

Description of Additional Supplementary Files

File name: Supplementary Data 1

File description: Detailed information on GWAS studies for autoimmune diseases.

File name: Supplementary Data 2

File description: Detailed information on autoimmune diseases associated with loci and signals.

File name: Supplementary Data 3

File description: Specific immune cell types associated with signals around the loci of *IL10*, *IL12A*, *WDFY4*, and *IL12RB2/IL23R*.

File name: Supplementary Data 4

File description: Prioritization of target genes linked to each autoimmune disease.

File name: Supplementary Data 5

File description: KEGG and Reactome pathway enrichment results for each autoimmune disease using all top-tier genes.

File name: Supplementary Data 6

File description: KEGG and Reactome pathway enrichment results for each autoimmune disease using only disease-shared genes.

File name: Supplementary Data 7

File description: KEGG and Reactome pathway enrichment results for each autoimmune disease using only disease-specific genes.

File name: Supplementary Data 8

File description: Functional clustering modules and genes.

File name: Supplementary Data 9

File description: The top five most significantly enriched pathways for each module.

File name: Supplementary Data 10

File description: Drugs in phase III or phase IV clinical trials, along with their targets from the ChEMBL and DrugBank databases for each module.

File name: Supplementary Data 11

File description: Three categories of drugs: drugs already approved for multiple ADs (27 drugs), drugs actively in clinical development for new autoimmune indications (16 drugs), and novel repurposing candidates not yet explored in ADs (7 drugs).