Supplementary

Figure S1. Quality Control: Sequencing depth distribution

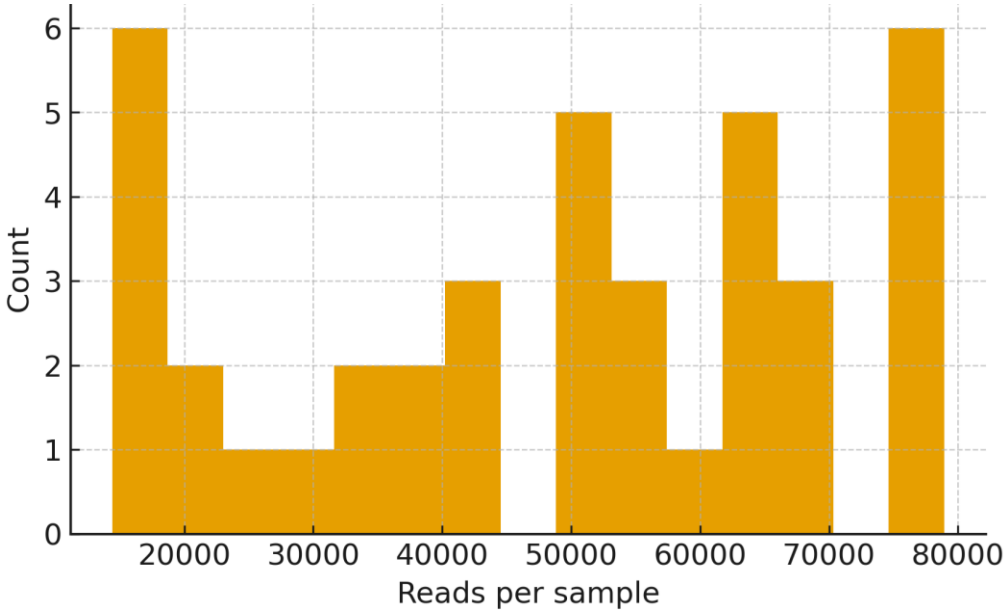

Figure S2. Quality Control: DNA quantity vs A260/280 purity ratio

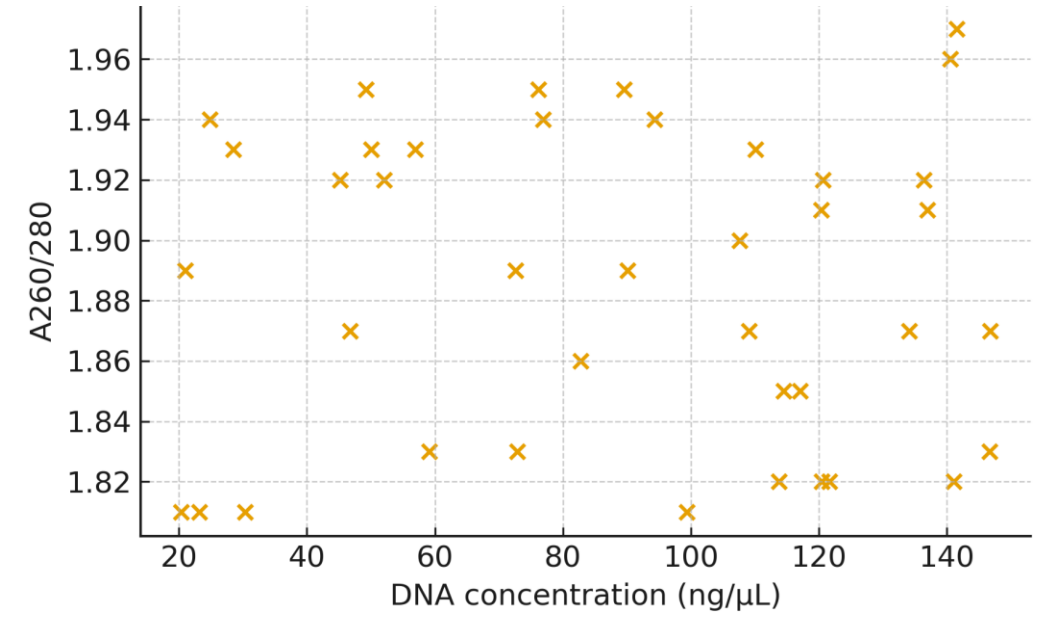

Figure S3. Quality Control: High molecular weight DNA integrity score distribution

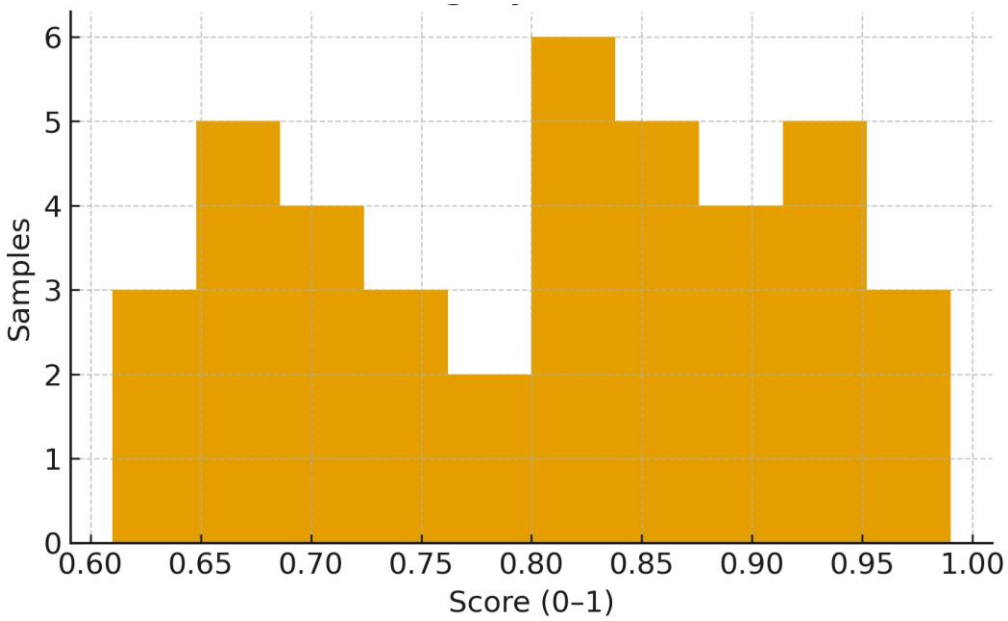

Figure S4. Expanded Demographics: Age distribution by BMI group

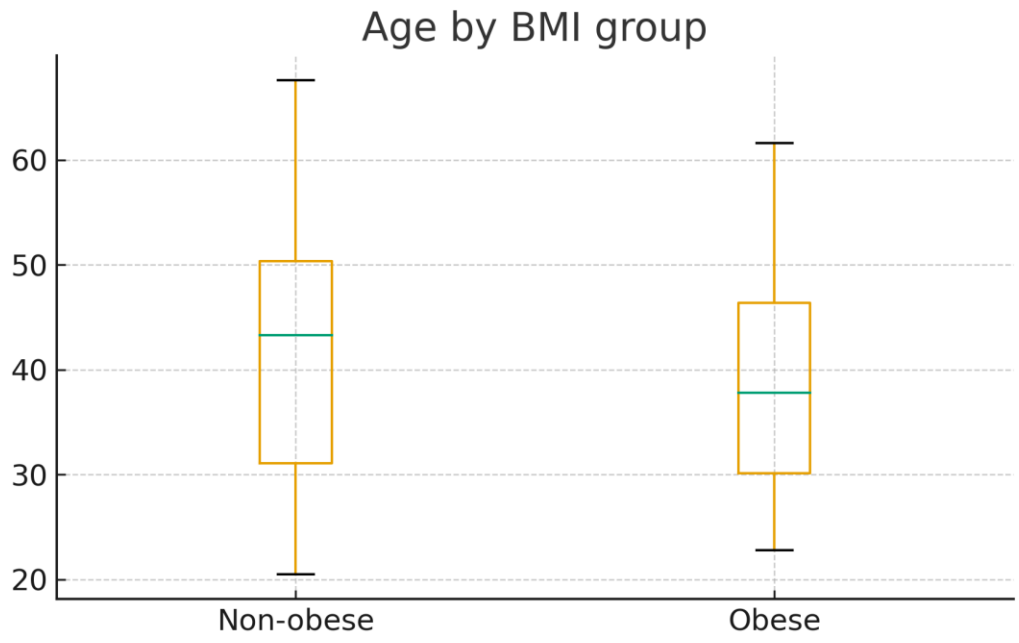

Figure S5. Expanded Demographics: Proportional activity levels (Low/Moderate/High) by BMI group

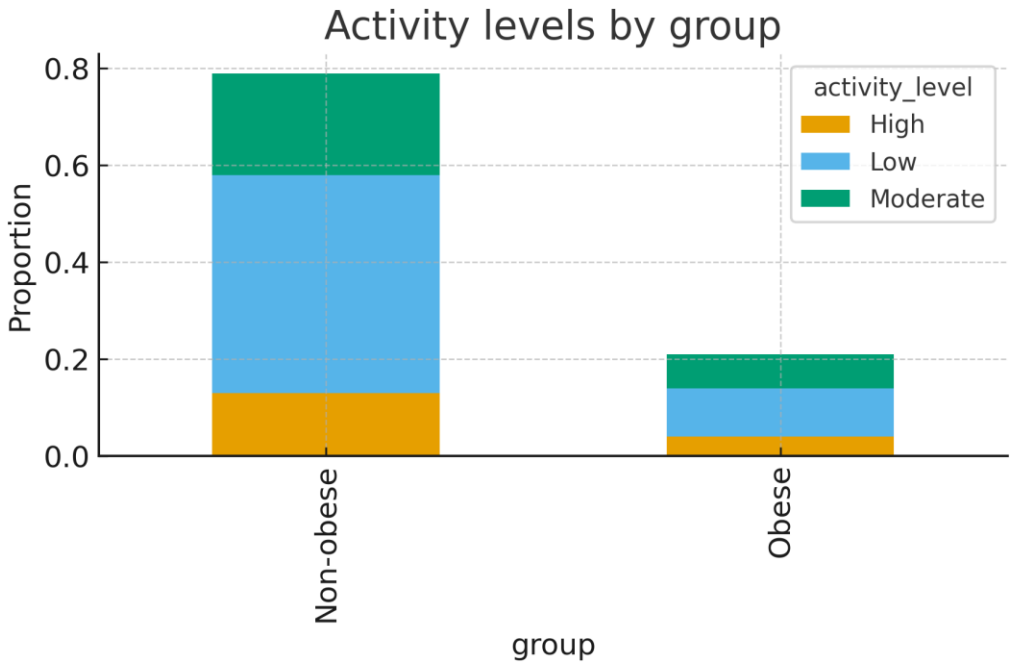

Figure S6. Expanded Demographics: Daily fiber intake (g) by BMI group

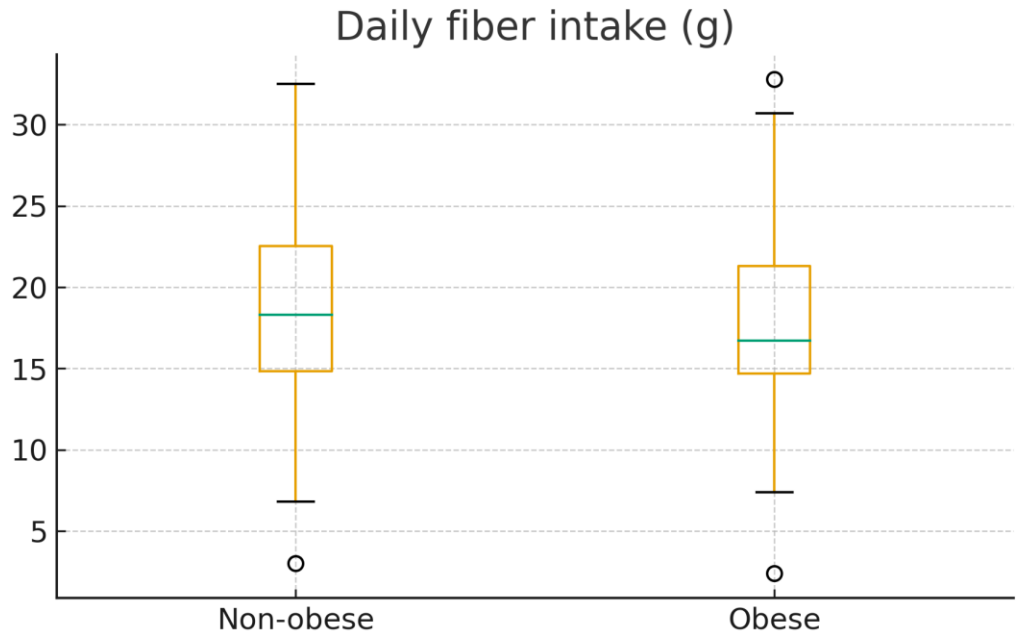

Figure S7. Expanded Demographics: Fasting glucose by BMI group

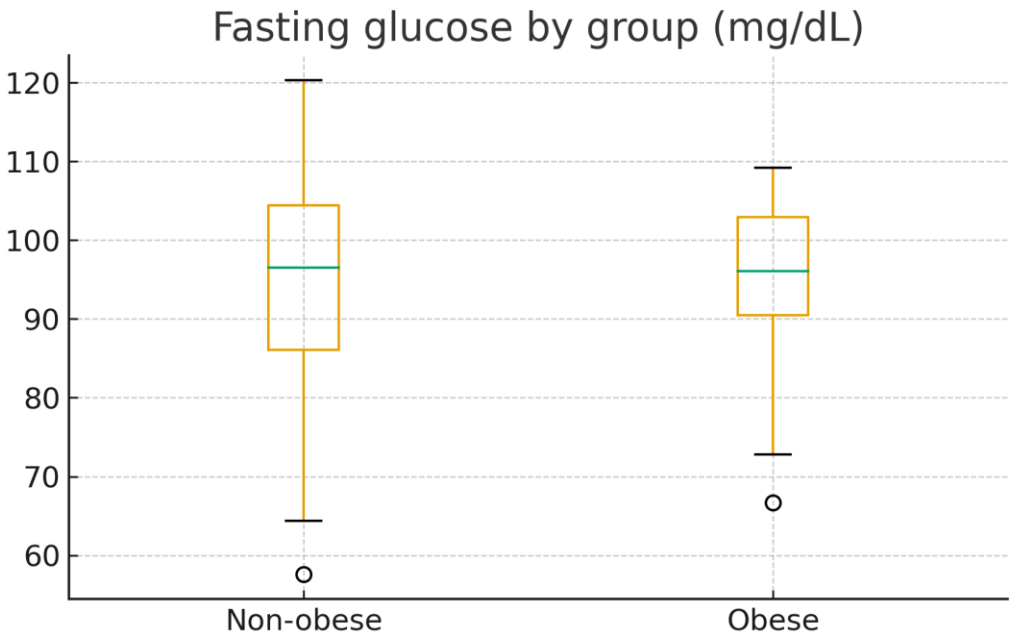

Figure S8. Expanded Demographics: Triglycerides by BMI group

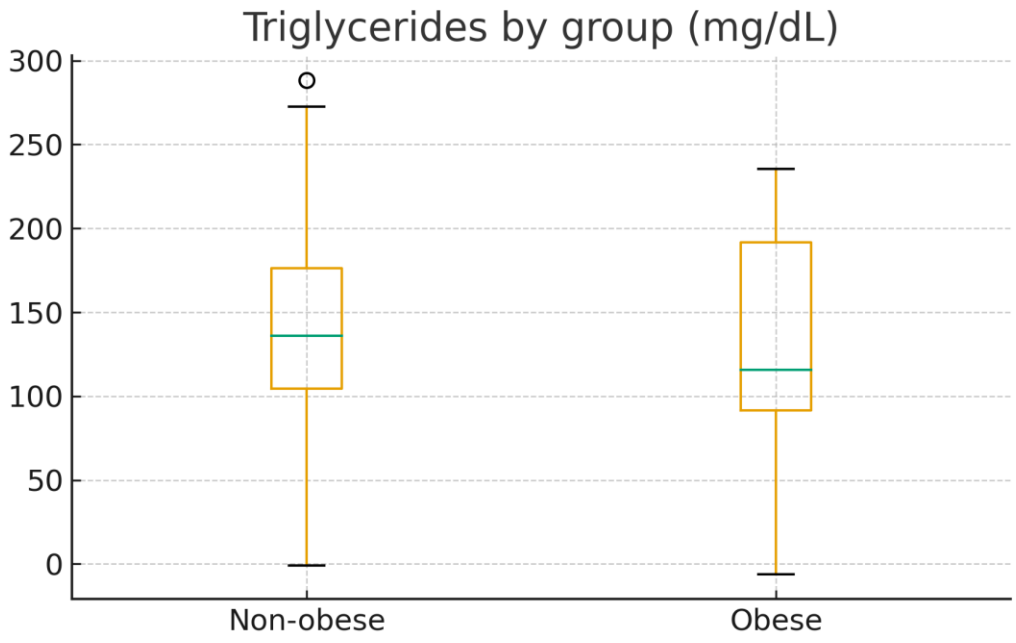

Figure S9. Differentially abundant genera between obese and non-obese groups obtained using DESeq2 (design: ~ Age + BMI). Points show log2 fold-change; lines indicate direction and magnitude. Positive values indicate enrichment in non-obese.

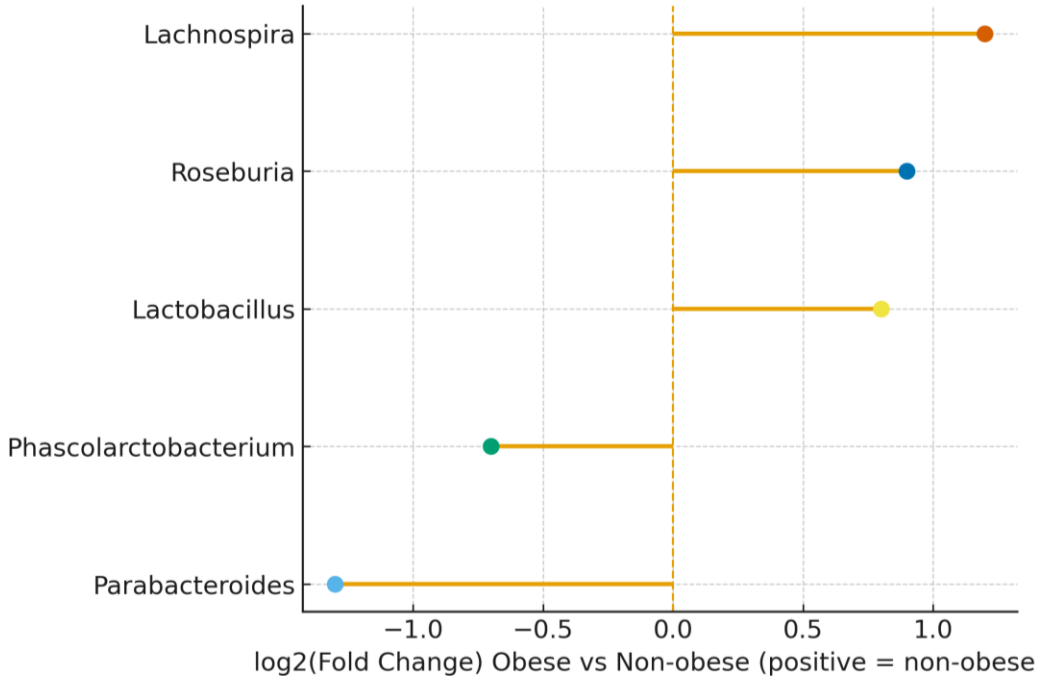

Figure S10. Sensitivity Analysis: Age-matched subset DESeq2 results (significant taxa)

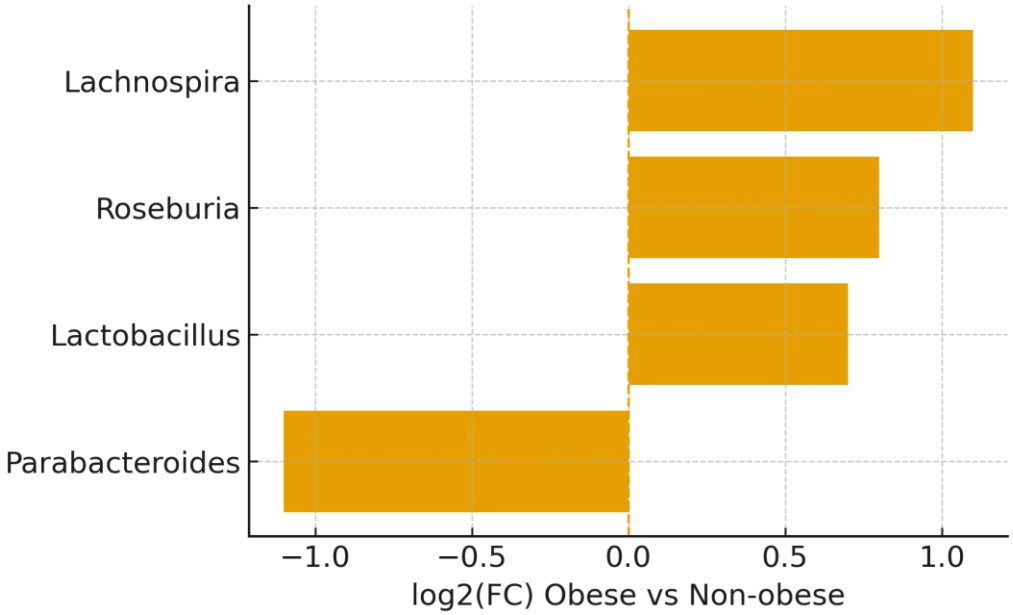

Figure S11. Simplified schematic of covariance network analysis linking bacterial genera and metabolic pathways.

