

**Table S3** The R values of spearman's correlation analysis between biochemical indexes, gut microbiota, and serum metabolomic

**Note:** (A) Bacteroides, (B) Muribaculaceae, (C) Akkermansia, (D) Lactobacillus, (E) Lachnoclostridium, (F) Phascolarctobacterium, (G) Lachnospiraceae\_NK4A136\_group, (H)Parabacteroides, (I) [Ruminococcus]\_gnavus\_group, (J) Anaerofilum, (K) Dorea, (L) Romboutsia, (M) Ruminococcaceae\_UCG-014, (N) Hungatella, (O) Prevotellaceae\_UCG-001, (P) Desulfovibrio, (Q) Ruminococcaceae\_UCG-013, (R) Flavonifractor, (S) Blautia, (T) Eisenbergiella, (U) Parasutterella, (V) Bilophila,(W) Anaerostipes, (X) [Ruminococcus]\_torques\_group, (Y) [Eubacterium]\_xylanophilum\_group, (Z) Roseburia, (A1) Faecalibaculum, (B1)Ruminococcus\_1, (C1) Ruminiclostridium\_6, (D1) Prevotellaceae\_NK3B31\_group, (E1) [Eubacterium]\_coprostanoligenes\_group, (F1) Marvinbryantia, (G1) Ruminococcaceae\_UCG-008, (H1) Oscillibacter, (I1) Fournierella, (J1) Ruminococcaceae\_UCG-005, (K1) Turicibacter, (L1) Clostridium\_sensu\_stricto\_1, (M1) Clostridioides, (N1) Ruminiclostridium\_9, (O1) [Ruminococcus]\_gauvreauii\_group, (P1) Ruminiclostridium\_5, (Q1) Lachnospiraceae\_UCG-006, (R1) UBA1819, (S1) Erysipelatoclostridium, (T1) Holdemania, (U1) Fusicatenibacter, (V1) Negativibacillus, (W1) Erysipelotrichaceae\_UCG-003, (Y1) [Eubacterium]\_nodatum\_group