

Supplementary materials

Urine metabolomics reveals new insights into hyperlipidemia and therapeutic effect of rhubarb

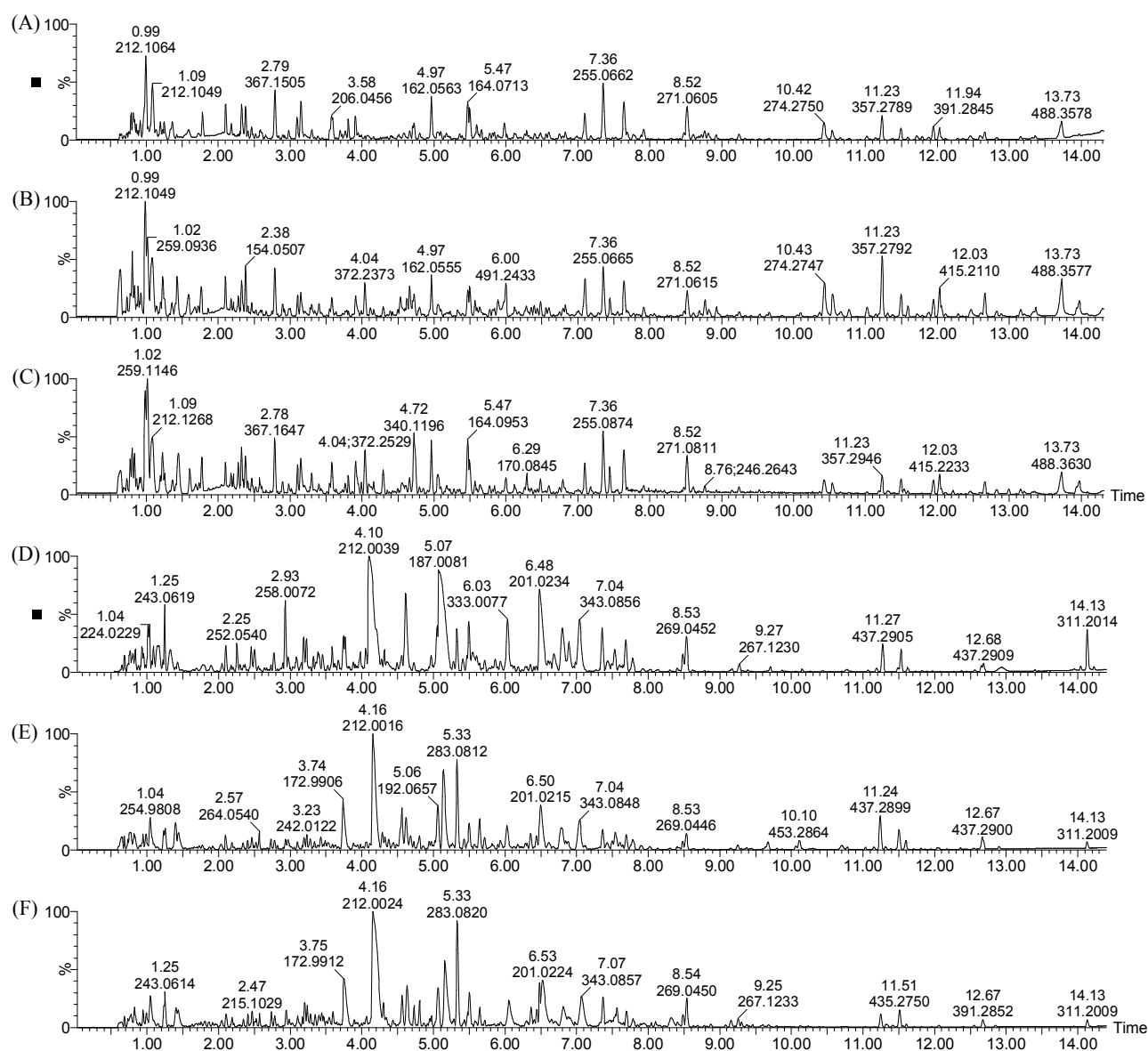


Fig. S1. Base peak intensity (BPI) chromatograms in positive and negative ion modes obtained from UPLC-MS analysis. (A), (B) and (C) represent the BPI chromatograms of the control group, diet-induced hyperlipidemic group and rhubarb-treated hyperlipidemic group in positive ion mode, respectively. (D), (E) and (F) represent BPI chromatogram of control group, diet-induced hyperlipidemic group and rhubarb-treated hyperlipidemic group in negative ion mode, respectively.

Table S1 All twenty-one pairs of interactions between four biomarkers and seven targets in the diet-induced hyperlipidemic rats

| ID | Biomarkers | Hyperlipidemia-related targets | Steps of metabolic reactions |
|----|-----------------|--------------------------------|------------------------------|
| 1 | D-Arginine | F2 | 0 |
| 2 | D-Arginine | LIPE | 20 |
| 3 | D-Arginine | F5 | 4 |
| 4 | D-Arginine | F7 | 6 |
| 5 | D-Arginine | PROS1 | 6 |
| 6 | D-Arginine | ALB | 14 |
| 7 | D-Arginine | FASN | 10 |
| 8 | L-Phenylalanine | F2 | 12 |
| 9 | L-Phenylalanine | LIPE | 14 |
| 10 | L-Phenylalanine | ALB | 6 |
| 11 | L-Phenylalanine | FASN | 10 |
| 12 | L-Phenylalanine | F5 | 14 |
| 13 | Xanthine | F2 | 20 |
| 14 | Xanthine | LIPE | 20 |
| 15 | Xanthine | ALB | 14 |
| 16 | Xanthine | FASN | 12 |
| 17 | Palmitic acid | F2 | 16 |
| 18 | Palmitic acid | LIPE | 16 |
| 19 | Palmitic acid | ALB | 10 |
| 20 | Palmitic acid | FASN | 6 |
| 21 | Palmitic acid | F5 | 18 |

Table S2 All forty-seven pairs of interactions between fourteen targets and five biomarkers in the diet-induced hyperlipidaemic rats.

| ID | Hyperlipidaemia-related targets | Biomarkers | Steps of metabolic reactions |
|----|---------------------------------|------------------|------------------------------|
| 1 | FASN | Palmitic acid | 4 |
| 2 | LIPE | Xanthine | 6 |
| 3 | LIPE | Palmitic acid | 6 |
| 4 | BAAT | Palmitic acid | 6 |
| 5 | ALB | Xanthine | 6 |
| 6 | ALB | Palmitic acid | 6 |
| 7 | CYP7A1 | Palmitic acid | 6 |
| 8 | ELOVL1 | Xanthine | 6 |
| 9 | ELOVL1 | Palmitic acid | 6 |
| 10 | APOA1 | Xanthine | 8 |
| 11 | APOA1 | Palmitic acid | 8 |
| 12 | LIPE | Phytosphingosine | 8 |
| 13 | BAAT | Xanthine | 8 |
| 14 | BAAT | Hippuric acid | 8 |
| 15 | NPC1L1 | Palmitic acid | 8 |
| 16 | ALB | Phytosphingosine | 8 |
| 17 | CYP7A1 | Phytosphingosine | 8 |
| 18 | CYP7A1 | Xanthine | 8 |
| 19 | FASN | Xanthine | 8 |
| 20 | LSS | Palmitic acid | 8 |
| 21 | ELOVL1 | Phytosphingosine | 8 |
| 22 | ELOVL1 | Hippuric acid | 8 |
| 23 | APOA1 | Phytosphingosine | 10 |
| 24 | LIPE | Hippuric acid | 10 |
| 25 | CYP27A1 | Hippuric acid | 10 |
| 26 | CYP27A1 | Palmitic acid | 10 |
| 27 | BAAT | Phytosphingosine | 10 |
| 28 | NPC1L1 | Phytosphingosine | 10 |
| 29 | NPC1L1 | Xanthine | 10 |
| 30 | ALB | Hippuric acid | 10 |
| 31 | FASN | Phytosphingosine | 10 |
| 32 | FASN | Hippuric acid | 10 |
| 33 | LSS | Phytosphingosine | 10 |
| 34 | LSS | Xanthine | 10 |
| 35 | GCG | Xanthine | 10 |
| 36 | GCG | Palmitic acid | 10 |
| 37 | F2 | Xanthine | 12 |
| 38 | F2 | Palmitic acid | 12 |
| 39 | APOA1 | Hippuric acid | 12 |
| 40 | CYP27A1 | Phytosphingosine | 12 |
| 41 | CYP27A1 | Xanthine | 12 |
| 42 | OSBP | Xanthine | 12 |
| 43 | OSBP | Palmitic acid | 12 |

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|----|--------|------------------|----|
| 44 | LCAT | Palmitic acid | 12 |
| 45 | ALB | Creatinine | 12 |
| 46 | CYP7A1 | Hippuric acid | 12 |
| 47 | GCG | Phytosphingosine | 12 |
