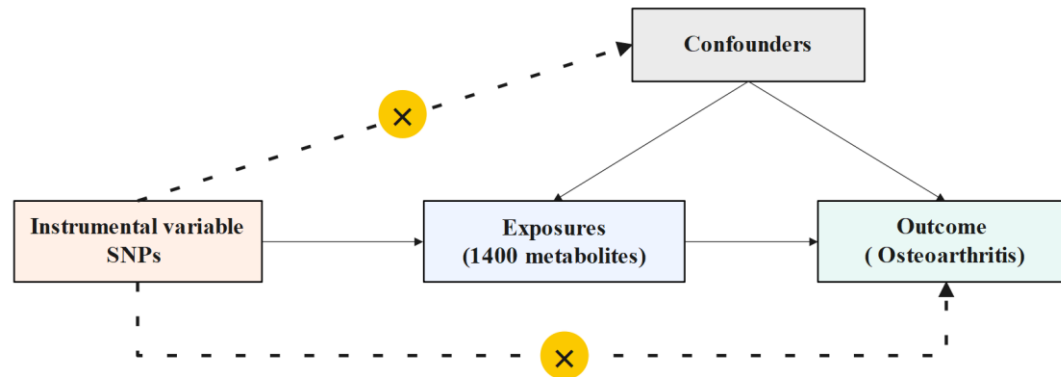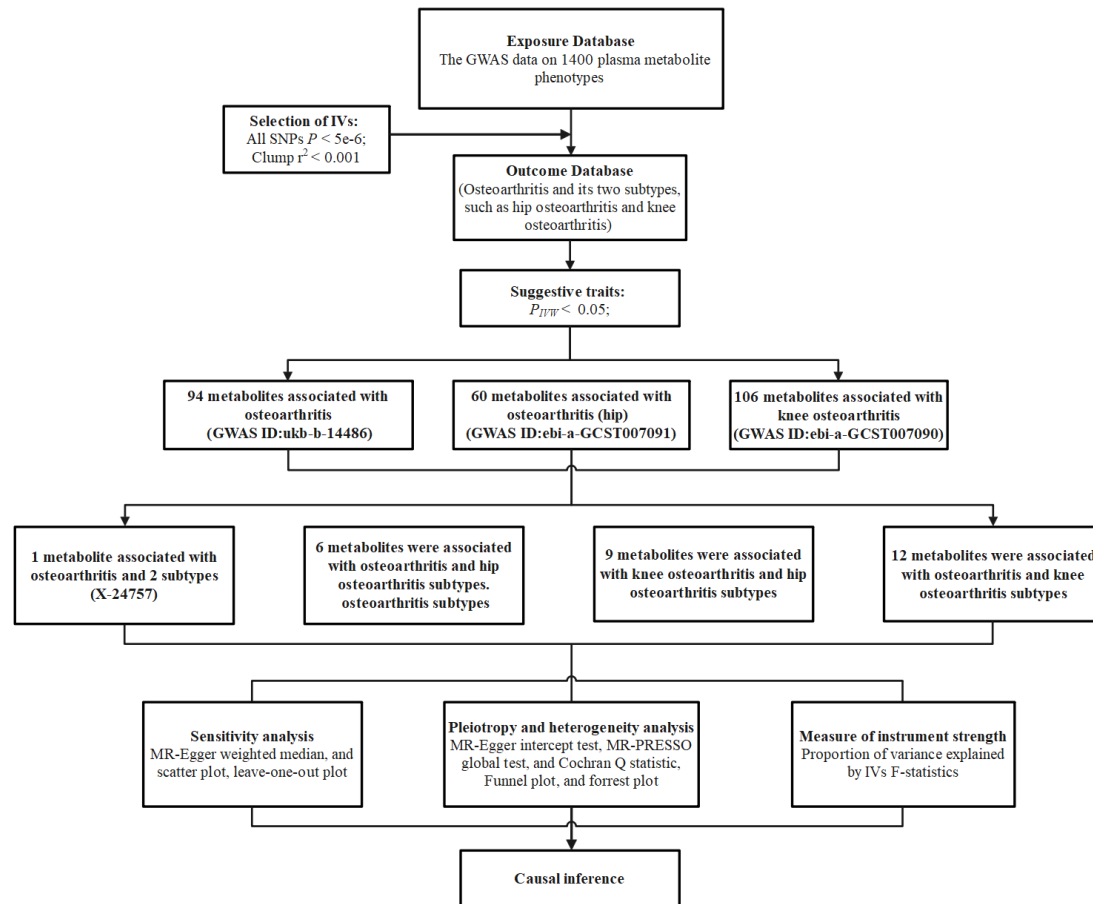*Supplementary Material*

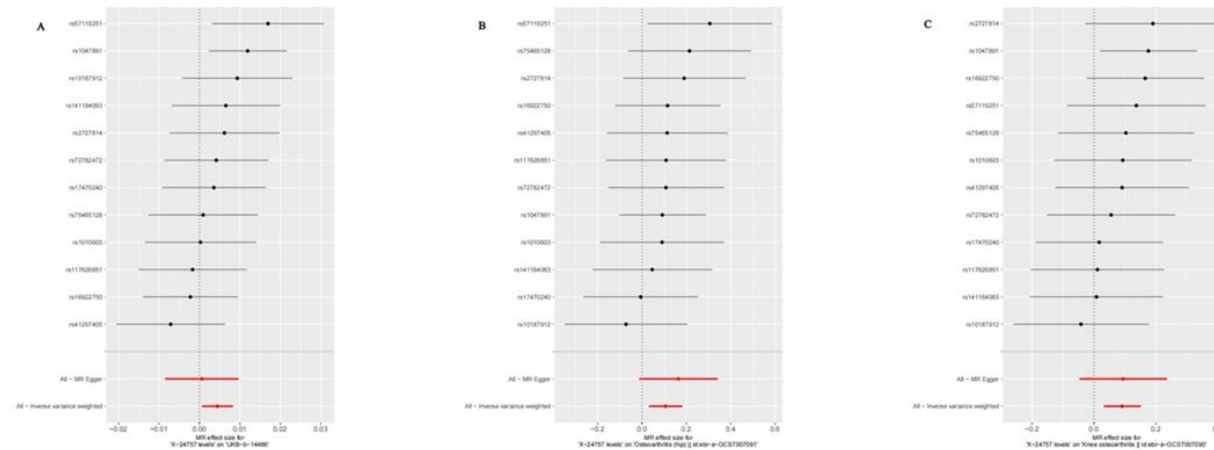**Supplementary Figures and Tables**
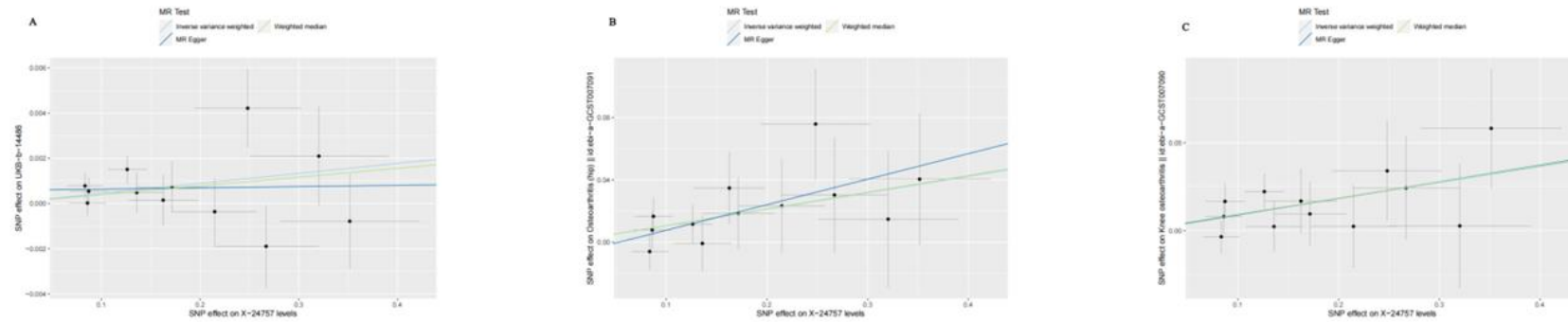
Supplementary Figures

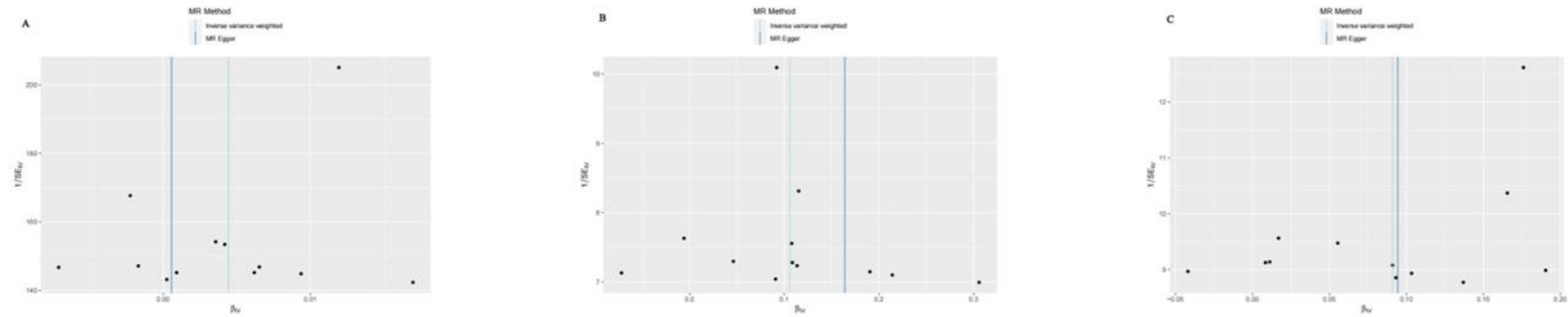**Supplementary Figure 1.** Three key hypotheses of instrumental variables.

Supplementary Figure 2. Flow diagram.

Supplementary Figure 3. Forest Plots depicting the overlapping metabolites (X-24757) associated with osteoarthritis, osteoarthritis (hip) and knee osteoarthritis using Mendelian Randomization Analysis.

Supplementary Figure 4. Scatter Plots depicting the overlapping metabolites (X-24757) associated with osteoarthritis, osteoarthritis (hip) and knee osteoarthritis using Mendelian Randomization Analysis.
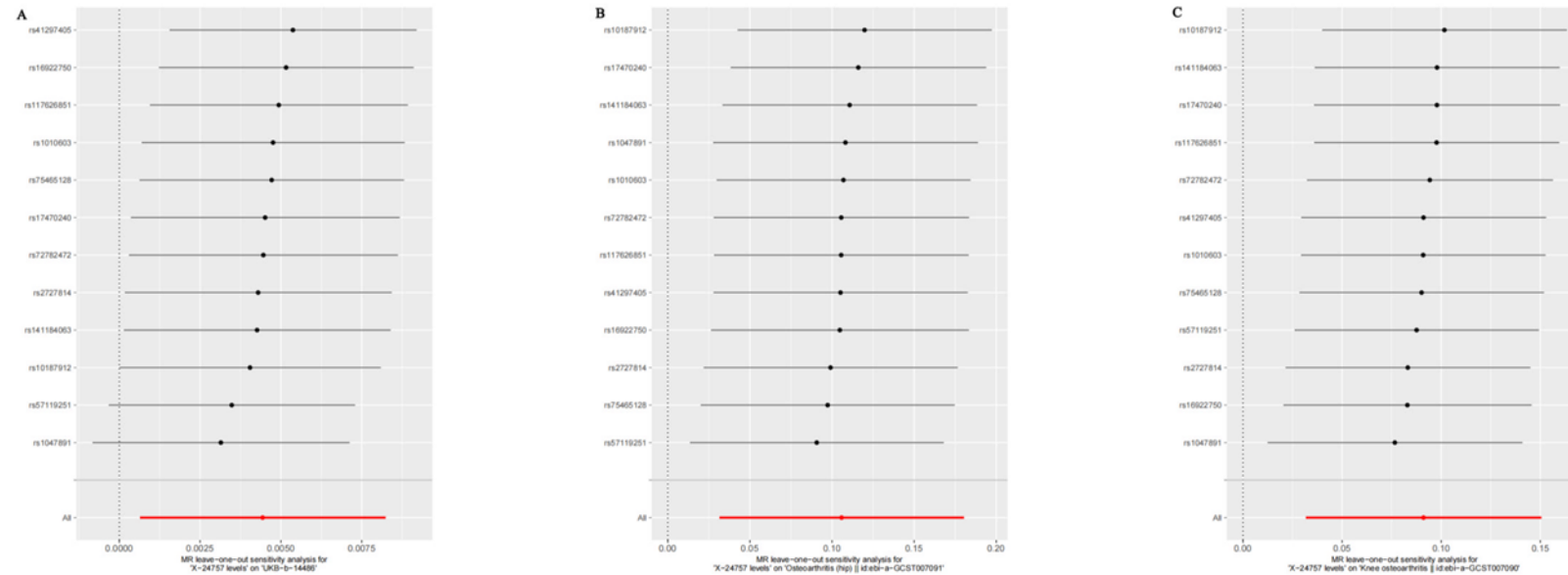
Supplementary Figure 5. unnel Plots depicting the overlapping metabolites (X-24757) associated with osteoarthritis, osteoarthritis (hip) and knee osteoarthritis using Mendelian Randomization Analysis.

Supplementary Figure 6. Leave-One-Out Plots depicting the overlapping metabolites (X-24757) associated with osteoarthritis, osteoarthritis (hip) and knee osteoarthritis using Mendelian Randomization Analysis.