**Supplementary material**

The composition of regular chow and high-fat diets were provided by Table S1.

Tab. S1 The composition of chow and high-fat diets

|  |  |  |
| --- | --- | --- |
| Ingredient | regular chow (g/kg) | high-fat diets (g/kg) |
| Casein | 200 | 200 |
| L-Cystine | 3 | 3 |
| Corn Starch | 506.2 | 0 |
| Maltodextrin 10 | 125 | 125 |
| Sucrose | 72.8 | 72.8 |
| Cellulose, BW20 | 50 | 50 |
| Soybean Oil | 25 | 25 |
| Lard | 20 | 245 |
| Mineral Mix S10026B | 50 | 50 |
| Vitamin Mix V10001C | 1 | 1 |
| Choline Bitartrate | 2 | 2 |
| Product (kcal%) | regular chow | high-fat diets |
| Protein | 20% | 26% |
| Carbohydrate | 20% | 26% |
| Fat | 60% | 35% |
| kcal/g | 3.85 | 5.22 |

The kettle and feed weights were recorded in the Fig. S1A,B. The results for several other SCFAs are shown in the Fig. S1C–F.

Fig. S1 Effects of *Morchella esculenta* soluble polysaccharide fraction (MPF) on a high-fat diet. **A** Food intake, **B** Water intake, **C** Propionic acid, **D** Isobutyric acid, **E** Isovaleric acid, **F** Valeric acid. (A–F: n = 8, mean ± SD, Between-group variation was statistically analyzed using a one-way single-factor analysis of variance, followed by a post-test with Tukey’s honestly significant difference. *P* < 0.05 indicates a significant difference, #significance of diversity in the RC group, \*significance of diversity in the HFD group, ※significance of diversity between HFD+MPF100 group and HFD+MPF400 group).