

## Description of Additional Supplementary Files

**File name:** Supplementary Data 1

**Description:** Regional genetic correlations between GWAS diseases tested in the present study.

**File name:** Supplementary Data 2

**Description:** Significant results (FDR < 0.01) of regional genetic correlations between sc-eQTLs and diseases tested in the present study. Source data behind Figures 3 and 4.

**File name:** Supplementary Data 3

**Description:** Colocalization results between diseases and expressed genes across immune cell types for disease-cell type pairs with Posterior Probability, PP H4  $\geq 0.8$ , indicating evidence of a shared causal signal. Source data behind Figure 5.

**File name:** Supplementary Data 4

**Description:** Regional genetic correlations between diseases and gene expression levels, for which the implicated loci did not harbour genome-wide significant GWAS variants ( $p$ -value <  $5E-8$ ).

**File name:** Supplementary Data 5

**Description:** Significant results (FDR < 0.01) of regional genetic correlations between pQTLs and diseases tested in the present study.

**File name:** Supplementary Data 6

**Description:** Diseases with significant Gene Ontology biological processes.