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ORIGINAL ARTICLE

Myeloid Dendritic Cell Counts and Coronary Heart Disease: a Bidirectional Mendelian Randomization Study

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ABSTRACT

Background: **Coronary heart disease (CHD) remains a leading cause of morbidity and mortality worldwide, with immune and inflammatory mechanisms playing important roles in its pathogenesis. Dendritic cells (DCs) are key regulators of immune responses; however, the relationship between specific DC subsets and CHD risk remains incompletely understood.**
Methods: **This study conducted a bidirectional two-sample Mendelian randomization (MR) analysis using publicly available genome-wide association study (GWAS) summary statistics to investigate the potential associations between circulating dendritic cell traits and CHD. Genetic instruments for myeloid dendritic cells (Myeloid DCs) and plasmacytoid dendritic cells (Plasmacytoid DCs), including both absolute counts and relative proportions, were obtained from immune cell GWAS datasets. Summary statistics for CHD were derived from a large European-ancestry population. Multiple MR methods were applied, and sensitivity analyses were performed to assess the robustness of the findings and potential pleiotropic effects.**
Results: **Nominal associations between genetically predicted Myeloid DC counts and CHD risk were observed in the MR-Egger and weighted median analyses, whereas the inverse variance weighted analysis demonstrated no significant association. These nominal associations did not remain statistically significant after correction for multiple testing. No significant associations were observed for Plasmacytoid DC counts or for the relative proportions of either DC subset. Reverse MR analyses were inconclusive due to wide confidence intervals, precluding meaningful inference regarding a causal effect of CHD on DC-related traits. Sensitivity analyses revealed no substantial heterogeneity or horizontal pleiotropy.**
Conclusions: **This bidirectional MR study explored the potential relationships between circulating dendritic cell traits and CHD risk. Although nominal associations involving Myeloid DC counts were observed in secondary MR analyses, no robust evidence supporting an association remained after correction for multiple testing. Further studies using larger datasets and functional approaches are warranted to clarify the role of dendritic cells in CHD.**
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Supplementary Data

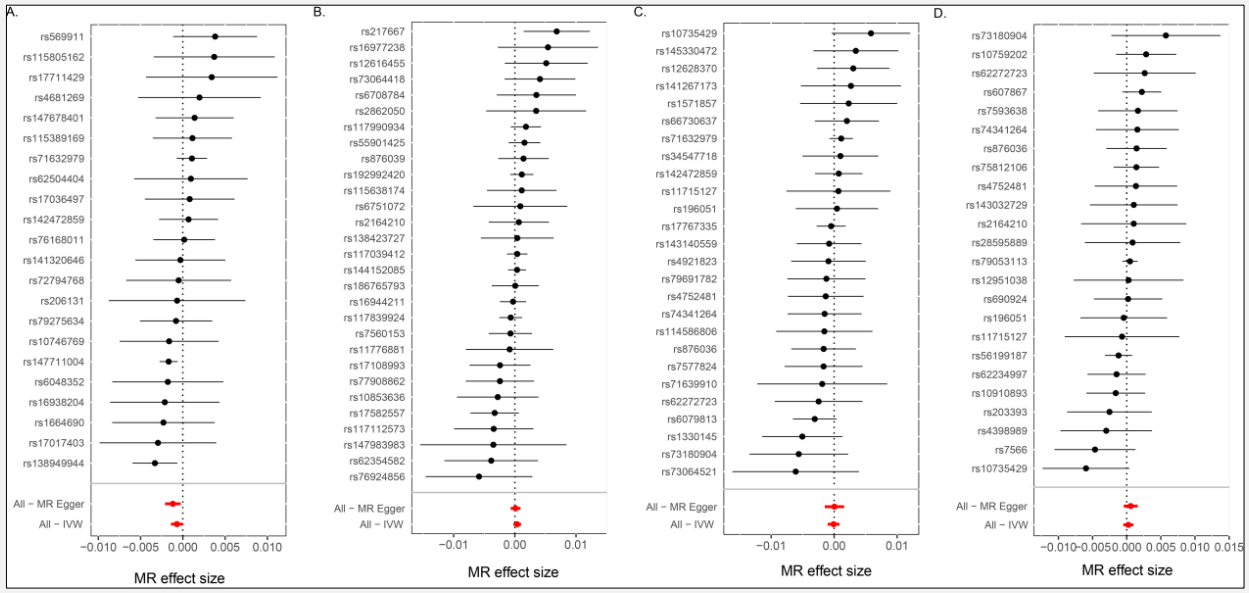

Figure S1. MR effect sizes of individual SNPs on the causal association between myeloid dendritic cell counts and coronary heart disease.

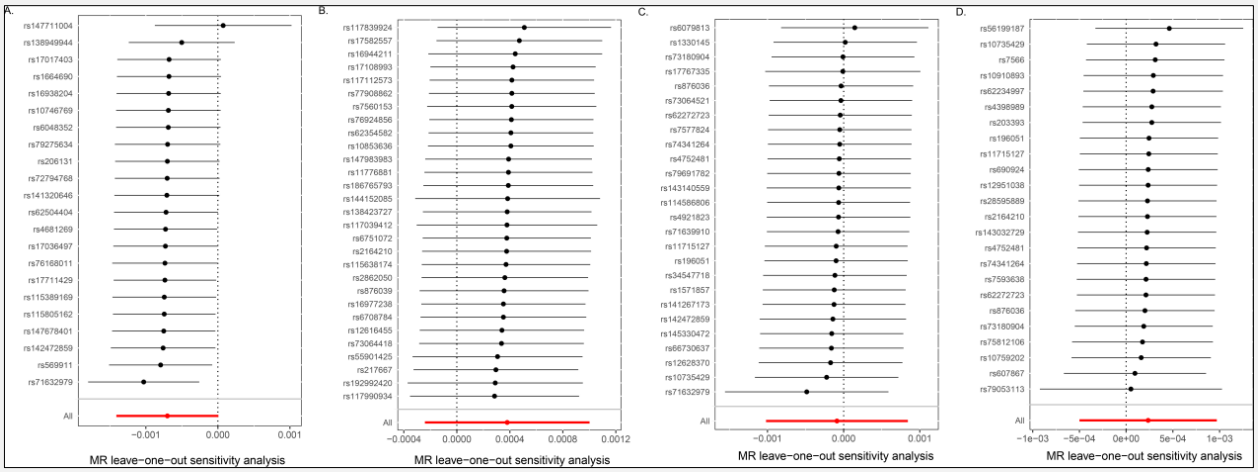

Figure S2. Leave-one-out sensitivity analysis for the causal association between myeloid dendritic cell counts and coronary heart disease.

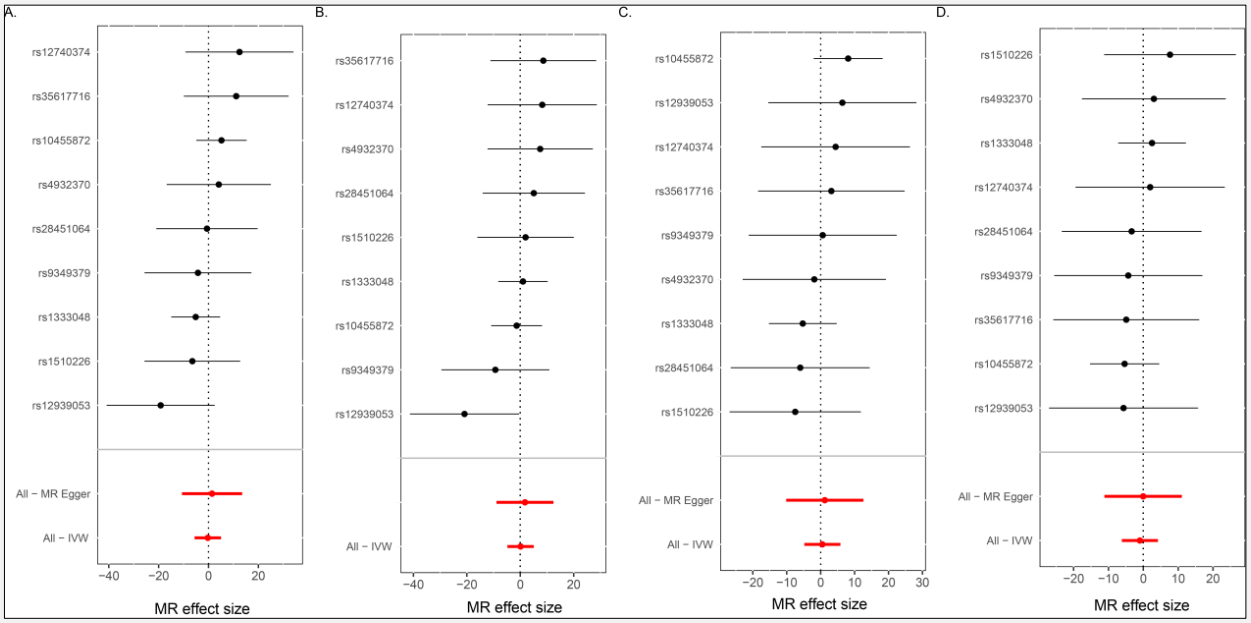

Figure S3. MR effect sizes of individual CHD-associated SNPs on myeloid dendritic cell counts.

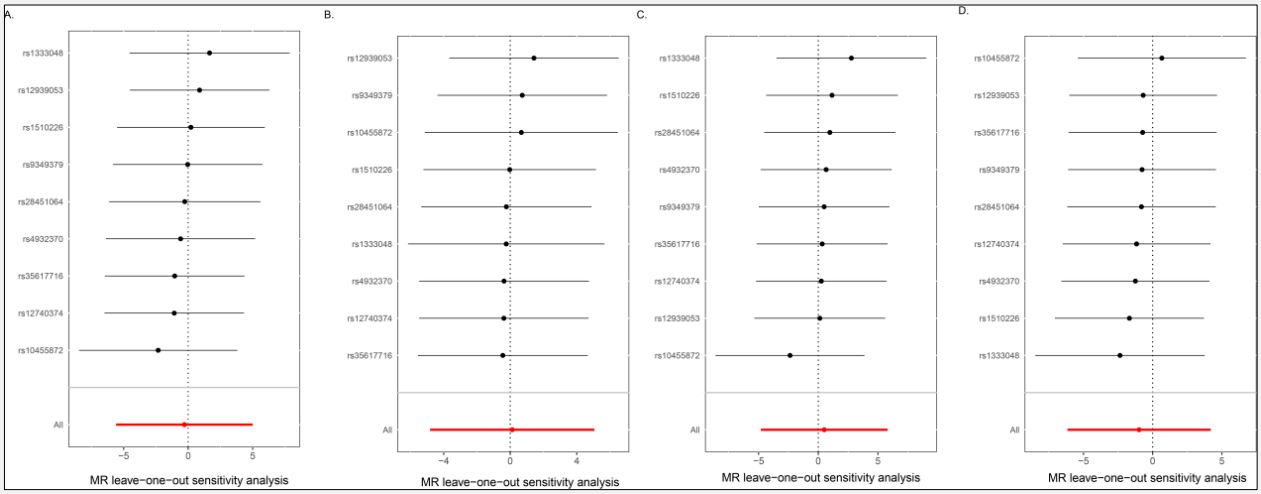

Figure S4. Leave-one-out sensitivity analysis for the causal effect of coronary heart disease on myeloid dendritic cell counts.