Supplementary Information

Elucidating the Multitrait Association between Parkinson's Disease and Respiratory Disorders: HLA gene complex as a causal nexus

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Supplementary Figures

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Figure S2. Manhattan plots of PLACO results for Parkinson`s diesase and A)chronic obstructive pulmonary disease, B) idiopathic pulmonary fibrosis, C)obstructive sleep apnea and D)asthma

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Figure S4. LocusZoom and LocusCompare Plots of Colocalized Locus A)SETD1A and B)PIGL

Figure S5. Star Bar Plot of colocalization results between PD and RD trait

Figure S6. The transcriptomes form discrete cell-specific clusters using Uniform Manifold Approximation and Projection (UMAP) for peripheral blood mononuclear cell(PBMC) in idiopathic pulmonary fibrosis

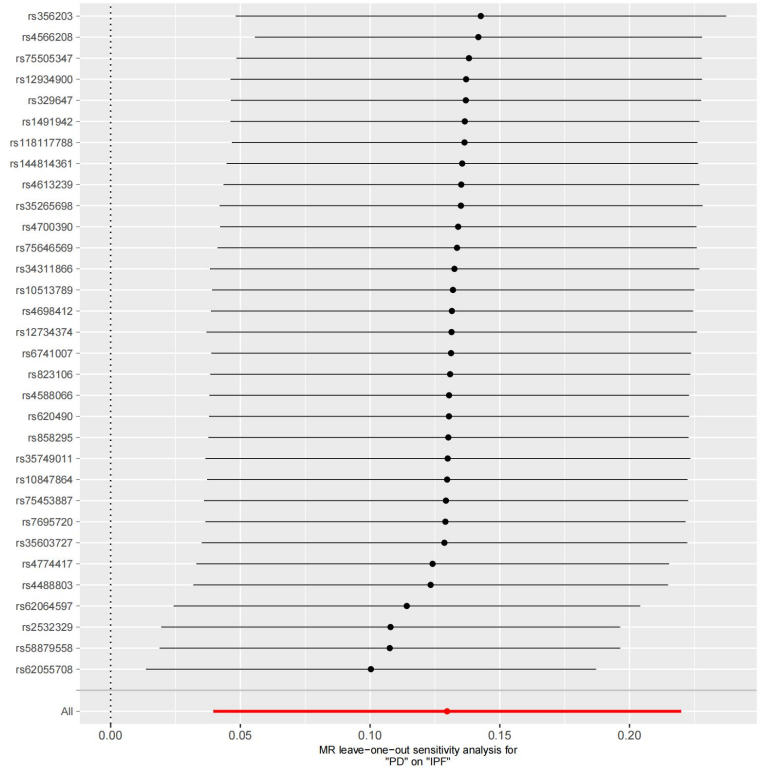
Figure S7. Expression of MAGMA-prioritized genes across cell-specific clusters from UMAP for A)peripheral blood mononuclear cell(PBMC) in Parkinson`s disease, B)brain cell in Parkinson`s disease, C)PBMC in chronic obstructive pulmonary disease and D)PBMC in idiopathic pulmonary fibrosis. Red indicates higher expression

This Additional file has been provided by the authors to give readers additional information about their work.

Supplementary Figures

Figure S1. Leave-one-out sensitivity tests between Parkinson`s diesase and A)idiopathic pulmonary fibrosis and B)obstructive sleep apnea

A)



B)

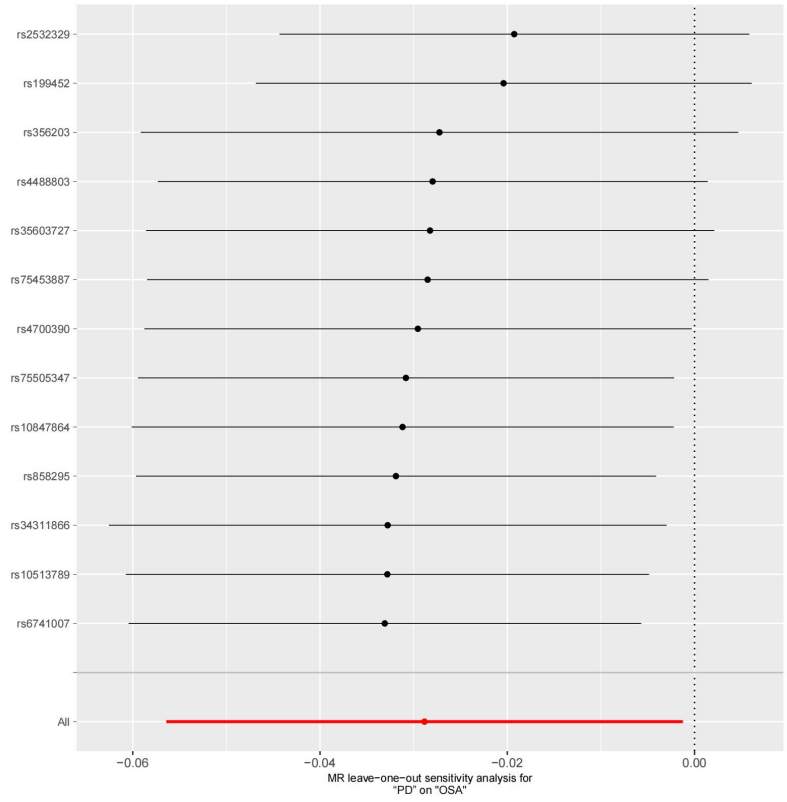
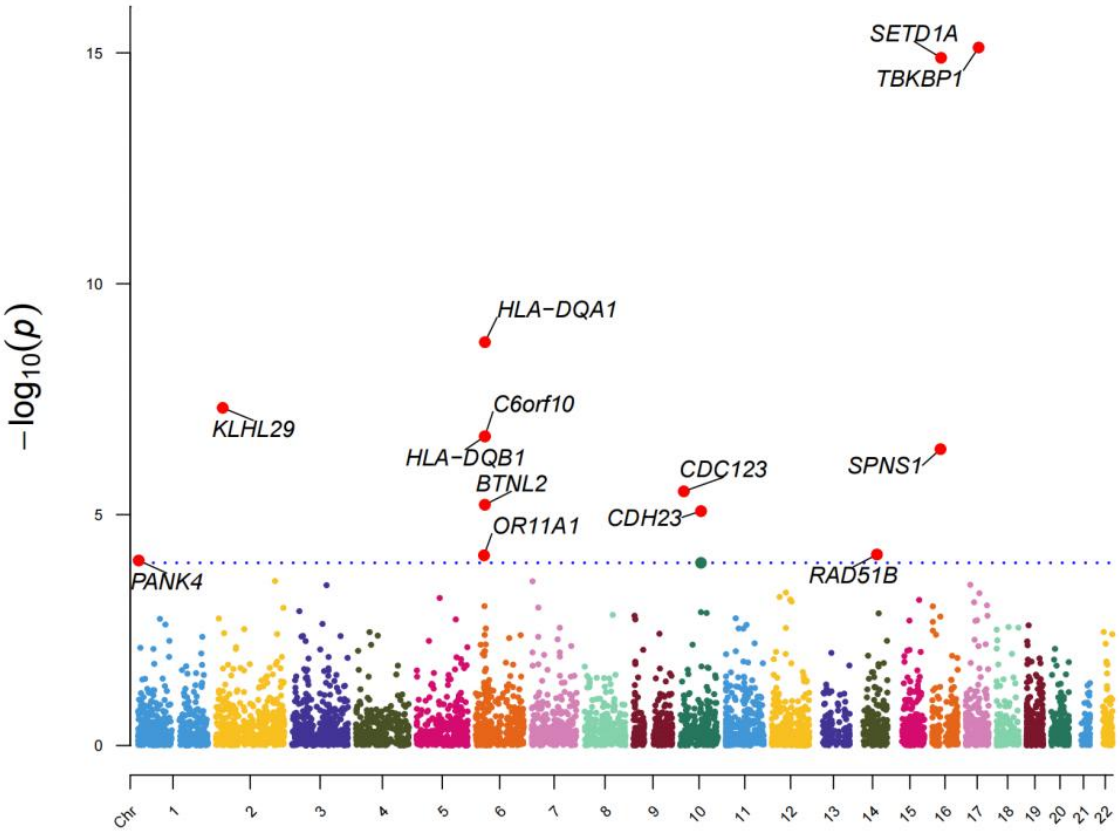
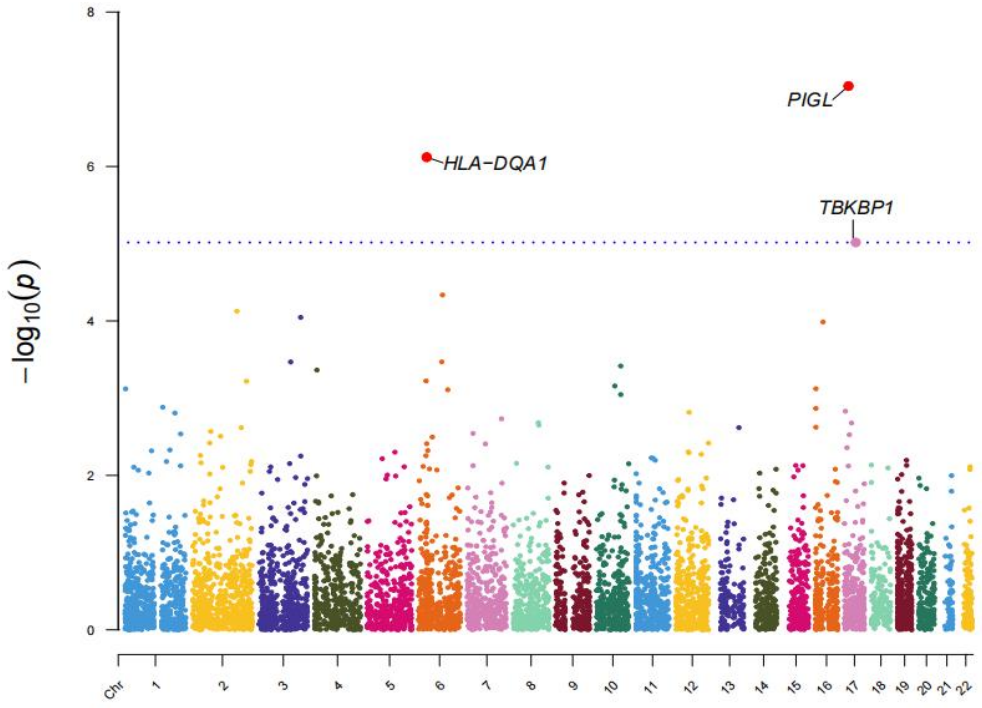


Figure S2. Manhattan plots of PLACO results for Parkinson`s diesase and A)chronic obstructive pulmonary disease , B) idiopathic pulmonary fibrosis, C)obstructive sleep apnea and D)asthma

A)



B)



C)


WIF1
CNTN1
$-\log_{10}(p)$
Chr

D)

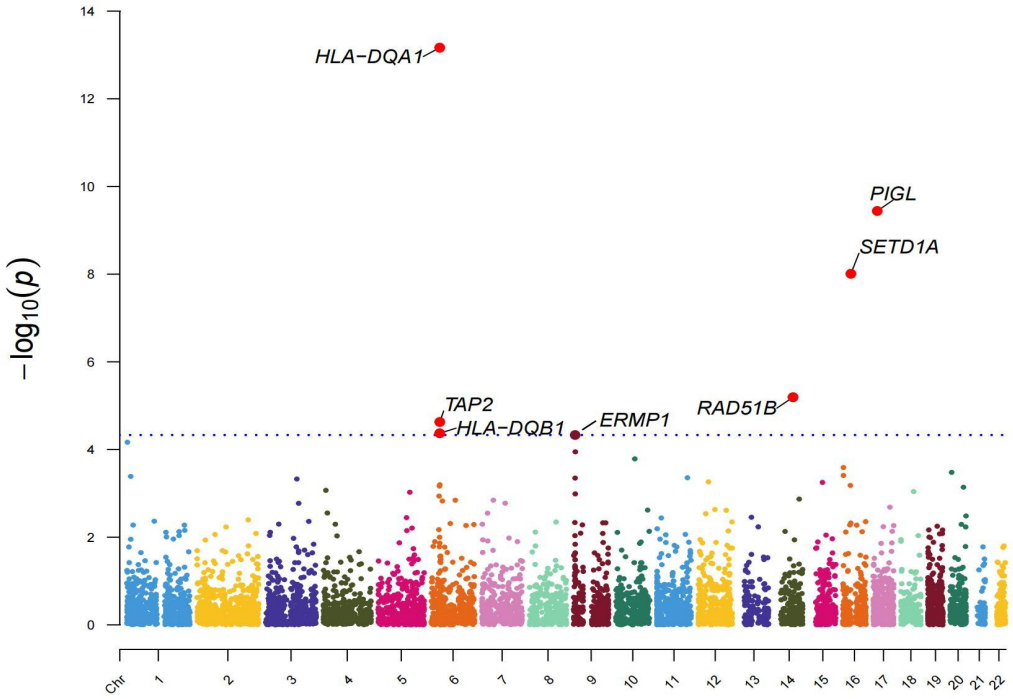
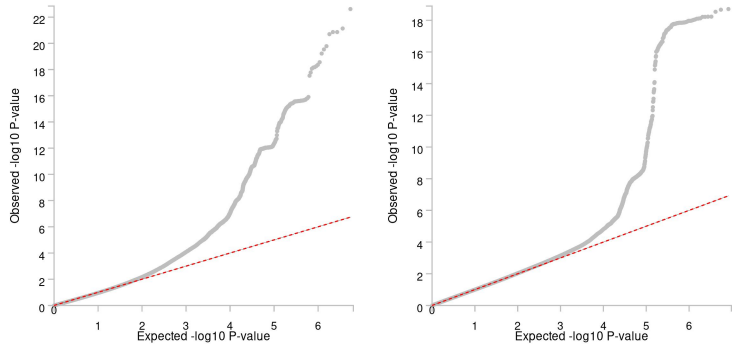

HLA-DQA1
PIGL
SETD1A
TAP2
HLA-DQB1
ERMP1
RAD51B
$-\log_{10}(p)$
Chr

Figure S3. Quantile-Quantile (Q-Q) Plots of PLACO Results for Parkinson`s diease and A)chronic obstructive pulmonary disease , B) idiopathic pulmonary fibrosis, C)obstructive sleep apnea and D)asthma

A) **B)**



C) **D)**

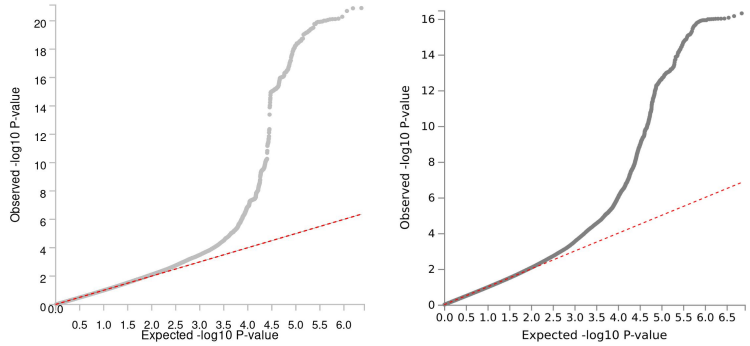
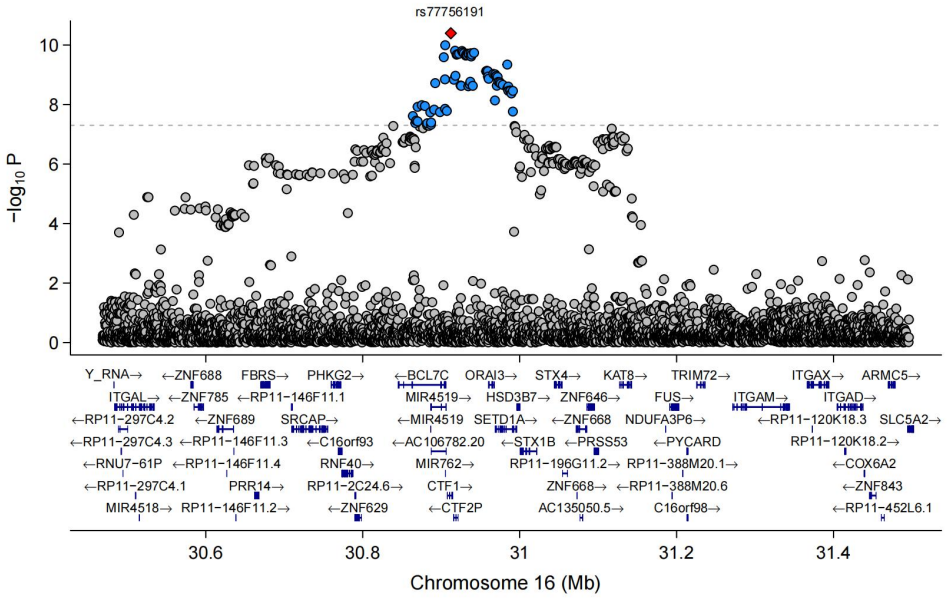
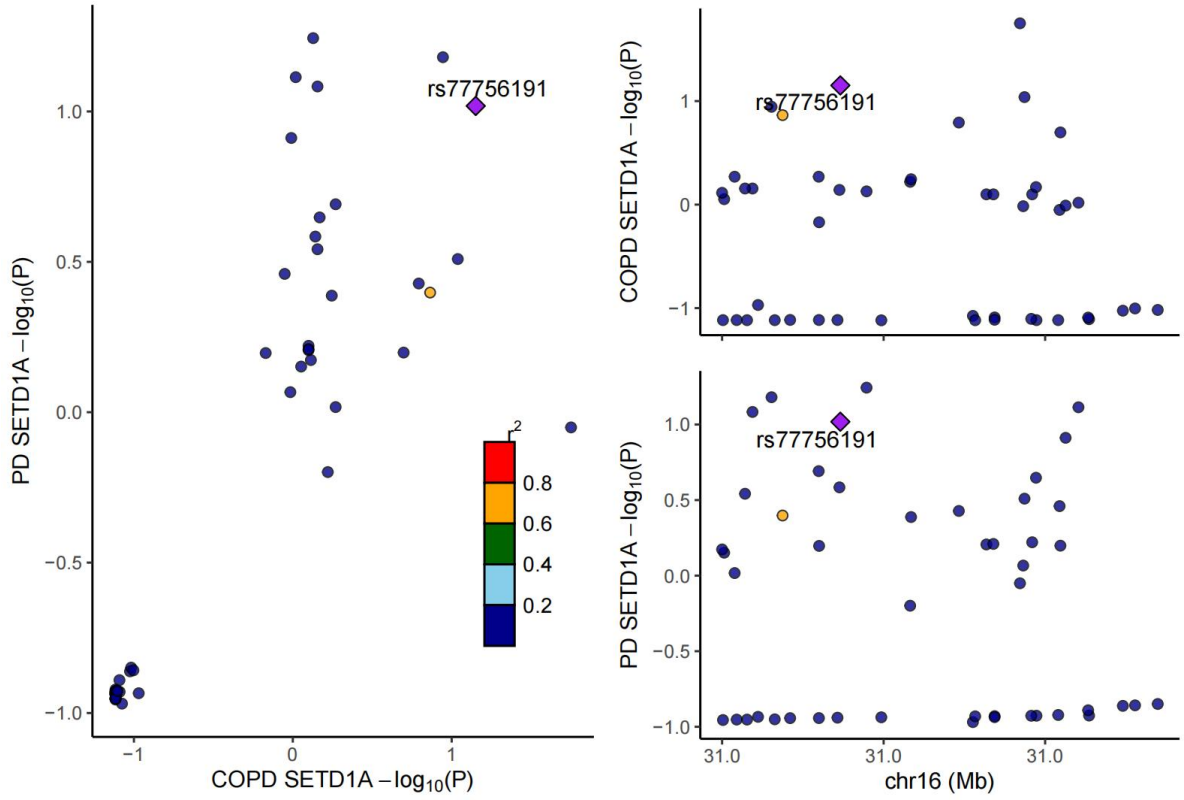


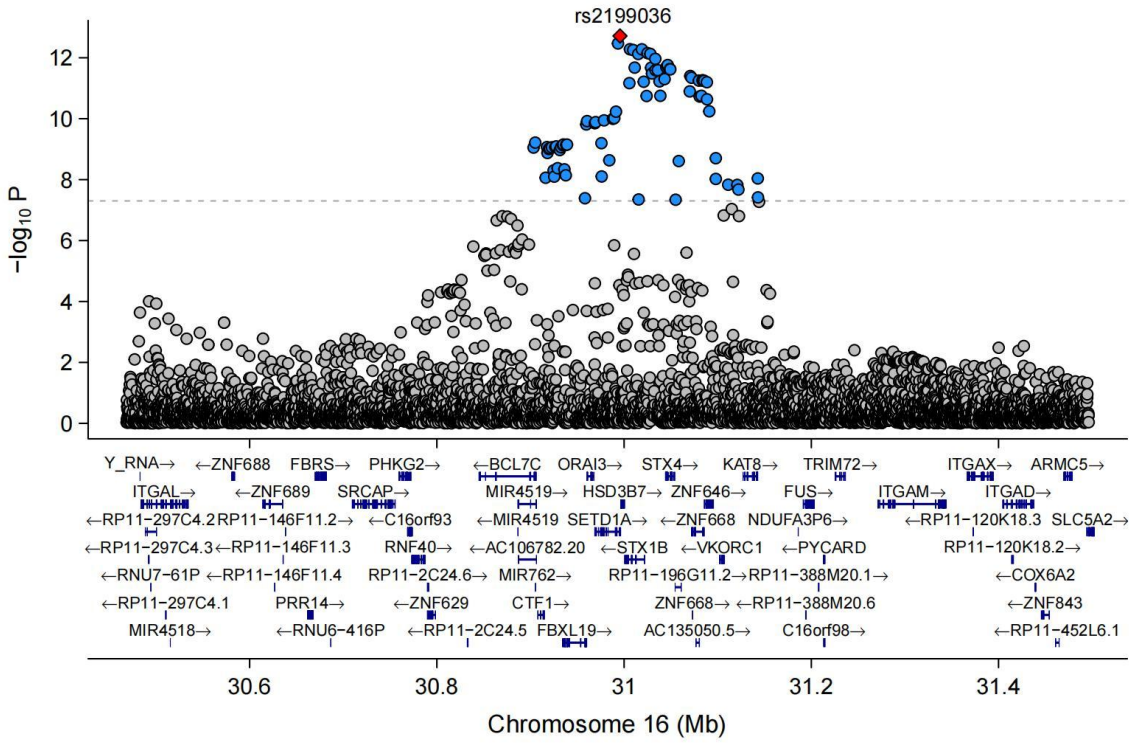
Figure S4. LocusZoom and LocusCompare Plots of Colocalized Locus A)SETD1A and B)PIGL

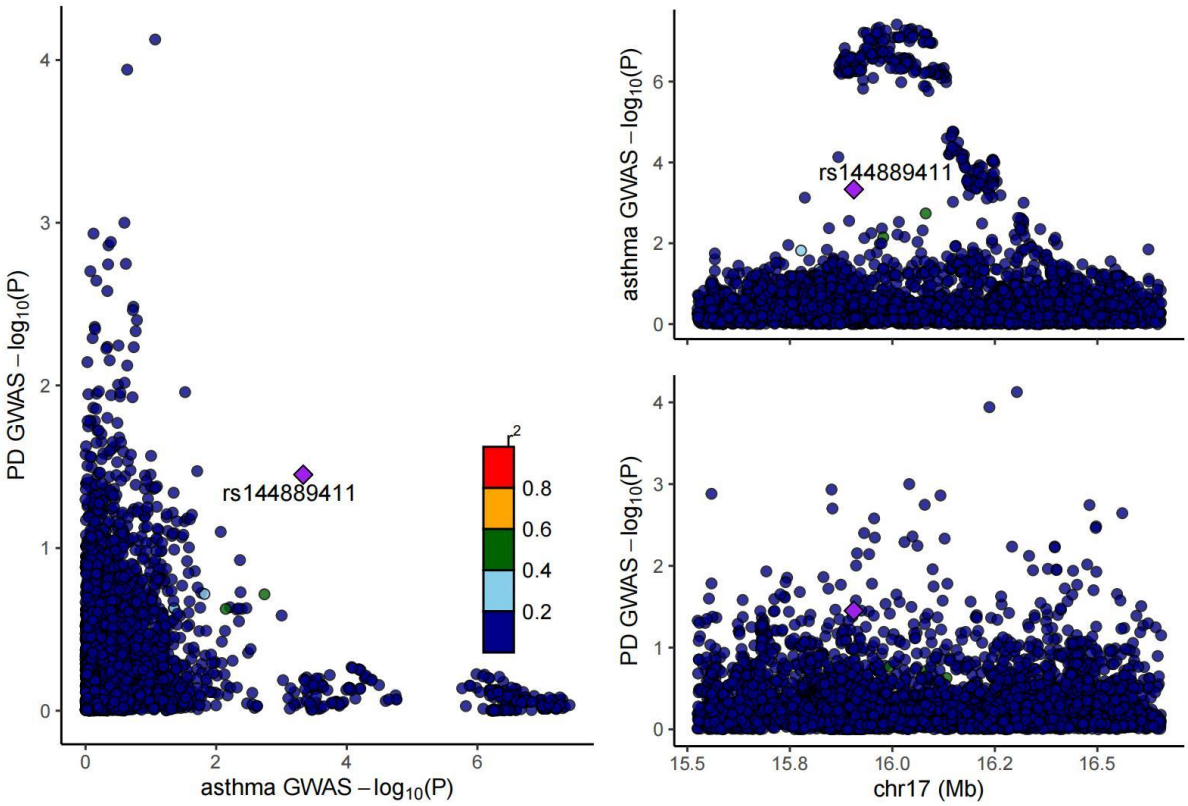
A)




rs77756191
PD SETD1A – log10(P)
COPD SETD1A – log10(P)
r2
0.8
0.6
0.4
0.2
chr16 (Mb)

B)


rs2199036
−log10 P
Y_RNA→ ←ZNF688 FBRS→ PHKG2→ ←BCL7C ORAI3→ STX4→ KAT8→ TRIM72→ ITGAX→ ARMC5→
ITGAL→ ←ZNF689 SRCAP→ MIR4519→ HSD3B7→ ZNF646→ FUS→ ITGAM→ ITGAD→
←RP11−297C4.2 RP11−146F11.2→ ←C16orf93 ←MIR4519 SETD1A→ ←ZNF668 NDUFA3P6→ ←RP11−120K18.3 SLC5A2→
←RP11−297C4.3 ←RP11−146F11.3 RNF40→ ←AC106782.20 ←STX1B ←VKORC1 ←PYCARD RP11−120K18.2→
←RNU7−61P ←RP11−146F11.4 RP11−2C24.6→ MIR762→ RP11−196G11.2→ RP11−388M20.1→ ←COX6A2
←RP11−297C4.1 PRR14→ ←ZNF629 CTF1→ ZNF668→ ←RP11−388M20.6 ←ZNF843
MIR4518→ ←RNU6−416P ←RP11−2C24.5 FBXL19→ AC135050.5→ C16orf98→ ←RP11−452L6.1
Chromosome 16 (Mb)



All genomic location is based on reference genome hg19, and LD calculation is based on 1000 Genomes Project of European population.

Figure S5. Star Bar Plot of colocalization results between PD and RD trait

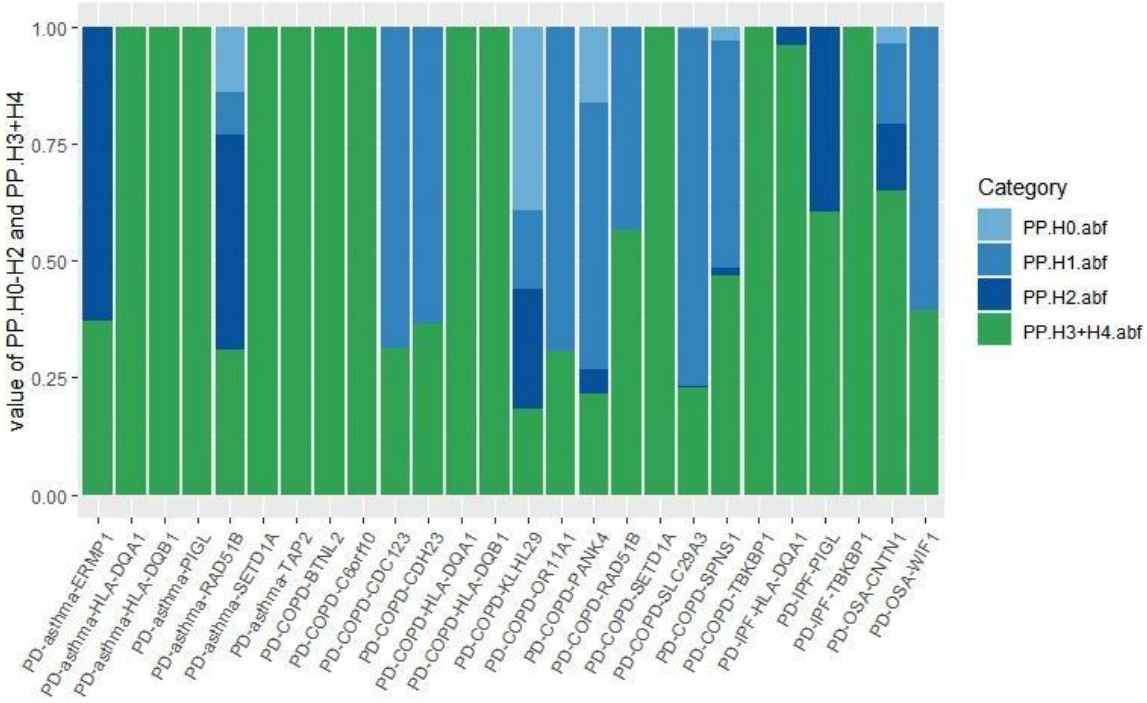


Figure S6. The transcriptomes form discrete cell-specific clusters using Uniform Manifold Approximation and Projection (UMAP) for peripheral blood mononuclear cell(PBMC) in idiopathic pulmonary fibrosis

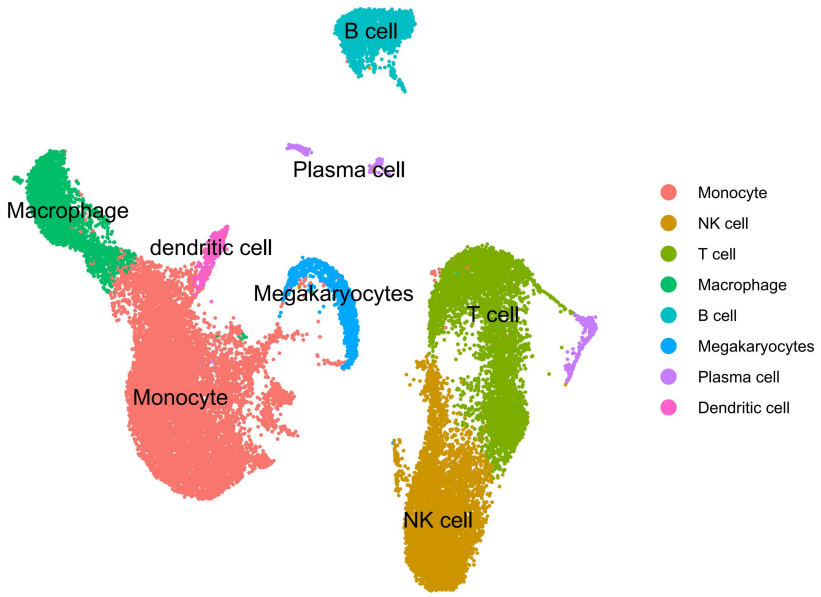
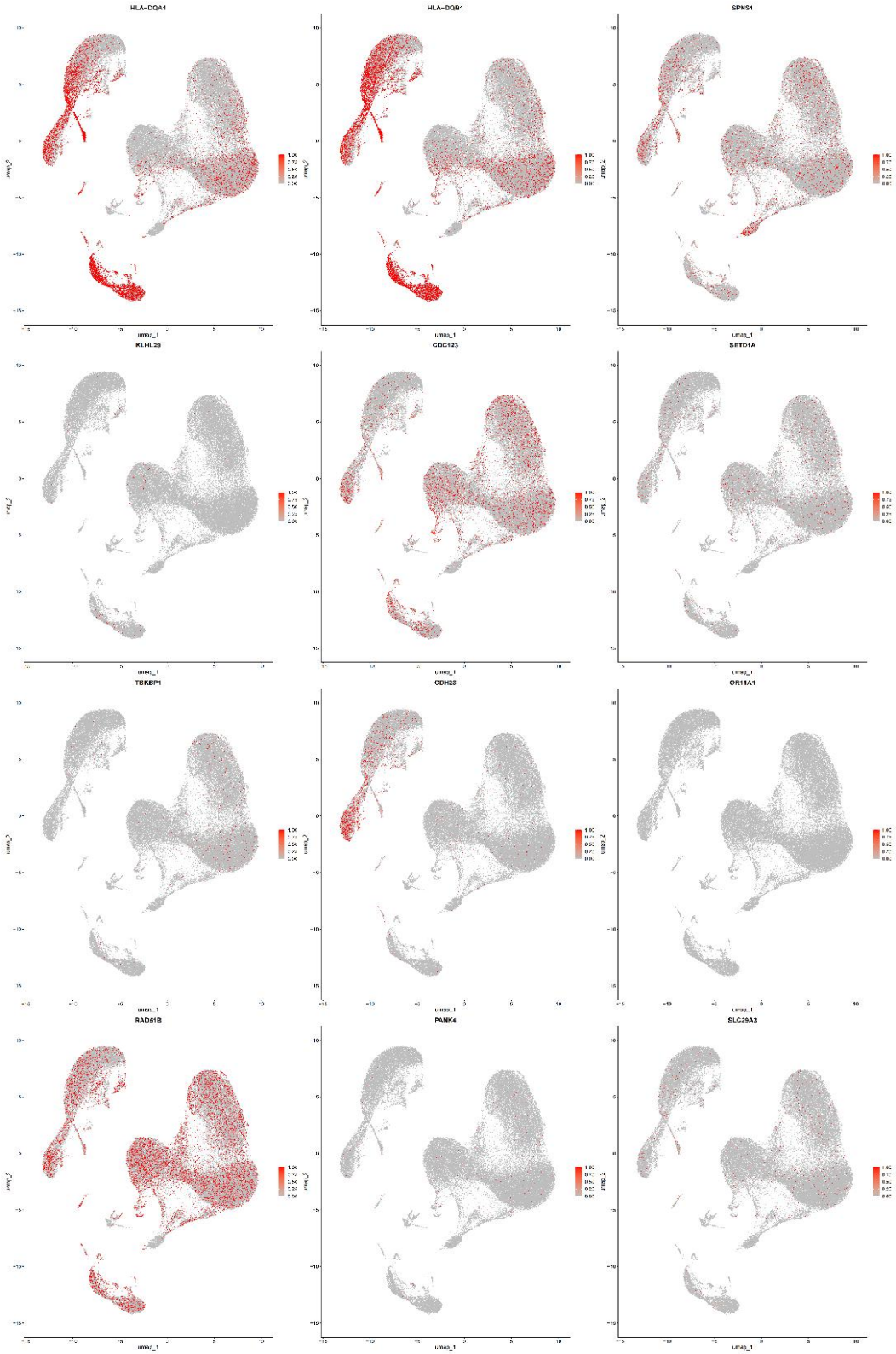
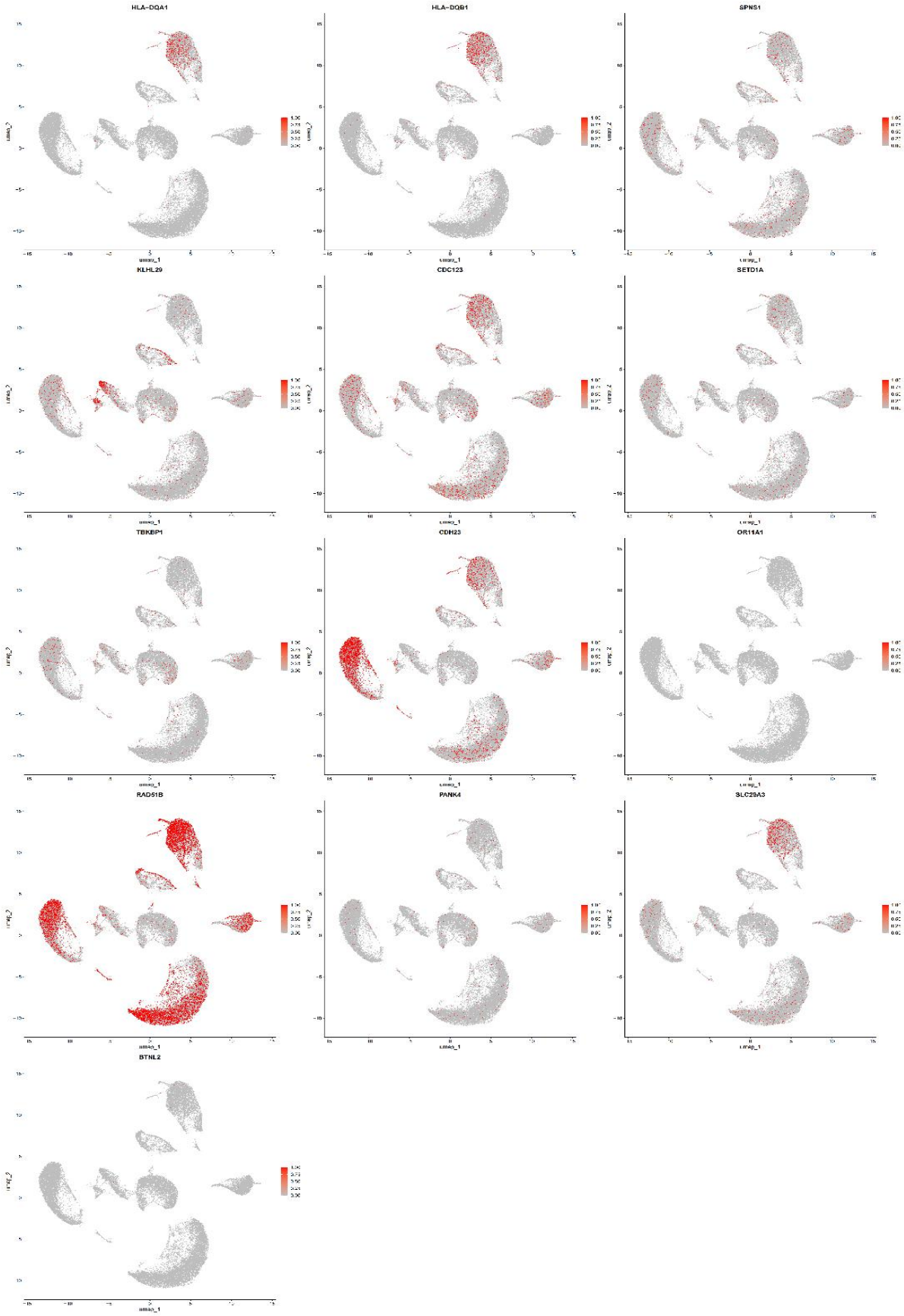


Figure S7. Expression of MAGMA-prioritized genes across cell-specific clusters from UMAP for A)peripheral blood mononuclear cell(PBMC) in Parkinson`s disease, B)brain cell in Parkinson`s disease, C)PBMC in chronic obstructive pulmonary disease and D)PBMC in idiopathic pulmonary fibrosis. Red indicates higher expression

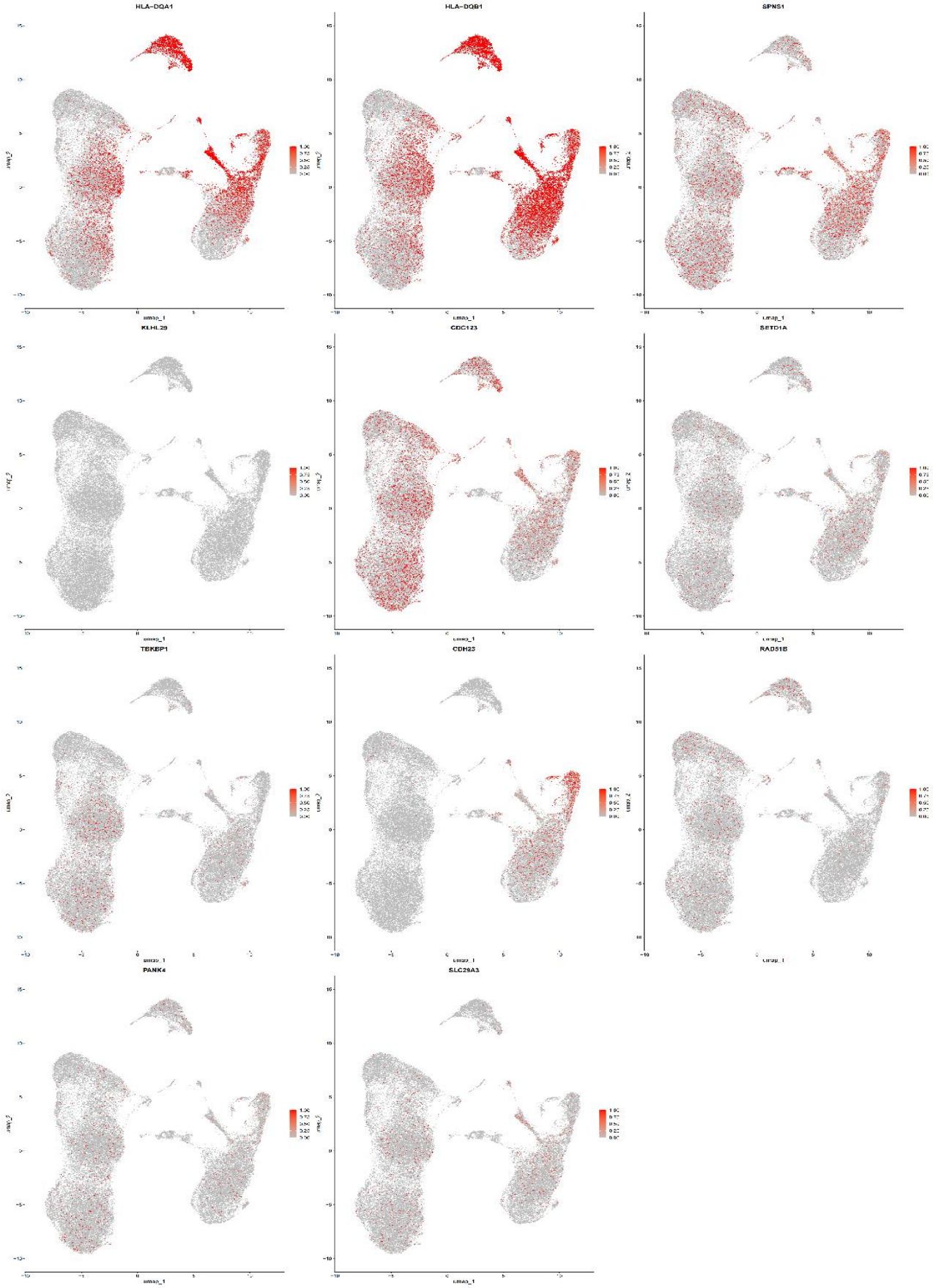
A)



B)


HLA-DQA1
HLA-DQB1
SPNS1
KLHL29
CDC123
SETD1A
TBKBP1
CDH23
OR11A1
RAD51B
PANK4
SLC29A3
BTNL2

C)


HLA-DQA1
HLA-DQB1
SPNS1
KLHL29
CDC123
SETD1A
TBKBP1
CDH23
RAD51B
PANK4
SLC29A3
umap_1
umap_2

D)