

ccRCC 单细胞数据的 Treg 细胞差异 表达基因

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1 摘要

- ccRCC Treg 细胞的差异表达基因见 Tab. 1
- Treg 的差异基因和下游靶点的筛选可参考 Tab. 2、Tab. 3 (细胞通讯角度)
- 或者参考通路富集筛选差异基因和下游靶点 3.4

2 材料和方法

2.1 材料

All used GEO expression data and their design:

- **GSE210038**: Seven tumoral and two normal adjacent tissue samples from patients presenting clear-cell Renal Cell Carcinoma were analyzed by single-cell RNA sequencing.

2.2 方法

Mainly used method:

- CellChat used for cell communication analysis.¹
- ClusterProfiler used for GSEA enrichment.²
- GEO <https://www.ncbi.nlm.nih.gov/geo/> used for expression dataset aquisition .
- Seurat used for scRNA-seq processing; SCSA used for cell type annotation.³⁻⁵
- Other R packages (eg., dplyr and ggplot2) used for statistic analysis or data visualization.

3 附：分析流程

3.1 ccRCC 单细胞数据

Figure 1 (下方图) 为图 UMAP Clustering 概览。

(对应文件为 `Figure+Table/UMAP-Clustering.pdf`)

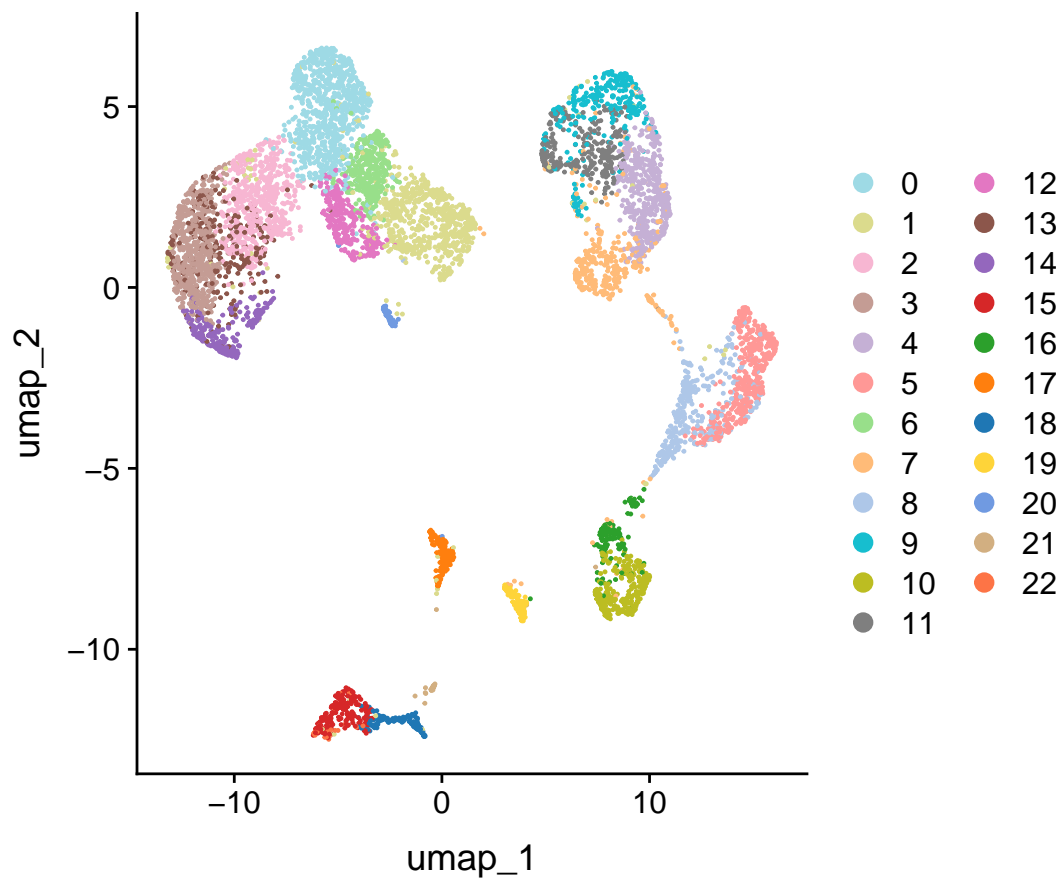


Figure 1: UMAP Clustering

3.2 鉴定 Treg 细胞

根据文献⁶，使用 FOXP3, BATF, CTLA4, TIGIT” 作为 marker 鉴定 Treg 细胞。

Figure 2 (下方图) 为图 Heatmap show the reference genes 概览。

(对应文件为 `Figure+Table/Heatmap-show-the-reference-genes.pdf`)

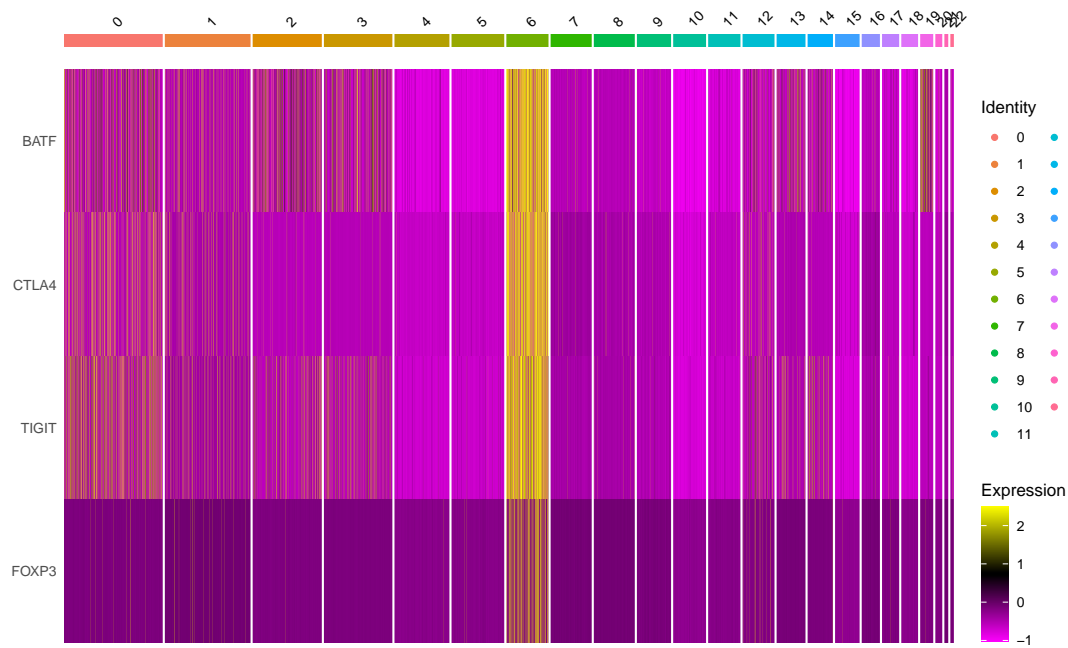


Figure 2: Heatmap show the reference genes

显然，Cluster 6 为 Treg 细胞。

其余细胞以 SCSA 注释。

Figure 3 (下方图) 为图 The cell type 概览。

(对应文件为 **Figure+Table/The-cell-type.pdf**)

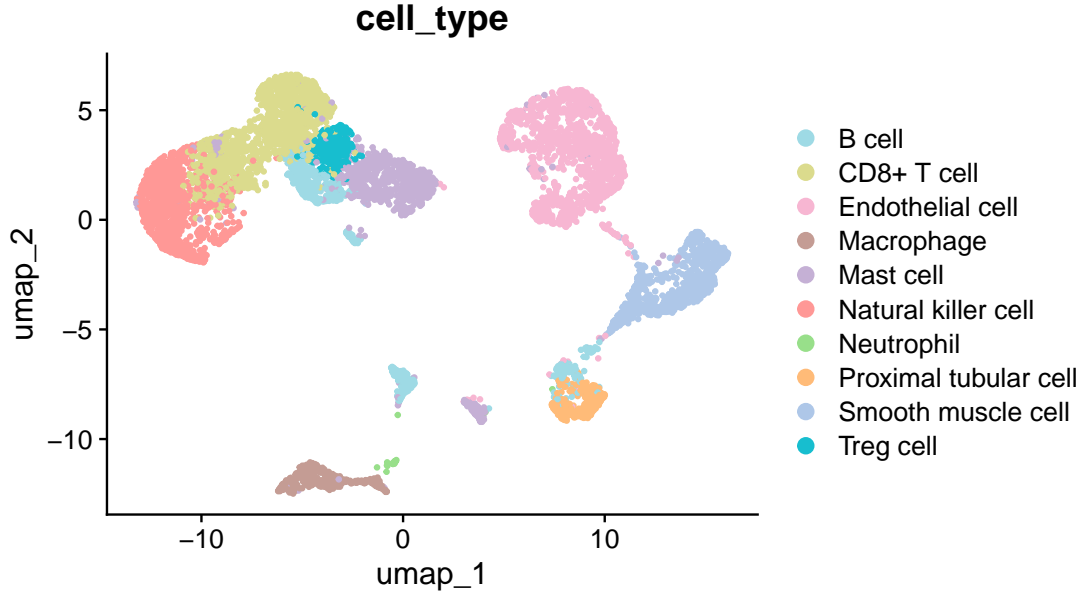


Figure 3: The cell type

3.3 Treg 细胞的差异表达基因 (对比其它细胞)

Table 1 (下方表格) 为表格 Treg DEGs 概览。

(对应文件为 `Figure+Table/Treg-DEGs.csv`)

注：表格共有 652 行 8 列，以下预览的表格可能省略部分数据；表格含有 652 个唯一 ‘rownames’。

Table 1: Treg DEGs

rownames	p_val	avg_l...	pct.1	pct.2	p_val...	cluster	gene
CTLA4	0	3.608...	0.688	0.046	0	6	CTLA4
TBC1D4	0	3.051...	0.749	0.086	0	6	TBC1D4
FOXP3	0	2.156...	0.315	0.006	0	6	FOXP3
ICOS	8.465...	2.946...	0.599	0.053	1.520...	6	ICOS
TIGIT1	1.433...	3.012...	0.733	0.101	2.575...	6	TIGIT
RTKN2	2.467...	2.752...	0.354	0.015	4.433...	6	RTKN2
RP11-...	2.973...	2.298...	0.298	0.011	5.342...	6	RP11-...
LTB1	3.956...	2.917...	0.766	0.125	7.108...	6	LTB
BATF3	3.925...	3.204...	0.76	0.139	7.052...	6	BATF
TNFRSF18	3.680...	3.126...	0.507	0.051	6.612...	6	TNFRSF18
SLAMF1	6.452...	2.463...	0.432	0.036	1.159...	6	SLAMF1
CD271	3.806...	2.380...	0.702	0.118	6.838...	6	CD27
IL2RA	2.908...	2.084...	0.256	0.012	5.225...	6	IL2RA

rownames	p_val	avg_l...	pct.1	pct.2	p_val...	cluster	gene
STAM	2.076...	2.388...	0.529	0.077	3.730...	6	STAM
IKZF2	8.030...	2.235...	0.451	0.053	1.442...	6	IKZF2
...

3.4 Treg 差异基因通路富集

Figure 4 (下方图) 为图 KEGG enrichment 概览。

(对应文件为 **Figure+Table/KEGG-enrichment.pdf**)

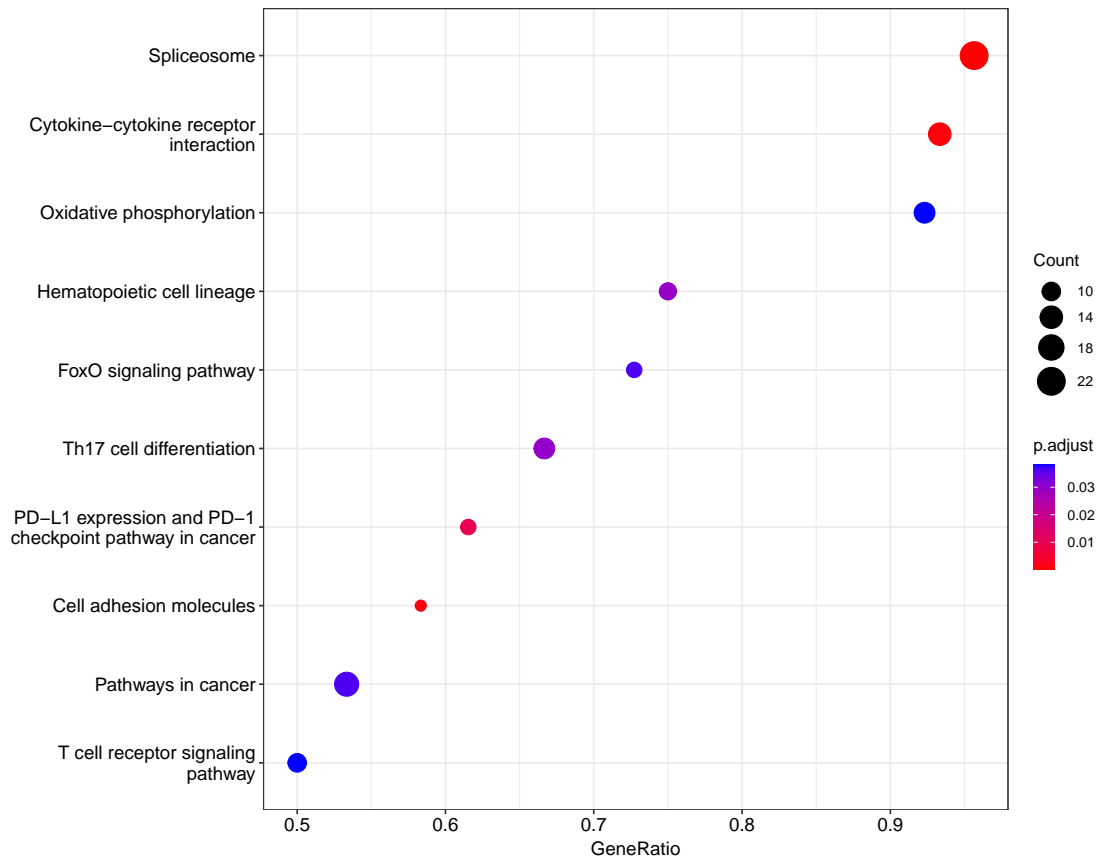


Figure 4: KEGG enrichment

Figure 5 (下方图) 为图 GSEA plot of the pathways 概览。

(对应文件为 **Figure+Table/GSEA-plot-of-the-pathways.pdf**)

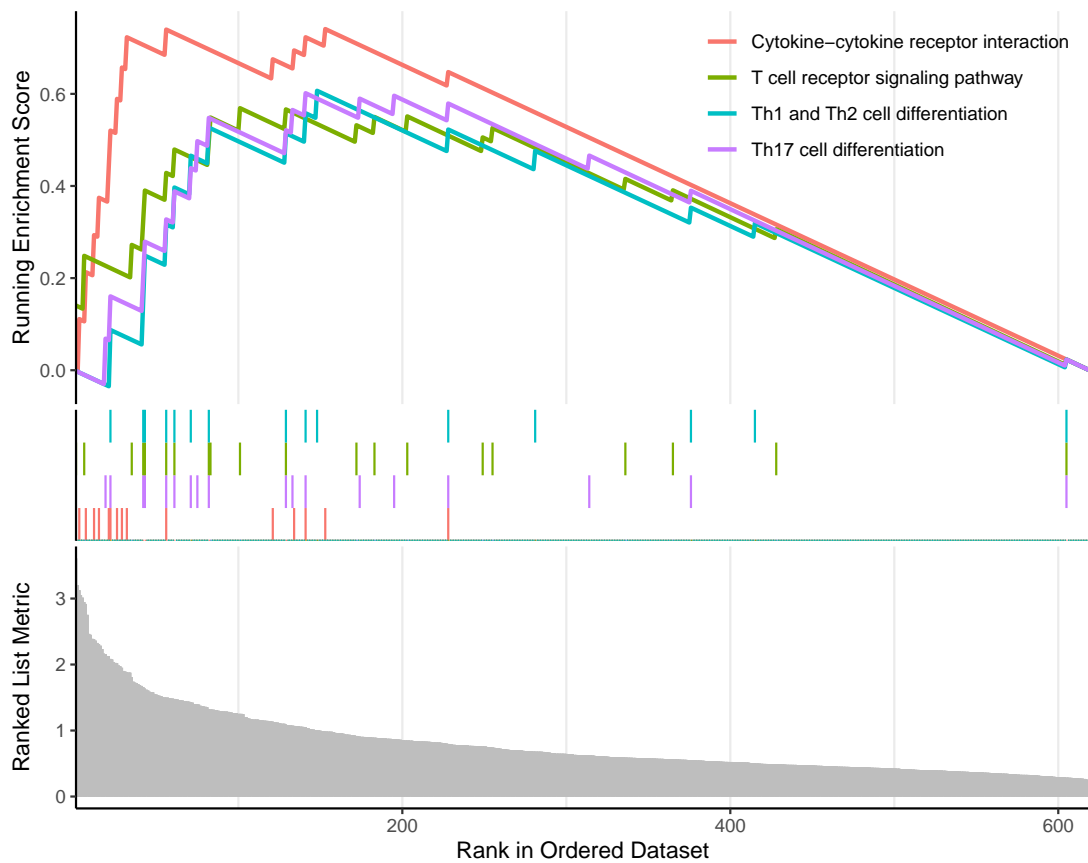


Figure 5: GSEA plot of the pathways

Figure 6 (下方图) 为图 view pathway of hsa04060 概览。

(对应文件为 **Figure+Table/hsa04060.pathview.png**)

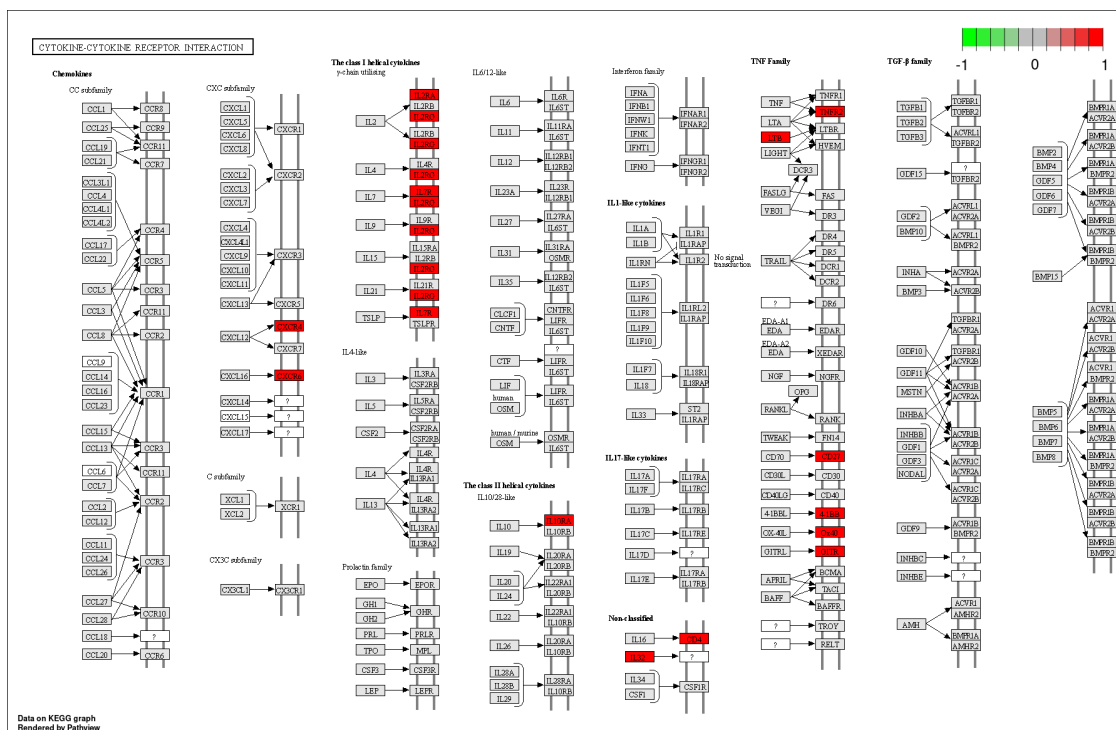


Figure 6: View pathway of hsa04060

3.5 Treg 细胞通讯信息

Figure 7 (下方图) 为图 Overall communication count 概览。

(对应文件为 Figure+Table/Overall-communication-count.pdf)

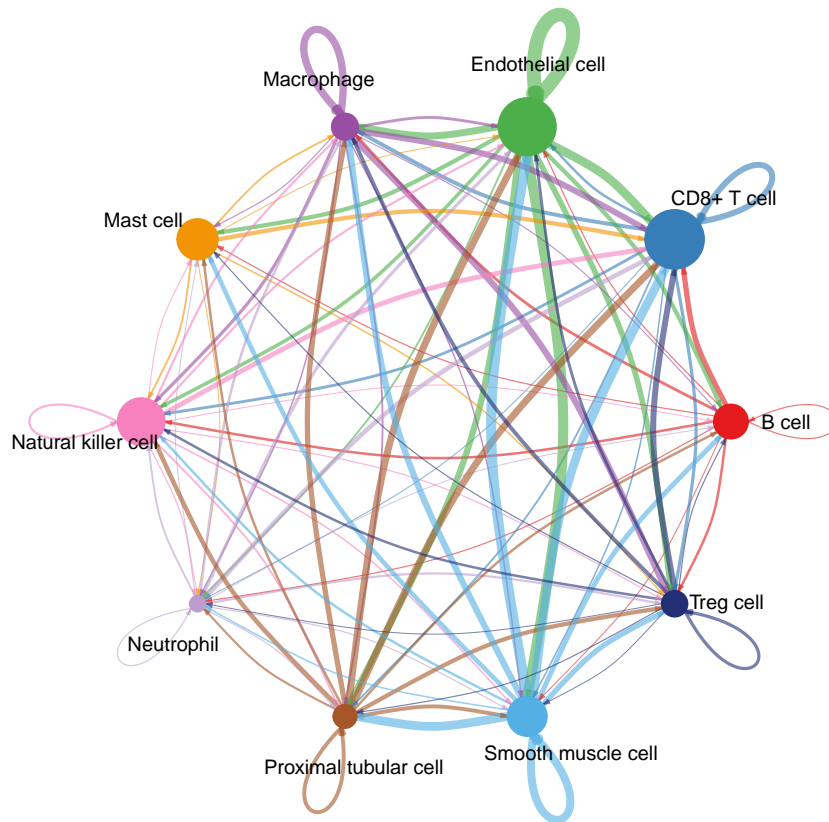


Figure 7: Overall communication count

Table 2 (下方表格) 为表格 Interaction of pathways 概览。

(对应文件为 **Figure+Table/Interaction-of-pathways.csv**)

注：表格共有 57 行 5 列，以下预览的表格可能省略部分数据；表格含有 10 个唯一 ‘source’。

Table 2: Interaction of pathways

source	target	pathw...	prob	pval
B cell	Treg ...	MHC-II	0.008...	0
B cell	Treg ...	MIF	0.022...	0
CD8+ ...	Treg ...	CD137	0.007...	0
CD8+ ...	Treg ...	MHC-II	0.029...	0

source	target	pathw...	prob	pval
CD8+ ...	Treg ...	TNF	0.002...	0
Endot...	Treg ...	APP	0.074...	0
Endot...	Treg ...	COLLAGEN	0.128...	0
Endot...	Treg ...	CXCL	0.024...	0
Endot...	Treg ...	FN1	0.049...	0
Endot...	Treg ...	LAMININ	0.038...	0
Endot...	Treg ...	MHC-II	0.016...	0
Macro...	Treg ...	CD86	0.010...	0
Macro...	Treg ...	CXCL	0.006...	0
Macro...	Treg ...	GALECTIN	0.025...	0
Macro...	Treg ...	MHC-II	0.265...	0
...

Table 3 (下方表格) 为表格 Interaction of ligand and receptor 概览。

(对应文件为 **Figure+Table/Interaction-of-ligand-and-receptor.csv**)

注：表格共有 136 行 11 列，以下预览的表格可能省略部分数据；表格含有 10 个唯一 ‘source’。

Table 3: Interaction of ligand and receptor

source	target	ligand	receptor	prob	pval	inter.....7	inter.....8	pathw...	annot...
Endot...	Treg ...	CXCL12	CXCR4	0.024...	0	CXCL1...	CXCL1...	CXCL	Secre...
Macro...	Treg ...	CXCL16	CXCR6	0.006...	0	CXCL1...	CXCL1...	CXCL	Secre...
Treg ...	B cell	MIF	CD74_...	0.012...	0	MIF_C...	MIF -...	MIF	Secre...
Treg ...	CD8+ ...	MIF	CD74_...	0.015...	0	MIF_C...	MIF -...	MIF	Secre...
Treg ...	Endot...	MIF	CD74_...	0.006...	0.03	MIF_C...	MIF -...	MIF	Secre...
Treg ...	Macro...	MIF	CD74_...	0.028...	0	MIF_C...	MIF -...	MIF	Secre...
Treg ...	Mast ...	MIF	CD74_...	0.013...	0	MIF_C...	MIF -...	MIF	Secre...
Treg ...	Natur...	MIF	CD74_...	0.005...	0.03	MIF_C...	MIF -...	MIF	Secre...
Treg ...	Neutr...	MIF	CD74_...	0.011...	0.01	MIF_C...	MIF -...	MIF	Secre...
B cell	Treg ...	MIF	CD74_...	0.014...	0	MIF_C...	MIF -...	MIF	Secre...
Proxi...	Treg ...	MIF	CD74_...	0.105...	0	MIF_C...	MIF -...	MIF	Secre...
Treg ...	Treg ...	MIF	CD74_...	0.014...	0	MIF_C...	MIF -...	MIF	Secre...
Treg ...	B cell	MIF	CD74_...	0.004...	0	MIF_C...	MIF -...	MIF	Secre...
Treg ...	CD8+ ...	MIF	CD74_...	0.007...	0	MIF_C...	MIF -...	MIF	Secre...
Treg ...	Macro...	MIF	CD74_...	0.016...	0	MIF_C...	MIF -...	MIF	Secre...
...

Reference

1. Jin, S. *et al.* Inference and analysis of cell-cell communication using cellchat. *Nature Communications* **12**, (2021).
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