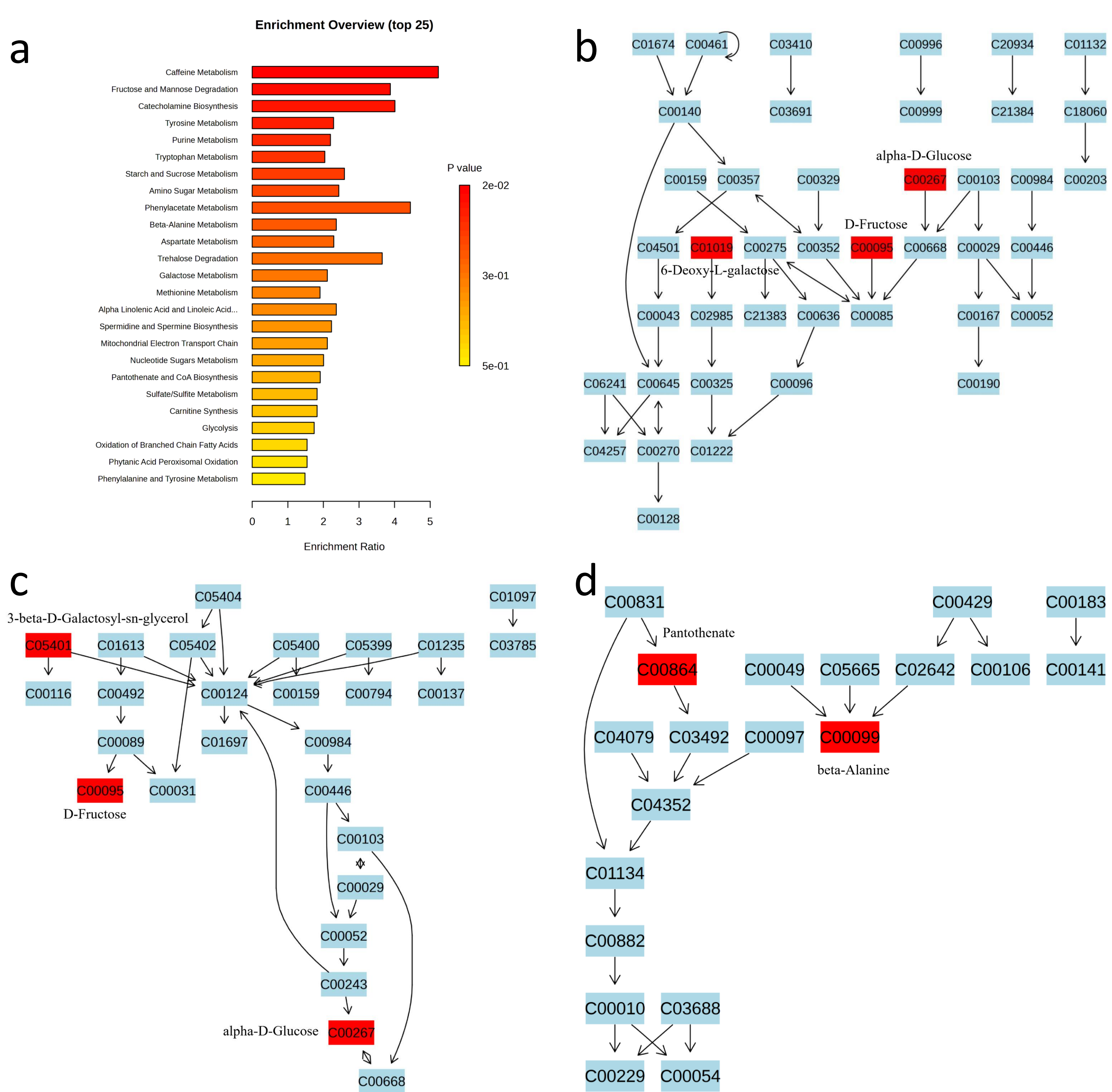


Supplementary Figure 1: a. PCA showing the discriminative trend of metabolite composition; b. Heatmap of the top 25 metabolites in control and T1D samples; the local explanations of the three randomly chosen subjects of ID T2(c), ID T14(d) and C14(e) in T1D and control groups.



Supplementary Figure 2:a. Bar plot showing the top 25 enriched metabolic pathways; (b-d) Network diagrams visualizing key metabolites from three enriched pathways in both T1D and control groups, with significant metabolites marked in red:(b) Amino Sugar and Nucleotide Sugar Metabolism;(c) Galactose Metabolism;(d) Pantothenate and CoA Biosynthesis.