard distance matrix. (B) Principal coordinate analysis plot constructed by using the unweighted-UniFrac distance matrix. CT, healthy controls; RA, rheumatoid arthritis; CM, cecal mucus; F, fecal. All mice are from ICR background.

**Supplemental Table S1.** Pairwise-PERMANOVA and PERMDISP results based on Bray-Curtis dissimilarity for gut microbiota diversity

| <b>Bray curtis_PERMANOVA-pairwise</b> |          |             |              |          |         |          |
|---------------------------------------|----------|-------------|--------------|----------|---------|----------|
| Group 1                               | Group 2  | Sample size | Permutations | pseudo-F | p-value | q-value  |
| CT-CC                                 | CT-CM    | 17          | 999          | 0.32856  | 0.948   | 0.948    |
| CT-CC                                 | CT-Feces | 13          | 999          | 1.386194 | 0.172   | 0.184286 |
| CT-CC                                 | RA-CC    | 9           | 999          | 2.57514  | 0.016   | 0.02     |
| CT-CC                                 | RA-CM    | 18          | 999          | 3.914294 | 0.001   | 0.002143 |
| CT-CC                                 | RA-Feces | 25          | 999          | 6.10048  | 0.001   | 0.002143 |
| CT-CM                                 | CT-Feces | 18          | 999          | 2.512023 | 0.009   | 0.012273 |
| CT-CM                                 | RA-CC    | 14          | 999          | 2.966399 | 0.002   | 0.00375  |
| CT-CM                                 | RA-CM    | 23          | 999          | 4.478852 | 0.001   | 0.002143 |
| CT-CM                                 | RA-Feces | 30          | 999          | 10.51654 | 0.001   | 0.002143 |
| CT-Feces                              | RA-CC    | 10          | 999          | 2.839801 | 0.007   | 0.0105   |
| CT-Feces                              | RA-CM    | 19          | 999          | 5.325122 | 0.001   | 0.002143 |
| CT-Feces                              | RA-Feces | 26          | 999          | 4.429387 | 0.001   | 0.002143 |
| RA-CC                                 | RA-CM    | 15          | 999          | 1.90157  | 0.103   | 0.118846 |
| RA-CC                                 | RA-Feces | 22          | 999          | 3.52668  | 0.004   | 0.006667 |
| RA-CM                                 | RA-Feces | 31          | 999          | 8.655425 | 0.001   | 0.002143 |

| <b>Bray curtis_PERMDISP-pairwise</b> |          |             |              |          |         |          |
|--------------------------------------|----------|-------------|--------------|----------|---------|----------|
| Group 1                              | Group 2  | Sample size | Permutations | F-value  | p-value | q-value  |
| CT-CC                                | CT-CM    | 17          | 999          | 0.016693 | 0.854   | 0.868    |
| CT-CC                                | CT-Feces | 13          | 999          | 0.399979 | 0.496   | 0.744    |
| CT-CC                                | RA-CC    | 9           | 999          | 2.980113 | 0.126   | 0.63     |
| CT-CC                                | RA-CM    | 18          | 999          | 0.188615 | 0.655   | 0.81875  |
| CT-CC                                | RA-Feces | 25          | 999          | 0.03553  | 0.821   | 0.868    |
| CT-CM                                | CT-Feces | 18          | 999          | 0.662935 | 0.404   | 0.673333 |
| CT-CM                                | RA-CC    | 14          | 999          | 8.777898 | 0.112   | 0.63     |
| CT-CM                                | RA-CM    | 23          | 999          | 0.549857 | 0.392   | 0.673333 |
| CT-CM                                | RA-Feces | 30          | 999          | 0.016301 | 0.868   | 0.868    |
| CT-Feces                             | RA-CC    | 10          | 999          | 4.870214 | 0.048   | 0.63     |
| CT-Feces                             | RA-CM    | 19          | 999          | 1.2533   | 0.24    | 0.673333 |
| CT-Feces                             | RA-Feces | 26          | 999          | 0.311571 | 0.559   | 0.762273 |
| RA-CC                                | RA-CM    | 15          | 999          | 1.488566 | 0.347   | 0.673333 |
| RA-CC                                | RA-Feces | 22          | 999          | 3.4689   | 0.238   | 0.673333 |
| RA-CM                                | RA-Feces | 31          | 999          | 0.663185 | 0.32    | 0.673333 |