

# ST 和 IMS 联合分析

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LiChuang Huang



@ 立效研究院

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# 1 摘要

## 1.1 2-48512+ 曹卓 + 补实验

### 1.1.1 代谢物的表达

Table 1 (下方表格) 为表格 metabolites expression 概览。

(对应文件为 `Figure+Table/metabolites-expression.csv`)

注：表格共有 64 行 502 列，以下预览的表格可能省略部分数据；表格含有 32 个唯一‘KEGG’。

Table 1: Metabolites expression									
KEGG	group	V1	V2	V3	V4	V5	V6	V7	V8
C06142	LC	-23.1...	6.440...	25.81...	10.16...	-6.84...	-1.12...	-4.87...	56.90...
C06142	N	206.8...	53.76...	217.4...	225.0...	107.8...	142.1...	398.8...	-160....
C00854	LC	5.584...	23.56...	24.16...	-14.1...	8.792...	2.588...	9.924...	-3.55...
C00854	N	135.1...	227.9...	476.9...	-12.3...	167.2...	301.6...	343.3...	63.20...
C16834	LC	5.378...	43.13...	-40.4...	31.91...	57.59...	2.177...	32.43...	66.31...
C16834	N	159.6...	102.9...	183.9...	565.5...	-263....	302.1...	221.6...	417.2...
C00741	LC	-3.05...	-21.9...	-7.10...	1.853...	5.090...	-20.2...	21.87...	23.41...
C00741	N	175.9...	523.6...	-404....	-203....	-70.7...	585.7...	1051....	-59.6...
C02845	LC	-2.48...	20.88...	15.45...	64.56...	16.32...	5.333...	35.69...	24.03...
C02845	N	926.6...	-612....	257.3...	1732....	2358....	2393....	-3.36...	741.9...
C19377	LC	0	0	0	0	0	0	0	0
C19377	N	1760....	1075....	774.8...	-838....	-140....	862.9...	733.4...	1464....
C08380	LC	19.19...	20.78...	17.04...	-2.41...	-3.67...	28.75...	18.27...	-8.64...
C08380	N	473.4...	-624....	-168....	849.4...	766.8...	513.4...	-98.0...	2.788...
C01949	LC	26.83...	57.65...	29.98...	61.95...	54.43...	12.21...	117.9...	-7.28...
...	...	...	...	...	...	...	...	...	...

### 1.1.2 代谢物和代谢通路在细胞亚群中的动态变化

Table 2 (下方表格) 为表格 metabolites expression in pseudotime of cancer subtypes 概览。

(对应文件为 `Figure+Table/metabolites-expression-in-pseudotime-of-cancer-subtypes.csv`)

注：表格共有 16000 行 8 列，以下预览的表格可能省略部分数据；表格含有 32 个唯一‘KEGG’。

Table 2: Metabolites expression in pseudotime of cancer subtypes

KEGG	pse	name	group	value	row	col	barcodes
C06142	3.086...	V1	LC	-23.1...	42	28	AAACC...
C00854	3.086...	V1	LC	5.584...	42	28	AAACC...
C16834	3.086...	V1	LC	5.378...	42	28	AAACC...
C00741	3.086...	V1	LC	-3.05...	42	28	AAACC...
C02845	3.086...	V1	LC	-2.48...	42	28	AAACC...
C19377	3.086...	V1	LC	0	42	28	AAACC...
C08380	3.086...	V1	LC	19.19...	42	28	AAACC...
C01949	3.086...	V1	LC	26.83...	42	28	AAACC...
C07329	3.086...	V1	LC	-7.47...	42	28	AAACC...
C07287	3.086...	V1	LC	35.55...	42	28	AAACC...
C00466	3.086...	V1	LC	65.99...	42	28	AAACC...
C00207	3.086...	V1	LC	121.4...	42	28	AAACC...
C00261	3.086...	V1	LC	-143...	42	28	AAACC...
C00601	3.086...	V1	LC	10.04...	42	28	AAACC...
C01412	3.086...	V1	LC	0	42	28	AAACC...
...	...	...	...	...	...	...	...

### 1.1.3 肿瘤/上皮细胞和免疫细胞的相互作用

Table 3 (下方表格) 为表格 cell communication probability of PATHWAY 概览。

(对应文件为 `Figure+Table/cell-communication-probability-of-PATHWAY.csv`)

注：表格共有 2111 行 5 列，以下预览的表格可能省略部分数据；表格含有 12 个唯一 'source'。

Table 3: Cell communication probability of PATHWAY

source	target	pathw...	prob	pval
Basal...	Basal...	CD46	0.146...	0.03
Basal...	Basal...	CDH	0.052...	0
Basal...	Basal...	CDH1	0.088...	0
Basal...	Basal...	COLLAGEN	0.236...	0.003...
Basal...	Basal...	CXCL	0.101...	0
Basal...	Basal...	DESMO...	0.111...	0
Basal...	Basal...	EPHA	0.007...	0.02
Basal...	Basal...	JAM	0.233...	0
Basal...	Basal...	LAMININ	1.611...	0.004
Basal...	Basal...	MIF	0.225...	0

source	target	pathw...	prob	pval
Basal...	Basal...	NECTIN	0.011...	0
Basal...	Basal...	NOTCH	0.114...	0
Basal...	Basal...	SPP1	0.271...	0
Basal...	Basal...	TENASCIN	0.117...	0.03
Basal...	Basal...	THBS	0.027...	0.02
...	...	...	...	...

#### 1.1.4 肿瘤/上皮细胞和免疫细胞的代谢作用

Table 4 (下方表格) 为表格 cells metabolite levels 概览。

(对应文件为 `Figure+Table/cells-metabolite-levels.csv`)

注：表格共有 16000 行 6 列，以下预览的表格可能省略部分数据；表格含有 500 个唯一 ‘name’。

Table 4: Cells metabolite levels

name	KEGG	group	value	scsa_...	.barc...
V1	C06142	LC	-23.1...	Cance...	AAACC...
V1	C00854	LC	5.584...	Cance...	AAACC...
V1	C16834	LC	5.378...	Cance...	AAACC...
V1	C00741	LC	-3.05...	Cance...	AAACC...
V1	C02845	LC	-2.48...	Cance...	AAACC...
V1	C19377	LC	0	Cance...	AAACC...
V1	C08380	LC	19.19...	Cance...	AAACC...
V1	C01949	LC	26.83...	Cance...	AAACC...
V1	C07329	LC	-7.47...	Cance...	AAACC...
V1	C07287	LC	35.55...	Cance...	AAACC...
V1	C00466	LC	65.99...	Cance...	AAACC...
V1	C00207	LC	121.4...	Cance...	AAACC...
V1	C00261	LC	-143....	Cance...	AAACC...
V1	C00601	LC	10.04...	Cance...	AAACC...
V1	C01412	LC	0	Cance...	AAACC...
...	...	...	...	...	...

## 1.2 7-48470+ 曹卓 + 补实验

#### 1.2.1 肿瘤/上皮细胞和免疫细胞的代谢作用

Table 5 (下方表格) 为表格 cell metabolites levels average 概览。

(对应文件为 Figure+Table/cell-metabolites-levels-average.csv)

注：表格共有 32 行 3 列，以下预览的表格可能省略部分数据；表格含有 1 个唯一‘scsa\_copykat’。

Table 5: Cell metabolites levels average

scsa_...	KEGG	mean
Cance...	C00207	29.43...
Cance...	C00246	20.98...
Cance...	C00261	157.0...
Cance...	C00463	125.5...
Cance...	C00466	22.78...
Cance...	C00469	33.77...
Cance...	C00601	21.12...
Cance...	C00741	14.17...
Cance...	C00747	1.830...
Cance...	C00803	16.61...
Cance...	C00854	12.43...
Cance...	C01412	0
Cance...	C01468	1071....
Cance...	C01949	18.85...
Cance...	C02845	13.68...
...	...	...

### 1.3 6-45140+ 曹卓 + 补实验

#### 1.3.1 代谢物和代谢通路在细胞亚群中的动态变化

Table 6 (下方表格) 为表格 metabolites expression in pseudotime average levels 概览。

(对应文件为 Figure+Table/metabolites-expression-in-pseudotime-average-levels.csv)

注：表格共有 224 行 3 列，以下预览的表格可能省略部分数据；表格含有 32 个唯一‘KEGG’。

Table 6: Metabolites expression in pseudotime average levels

KEGG	round...	mean
C00207	0	20.68...
C00207	1	28.18...
C00207	2	36.93...
C00207	3	35.84...

KEGG	round...	mean
C00207	4	24.45...
C00207	5	34.33...
C00207	7	30.63...
C00246	0	24.75...
C00246	1	16.38...
C00246	2	27.03...
C00246	3	14.57...
C00246	4	14.70...
C00246	5	22.28...
C00246	7	19.91...
C00261	0	170.7...
...	...	...

### 1.3.2 肿瘤/上皮细胞和免疫细胞的相互作用

Table 7 (下方表格) 为表格 cell communication probability of LIGAND RECEPTORS 概览。

(对应文件为 **Figure+Table/cell-communication-probability-of-LIGAND-RECEPTORS.csv**)

注：表格共有 6817 行 11 列，以下预览的表格可能省略部分数据；表格含有 12 个唯一‘source’。

Table 7: Cell communication probability of LIGAND RECEPTORS

source	target	ligand	receptor	prob	pval	inter.....7	inter.....8	pathw...	annot...
cancer_2	Basal...	TGFB1	ACVR1...	0.000...	0.04	TGFB1...	TGFB1...	TGFb	Secre...
Endot...	Basal...	TGFB1	ACVR1...	0.001...	0.01	TGFB1...	TGFB1...	TGFb	Secre...
cancer_2	cancer_1	TGFB1	ACVR1...	0.001...	0	TGFB1...	TGFB1...	TGFb	Secre...
cancer_3	cancer_1	TGFB1	ACVR1...	0.001...	0	TGFB1...	TGFB1...	TGFb	Secre...
Endot...	cancer_1	TGFB1	ACVR1...	0.002...	0	TGFB1...	TGFB1...	TGFb	Secre...
Fibro...	cancer_1	TGFB1	ACVR1...	0.000...	0.04	TGFB1...	TGFB1...	TGFb	Secre...
Inter...	cancer_1	TGFB1	ACVR1...	0.001...	0.01	TGFB1...	TGFB1...	TGFb	Secre...
Plasm...	cancer_1	TGFB1	ACVR1...	0.000...	0.03	TGFB1...	TGFB1...	TGFb	Secre...
cancer_2	cancer_2	TGFB1	ACVR1...	0.002...	0	TGFB1...	TGFB1...	TGFb	Secre...
cancer_3	cancer_2	TGFB1	ACVR1...	0.001...	0	TGFB1...	TGFB1...	TGFb	Secre...
Endot...	cancer_2	TGFB1	ACVR1...	0.002...	0	TGFB1...	TGFB1...	TGFb	Secre...
Epith...	cancer_2	TGFB1	ACVR1...	0.000...	0.01	TGFB1...	TGFB1...	TGFb	Secre...
Fibro...	cancer_2	TGFB1	ACVR1...	0.000...	0	TGFB1...	TGFB1...	TGFb	Secre...
Inter...	cancer_2	TGFB1	ACVR1...	0.001...	0	TGFB1...	TGFB1...	TGFb	Secre...
Macro...	cancer_2	TGFB1	ACVR1...	0.000...	0.01	TGFB1...	TGFB1...	TGFb	Secre...

source	target	ligand	receptor	prob	pval	inter.....7	inter.....8	pathw...	annot...
...	...	...	...	...	...	...	...	...	...

## 2 材料和方法

### 2.1 方法

Mainly used method:

- Other R packages (eg., `dplyr` and `ggplot2`) used for statistic analysis or data visualization.