

## **Description of Additional Supplementary Files**

**File Name: Supplementary Data 1**

**Description:** Description of cohorts.

**File Name: Supplementary Data 2**

**Description:** DNA methylation differences at HLA-DRB1 in monocytes.

**File Name: Supplementary Data 3**

**Description:** Primer sequences.

**File Name: Supplementary Data 4**

**Description:** SNPs that mediate risk for MS through changes in DNA methylation.

**File Name: Supplementary Data 5**

**Description:** DNA methylation differences at DMRs mediating genetic risk in sorted cells.

**File Name: Supplementary Data 6**

**Description:** Summary statistics for the meQTLs (exposure) and eQTLs (outcome) that were used in a two-sample Mendelian Randomization (MR).

**File Name: Supplementary Data 7**

**Description:** Association of CIT SNPs with MS after adjustment for the known MS risk variants in the HLA locus.

**File Name: Supplementary Data 8**

**Description:** RNA-seq data in PBMCs for HLA-DRB1 gene.