# Supplementary Method 2

To ensure the reliability of the MR analysis results, we undertook heterogeneity, pleiotropy, and sensitivity analyses. The Cochrane Q statistic was used to evaluate the heterogeneity of the instrumental variables, with P<0.05 indicating the presence of heterogeneity. The pleiotropy test was performed through the intercept term of the MR-Egger regression and MR-PRESSO, where MR-PRESSO was utilized to detect and correct outliers caused by horizontal pleiotropy. Furthermore, the sensitivity analysis was conducted using the 'leave-one-out' method to exclude the influence of individual SNPs on the results, ensuring that no single SNP would significantly affect the causal relationships between proteins, biomarkers, and MASLD.