**Supplemental Digital Content 2.** Associations between baseline metabolites and change in cardiometabolic risk factors.

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| ∆ Risk Factor | Metabolite | Beta Coefficient | p-Value |
| CRF | Cyclic AMP | 0.26 | 6.77×10-4 |
| (mL/kg/min) | ADMA/SDMA | 0.26 | 9.93×10-4 |
|  | Glycerol-3-Phosphate | 0.25 | 2.37×10-3 |
|  | Cytidine | -0.21 | 1.05×10-2 |
|  | Taurine | 0.21 | 1.15×10-2 |
|  | Citric Acid/Isocitric Acid | -0.18 | 2.18×10-2 |
|  | Taurine | 0.19 | 2.46×10-2 |
|  | Alpha-Glycerophosphocholine | 0.24 | 2.93×10-2 |
|  | C26-Carnitine | 0.18 | 3.47×10-2 |
|  | AMP | 0.16 | 3.75×10-2 |
|  | NMMA | 0.16 | 3.97×10-2 |
| WC | Taurine | -0.25 | 1.15×10-3 |
|  | Cyclic AMP | -0.20 | 7.09×10-3 |
|  | Citric Acid/Isocitric Acid | 0.202 | 8.04×10-3 |
|  | ADMA/SDMA | -0.16 | 3.46×10-2 |
|  | ADP | -0.15 | 4.90×10-2 |
| BMI | Uridine | -0.19 | 1.25×10-2 |
|  | Taurine | -0.19 | 1.52×10-2 |
|  | Cyclic AMP | -0.18 | 2.28×10-2 |
|  | D-Gluconic Acid | -0.18 | 3.82×10-2 |
|  | Alanine | -0.16 | 3.83×10-2 |
| Fasting Insulin | Deoxycholic Acid | 0.17 | 6.79×10-3 |
|  | UDP-Glucose/Galactose | 0.15 | 2.00×10-2 |
|  | Malonic Acid | -0.14 | 2.85×10-2 |
|  | 2-Aminoadipic Acid | 0.14 | 2.89×10-2 |
|  | Taurine | -0.14 | 3.37×10-2 |
|  | Allantoin | -0.14 | 3.46×10-2 |
|  | Oxaloacetic Acid | -0.14 | 3.70×10-2 |
|  | C5-Valeryl Carnitines | 0.15 | 4.09×10-2 |
|  | Phosphocreatine | 0.13 | 4.32×10-2 |
|  | C26-Carnitine | -0.13 | 4.49×10-2 |
|  | Taurine | -0.13 | 4.84×10-2 |
| HOMA IR | Deoxycholic Acid | 0.17 | 8.43×10-3 |
|  | Allantoin | -0.17 | 1.32×10-2 |
|  | C26-Carnitine | -0.17 | 1.41×10-2 |
|  | UDP-Glucose/Galactose | 0.14 | 3.51×10-2 |
|  | Taurine | -0.14 | 3.54×10-2 |
|  | Malonic Acid | -0.14 | 3.71×10-2 |
|  | Phosphocreatine | 0.13 | 3.75×10-2 |
|  | Oxaloacetic Acid | -0.14 | 3.87×10-2 |
|  | C5-Valeryl Carnitines | 0.14 | 4.72×10-2 |
|  | 2-Aminoadipic Acid | 0.13 | 4.76×10-2 |
| Insulin AUC | Taurine | -0.20 | 1.72×10-3 |
|  | Allantoin | -0.19 | 2.97×10-3 |
|  | Pseudouridine | -0.18 | 4.23×10-3 |
|  | Arginine | -0.15 | 1.36×10-2 |
|  | ADMA/SDMA | -0.15 | 1.42×10-2 |
|  | Dimethylglycine | -0.15 | 1.53×10-2 |
|  | Choline | -0.14 | 2.45×10-2 |
|  | Creatinine | -0.15 | 2.91×10-2 |
|  | Kynurenic Acid | -0.14 | 2.93×10-2 |
|  | Glyceric Acid | -0.13 | 3.01×10-2 |
|  | NMMA | -0.13 | 3.56×10-2 |
|  | *cis/trans*-Hydroxyproline | -0.13 | 4.45×10-2 |
|  | Homocysteine | -0.13 | 4.47×10-2 |
|  | Citrulline | -0.13 | 4.64×10-2 |
|  | Phosphocholine | -0.12 | 4.72×10-2 |
| 2-Hour Glucose | *cis/trans*-Hydroxyproline | -0.22 | 1.17×10-3 |
|  | Hippuric Acid | -0.22 | 1.88×10-3 |
|  | C10-Carnitine | -0.21 | 1.96×10-3 |
|  | C7-Carnitine | -0.22 | 2.09×10-3 |
|  | Creatinine | -0.24 | 2.16×10-3 |
|  | C8-Carnitine | -0.20 | 3.12×10-3 |
|  | Uric Acid | 0.23 | 3.68×10-3 |
|  | C14-Carnitine | -0.20 | 4.53×10-3 |
|  | Citrulline | -0.19 | 5.65×10-3 |
|  | C18-Carnitine | -0.21 | 5.68×10-3 |
|  | Taurine | -0.19 | 6.73×10-3 |
|  | C12-Carnitine | -0.19 | 7.33×10-3 |
|  | Glucose/Fructose/Galactose | 0.18 | 9.98×10-3 |
|  | C6-Carnitine | -0.18 | 1.15×10-2 |
|  | C5-Glutaryl Carnitine | -0.16 | 1.86×10-2 |
|  | Histidine | -0.16 | 1.95×10-2 |
|  | Hypoxanthine | 0.16 | 2.31×10-2 |
|  | C26-Carnitine | -0.16 | 2.38×10-2 |
|  | Inosine | 0.16 | 2.56×10-2 |
|  | C16-Carnitine | -0.17 | 2.59×10-2 |
|  | Choline | -0.16 | 2.74×10-2 |
|  | Phosphocholine | -0.15 | 3.25×10-2 |
|  | Keto Isocaproic Acid/Keto Methylvalerate | 0.16 | 3.44×10-2 |
|  | Allantoin | -0.15 | 3.68×10-2 |
|  | 2-Ketoisovaleric Acid | 0.15 | 3.91×10-2 |
|  | Dimethylglycine | -0.14 | 4.41×10-2 |
|  | Glyceric Acid | -0.14 | 4.69×10-2 |
|  | Xanthosine | 0.14 | 4.77×10-2 |
|  | Glycine | -0.15 | 4.82×10-2 |
| SBP | Quinolinic Acid | 0.21 | 6.34×10-3 |
|  | 2-Hydroxyglutaric Acid | 0.21 | 6.83×10-3 |
|  | Anthranilic Acid | 0.20 | 8.66×10-3 |
|  | Thiamine | 0.18 | 1.54×10-2 |
|  | 2-Aminoadipic Acid | -0.19 | 1.68×10-2 |
|  | Malonic Acid | 0.18 | 2.01×10-2 |
|  | C9-Carnitine | -0.17 | 2.69×10-2 |
|  | C4-Butyryl Carnitines | 0.17 | 2.77×10-2 |
|  | Oxalic Acid | -0.17 | 3.20×10-2 |
|  | Kynurenine | 0.17 | 3.31×10-2 |
|  | Homocysteine | -0.16 | 3.47×10-2 |
|  | Glutamate | 0.17 | 4.26×10-2 |
|  | Kynurenine | 0.16 | 4.47×10-2 |
| DBP | Glutamate | 0.29 | 2.49×10-4 |
|  | Thiamine | 0.22 | 2.82×10-3 |
|  | Uracil | 0.22 | 3.10×10-3 |
|  | Homogentisic Acid | 0.21 | 4.70×10-3 |
|  | Pyruvic Acid | 0.19 | 7.54×10-3 |
|  | Alpha-Ketoglutaric Acid | 0.19 | 9.83×10-3 |
|  | Quinolinic Acid | 0.19 | 1.08×10-2 |
|  | C9-Carnitine | -0.18 | 1.42×10-2 |
|  | C10-Carnitine | -0.17 | 1.79×10-2 |
|  | Homocysteine | -0.17 | 1.98×10-2 |
|  | Tyrosine | 0.17 | 2.46×10-2 |
|  | Phosphocreatine | -0.16 | 2.84×10-2 |
|  | 2-Aminoadipic Acid | -0.16 | 3.89×10-2 |
|  | Oxalic Acid | -0.15 | 4.42×10-2 |
|  | Niacinamide | 0.14 | 4.79×10-2 |
|  | Glycochenodeoxycholic Acid | 0.15 | 4.79×10-2 |

AUC, area under the curve; SBP, systolic blood pressure; DBP, diastolic blood pressure; WC, waist circumference; CRF, cardiorespiratory fitness. Multiple regression adjusted for age, sex and baseline risk factor.