Supplementary Material

Table S1. Intra- and inter- assay variations of metabolic status indices. [1]
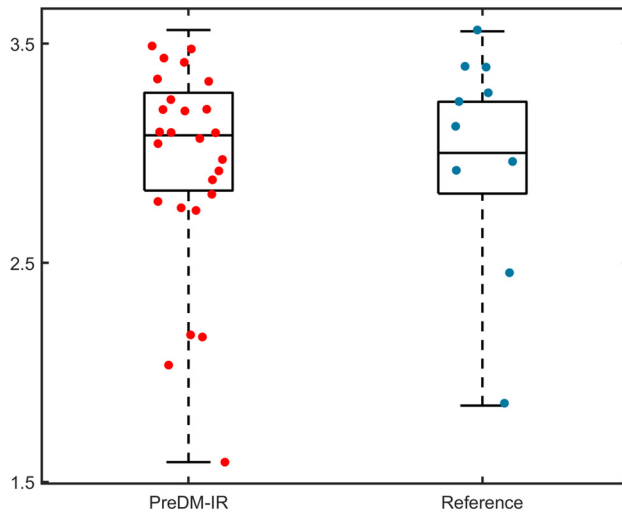
	Glucose	Insulin	TC	HDL-C	TG
Intra-assay variation %	1.4	1.2	2.1	1.5	1.8
Inter-assay variation %	3.1	5.5	3.0	2.7	3.6

[1] TC, total cholesterol; HDL-C, high-density lipoprotein cholesterol; TG, triglycerides

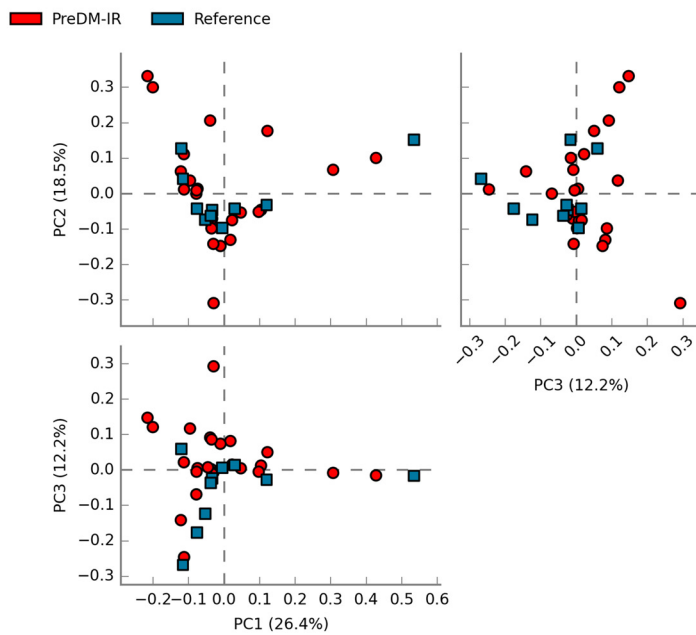Figure S1. Gut microbiome composition at species level (top 50 species).

Figure S2. Within- and between- sample diversities: (A) α-diversity defined by the Shannon Index, indicating the number of species (richness) and relative abundance distribution (evenness) within a sample; (B) β-diversity defined by Principal Component Analysis (PCA), comparing species-level taxonomic profiles between PreDM-IR and Reference groups.
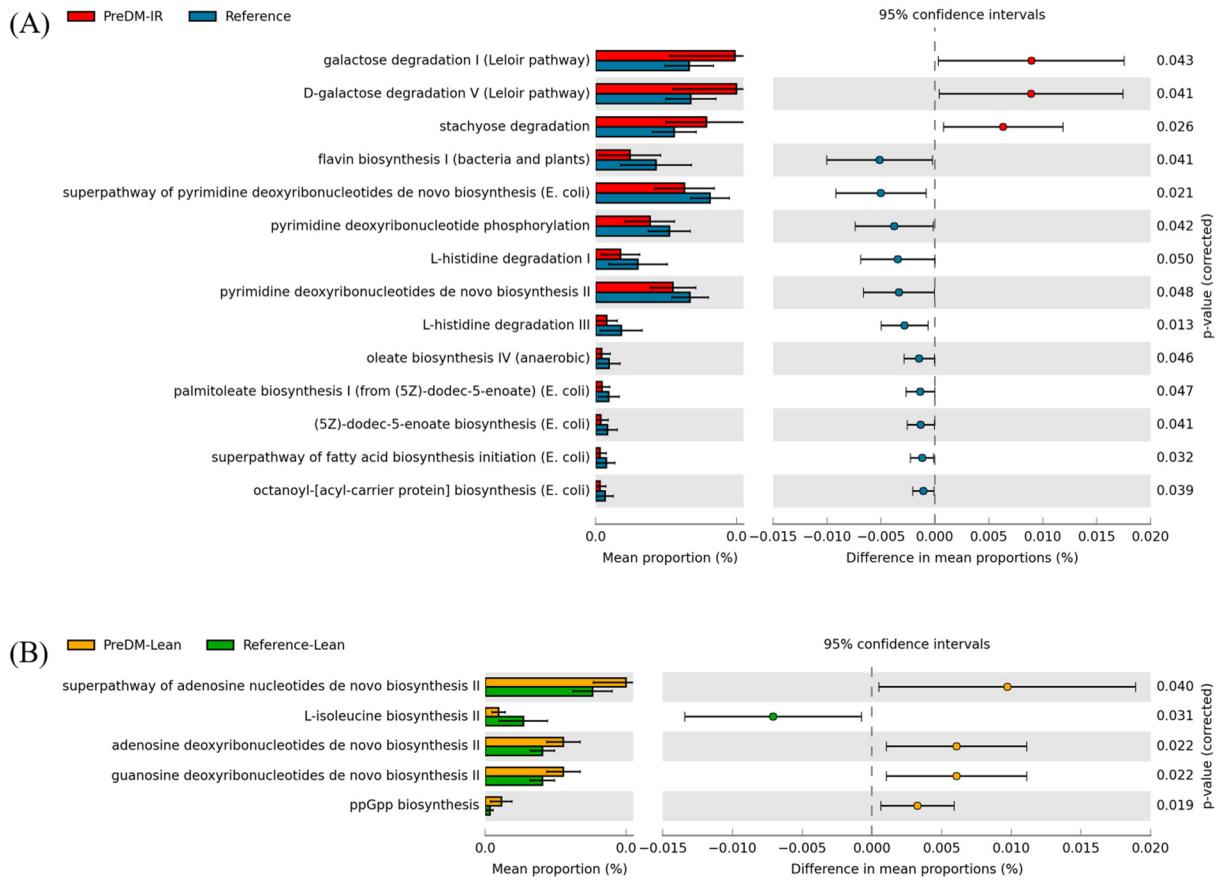
Figure S3. Predicted functional pathways: (A) PreDM-IR group vs. Reference group; (B) PreDM-Lean group vs. Reference-Lean group
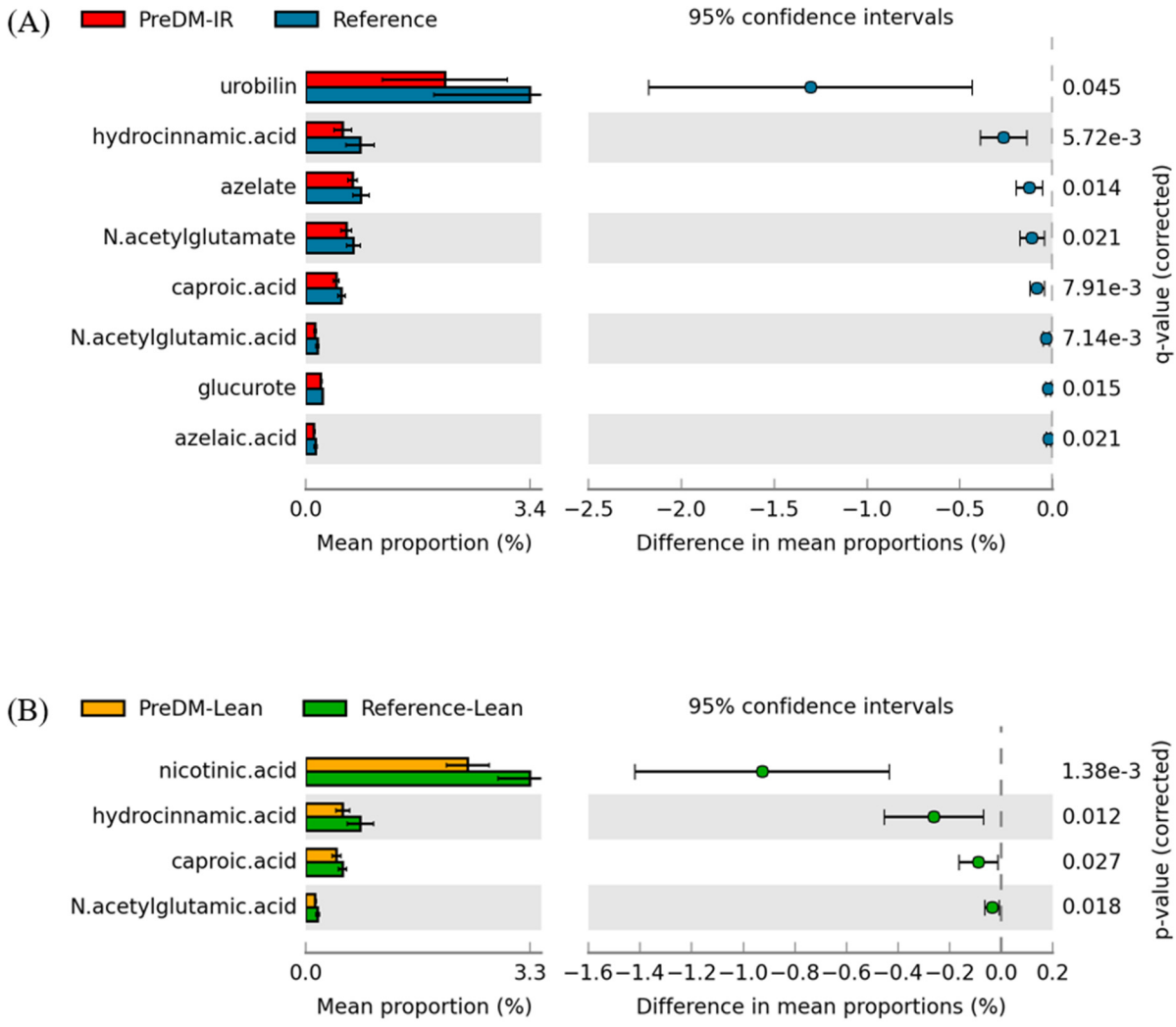
Figure S4. Predicted metabolomics: (A) PreDM-IR group vs. Reference group; (B) PreDM-Lean group vs. Reference-Lean group.