**1**  检测总览

## >1.1 送检信息

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **受检者信息** |  | | | | |
|  |  |  |  | |  |
| **送检医院** | {{sample.company}} | | | | |
| **姓名** | {{sample.patient\_name}} |  | **性别** | {{sample.gender}} | |
| **年龄** | {{sample.age}} |  | **受检编号** | {{sample.sample\_parent\_id}} | |
| **临床诊断** |  |  | **家族病史** |  | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **样本信息** |  | | | | |
|  |  |  |  | |  |
| **样本类型** | {{sample.sample\_type}} |  | **样本数量** | {{sample.sample\_amount}} | |
| **样本编号** | {{sample.sample\_id}} |  | **病理编号** | {{sample.pathological\_id}} | |
| **采集部位** |  |  | **采集日期** | {{sample.gather\_data}} | |
| **病理诊断** | {{sample.pathol\_diagn}} |  | **接收日期** | {{sample.receive\_data}} | |

**{%p if sample.control\_sample\_id %}**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **对照样本信息** |  | | | | |
|  |  |  |  | |  |
| **样本类型** | {{sample.control\_sample\_type}} |  | **样本数量** | {{sample.control\_sample\_amount}} | |
| **样本编号** | {{sample.control\_sample\_id}} |  | **病理编号** |  | |
| **采集日期** | {{sample.gather\_data}} |  | **接收日期** | {{sample.receive\_data}} | |

**{%p endif%}**

**>1.2 检测结果总结**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **结果小结** | **检测项** | **检测结果** | **丰度/基因型/拷贝数** | **变异等级** | **临床意义** |
| **伴随诊断相关生物标志物检测结果**  **（骨巨细胞瘤）** | ***NTRK1*** | - | - | - | - |
| ***NTRK2*** | - | - | - | - |
| ***NTRK3*** | - | - | - | - |
| **其他肿瘤相关基因检测结果** | ***-*** | - | - | - | - |
| **免疫治疗相关标志物检测结果** | **MSI** | {%if msi.var\_id==”MSS”%}MSS{%else%}MSI-H{%endif%} |  |  | - |
| **TMB** | {{tmb.TMB\_value}} Muts/Mb, {%if tmb.var\_id==”TMB-L”%}TMB-L{%else%}TMB-H{%endif%} |  |  | - |
| **免疫正负相关基因** | - | - | - | - |
| **肿瘤易感性相关**  **标志物检测结果** | **肿瘤易感基因** | - | - | - | - |

**注：**

1. 本项目基于杂交捕获的高通量测序法检测样本DNA中559个基因和RNA中1813个基因目标区域范围内的点突变、小片段插入缺失、基因融合、拷贝数变异和基因表达；同时还检测白细胞抗原(HLA)分型、微卫星不稳定性（MSI）和化疗药物代谢相关酶类多态性位点，为患者进行靶向治疗、免疫治疗、化疗等提供辅助决策参考，同时检测88个相关肿瘤遗传易感基因，预测相关遗传风险，详见附录1；
2. 伴随诊断相关生物标志物检测结果部分列出针对相应肿瘤中具有/潜在具有临床意义的生物标志物变异情况，其他肿瘤相关基因检测结果部分列出其他I类/II类变异情况。

**>1.3 检测结果**

## 1.3.1检出变异的临床意义提示

{%p if var.var\_for\_regimen\_without\_rnasv.level\_I + var.var\_for\_regimen\_without\_rnasv.level\_II+var.var\_germline.level\_5+var.var\_germline.level\_4 or var.knb%}

{%p if (var.var\_for\_regimen\_without\_rnasv.level\_I + var.var\_for\_regimen\_without\_rnasv.level\_II or var.knb) and var.var\_somatic\_rna\_sv.level\_I + var.var\_somatic\_rna\_sv.level\_II %}

**DNA变异**

{%p endif%}

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **基因** | **检测结果** | **丰度/基因型/拷贝数** | **变异分类** | **临床意义** |
| {%tr if var.knb%} | | | | |
| ***KRAS/***  ***NRAS/***  ***BRAF* p.(V600E)** | 野生型 | - | - | {%p if var.knb.evi\_sum.evi\_split.Predictive%}  {%p for b in var.knb.evi\_sum.evi\_split.Predictive%}  {{b.regimen\_name}}（{{b.clinical\_significance\_cn}}，{{b.evi\_conclusion\_simple}}级）  {%p endfor%}  {%p endif%}  {%p if var.knb.evi\_sum.evi\_split.Prognostic%}  {%p for b in var.knb.evi\_sum.evi\_split.Prognostic %}  预后{{b.clinical\_significance\_cn }}（ / ，{{b.evi\_conclusion\_simple }}级）  {%p endfor%}  {%p endif%}  {%p if var.knb.evi\_sum.evi\_split.Diagnostic%}  {%p for b in var.knb.evi\_sum.evi\_split.Diagnostic %}  辅助诊断（ / ，{{b.evi\_conclusion\_simple }}级）  {%p endfor%}  {%p endif%} |
| {%tr endif%} | | | | |
| {%tr if var.var\_for\_regimen\_without\_rnasv.level\_I+ var.var\_for\_regimen\_without\_rnasv.level\_II+var.var\_germline.level\_5+var.var\_germline.level\_4%} | | | | |
| {%tr for a in var.var\_for\_regimen\_without\_rnasv.level\_I+ var.var\_for\_regimen\_without\_rnasv.level\_II+var.var\_germline.level\_5+var.var\_germline.level\_4%} | | | | |
| **{%p if “,” in a.gene\_symbol and (a.bio\_category==”Sv” or a.bio\_category == “PSeqRnaSv”)%}**  **{%p if a.five\_prime\_gene != a.three\_prime\_gene %}**  ***{{a.five\_prime\_gene}}***  ***{{a.three\_prime\_gene}}***  **{%p else%}**  ***{{a.five\_prime\_gene}}***  **{%p endif%}**  **{%p else%}**  ***{{a.gene\_symbol}}***  **{%p endif%}** | {%p if a.bio\_category==”Snvindel”%}  {%p if a.hgvs\_p!=”p.?”%}  {{a.gene\_region}} {{a.hgvs\_c}} {{a.hgvs\_p}}  {%p else%}  {{a.gene\_region}} {{a.hgvs\_c}}  {%p endif%}  {{a.transcript\_primary}}  {%p elif a.bio\_category==”Cnv”%}  扩增  {%p elif a.bio\_category==”Sv”%}  {{a.five\_prime\_gene}}:{{a.five\_prime\_cds}}-{{a.three\_prime\_gene}}:{{a.three\_prime\_cds}}融合  {{a.five\_prime\_transcript}}/{{a.three\_prime\_transcript}}  {%p endif%} | {%p if a.bio\_category==”Snvindel”%}  {%p if a.var\_origin==”germline”%}  {%if a.freq\_sc >= 0.85%}纯合{%else%}杂合{%endif%}  {%p else%}  {{a.freq\_str}}  {%p endif%}  {%p elif a.bio\_category==”Cnv”%}  {{a.cn\_mean}}  {%p elif a.bio\_category==”Sv”%}  {{a.freq\_str}}  {%p endif%} | {%p if a.clinic\_num\_s==5%}  I类  {%p else%}  II类  {%p endif%} | {%p if a.evi\_sum.evi\_split.Predictive%}  {%p for b in a.evi\_sum.evi\_split.Predictive%}  {{b.regimen\_name}}（{{b.clinical\_significance\_cn}}，{{b.evi\_conclusion\_simple}}级）  {%p endfor%}  {%p endif%}  {%p if a.evi\_sum.evi\_split.Prognostic%}  {%p for b in a.evi\_sum.evi\_split.Prognostic %}  预后{{b.clinical\_significance\_cn }}（ / ，{{b.evi\_conclusion\_simple }}级）  {%p endfor%}  {%p endif%}  {%p if a.evi\_sum.evi\_split.Diagnostic%}  {%p for b in a.evi\_sum.evi\_split.Diagnostic %}  辅助诊断（ / ，{{b.evi\_conclusion\_simple }}级）  {%p endfor%}  {%p endif%} |
| {%tr endfor%} | | | | |
| {%tr endif%} | | | | |

**{%p endif%}**

**{%p if var.var\_somatic\_rna\_sv.level\_I + var.var\_somatic\_rna\_sv.level\_II and sample.rna\_sample\_id%}**

**RNA变异**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **基因** | **检测结果** | **融合支持数** | **变异分类** | **临床意义** |
| {%tr for a in var.var\_somatic\_rna\_sv.level\_I + var.var\_somatic\_rna\_sv.level\_II%} | | | | |
| **{%p if “,” in a.gene\_symbol and (a.bio\_category==”Sv” or a.bio\_category == “PSeqRnaSv”)%}**  **{%p if a.five\_prime\_gene != a.three\_prime\_gene %}**  ***{{a.five\_prime\_gene}}***  ***{{a.three\_prime\_gene}}***  **{%p else%}**  ***{{a.five\_prime\_gene}}***  **{%p endif%}**  **{%p else%}**  ***{{a.gene\_symbol}}***  **{%p endif%}** | {{a.five\_prime\_gene}}:{{a.five\_prime\_cds}}-{{a.three\_prime\_gene}}:{{a.three\_prime\_cds}}融合  {{a.five\_prime\_transcript}}/{{a.three\_prime\_transcript}} | {{a.freq}} copies | {%p if a.clinic\_num\_s==5%}  I类  {%p else%}  II类  {%p endif%} | {%p if a.evi\_sum.evi\_split.Predictive%}  {%p for b in a.evi\_sum.evi\_split.Predictive%}  {{b.regimen\_name}}（{{b.clinical\_significance\_cn}}，{{b.evi\_conclusion\_simple}}级）  {%p endfor%}  {%p endif%}  {%p if a.evi\_sum.evi\_split.Prognostic%}  {%p for b in a.evi\_sum.evi\_split.Prognostic %}  预后{{b.clinical\_significance\_cn }}（ / ，{{b.evi\_conclusion\_simple }}级）  {%p endfor%}  {%p endif%}  {%p if a.evi\_sum.evi\_split.Diagnostic%}  {%p for b in a.evi\_sum.evi\_split.Diagnostic %}  辅助诊断（ / ，{{b.evi\_conclusion\_simple }}级）  {%p endfor%}  {%p endif%} |
| {%tr endfor%} | | | | |

**{%p endif%}**

**{%p if not var.var\_for\_regimen\_without\_rnasv.level\_I + var.var\_for\_regimen\_without\_rnasv.level\_II and not var.var\_somatic\_rna\_sv.level\_I + var.var\_somatic\_rna\_sv.level\_II and not var.knb and not var.var\_germline.level\_5+var.var\_germline.level\_4%}**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | | | | |
| **基因** | **检测结果** | **丰度/拷贝数/基因型/融合支持数** | **变异分类** | **临床意义** |
| 未检测到相关变异 | | | | |

**{%p endif%}**

**注：**

1. 检出变异参照美国病理协会（Association for Molecular Pathology, AMP）、美国临床肿瘤学会（American Society of Clinical Oncology, ASCO）和美国病理学家协会（College of American Pathologists, CAP）联合发布的《肿瘤变异解读及报告指南》（PMID: 27993330）中的变异分类方法，综合变异在治疗、诊断和预后方面相关研究证据，将变异分为4类：I类为强临床意义；II类为潜在临床意义；III类为临床意义不明；IV类为良性/可能良性。上表仅列出I-II类变异，与肿瘤发生发展相关但暂无临床药物研究的胚系/体细胞变异不在本表中展示。
2. 检出变异与临床意义相关性的证据水平分为A、B、C、D四个等级，A级：对应癌种中FDA/NMPA批准或指南推荐的治疗、诊断或预后的相关标志物；B级：专家共识或III/IV期临床试验研究表明对患者肿瘤治疗有敏感或耐药、或具有诊断、预后意义的生物标志物；C级: FDA/NMPA批准或专业指南推荐的在其他癌种对某个治疗方案敏感或耐药的标志物；或者是作为临床试验入组标准的标志物；或者是多个小型研究结果证实具有诊断或预后意义的标志物；D级: 临床前研究表明具有潜在的治疗意义，或基于小型研究或多个案例报告可能作为辅助疾病诊断或预后的标志物（结论未形成共识）。具有明确临床意义的I类变异，对应药物敏感性证据级别为A级和B级；具有潜在临床意义的II类变异，对应药物敏感性证据级别为C级和D级；不会对临床意义尚不明确的III类变异做药物敏感性分析。
3. DNA变异包含在体细胞和胚系中检出的点突变/小片段插入缺失、结构变异和拷贝数变异；RNA变异包含在体细胞中检出的结构变异。
4. 检出体细胞DNA点突变/小片段插入缺失和结构变异时提示丰度，指突变型占野生型和突变型之和的比例；检出体细胞DNA拷贝数变异时提示拷贝数，正常细胞中基因拷贝数为2；检出体细胞RNA结构变异时提示拷贝支持数，指测序支持reads数；检出胚系DNA点突变/小片段插入缺失和结构变异时提示基因型，即纯合或杂合。

## 1.3.2免疫治疗相关标志物检测结果

|  |  |  |
| --- | --- | --- |
| **免疫治疗生物标志物检测结果** | | |
| **检测内容** | **检测意义** | **检测结果** |
|  | | |
| 肿瘤突变负荷  （TMB） | 对于肿瘤突变负荷（TMB）较高的患者，FDA已批准帕博利珠单抗用于既往治疗后疾病进展且没有令人满意替代治疗方案的不可手术或转移性的成人和儿童实体瘤患者。 | {{tmb.TMB\_value}} Muts/Mb,  {%if tmb.var\_id==”TMB-L”%}TMB-L{%else%}TMB-H{%endif%} |
| 微卫星不稳定性  （MSI） | FDA已批准纳武利尤单抗、纳武利尤单抗+伊匹单抗、帕博利珠单抗用于MSI-H的结直肠癌、子宫内膜癌、肾细胞癌等的治疗。 | {%if msi.var\_id==”MSS”%}  MSS{%else%}MSI-H{%endif%} |

**注：**

1. 肿瘤突变负荷（Tumor Mutation Burden, TMB）：本样本检测到的TMB值与既往检测样本TMB数值由高到低进行排序，并根据四分位法，设定排序在前25％的值为TMB-H，后75％为TMB-L。
2. 微卫星不稳定（Microsatellite instable , MSI）：本产品共检测307个MSI位点，在胃癌和肠癌样本中进行了充分验证

## 1.3.3化疗药物相关标志物检测结果

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 检测基因 | 位点 | 基因型 | 临床意义 | 证据水平 |
| {%tr for a in chemo.reduce\_116%} | | | | |
| ***{{a.gene\_symbol}}*** | {{a.dbsnp}} | {{a.genotype}} | {{a.clin\_anno\_cn}} | {{a.evi\_level}} |
| {{%tr endfor%}} | | | | |

**注：**

1. 化疗药物证据水平划分依据参考PharmGKB数据库，共分为1A/1B/2A/2B/3/4这6个等级：

1A级：由临床药物基因组学实施联盟（CPIC）或遗传药理学指南认可，或者应用于其他主要卫生系统；

1B级：注释基于多项有统计显著性的研究；

2A级：注释基于多项重复研究，并且该基因为明确的药物代谢基因；

2B级：注释基于多项重复研究，但其中一些研究没有统计学意义或影响较小；

3级：注释仅基于一项有显著性差异的研究，或多项研究但缺乏明显药效关联；

4级：注释仅基于病例报告，非权威性研究或体外分子功能研究。

1. 如果同一个药物不同SNP位点对药物疗效或毒性预测的结论不一致，以证据水平级别高的为准。

## 1.3.4肿瘤易感基因检测结果

{%p if var.var\_germline.level\_4+var.var\_germline.level\_5%}

{%p for a in var.var\_germline.level\_4+var.var\_germline.level\_5%}

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **基因** | **检测结果** | | **杂合/纯合** | | **变异解读** |
|  | | | | | |
|  | |  | |  |  |
|  | |  | |  |  |
|  | |  | |  |  |

{%p endfor%}

{%p else%}

|  |  |  |  |
| --- | --- | --- | --- |
| **基因** | **检测结果** | **杂合/纯合** | **变异解读** |
|  | | | |
| 未检出致病性或可能致病性变异 | | | |

{%p endif%}

**注：**

遗传变异解读遵循美国医学遗传学和基因组学学会（American College of Medical Genetics, ACMG）发布的《遗传变异注释标准与指南》（2015年版），遗传变异分为致病性变异、可能致病性变异、临床意义不明变异、可能良性变异和良性变异五个等级。本产品共检测88个与遗传性肿瘤/综合征相关基因，本报告只展示这些基因检测到的致病性变异和可能致病性变异，并对其进行详细解读。

## 1.3.5临床意义不明变异

|  |  |  |
| --- | --- | --- |
| 基因 | 检测结果 | 丰度/拷贝数 |
| 未检出临床意义不明的变异 | | |

**注：**

在报告出具时根据可及的参考资料信息，以上这些变异的临床意义尚不明确，不排除随着研究的进展，这些变异的临床意义发生变化。变异解读标准详见本报告第六章。

检测人： 复核人： 审批人：

**2** 检测结果详细解读

## >2.1 靶向治疗相关标志物检测结果解读

|  |  |
| --- | --- |
|  | |
|  | |
| **基因简介** |  |
| **变异解读** | 未检出具有明确或潜在临床意义的变异 |
| **治疗策略** |  |

## >2.2 免疫治疗相关标志物检测结果解读

### 2.2.1 肿瘤微卫星不稳定性结果解读

|  |  |
| --- | --- |
| **微卫星不稳定性（MSI）** | |
|  | |
| **检测结果** | **MSS（微卫星稳定）** |
| **检测介绍** | 微卫星（Microsatellite）又称简单重复序列（SSR），是指遍布于人类基因组中的短串联重复序列，一般由1-6个核苷酸组成。DNA复制时，肿瘤细胞内的微卫星由于重复单位的插入或缺失而造成的微卫星长度的变化，称为微卫星不稳定性（Microsatellite Instability, MSI）。大量研究表明，MSI是由错配修复（mismatch repair，MMR）基因突变或功能缺陷引起的（PMID:25701956）。MSI在多种癌种中被发现，包括子宫内膜癌、结直肠癌和胃腺癌等。据报道，10%-15%的散发性结直肠癌患者存在MSI（PMID:15528785 ），NCCN指南明确推荐所有结直肠癌患者均需考虑做MSI或MMR检测。临床上也已将MSI作为结直肠癌及其他实体瘤预后和制定辅助治疗方案的重要分子标志物。 |
| **治疗策略** | **暂无临床用药：**基于当前的临床硏究进展，该变异的临床用药相关性还不明确。 |

### 2.2.2 肿瘤突变负荷结果解读

|  |  |
| --- | --- |
| **肿瘤突变负荷（TMB）** | |
|  |  |
| **检测结果** | **0.0 Muts/Mb, TMB-L** |
| **检测介绍** | 肿瘤突变负荷（Tumor mutation burden，TMB）通常定义为每个癌症病人基因组中每百万碱基（Mb）的非同义突变或所有体细胞突变数目。TMB是对基因组不稳定性的一种衡量，它的高低受到多种外源或内源因素的影响，外源因素主要包括吸烟、暴露于紫外线照射等等（PMID:15748635;PMID:12379884 ），而内源因素则主要是获得性的DNA修复机制的损伤，如BRCA1/2、MLH1, MSH2, MSH6等基因发生突变(PMID:22810696)。 |
| **治疗策略** | **暂无临床用药：**基于当前的临床硏究进展，该变异的临床用药相关性还不明确。 |

### 2.2.3 免疫治疗疗效相关检测结果解读

|  |  |
| --- | --- |
|  | |
|  |  |
| **检测结果** | 未检测到与免疫治疗疗效相关的基因变异 |
| **治疗策略** |  |

## >2.3 肿瘤易感性相关标志物结果解读

|  |  |
| --- | --- |
|  | |
|  | |
| **基因简介** |  |
| **变异解读** | 未检出致病性或可能致病性变异 |
| **遗传风险** |  |
| **治疗策略** |  |

**注：**

本报告中，遗传易感基因部分仅对根据ACMG指南解读并判定为致病性或可能致病性的遗传变异进行详细解读。

**3** 可能获益的药物

## >FDA/NMPA获批药物简介

|  |  |  |  |
| --- | --- | --- | --- |
| **药物名称** | **通用名：-** | **-** | **-** |
| **商品名：-** |
|  |  |  |  |
| **药理机制** | - | | |
| **相关变异** | - | | |
| **适应症** | - | | |

**注：**

药物批准信息来源于FDA/NMPA官方网站或药物说明书。

**4** 可能获益的临床试验llinchuang

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **生物标志物** | **试验编号** | **研究内容** | **治疗方案** | **试验阶段** |
|  | | | | |
| 未找到相关临床试验信息 | | | | |

**注：**

上述临床试验信息是根据受检者检测结果在ClinicalTrial（https://clinicaltrials.gov/）和药物临床试验登记与信息公示平台（http://www.chinadrugtrials.org.cn/）中检索而来，如需了解详细试验研究信息（入组条件、研究者信息、参加机构信息等）可根据上表中试验编号在上述网站中检索。

**6**

**5**  数据质控

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **肿瘤样本 DNA质控内容** | | **合格标准** | **质控结果** | **是否合格** |
|  | | | | |
| **样品质控** | 肿瘤细胞含量 | 合格：≥20%  风险：5％-20％ | N/A | N/A |
| DNA量-组织样本 | ≥ 60ng | 17300.0ng | 合格 |
| **文库质控** | 文库浓度 | ≥30ng/uL | 130.0ng/uL | 合格 |
| 插入片段大小 | 140-300bp | 218.782bp | 合格 |
| **数据质控** | Q30 | ≥75% | 92.36% | 合格 |
| 比对率 | ≥95% | 99.86% | 合格 |
| 覆盖度 | ≥95% | 99.72% | 合格 |
| 均一性  （热点区域） | ≥90% | 98.49% | 合格 |
| 均一性  （非热点区域） | ≥90% | 94.52% | 合格 |
| 平均有效深度  （热点区域） | ≥1000 | 2634.52 | 合格 |
| 平均有效深度  （非热点区域） | ≥500 | 1254.1 | 合格 |

**注：**

1. 仅当送检的样品中含有石蜡玻片时才能进行病理质控，若肿瘤细胞含量低于20%，本产品不检测CNV。

2. Q30: 测序的准确率高于99.9%的碱基的比例

3. 比对率: 可以比对至参考序列上的reads的比例

4. 覆盖度: 检测到的区域占目标区域的比例

5. 平均有效深度: 目标区域每个碱基被覆盖到的次数的平均值，去除PCR重复后测到的读数（dedup reads）

6. 对照白细胞几乎100%能满足质控要求，因此不在此详细展示质控内容。

7. 如质控结果为风险，可能会影响检测的灵敏度和特异性。对于热点区域（探针中涉及的重要变异）均一性合格，非热点区域均一性异常的样本，已检出变异可作为临床治疗参考，不排除有部分非热点变异漏检的可能。

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **肿瘤样本RNA质控内容** | | **合格标准** | **质控结果** | **是否合格** |
|  | | | | |
| 样品质控 | RNA量 | 合格≥50ng  风险≥5ng | 8300.0ng | 合格 |
| RNA片段大小分布（DV200） | 合格≥20%  风险≥5％ | 65.29% | 合格 |
| 文库质控 | 文库浓度 | ≥15ng/uL | 54.0ng/ul | 合格 |
| 数据质控 | Q30 | ≥75% | 93.53% | 合格 |
| 下机数据量 | 合格≥1.5G  风险≥1G | 7.17G | 合格 |

**注：**

DV200：RNA片段大小分布，即计算大于 200bp的 RNA 片段占总体RNA片段的百分比。

## >6.1 关于本产品

**6**  产品声明

本产品对肿瘤组织和配对样本进行检测，并对与肿瘤诊断、治疗和预后密切相关具有临床意义的检测结果进行详细解读（详细列表见本报告附录），为临床实体瘤患者的临床诊断治疗提供辅助参考。

本报告主要检测肿瘤相关基因的变异情况，对变异的解读遵循相关指南和规范。报告给出的这些变异信息（和无变异信息）可为临床医生的决策提供参考，受检者请在临床医生的指导下阅读本报告。

本报告中的基因变异和药物排名不分先后顺序，任何一个标志物变异和潜在有效或无效药物均不按照先后顺序排名。

本报告不对任何患者承诺或保证会在某一药物治疗中有效，也不承诺在某一药物治疗中无效。

## >6.2 变异命名与解读

本报告变异均采用人类基因组变异协会（Human Genome Variant Society，HGVS）推荐的序列变异法命名（2015年版v15.11）。

体细胞变异解读遵循美国病理学会（AMP）、美国医学遗传学和基因组学学会（ACMG）、美国临床肿瘤学会（ASCO）和美国病理学家学会（CAP）共同参与制定的《体细胞变异解读指南（2017年版）》与中国专家共识《二代测序临床报告解读指引》，根据生物标志物在诊断、治疗和预后的证据级别，将体细胞变异分为I类变异（具有强临床意义）、II类变异（具有潜在临床意义）、III类变异（临床意义不明变异）和IV类变异（良性和可能良性变异）。

|  |  |  |
| --- | --- | --- |
| **体细胞变异分类** | **等级** | **解释** |
|  | | |
| I类变异  （强临床意义） | A | FDA/NMPA获批用于患者肿瘤治疗有响应或耐药的生物标志物 |
| A | 专业指南明确对患者肿瘤治疗有响应或耐药的生物标志物 |
| A | 专业指南明确对患者肿瘤有诊断或预后意义的生物标志物 |
| B | 专家共识或III/IV期临床试验研究明确对患者肿瘤治疗有响应或耐药的生物标志物 |
| B | 专家共识或III/IV期临床试验研究明确对患者肿瘤有诊断或预后意义的生物标志物 |
| II类变异  （潜在临床意义） | C | FDA/NMPA获批用于其他肿瘤治疗有响应或耐药的生物标志物 |
| C | 专业指南推荐对其他肿瘤治疗有响应或耐药的生物标志物 |
| C | 已经作为临床试验筛选入组标准的生物标志物 |
| C | 多项小型研究（I/II期临床试验）结果表明有诊断或预后意义的生物标志物 |
| D | 临床前硏究表明具有潜在治疗意义的生物标志物 |
| D | 有病例报道或结论末形成共识，评估疾病诊断或预后意义的生物标志物 |
| III类变异  （临床意义不明变异） | - | 在全人群或特定人群数据库、泛癌种或特定肿瘤数据库中均未观察到较高变异频率 |
| - | 缺乏令人信服的已发表肿瘤相关证据 |
| IV类变异  （良性和可能良性变异） | - | 在全人群或特定人群数据库中观察到高变异频率 |
| - | 无已发表的肿瘤相关证据 |

遗传变异解读遵循美国医学遗传学和基因组学学会（American College of Medical Genetics, ACMG）发布的《遗传变异注释标准与指南》（2015年版），遗传变异分为致病性变异、可能致病性变异、临床意义不明变异、可能良性变异和良性变异五个等级。本产品的胚系变异检测部分只报致病性变异和可能致病性变异，并对其进行详细解读。

## >6.3检测方法与局限性

本产品采用自主知识产权的靶向捕获技术结合Illumina测序平台进行检测。本产品可同时检测目标基因的单核苷酸变异（SNV）、小片段插入/缺失（indel）、拷贝数变异（CNV）以及结构变异（SV）。产品的检测性能与样本质量密切相关，样本质控等级以及某些变异特征会降低检测敏感度。

## >6.4阴性检测结果

对于送检肿瘤样本，不排除出现无基因变异的情况（即没有检测到任何肿瘤相关基因变异）。因为肿瘤生物学机制的复杂性，肿瘤的基因异常可出现在基因组、转录组、蛋白质组和表观遗传等多个层面，因此无基因变异的情况是客观存在的、不能完全避免的。无基因变异并不是完全无用的信息，并不能证明治疗方法有效或无效，基因未发生变异同样能够为临床科研提供参考和帮助。

无基因变异的情况不能排除存在低于现有检测方法检测下限的低丰度变异的可能。我们不承诺所有的检测都能获得肿瘤基因变异信息，同样不承诺肿瘤基因变异信息中一定存在明确的可用药或治疗相关的基因变异。

## >6.5临床方案决定

患者的治疗决策必须基于医生的医学判断，还需要考虑到患者所有可用信息，包括患者病史和家族史、体检、其他的医学检测信息及患者喜好，并遵照医院给出的护理标准。医生的决策不能仅依赖于某一单个检测。本报告不是临床诊断报告，不具备医嘱性质，供医生参考，治疗方案由医生决策。

## >6.6 数据安全与隐私保护

您的个人信息仅样本接收人员公开，在整个检测过程中，您的个人信息将会隐去，每份检测样本仅以条码作为识别，负责样本接收的人员为您的信息保密负责。我们采用多种措施确保检测数据的安全。

|  |  |
| --- | --- |
| **参考文献** |  |

1. 美国国家综合癌症网络（NCCN®） 肿瘤临床实践指南
2. Marilyn M Li , Michael Datto , Eric J Duncavage, et al.( 2017) Standards and Guidelines for the Interpretation and Reporting of Sequence Variants in Cancer: A Joint Consensus Recommendation of the Association for Molecular Pathology, American Society of Clinical Oncology, and College of American Pathologists. The Journal of molecular diagnostics 19(1):4-23.[ PMID: 27993330]

|  |  |
| --- | --- |
| **附录** |  |

**附录1 检测基因列表**

1. 本项目基于杂交捕获的高通量测序法检测559基因DNA和1813基因RNA目标区域范围内的点突变、小片段插入缺失、基因融合、拷贝数变异和基因表达；同时检测白细胞抗原(HLA)分型，微卫星不稳定性（MSI）和化疗药物代谢相关酶类多态性位点，为患者进行靶向药物、免疫治疗药物、化疗药物等的治疗方面进行相关用药指导，同时还可对相关肿瘤遗传易感基因检测，预测相关遗传风险。
2. 本检测项目中使用的参考基因组版本为hg19，报告中的变异命名遵从HGVS指南(http://varnomen.hgvs.org)中的相关规定进行命名。检测突变，插入缺失，CNV，基因融合，基因表达等变异类型的基因列表，同一基因可重复出现。

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **点突变与插入缺失突变的检测基因列表（549基因）** | | | | | | | | | | | | | | | | | |
|  |  | |  |  | |  |  | |  |  |  | |  | | | | |
| ***ABCB1*** | | ***ABL1*** | | | ***ABL2*** | | | ***ACVR1B*** | | ***AKT1*** | | ***AKT2*** | | ***AKT3*** | ***ALK*** | ***ALOX12B*** | ***AMER1*** |
| ***AP3B1*** | | ***APC*** | | | ***APC2*** | | | ***APEX1*** | | ***AR*** | | ***ARAF*** | | ***ARFRP1*** | ***ARID1A*** | ***ARID1B*** | ***ARID2*** |
| ***ARID5B*** | | ***ASXL1*** | | | ***ATM*** | | | ***ATR*** | | ***ATRX*** | | ***AURKA*** | | ***AURKB*** | ***AUTS2*** | ***AXIN1*** | ***AXIN2*** |
| ***AXL*** | | ***B2M*** | | | ***BAP1*** | | | ***BARD1*** | | ***BCL2*** | | ***BCL2L1*** | | ***BCL2L11*** | ***BCL2L2*** | ***BCL6*** | ***BCOR*** |
| ***BCORL1*** | | ***BCR*** | | | ***BIRC3*** | | | ***BLK*** | | ***BLM*** | | ***BMP2*** | | ***BMP4*** | ***BMPR1A*** | ***BRAF*** | ***BRCA1*** |
| ***BRCA2*** | | ***BRD3*** | | | ***BRD4*** | | | ***BRIP1*** | | ***BTG1*** | | ***BTK*** | | ***C11orf30*** | ***C8orf34*** | ***CALR*** | ***CARD11*** |
| ***CASP8*** | | ***CBFB*** | | | ***CBL*** | | | ***CBLB*** | | ***CCND1*** | | ***CCND2*** | | ***CCND3*** | ***CCNE1*** | ***CD274*** | ***CD34*** |
| ***CD44*** | | ***CD79A*** | | | ***CD79B*** | | | ***CD80*** | | ***CD86*** | | ***CDA*** | | ***CDC73*** | ***CDH1*** | ***CDK12*** | ***CDK4*** |
| ***CDK6*** | | ***CDK8*** | | | ***CDKN1A*** | | | ***CDKN1B*** | | ***CDKN2A*** | | ***CDKN2B*** | | ***CDKN2C*** | ***CEBPA*** | ***CHD2*** | ***CHD4*** |
| ***CHEK1*** | | ***CHEK2*** | | | ***CIC*** | | | ***CORO2A*** | | ***CREBBP*** | | ***CRKL*** | | ***CRLF2*** | ***CSF1*** | ***CSF1R*** | ***CSF3R*** |
| ***CTCF*** | | ***CTLA4*** | | | ***CTNNA1*** | | | ***CTNNB1*** | | ***CUL3*** | | ***CXCL8*** | | ***CYLD*** | ***CYP19A1*** | ***CYP2C8*** | ***CYP2D6*** |
| ***DAXX*** | | ***DCUN1D1*** | | | ***DDK1*** | | | ***DDR1*** | | ***DDR2*** | | ***DICER1*** | | ***DIS3*** | ***DKK3*** | ***DNMT1*** | ***DNMT3A*** |
| ***DOT1L*** | | ***DPYD*** | | | ***DYNC2H1*** | | | ***EED*** | | ***EGFR*** | | ***EIF1AX*** | | ***EIF2C1*** | ***EIF4A2*** | ***ENG*** | ***EP300*** |
| ***EPAS1*** | | ***EPCAM*** | | | ***EPHA3*** | | | ***EPHA5*** | | ***EPHA6*** | | ***EPHA7*** | | ***EPHB1*** | ***ERBB2*** | ***ERBB3*** | ***ERBB4*** |
| ***ERCC1*** | | ***ERCC2*** | | | ***ERCC3*** | | | ***ERG*** | | ***ERRFI1*** | | ***ESR1*** | | ***ETS2*** | ***ETV1*** | ***ETV4*** | ***ETV5*** |
| ***EZH2*** | | ***F2R*** | | | ***FAM175A*** | | | ***FAM46C*** | | ***FANCA*** | | ***FANCC*** | | ***FANCD2*** | ***FANCE*** | ***FANCF*** | ***FANCG*** |
| ***FANCI*** | | ***FANCL*** | | | ***FANCM*** | | | ***FAS*** | | ***FAT1*** | | ***FBXW7*** | | ***FCGR2B*** | ***FGF10*** | ***FGF14*** | ***FGF19*** |
| ***FGF23*** | | ***FGF3*** | | | ***FGF4*** | | | ***FGF6*** | | ***FGF7*** | | ***FGFR1*** | | ***FGFR2*** | ***FGFR3*** | ***FGFR4*** | ***FGR*** |
| ***FH*** | | ***FLCN*** | | | ***FLT1*** | | | ***FLT3*** | | ***FLT4*** | | ***FOXA1*** | | ***FOXL2*** | ***FOXO1*** | ***FOXP1*** | ***FRS2*** |
| ***FUBP1*** | | ***FYN*** | | | ***GABRA6*** | | | ***GATA1*** | | ***GATA2*** | | ***GATA3*** | | ***GATA4*** | ***GATA6*** | ***GEN1*** | ***GLI1*** |
| ***GNA11*** | | ***GNA13*** | | | ***GNAQ*** | | | ***GNAS*** | | ***GREM1*** | | ***GRIN2A*** | | ***GRM3*** | ***GSK3B*** | ***GSTP1*** | ***H3F3A*** |
| ***H3F3C*** | | ***HAMP*** | | | ***HAVCR2*** | | | ***HCK*** | | ***HDAC2*** | | ***HGF*** | | ***HIF1A*** | ***HIST1H1C*** | ***HIST1H2BD*** | ***HIST1H3B*** |
| ***HLA-A*** | | ***HLA-B*** | | | ***HLA-C*** | | | ***HNF1A*** | | ***HRAS*** | | ***HSD3B1*** | | ***HSP90AA1*** | ***HSPB1*** | ***ICOS*** | ***ICOSLG*** |
| ***IDH1*** | | ***IDH2*** | | | ***IFNGR1*** | | | ***IFNGR2*** | | ***IGF1*** | | ***IGF1R*** | | ***IGF2*** | ***IKBKE*** | ***IKZF1*** | ***IL13*** |
| ***IL1A*** | | ***IL4*** | | | ***IL6*** | | | ***IL7R*** | | ***INHBA*** | | ***INPP4A*** | | ***INPP4B*** | ***INSR*** | ***IP6K1*** | ***IRF1*** |
| ***IRF2*** | | ***IRF4*** | | | ***IRS2*** | | | ***ITGB2*** | | ***ITGB6*** | | ***JAK1*** | | ***JAK2*** | ***JAK3*** | ***JUN*** | ***KDM5A*** |
| ***KDM5C*** | | ***KDM6A*** | | | ***KDR*** | | | ***KEAP1*** | | ***KEL*** | | ***KIT*** | | ***KLF4*** | ***KLHL6*** | ***KMT2A*** | ***KMT2B*** |
| ***KMT2C*** | | ***KMT2D*** | | | ***KRAS*** | | | ***LAG3*** | | ***LATS1*** | | ***LATS2*** | | ***LCK*** | ***LGALS3*** | ***LIG4*** | ***LIN28B*** |
| ***LMO1*** | | ***LRP1B*** | | | ***LYN*** | | | ***LZTR1*** | | ***MAGI2*** | | ***MAP2K1*** | | ***MAP2K2*** | ***MAP2K4*** | ***MAP3K1*** | ***MAP3K13*** |
| ***MAP3K14*** | | ***MAPK1*** | | | ***MAPK3*** | | | ***MAPK4*** | | ***MAX*** | | ***MCL1*** | | ***MDC1*** | ***MDM2*** | ***MDM4*** | ***MED12*** |
| ***MEF2B*** | | ***MEN1*** | | | ***MET*** | | | ***MGA*** | | ***MGMT*** | | ***MIF*** | | ***MITF*** | ***MKI67*** | ***MLH1*** | ***MLH3*** |
| ***MMP1*** | | ***MMP7*** | | | ***MPL*** | | | ***MPO*** | | ***MRE11*** | | ***MSH2*** | | ***MSH3*** | ***MSH6*** | ***MST1R*** | ***MT2A*** |
| ***MTHFR*** | | ***MTOR*** | | | ***MTRR*** | | | ***MUC16*** | | ***MUC5B*** | | ***MUTYH*** | | ***MYB*** | ***MYC*** | ***MYCL*** | ***MYCN*** |
| ***MYD88*** | | ***MYOD1*** | | | ***NAA11*** | | | ***NBN*** | | ***NCOA3*** | | ***NCOR1*** | | ***NEIL1*** | ***NF1*** | ***NF2*** | ***NFKB1*** |
| ***NFKBIA*** | | ***NKX2-1*** | | | ***NOS2*** | | | ***NOS3*** | | ***NOTCH1*** | | ***NOTCH2*** | | ***NOTCH3*** | ***NOTCH4*** | ***NPM1*** | ***NQO1*** |
| ***NR1I2*** | | ***NRAS*** | | | ***NRF2*** | | | ***NSD1*** | | ***NTRK1*** | | ***NTRK2*** | | ***NTRK3*** | ***NUP93*** | ***OXSR1*** | ***PAK1*** |
| ***PAK3*** | | ***PAK7*** | | | ***PALB2*** | | | ***PAPPA2*** | | ***PARK2*** | | ***PARP1*** | | ***PAX5*** | ***PBRM1*** | ***PDCD1*** | ***PDCD1LG2*** |
| ***PDGFRA*** | | ***PDGFRB*** | | | ***PDK1*** | | | ***PDPK1*** | | ***PEG3*** | | ***PGR*** | | ***PHF6*** | ***PIK3C2B*** | ***PIK3C2G*** | ***PIK3C3*** |
| ***PIK3CA*** | | ***PIK3CB*** | | | ***PIK3CD*** | | | ***PIK3CG*** | | ***PIK3R1*** | | ***PIK3R2*** | | ***PIM1*** | ***PLCG2*** | ***PLK2*** | ***PMS1*** |
| ***PMS2*** | | ***PNRC1*** | | | ***POLD1*** | | | ***POLE*** | | ***POLE4*** | | ***PPARG*** | | ***PPP2R1A*** | ***PPP2R2A*** | ***PRDM1*** | ***PRDX1*** |
| ***PRDX6*** | | ***PREX2*** | | | ***PRKAA1*** | | | ***PRKACA*** | | ***PRKAR1A*** | | ***PRKCI*** | | ***PRKDC*** | ***PRSS8*** | ***PSMD4*** | ***PTCH1*** |
| ***PTEN*** | | ***PTGS2*** | | | ***PTPN11*** | | | ***PTPRD*** | | ***PTTG1*** | | ***PXDNL*** | | ***QKI*** | ***RAC1*** | ***RAD21*** | ***RAD50*** |
| ***RAD51*** | | ***RAD51B*** | | | ***RAD51C*** | | | ***RAD51D*** | | ***RAD52*** | | ***RAD54L*** | | ***RAF1*** | ***RANBP2*** | ***RARA*** | ***RASA1*** |
| ***RASAL1*** | | ***RB1*** | | | ***RBM10*** | | | ***RECQL*** | | ***RECQL4*** | | ***REL*** | | ***RET*** | ***REV3L*** | ***RHEB*** | ***RHOA*** |
| ***RICTOR*** | | ***RIPK4*** | | | ***RIT1*** | | | ***RNASEL*** | | ***RNF43*** | | ***ROBO2*** | | ***ROS1*** | ***RPPH1*** | ***RPS6KB1*** | ***RPS6KB2*** |
| ***RPTOR*** | | ***RSF1*** | | | ***RUNX1*** | | | ***RUNX1T1*** | | ***SCN8A*** | | ***SDHA*** | | ***SDHAF2*** | ***SDHB*** | ***SDHC*** | ***SDHD*** |
| ***SEMA3C*** | | ***SERPINB3*** | | | ***SERPINB4*** | | | ***SERPINE1*** | | ***SETBP1*** | | ***SETD2*** | | ***SF3B1*** | ***SIK1*** | ***SKP2*** | ***SLC28A3*** |
| ***SLC47A1*** | | ***SLCO1B1*** | | | ***SLIT2*** | | | ***SMAD2*** | | ***SMAD3*** | | ***SMAD4*** | | ***SMARCA4*** | ***SMARCB1*** | ***SMARCD1*** | ***SMO*** |
| ***SNCAIP*** | | ***SOCS1*** | | | ***SOD2*** | | | ***SOX10*** | | ***SOX17*** | | ***SOX2*** | | ***SOX9*** | ***SPEN*** | ***SPOP*** | ***SPTA1*** |
| ***SRC*** | | ***SRSF2*** | | | ***STAG2*** | | | ***STAT3*** | | ***STAT4*** | | ***STK11*** | | ***SUFU*** | ***SUZ12*** | ***SYK*** | ***TAF1*** |
| ***TAOK1*** | | ***TBX3*** | | | ***TCF7L1*** | | | ***TCF7L2*** | | ***\*TERT*** | | ***TET1*** | | ***TET2*** | ***TGFB1*** | ***TGFBR2*** | ***TIGIT*** |
| ***TMEM127*** | | ***TNF*** | | | ***TNFAIP3*** | | | ***TNFRSF14*** | | ***TNFRSF18*** | | ***TNFRSF9*** | | ***TOP1*** | ***TOP2A*** | ***TP53*** | ***TPMT*** |
| ***TRAF3*** | | ***TRAF7*** | | | ***TRRAP*** | | | ***TSC1*** | | ***TSC2*** | | ***TSHR*** | | ***TXNRD2*** | ***TYMS*** | ***U2AF1*** | ***UGT1A1*** |
| ***UMPS*** | | ***VEGFA*** | | | ***VHL*** | | | ***WISP3*** | | ***WT1*** | | ***XPC*** | | ***XPO1*** | ***XRCC1*** | ***XRCC2*** | ***XRCC3*** |
| ***XRCC4*** | | ***XRCC5*** | | | ***YES1*** | | | ***ZBTB2*** | | ***ZFHX4*** | | ***ZNF217*** | | ***ZNF703*** | ***ZNRF3*** | ***ZRSR2*** |  |

**注：**\*，同时检测启动子区域的基因。

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **CNV检测基因列表（28基因）** | | | | | | | | | |
|  | | | | | | | | | |
| ***AKT2*** | ***AKT3*** | ***AURKA*** | ***CCND1*** | ***CCNE1*** | ***CD274*** | ***CDK4*** | ***CDK6*** | ***EGFR*** | ***ERBB2*** |
| ***FGF19*** | ***FGF3*** | ***FGFR1*** | ***FGFR2*** | ***FGFR3*** | ***IGF1R*** | ***MAPK1*** | ***MET*** | ***MYC*** | ***NTRK3*** |
| ***PDCD1*** | ***PDGFRA*** | ***PGR*** | ***PIK3CA*** | ***RET*** | ***RICTOR*** | ***SMO*** | ***TOP2A*** |  |  |

**注：**当样本肿瘤细胞含量低于20%时，本产品不做CNV检测。

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **重排变异检测基因列表（30基因，DNA/RNA共检）** | | | | | | | | | |
|  | | | | | | | | | |
| ***ALK*** | ***AR-*** | ***BRAF*** | ***CD74*** | ***CLDN18*** | ***EGFR*** | ***ERBB2*** | ***ESR1*** | ***ETV6*** | ***EWSR1*** |
| ***FGFR1*** | ***FGFR2*** | ***FGFR3*** | ***FGFR4*** | ***FUS*** | ***MET*** | ***NCOA2*** | ***NR4A3*** | ***NRG1*** | ***NTRK1*** |
| ***NTRK2*** | ***NTRK3*** | ***PAX8*** | ***RET*** | ***ROS1*** | ***SDC4*** | ***SS18*** | ***STAT6*** | ***TFE3*** | ***TMPRSS2*** |

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **遗传性肿瘤易感基因检测列表（88基因）** | | | | | | | | | |
|  | | | | | | | | | |
| ***ALK*** | ***APC*** | ***ATM*** | ***ATR*** | ***AXIN2*** | ***BAP1*** | ***BARD1*** | ***BLM*** | ***BMPR1A*** | ***BRAF*** |
| ***BRCA1*** | ***BRCA2*** | ***BRIP1*** | ***CDC73*** | ***CDH1*** | ***CDK12*** | ***CDK4*** | ***CDKN1B*** | ***CDKN2A*** | ***CEBPA*** |
| ***CHEK2*** | ***CHEK1*** | ***EPCAM*** | ***CTNNA1*** | ***DICER1*** | ***EGFR*** | ***ENG*** | ***FAM175A*** | ***FANCA*** | ***FH*** |
| ***FANCI*** | ***FANCL*** | ***FLCN*** | ***GEN1*** | ***GREM1*** | ***GATA2*** | ***MET*** | ***MLH1*** | ***MSH2*** | ***HRAS*** |
| ***KIT*** | ***MAX*** | ***MSH3*** | ***MEN1*** | ***MSH6*** | ***MITF*** | ***MUTYH*** | ***MLH3*** | ***NBN*** | ***NF1*** |
| ***PALB2*** | ***PMS2*** | ***POLD1*** | ***POLE*** | ***PTEN*** | ***NF2*** | ***RAD51C*** | ***RAD51D*** | ***RNF43*** | ***PDGFRA*** |
| ***SDHA*** | ***SDHB*** | ***SDHC*** | ***PPP2R2A*** | ***PRKAR1A*** | ***SDHD*** | ***PTCH1*** | ***SMAD4*** | ***RAD50*** | ***RAD51B*** |
| ***STK11*** | ***TP53*** | ***RAD54L*** | ***RB1*** | ***RECQL*** | ***RECQL4*** | ***RET*** | ***TSC1*** | ***TSC2*** | ***VHL*** |
| ***RUNX1*** | ***SDHAF2*** | ***SMARCA4*** | ***SMARCB1*** | ***SUFU*** | ***TERT*** | ***TMEM127*** | ***WT1*** |  |  |

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **RNA表达基因检测列表（1806基因）** | | | | | | | | | |
|  | | | | | | | | | |
| ***A2M*** | ***ABCB1*** | ***\*ABCF1*** | ***ABL1*** | ***ACAD9*** | ***ACAN*** | ***\*ACTB*** | ***ACTG1*** | ***ACTL6A*** | ***ACTL6B*** |
| ***ACVR1B*** | ***ACVR1C*** | ***ACVR2A*** | ***ADA*** | ***ADAM12*** | ***ADGRE2*** | ***ADGRE5*** | ***ADORA2A*** | ***AFDN*** | ***\*AGK*** |
| ***AICDA*** | ***AIF1*** | ***AIRE*** | ***AKR1C3*** | ***AKT1*** | ***AKT2*** | ***\*AKT3*** | ***\*ALAS1*** | ***ALCAM*** | ***ALK*** |
| ***ALKBH2*** | ***ALKBH3*** | ***ALOX15B*** | ***AMBP*** | ***AMER1*** | ***AMH*** | ***\*AMMECR1L*** | ***ANGPT1*** | ***ANP32B*** | ***ANXA1*** |
| ***APAF1*** | ***APBB1*** | ***APC*** | ***APC2*** | ***APH1B*** | ***APOE*** | ***APP*** | ***APPL1*** | ***AR*** | ***ARAF*** |
| ***AREG*** | ***\*ARF1*** | ***ARG1*** | ***ARG2*** | ***ARHGEF6*** | ***ARID1A*** | ***ARID1B*** | ***ARID2*** | ***ARMH3*** | ***ARNT*** |
| ***ARNT2*** | ***ASXL1*** | ***ATF1*** | ***ATF2*** | ***ATF4*** | ***ATG10*** | ***ATG12*** | ***ATG16L1*** | ***ATG5*** | ***ATG7*** |
| ***ATM*** | ***ATP5F1E*** | ***ATR*** | ***ATRX*** | ***AURKA*** | ***AXIN1*** | ***AXIN2*** | ***AXL*** | ***AZGP1*** | ***B2M*** |
| ***B3GAT1*** | ***BACH2*** | ***BAD*** | ***BAG1*** | ***BAIAP3*** | ***BAK1*** | ***BAMBI*** | ***BAP1*** | ***BATF*** | ***BAX*** |
| ***BBC3*** | ***BCAT1*** | ***BCL10*** | ***BCL2*** | ***BCL2A1*** | ***BCL2L1*** | ***BCL2L11*** | ***BCL3*** | ***BCL6*** | ***BCOR*** |
| ***BCR*** | ***BDNF*** | ***BGN*** | ***BID*** | ***BIRC2*** | ***BIRC3*** | ***BIRC5*** | ***BIRC7*** | ***BLK*** | ***BLNK*** |
| ***BMI1*** | ***BMP2*** | ***BMP4*** | ***BMP5*** | ***BMP6*** | ***BMP7*** | ***BMP8A*** | ***BMPR1B*** | ***BNIP3*** | ***BRAF*** |
| ***BRCA1*** | ***BRCA2*** | ***BRD7*** | ***BRIP1*** | ***BST1*** | ***BST2*** | ***BTK*** | ***BTLA*** | ***BUB1*** | ***BUB1B-PAK6*** |
| ***C1QA*** | ***C1QB*** | ***C1QBP*** | ***C1R*** | ***C1S*** | ***C2*** | ***C2CD5*** | ***C3*** | ***C3AR1*** | ***C4B*** |
| ***C4BPA*** | ***C5*** | ***C6*** | ***C7*** | ***C8A*** | ***C8B*** | ***C8G*** | ***C9*** | ***CA4*** | ***CACNA1C*** |
| ***CACNA1D*** | ***CACNA1E*** | ***CACNA1G*** | ***CACNA1H*** | ***CACNA2D1*** | ***CACNA2D2*** | ***CACNA2D3*** | ***CACNA2D4*** | ***CACNB2*** | ***CACNB3*** |
| ***CACNB4*** | ***CACNG1*** | ***CACNG4*** | ***CACNG6*** | ***CALM1*** | ***CALM2*** | ***CALM3*** | ***CALML3*** | ***CALML4*** | ***CALML5*** |
| ***CALML6*** | ***CAMK1*** | ***CAMK1D*** | ***CAMK1G*** | ***CAMK2A*** | ***CAMK2B*** | ***CAMK2D*** | ***CAMK2G*** | ***CAMK4*** | ***CAMP*** |
| ***CAPN2*** | ***CARD11*** | ***CARD9*** | ***CASP1*** | ***CASP10*** | ***CASP12*** | ***CASP3*** | ***CASP7*** | ***CASP8*** | ***CASP9*** |
| ***CBL*** | ***CBLB*** | ***CBLC*** | ***\*CC2D1B*** | ***CCDC6*** | ***CCL1*** | ***CCL11*** | ***CCL13*** | ***CCL14*** | ***CCL15*** |
| ***CCL16*** | ***CCL17*** | ***CCL18*** | ***CCL19*** | ***CCL2*** | ***CCL20*** | ***CCL21*** | ***CCL22*** | ***CCL23*** | ***CCL24*** |
| ***CCL25*** | ***CCL26*** | ***CCL27*** | ***CCL28*** | ***CCL3*** | ***CCL3L1*** | ***CCL4*** | ***CCL5*** | ***CCL7*** | ***CCL8*** |
| ***CCNA1*** | ***CCNA2*** | ***CCNB1*** | ***CCNB2*** | ***CCNB3*** | ***CCND1*** | ***CCND2*** | ***CCND3*** | ***CCNE1*** | ***CCNE2*** |
| ***CCNO*** | ***CCR1*** | ***CCR2*** | ***CCR3*** | ***CCR4*** | ***CCR5*** | ***CCR6*** | ***CCR7*** | ***CCR9*** | ***CCRL2*** |
| ***CD101*** | ***CD14*** | ***CD160*** | ***CD163*** | ***CD164*** | ***CD180*** | ***CD19*** | ***CD1A*** | ***CD1B*** | ***CD1C*** |
| ***CD1D*** | ***CD1E*** | ***\*CD2*** | ***CD200*** | ***CD207*** | ***CD209*** | ***CD22*** | ***CD226*** | ***CD24*** | ***CD244*** |
| ***CD247*** | ***CD27*** | ***CD274*** | ***CD276*** | ***CD28*** | ***CD33*** | ***CD34*** | ***CD36*** | ***CD37*** | ***CD38*** |
| ***CD3D*** | ***CD3E*** | ***CD3EAP*** | ***CD3G*** | ***CD4*** | ***CD40*** | ***CD40LG*** | ***CD44*** | ***CD46*** | ***CD47*** |
| ***CD48*** | ***CD5*** | ***CD52*** | ***CD53*** | ***CD55*** | ***CD58*** | ***CD59*** | ***CD6*** | ***CD63*** | ***CD68*** |
| ***CD69*** | ***CD7*** | ***CD70*** | ***CD74*** | ***CD79A*** | ***CD79B*** | ***CD80*** | ***CD81*** | ***CD83*** | ***CD84*** |
| ***CD86*** | ***CD8A*** | ***CD8B*** | ***CD9*** | ***CD96*** | ***CD99*** | ***CDC14A*** | ***CDC14B*** | ***CDC25A*** | ***CDC25B*** |
| ***CDC25C*** | ***CDC42*** | ***CDC6*** | ***CDC7*** | ***CDH1*** | ***CDH17*** | ***CDH5*** | ***CDK1*** | ***CDK2*** | ***CDK4*** |
| ***CDK6*** | ***CDKN1A*** | ***CDKN1B*** | ***CDKN1C*** | ***CDKN2A*** | ***CDKN2B*** | ***CDKN2C*** | ***CDKN2D*** | ***CDKN3*** | ***CDX2*** |
| ***CEACAM1*** | ***CEACAM6*** | ***CEACAM8*** | ***CEBPA*** | ***CEBPB*** | ***CEBPE*** | ***CFB*** | ***CFD*** | ***CFI*** | ***CFL1*** |
| ***CFP*** | ***CHAD*** | ***CHEK1*** | ***CHEK2*** | ***CHIT1*** | ***CHUK*** | ***CIC*** | ***CIITA*** | ***CKLF*** | ***CKS1B*** |
| ***CKS2*** | ***CLCF1*** | ***CLEC10A*** | ***CLEC4A*** | ***CLEC4C*** | ***CLEC5A*** | ***CLEC6A*** | ***CLEC7A*** | ***CLTC*** | ***CLU*** |
| ***CMA1*** | ***CMKLR1*** | ***\*CNOT10*** | ***\*CNOT4*** | ***CNTFR*** | ***\*COG7*** | ***COL11A1*** | ***COL11A2*** | ***COL1A1*** | ***COL1A2*** |
| ***COL24A1*** | ***COL27A1*** | ***COL2A1*** | ***COL3A1*** | ***COL4A1*** | ***COL4A2*** | ***COL4A3*** | ***COL4A4*** | ***COL4A5*** | ***COL4A6*** |
| ***COL5A1*** | ***COL5A2*** | ***COL6A3*** | ***COL6A6*** | ***COLEC12*** | ***COMP*** | ***CORO1A*** | ***CR1*** | ***CR2*** | ***CREB1*** |
| ***CREB3*** | ***CREB3L1*** | ***CREB3L2*** | ***CREB3L3*** | ***CREB3L4*** | ***CREB5*** | ***CREBBP*** | ***CRK*** | ***CRKL*** | ***CRLF2*** |
| ***CRP*** | ***CRTAM*** | ***CSF1*** | ***CSF1R*** | ***CSF2*** | ***CSF2RB*** | ***CSF3*** | ***CSF3R*** | ***CSNK1A1*** | ***CSNK1A1L*** |
| ***CT45A1*** | ***CTAG1B*** | ***CTAG2*** | ***CTAGE1*** | ***CTBP1*** | ***CTBP2*** | ***CTCFL*** | ***CTLA4*** | ***CTNNA1*** | ***CTNNA2*** |
| ***CTNNA3*** | ***CTNNB1*** | ***CTSG*** | ***CTSH*** | ***CTSL*** | ***CTSS*** | ***CTSV*** | ***CTSW*** | ***CUL1*** | ***CUL2*** |
| ***CUL3*** | ***CX3CL1*** | ***CX3CR1*** | ***CXCL1*** | ***CXCL10*** | ***CXCL11*** | ***CXCL12*** | ***CXCL13*** | ***CXCL14*** | ***CXCL16*** |
| ***CXCL2*** | ***CXCL3*** | ***CXCL5*** | ***CXCL6*** | ***CXCL8*** | ***CXCL9*** | ***CXCR1*** | ***CXCR2*** | ***CXCR3*** | ***CXCR4*** |
| ***CXCR5*** | ***CXCR6*** | ***CXXC4*** | ***CYBB*** | ***CYCS*** | ***CYFIP2*** | ***CYLD*** | ***CYP2D6*** | ***DAPK1*** | ***DAPK2*** |
| ***DAPK3*** | ***DAXX*** | ***DCC*** | ***DDB2*** | ***DDIT3*** | ***DDIT4*** | ***DDX43*** | ***\*DDX50*** | ***DDX58*** | ***DEFB1*** |
| ***DGAT2*** | ***\*DHX16*** | ***DKK1*** | ***DKK2*** | ***DKK4*** | ***DLL1*** | ***DLL3*** | ***DLL4*** | ***DLX2*** | ***DMBT1*** |
| ***\*DNAJC14*** | ***DNMT1*** | ***DNMT3A*** | ***DOCK9*** | ***DPF1*** | ***DPF3*** | ***DPP4*** | ***DTX1*** | ***DTX3*** | ***DTX4*** |
| ***DUSP10*** | ***DUSP2*** | ***DUSP4*** | ***DUSP5*** | ***DUSP6*** | ***DUSP8*** | ***DVL1*** | ***DVL2*** | ***DVL3*** | ***E2F1*** |
| ***E2F2*** | ***E2F3*** | ***E2F5*** | ***EBI3*** | ***ECSIT*** | ***\*EDC3*** | ***EFNA1*** | ***EFNA2*** | ***EFNA3*** | ***EFNA4*** |
| ***EFNA5*** | ***EGF*** | ***EGFR*** | ***EGLN1*** | ***EGLN2*** | ***EGLN3*** | ***EGR1*** | ***EGR2*** | ***EGR3*** | ***EIF2AK2*** |
| ***\*EIF2B4*** | ***EIF4EBP1*** | ***ELANE*** | ***ELAVL4*** | ***ELK1*** | ***ELOB*** | ***ELOC*** | ***EML4*** | ***ENDOG*** | ***ENG*** |
| ***ENTPD1*** | ***EOMES*** | ***EP300*** | ***EPAS1*** | ***EPCAM*** | ***EPHA2*** | ***EPO*** | ***EPOR*** | ***ERBB2*** | ***ERCC1*** |
| ***ERCC2*** | ***\*ERCC3*** | ***ERCC4*** | ***ERCC5*** | ***ERCC6*** | ***EREG*** | ***ERG*** | ***ESR1*** | ***ESR2*** | ***ETS1*** |
| ***ETS2*** | ***ETV1*** | ***ETV4*** | ***ETV5*** | ***ETV7*** | ***EWSR1*** | ***EYA1*** | ***EZH2*** | ***F12*** | ***F13A1*** |
| ***F2RL1*** | ***FAAP24*** | ***FADD*** | ***FAM13C*** | ***FANCA*** | ***FANCB*** | ***FANCC*** | ***FANCD2*** | ***FANCE*** | ***FANCF*** |
| ***FANCG*** | ***FANCL*** | ***FAP*** | ***FAS*** | ***FASLG*** | ***\*FAU*** | ***FBXW7*** | ***FCER1A*** | ***FCER1G*** | ***FCER2*** |
| ***\*FCF1*** | ***FCGR1A*** | ***FCGR2A*** | ***FCGR2B*** | ***FCGR3A*** | ***FCGR3B*** | ***FCRLA*** | ***FEN1*** | ***FEZ1*** | ***FGF1*** |
| ***FGF10*** | ***FGF11*** | ***FGF12*** | ***FGF13*** | ***FGF14*** | ***FGF16*** | ***FGF17*** | ***FGF18*** | ***FGF19*** | ***FGF2*** |
| ***FGF20*** | ***FGF21*** | ***FGF22*** | ***FGF23*** | ***FGF3*** | ***FGF4*** | ***FGF5*** | ***FGF6*** | ***FGF7*** | ***FGF8*** |
| ***FGF9*** | ***FGFR1*** | ***FGFR2*** | ***FGFR3*** | ***FGFR4*** | ***FH*** | ***FHIT*** | ***FLCN*** | ***FLNA*** | ***FLNC*** |
| ***FLT1*** | ***FLT3*** | ***FLT3LG*** | ***FLT4*** | ***FN1*** | ***FOS*** | ***FOSL1*** | ***FOXJ1*** | ***FOXL2*** | ***FOXM1*** |
| ***FOXO1*** | ***FOXO3*** | ***FOXO4*** | ***FOXP3*** | ***FPR2*** | ***FRAT1*** | ***FRAT2*** | ***FST*** | ***FUBP1*** | ***FUT4*** |
| ***FUT5*** | ***FUT7*** | ***FUT8*** | ***FYB1*** | ***FYN*** | ***FZD1*** | ***FZD10*** | ***FZD2*** | ***FZD3*** | ***FZD4*** |
| ***FZD5*** | ***FZD6*** | ***FZD7*** | ***FZD8*** | ***FZD9*** | ***\*G6PD*** | ***GAB1*** | ***GAB2*** | ***GADD45A*** | ***GADD45B*** |
| ***GADD45G*** | ***GADD45GIP1*** | ***GAGE1*** | ***GAGE10*** | ***GAGE12F*** | ***GAGE12I*** | ***GAGE12J*** | ***GAGE13*** | ***GAGE2A*** | ***GAGE2C*** |
| ***GAGE2E*** | ***GAPDH*** | ***GAS1*** | ***GATA1*** | ***GATA2*** | ***GATA3*** | ***GBP1*** | ***GDF6*** | ***GHR*** | ***GLI1*** |
| ***GLI2*** | ***GLI3*** | ***GLS*** | ***GNA11*** | ***GNAQ*** | ***GNAS*** | ***GNG12*** | ***GNG4*** | ***GNG7*** | ***GNGT1*** |
| ***GNLY*** | ***\*GPATCH3*** | ***GPC4*** | ***GPI*** | ***GPR18*** | ***GPS1*** | ***GRAP2*** | ***GRB2*** | ***GRB7*** | ***GRIA3*** |
| ***GRIN1*** | ***GRIN2A*** | ***GRIN2B*** | ***GSK3B*** | ***GSN*** | ***GSTA1*** | ***GSTA2*** | ***GSTA3*** | ***GSTA4*** | ***GSTA5*** |
| ***GSTM1*** | ***GSTM2*** | ***GSTM3*** | ***GSTM4*** | ***GSTM5*** | ***GSTO1*** | ***GSTO2*** | ***GSTP1*** | ***GSTT1*** | ***GSTT2*** |
| ***GSTT2B*** | ***GTF2H3*** | ***GTF3C1*** | ***\*GUSB*** | ***GZMA*** | ***GZMB*** | ***GZMH*** | ***GZMK*** | ***GZMM*** | ***H2AX*** |
| ***H3-3A*** | ***H3-5*** | ***H3C10*** | ***H3C2*** | ***H3C8*** | ***HAMP*** | ***HAVCR2*** | ***HBEGF*** | ***HCK*** | ***HDAC1*** |
| ***HDAC10*** | ***HDAC11*** | ***HDAC2*** | ***\*HDAC3*** | ***HDAC4*** | ***HDAC5*** | ***HDAC6*** | ***HELLS*** | ***HERC6*** | ***HES1*** |
| ***HES5*** | ***HEY1*** | ***HEY2*** | ***HEYL*** | ***HGF*** | ***HHEX*** | ***HHIP*** | ***HIF1A*** | ***HLA-A*** | ***HLA-B*** |
| ***HLA-C*** | ***HLA-DMA*** | ***HLA-DMB*** | ***HLA-DOA*** | ***HLA-DOB*** | ***HLA-DPA1*** | ***HLA-DPB1*** | ***HLA-DQA1*** | ***HLA-DQA2*** | ***HLA-DQB1*** |
| ***HLA-DQB2*** | ***HLA-DRA*** | ***HLA-DRB1*** | ***HLA-DRB3*** | ***HLA-DRB4*** | ***HLA-E*** | ***HLA-F*** | ***HLA-F-AS1*** | ***HLA-G*** | ***\*HMBS*** |
| ***HMGA1*** | ***HMGA2*** | ***HMGB1*** | ***HMOX1*** | ***HNF1A*** | ***\*HNRNPL*** | ***HOXA10*** | ***HOXA11*** | ***HOXA9*** | ***HPGD*** |
| ***\*HPRT1*** | ***HRAS*** | ***HSD11B1*** | ***HSP90AA1*** | ***HSP90AB1*** | ***HSP90B1*** | ***HSPA1A*** | ***HSPA2*** | ***HSPA6*** | ***HSPB1*** |
| ***IBSP*** | ***ICAM1*** | ***ICAM2*** | ***ICAM3*** | ***ICAM4*** | ***ICOS*** | ***ICOSLG*** | ***ID1*** | ***ID2*** | ***ID3*** |
| ***ID4*** | ***IDH1*** | ***IDH2*** | ***IDO1*** | ***IDO2*** | ***IFI16*** | ***IFI27*** | ***IFI35*** | ***IFI44L*** | ***IFI6*** |
| ***IFIH1*** | ***IFIT1*** | ***IFIT2*** | ***IFIT3*** | ***IFITM1*** | ***IFITM2*** | ***IFNA1*** | ***IFNA17*** | ***IFNA2*** | ***IFNA7*** |
| ***IFNA8*** | ***IFNAR1*** | ***IFNAR2*** | ***IFNB1*** | ***IFNG*** | ***IFNGR1*** | ***IFNL1*** | ***IFNL2*** | ***IGF1*** | ***IGF1R*** |
| ***IGF2*** | ***IGF2R*** | ***IGFBP3*** | ***IGLL1*** | ***IGSF6*** | ***IKBKB*** | ***IKBKE*** | ***IKBKG*** | ***IKZF1*** | ***IKZF2*** |
| ***IKZF3*** | ***IKZF4*** | ***IL10*** | ***IL10RA*** | ***IL11*** | ***IL11RA*** | ***IL12A*** | ***IL12B*** | ***IL12RB1*** | ***IL12RB2*** |
| ***IL13*** | ***IL13RA1*** | ***IL13RA2*** | ***IL15*** | ***IL15RA*** | ***IL16*** | ***IL17A*** | ***IL17B*** | ***IL17F*** | ***IL17RA*** |
| ***IL17RB*** | ***IL18*** | ***IL18R1*** | ***IL18RAP*** | ***IL19*** | ***IL1A*** | ***IL1B*** | ***IL1R1*** | ***IL1R2*** | ***IL1RAP*** |
| ***IL1RAPL2*** | ***IL1RL1*** | ***IL1RL2*** | ***IL1RN*** | ***IL2*** | ***IL20RA*** | ***IL20RB*** | ***IL21*** | ***IL21R*** | ***IL22*** |
| ***IL22RA1*** | ***IL22RA2*** | ***IL23A*** | ***IL23R*** | ***IL24*** | ***IL25*** | ***IL26*** | ***IL27*** | ***IL2RA*** | ***IL2RB*** |
| ***IL2RG*** | ***IL3*** | ***IL32*** | ***IL34*** | ***IL3RA*** | ***IL4*** | ***IL4R*** | ***IL5*** | ***IL5RA*** | ***IL6*** |
| ***IL6R*** | ***IL6ST*** | ***IL7*** | ***IL7R*** | ***IL9*** | ***ILF3*** | ***ILK*** | ***ING4*** | ***INHBA*** | ***INHBB*** |
| ***INPP5D*** | ***INS*** | ***INSRR*** | ***IRAK1*** | ***IRAK2*** | ***IRAK3*** | ***IRAK4*** | ***IRF1*** | ***IRF2*** | ***IRF3*** |
| ***IRF4*** | ***IRF5*** | ***IRF7*** | ***IRF8*** | ***IRF9*** | ***IRGM*** | ***IRS1*** | ***ISG15*** | ***ISG20*** | ***ITCH*** |
| ***ITGA1*** | ***ITGA2*** | ***ITGA2B*** | ***ITGA3*** | ***ITGA4*** | ***ITGA5*** | ***ITGA6*** | ***ITGA7*** | ***ITGA8*** | ***ITGA9*** |
| ***ITGAE*** | ***ITGAL*** | ***ITGAM*** | ***ITGAV*** | ***ITGAX*** | ***ITGB1*** | ***ITGB2*** | ***ITGB3*** | ***ITGB4*** | ***ITGB6*** |
| ***ITGB7*** | ***ITGB8*** | ***ITK*** | ***JAG1*** | ***JAG2*** | ***JAK1*** | ***JAK2*** | ***JAK3*** | ***JAM3*** | ***JAML*** |
| ***JCHAIN*** | ***JUN*** | ***JUP*** | ***KAT2B*** | ***KDM5C*** | ***KDM6A*** | ***KDR*** | ***KEAP1*** | ***KIF7*** | ***KIR2DL1*** |
| ***KIR2DL2*** | ***KIR2DL3*** | ***KIR3DL1*** | ***KIR3DL2*** | ***KIR3DL3*** | ***KIR3DS1*** | ***KIT*** | ***KITLG*** | ***KLF2*** | ***KLF4*** |
| ***KLK2*** | ***KLK3*** | ***KLRB1*** | ***KLRC1*** | ***KLRC2*** | ***KLRD1*** | ***KLRF1*** | ***KLRG1*** | ***KLRK1*** | ***KMT2C*** |
| ***KMT2D*** | ***KRAS*** | ***KREMEN1*** | ***KRT5*** | ***KRT7*** | ***LAG3*** | ***LAIR2*** | ***LAMA1*** | ***LAMA2*** | ***LAMA3*** |
| ***LAMA4*** | ***LAMA5*** | ***LAMB1*** | ***LAMB2*** | ***LAMB3*** | ***LAMB4*** | ***LAMC1*** | ***LAMC2*** | ***LAMC3*** | ***LAMP1*** |
| ***LAMP2*** | ***LAMP3*** | ***LAPTM5*** | ***LAT*** | ***LBP*** | ***LCK*** | ***LCN2*** | ***LCP1*** | ***LEF1*** | ***LEFTY1*** |
| ***LEFTY2*** | ***LEP*** | ***LEPR*** | ***LEXM*** | ***LFNG*** | ***LGALS3*** | ***LHX3*** | ***LIF*** | ***LIFR*** | ***LIG1*** |
| ***LIG3*** | ***LIG4*** | ***LILRA1*** | ***LILRA4*** | ***LILRA5*** | ***LILRB1*** | ***LILRB2*** | ***LILRB3*** | ***\*LMNA*** | ***LRG1*** |
| ***\*LRP1*** | ***LRP2*** | ***LRP5*** | ***LRP6*** | ***LRRN3*** | ***LST1*** | ***LTA*** | ***LTB*** | ***LTBP1*** | ***LTBR*** |
| ***LTF*** | ***LTK*** | ***LY86*** | ***LY9*** | ***LY96*** | ***LYN*** | ***LYZ*** | ***M6PR*** | ***MAD2L1*** | ***MAD2L2*** |
| ***MADCAM1*** | ***MAF*** | ***MAGEA1*** | ***MAGEA10*** | ***MAGEA12*** | ***MAGEA3*** | ***MAGEA4*** | ***MAGEB2*** | ***MAGEC1*** | ***MAGEC2*** |
| ***MALT1*** | ***MAML2*** | ***MAP2K1*** | ***MAP2K2*** | ***MAP2K4*** | ***MAP2K6*** | ***MAP3K1*** | ***MAP3K12*** | ***MAP3K13*** | ***MAP3K14*** |
| ***MAP3K20*** | ***MAP3K5*** | ***MAP3K7*** | ***MAP3K8*** | ***MAP4K2*** | ***MAPK1*** | ***MAPK10*** | ***MAPK11*** | ***MAPK12*** | ***MAPK14*** |
| ***MAPK3*** | ***MAPK8*** | ***MAPK8IP1*** | ***MAPK8IP2*** | ***MAPK9*** | ***MAPKAPK2*** | ***MAPT*** | ***MARCKS*** | ***MARCO*** | ***MASP1*** |
| ***MASP2*** | ***MAVS*** | ***MAX*** | ***MBL2*** | ***MCAM*** | ***MCL1*** | ***MCM2*** | ***MCM4*** | ***MCM5*** | ***MCM7*** |
| ***MDC1*** | ***MDM2*** | ***MECOM*** | ***MED12*** | ***MEF2C*** | ***MEFV*** | ***MELK*** | ***MEN1*** | ***MERTK*** | ***MET*** |
| ***MFGE8*** | ***MFNG*** | ***MGMT*** | ***MGST1*** | ***MGST2*** | ***MGST3*** | ***MICA*** | ***MICB*** | ***MIF*** | ***MITF*** |
| ***MKI67*** | ***MLANA*** | ***MLF1*** | ***MLH1*** | ***MLLT3*** | ***MME*** | ***MMP1*** | ***MMP11*** | ***MMP2*** | ***MMP3*** |
| ***MMP7*** | ***MMP9*** | ***MNAT1*** | ***MNX1*** | ***MPL*** | ***MPO*** | ***MPPED1*** | ***MR1*** | ***MRC1*** | ***MRE11*** |
| ***MRM2*** | ***\*MRPS5*** | ***MS4A1*** | ***MS4A2*** | ***MSH2*** | ***MSH3*** | ***MSH6*** | ***MSR1*** | ***MST1R*** | ***\*MTMR14*** |
| ***MTOR*** | ***MTRR*** | ***MUC1*** | ***MUC2*** | ***MUTYH*** | ***MX1*** | ***MYB*** | ***MYBL2*** | ***MYC*** | ***MYCN*** |
| ***MYD88*** | ***NASP*** | ***NBN*** | ***NCAM1*** | ***NCF1*** | ***NCF4*** | ***NCL*** | ***NCOA1*** | ***NCOA3*** | ***NCOA4*** |
| ***NCOR1*** | ***NCR1*** | ***NCR3*** | ***NECTIN2*** | ***NEFL*** | ***NF1*** | ***NF2*** | ***NFATC1*** | ***NFATC2*** | ***NFATC3*** |
| ***NFATC4*** | ***NFE2L2*** | ***NFKB1*** | ***NFKB2*** | ***NFKBIA*** | ***NFKBIZ*** | ***NGF*** | ***NGFR*** | ***NKD1*** | ***NKG7*** |
| ***NKX3-1*** | ***NLRC5*** | ***NLRP3*** | ***NOD1*** | ***NOD2*** | ***NODAL*** | ***NOG*** | ***\*NOL7*** | ***NOS2*** | ***NOS3*** |
| ***NOTCH1*** | ***NOTCH2*** | ***NOTCH3*** | ***NOTCH4*** | ***NPM1*** | ***NPM2*** | ***NQO1*** | ***NR4A1*** | ***NR4A3*** | ***NRAS*** |
| ***NRP1*** | ***NSD1*** | ***NSD2*** | ***NSD3*** | ***NT5E*** | ***NTF3*** | ***NTHL1*** | ***NTN3*** | ***NTRK1*** | ***NTRK2*** |
| ***\*NUBP1*** | ***NUMB*** | ***NUMBL*** | ***NUP107*** | ***NUPR1*** | ***OAS1*** | ***OAS2*** | ***OAS3*** | ***\*OAZ1*** | ***OLFML2B*** |
| ***OSM*** | ***PAK1*** | ***PAK2*** | ***PAK3*** | ***PAK4*** | ***PAK5*** | ***PAK6*** | ***PARG*** | ***PARP2*** | ***PASD1*** |
| ***PAX3*** | ***PAX5*** | ***PAX8*** | ***PBK*** | ***PBRM1*** | ***PBX1*** | ***PBX3*** | ***\*PCBP1*** | ***PCK1*** | ***PCLAF*** |
| ***PCNA*** | ***PDCD1*** | ***PDCD1LG2*** | ***PDGFA*** | ***PDGFB*** | ***PDGFC*** | ***PDGFD*** | ***PDGFRA*** | ***PDGFRB*** | ***PDK1*** |
| ***PDPK1*** | ***PECAM1*** | ***PER2*** | ***PGF*** | ***PGK1*** | ***PGR*** | ***PHF10*** | ***PHF6*** | ***PIAS1*** | ***PIK3CA*** |
| ***PIK3CB*** | ***PIK3CD*** | ***PIK3CG*** | ***PIK3R1*** | ***PIK3R2*** | ***PIK3R3*** | ***PIK3R4*** | ***PIK3R5*** | ***PIM1*** | ***PIM2*** |
| ***PIN1*** | ***PITX2*** | ***PKM*** | ***PKMYT1*** | ***PLA1A*** | ***PLA2G10*** | ***PLA2G1B*** | ***PLA2G2A*** | ***PLA2G3*** | ***PLA2G4A*** |
| ***PLA2G4C*** | ***PLA2G4E*** | ***PLA2G4F*** | ***PLA2G5*** | ***PLA2G6*** | ***PLAT*** | ***PLAU*** | ***PLAUR*** | ***PLCB1*** | ***PLCB4*** |
| ***PLCE1*** | ***PLCG1*** | ***PLCG2*** | ***PLD1*** | ***PLD2*** | ***PMAIP1*** | ***PMCH*** | ***PMEL*** | ***PML*** | ***PMS2*** |
| ***PNKP*** | ***PNMA1*** | ***POLB*** | ***POLD1*** | ***POLD4*** | ***POLE2*** | ***POLK*** | ***\*POLR2A*** | ***POLR2D*** | ***POLR2H*** |
| ***POLR2J*** | ***POU2AF1*** | ***POU2F2*** | ***POU5F1*** | ***PPA1*** | ***PPARD*** | ***PPARG*** | ***PPARGC1A*** | ***PPBP*** | ***\*PPIA*** |
| ***PPP2CB*** | ***PPP2R1A*** | ***PPP2R2B*** | ***PPP2R2C*** | ***PPP3CA*** | ***PPP3CB*** | ***PPP3CC*** | ***PPP3R1*** | ***PPP3R2*** | ***PRAME*** |
| ***PRCC*** | ***PRDM1*** | ***PRDX1*** | ***PRF1*** | ***PRG2*** | ***PRKAA2*** | ***PRKACA*** | ***PRKACB*** | ***PRKACG*** | ***PRKAR1B*** |
| ***PRKAR2A*** | ***PRKAR2B*** | ***PRKCA*** | ***PRKCB*** | ***PRKCD*** | ***PRKCE*** | ***PRKCG*** | ***PRKDC*** | ***PRKX*** | ***PRL*** |
| ***PRLR*** | ***PRM1*** | ***PRMT8*** | ***PROM1*** | ***\*PRPF38A*** | ***PRSS1*** | ***PSEN1*** | ***PSEN2*** | ***PSMB10*** | ***PSMB7*** |
| ***PSMB8*** | ***PSMB9*** | ***PSMD7*** | ***PTCH1*** | ***PTCH2*** | ***PTCRA*** | ***PTEN*** | ***PTGDR2*** | ***PTGS2*** | ***PTK2*** |
| ***PTK7*** | ***PTPN11*** | ***PTPN5*** | ***PTPN6*** | ***PTPN7*** | ***PTPRC*** | ***PTPRCAP*** | ***PTPRR*** | ***PTTG2*** | ***PVR*** |
| ***PYCARD*** | ***PYGL*** | ***\*RAB7A*** | ***RAC1*** | ***RAC2*** | ***RAC3*** | ***RAD21*** | ***RAD50*** | ***RAD51*** | ***RAD51C*** |
| ***RAD52*** | ***RAD54L*** | ***RAF1*** | ***RAG1*** | ***RALA*** | ***RALB*** | ***RALBP1*** | ***RALGDS*** | ***RAP1A*** | ***RAP1B*** |
| ***RAPGEF1*** | ***RARA*** | ***RARB*** | ***RASA4*** | ***RASAL1*** | ***RASGRF1*** | ***RASGRF2*** | ***RASGRP1*** | ***RASGRP2*** | ***RASSF1*** |
| ***RASSF5*** | ***RB1*** | ***RBM45*** | ***RBX1*** | ***RCC1*** | ***REG4*** | ***REL*** | ***RELA*** | ***RELB*** | ***RELN*** |
| ***REPS1*** | ***RET*** | ***RFC3*** | ***RFC4*** | ***RHOA*** | ***RIN1*** | ***RIPK2*** | ***RNF43*** | ***RNF8*** | ***ROPN1*** |
| ***RORA*** | ***RORC*** | ***RPA3*** | ***\*RPL4*** | ***RPLP0*** | ***RPS11*** | ***\*RPS14*** | ***RPS27A*** | ***RPS6*** | ***RPS6KA5*** |
| ***RPS6KA6*** | ***RPS6KB1*** | ***RPS6KB2*** | ***\*RPS9*** | ***RRAD*** | ***RRAS2*** | ***RUNX1*** | ***RUNX1T1*** | ***RUNX3*** | ***RXRA*** |
| ***RXRB*** | ***RXRG*** | ***S100A12*** | ***S100A4*** | ***S100A7*** | ***S100A8*** | ***S100A9*** | ***S100B*** | ***SAA1*** | ***SAMHD1*** |
| ***\*SAP130*** | ***SBNO2*** | ***SCUBE2*** | ***\*SDHA*** | ***SELE*** | ***SELL*** | ***SELPLG*** | ***SEMG1*** | ***SENP1*** | ***SERPINB2*** |
| ***SERPINE1*** | ***SERPING1*** | ***SETBP1*** | ***SETD2*** | ***\*SF3A3*** | ***SF3B1*** | ***SFN*** | ***SFRP1*** | ***SFRP2*** | ***SFRP4*** |
| ***SGK2*** | ***SH2B2*** | ***SH2D1A*** | ***SH2D1B*** | ***SHC1*** | ***SHC2*** | ***SHC3*** | ***SHC4*** | ***SHH*** | ***SIGIRR*** |
| ***SIGLEC1*** | ***SIN3A*** | ***SIRT4*** | ***SIT1*** | ***SIX1*** | ***SKAP2*** | ***SKP1*** | ***SKP2*** | ***SLAMF1*** | ***SLAMF6*** |
| ***SLAMF7*** | ***SLAMF8*** | ***SLC11A1*** | ***SLC23A2*** | ***SLC2A1*** | ***SLC4A1AP*** | ***SMAD2*** | ***SMAD3*** | ***SMAD4*** | ***SMAD9*** |
| ***SMARCA2*** | ***SMARCA4*** | ***SMARCB1*** | ***SMARCC1*** | ***SMARCC2*** | ***SMARCD1*** | ***SMARCD2*** | ***SMARCD3*** | ***SMARCE1*** | ***SMC1A*** |
| ***SMC1B*** | ***SMC3*** | ***SMO*** | ***SMPD3*** | ***SNAI1*** | ***SNAI2*** | ***SOCS1*** | ***SOCS2*** | ***SOCS3*** | ***SOS1*** |
| ***SOS2*** | ***SOST*** | ***SOX17*** | ***SOX9*** | ***SP1*** | ***SPA17*** | ***SPACA3*** | ***SPANXB1*** | ***SPI1*** | ***SPINK5*** |
| ***SPINT1*** | ***SPN*** | ***SPO11*** | ***SPOP*** | ***SPP1*** | ***SPRY1*** | ***SPRY2*** | ***SPRY4*** | ***SRC*** | ***SRD5A2*** |
| ***SRGN*** | ***SRSF2*** | ***SSBP1*** | ***SSX1*** | ***SSX2*** | ***SSX4*** | ***ST6GAL1*** | ***STAG2*** | ***STAT1*** | ***STAT2*** |
| ***STAT3*** | ***STAT4*** | ***STAT5A*** | ***STAT5B*** | ***STAT6*** | ***STC1*** | ***STK11*** | ***STK4*** | ***STMN1*** | ***SUFU*** |
| ***SULF1*** | ***SUMO1*** | ***SUV39H2*** | ***SYCP1*** | ***SYK*** | ***SYT17*** | ***TAB1*** | ***TAGAP*** | ***TAL1*** | ***TANK*** |
| ***TAP1*** | ***TAP2*** | ***TAPBP*** | ***TARP*** | ***TBK1*** | ***TBL1XR1*** | ***\*TBP*** | ***TBX21*** | ***TCF3*** | ***TCF7*** |
| ***TCF7L1*** | ***TCF7L2*** | ***TCIM*** | ***TCL1B*** | ***TDO2*** | ***TERC*** | ***TERF2*** | ***TERT*** | ***TET2*** | ***TFDP1*** |
| ***TFE3*** | ***TFEB*** | ***TFG*** | ***\*TFRC*** | ***TGFA*** | ***TGFB1*** | ***TGFB2*** | ***TGFB3*** | ***TGFBR1*** | ***TGFBR2*** |
| ***THBD*** | ***THBS1*** | ***THBS4*** | ***THEM4*** | ***THY1*** | ***TIAM1*** | ***TICAM1*** | ***TICAM2*** | ***TIGIT*** | ***TIRAP*** |
| ***\*TLK2*** | ***TLR1*** | ***TLR10*** | ***TLR2*** | ***TLR3*** | ***TLR4*** | ***TLR5*** | ***TLR6*** | ***TLR7*** | ***TLR8*** |
| ***TLR9*** | ***TLX1*** | ***TMEFF2*** | ***TMPRSS2*** | ***\*TMUB2*** | ***TNC*** | ***TNF*** | ***TNFAIP3*** | ***TNFAIP8*** | ***TNFRSF10A*** |
| ***TNFRSF10B*** | ***TNFRSF10C*** | ***TNFRSF10D*** | ***TNFRSF11A*** | ***TNFRSF11B*** | ***TNFRSF12A*** | ***TNFRSF13B*** | ***TNFRSF13C*** | ***TNFRSF14*** | ***TNFRSF17*** |
| ***TNFRSF18*** | ***TNFRSF19*** | ***TNFRSF1A*** | ***TNFRSF1B*** | ***TNFRSF4*** | ***TNFRSF6B*** | ***TNFRSF8*** | ***TNFRSF9*** | ***TNFSF10*** | ***TNFSF11*** |
| ***TNFSF12*** | ***TNFSF13*** | ***TNFSF13B*** | ***TNFSF14*** | ***TNFSF15*** | ***TNFSF18*** | ***TNFSF4*** | ***TNFSF8*** | ***TNFSF9*** | ***TNN*** |
| ***TNR*** | ***TOLLIP*** | ***TOP2A*** | ***TOX*** | ***TP53*** | ***TP63*** | ***TPM2*** | ***TPM3*** | ***TPO*** | ***TPR*** |
| ***TPSAB1*** | ***TPTE*** | ***TPX2*** | ***TRAF1*** | ***TRAF2*** | ***TRAF3*** | ***TRAF4*** | ***TRAF5*** | ***TRAF6*** | ***TRAF7*** |
| ***TREM1*** | ***TREM2*** | ***TRIM29*** | ***\*TRIM39*** | ***TSC1*** | ***TSC2*** | ***TSHR*** | ***TSLP*** | ***TSPAN7*** | ***TTC31*** |
| ***TTK*** | ***\*TUBB*** | ***TUSC3*** | ***TWIST1*** | ***TWIST2*** | ***TXK*** | ***TXNIP*** | ***TXNRD1*** | ***TXNRD2*** | ***TXNRD3*** |
| ***TYK2*** | ***TYMP*** | ***TYROBP*** | ***U2AF1*** | ***\*UBB*** | ***UBC*** | ***UBE2T*** | ***ULBP2*** | ***UNC5D*** | ***UNG*** |
| ***UPK3A*** | ***\*USP39*** | ***USP9Y*** | ***UTY*** | ***VCAM1*** | ***VCAN*** | ***VEGFA*** | ***VEGFC*** | ***VEGFD*** | ***VHL*** |
| ***VPS33B*** | ***VSIR*** | ***VTCN1*** | ***WEE1*** | ***WIF1*** | ***WNT1*** | ***WNT10A*** | ***WNT10B*** | ***WNT11*** | ***WNT16*** |
| ***WNT2*** | ***WNT2B*** | ***WNT3*** | ***WNT3A*** | ***WNT4*** | ***WNT5A*** | ***WNT5B*** | ***WNT6*** | ***WNT7A*** | ***WNT7B*** |
| ***WNT8A*** | ***WNT8B*** | ***WNT9A*** | ***WNT9B*** | ***WT1*** | ***XAGE1B*** | ***XCL2*** | ***XCR1*** | ***XIAP*** | ***XPA*** |
| ***XRCC2*** | ***XRCC4*** | ***YTHDF2*** | ***ZAP70*** | ***ZBTB16*** | ***ZBTB17*** | ***ZBTB32*** | ***ZBTB46*** | ***\*ZC3H14*** | ***ZEB1*** |
| ***ZIC2*** | ***\*ZKSCAN5*** | ***\*ZNF143*** | ***ZNF205*** | ***\*ZNF346*** | ***ZNF384*** |  |  |  |  |

**注：** \*RNA参考内参基因（housekeeping基因）。

**附录2**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **RNA表达检测结果** | | | | | | | | | | | | |
|  |  |  | |  | | | | |  |  | | |
| Gene | | | TPM | | Gene | TPM | Gene | TPM | | | Gene | TPM |
| *A2M* | | | 263.72 | | *ABCB1* | 3.15 | *ABCF1* | 52.7 | | | *ABL1* | 135.6 |
| *ACAD9* | | | 107.44 | | *ACAN* | 119.21 | *ACTB* | 57314.97 | | | *ACTG1* | 19630.75 |
| *ACTL6A* | | | 48.86 | | *ACTL6B* | 0.03 | *ACVR1B* | 69.68 | | | *ACVR1C* | 0.89 |
| *ACVR2A* | | | 5.91 | | *ADA* | 56.31 | *ADAM12* | 17.77 | | | *ADGRE2* | 33.84 |
| *ADGRE5* | | | 858.01 | | *ADORA2A* | 16.38 | *AFDN* | 85.2 | | | *AGK* | 33.48 |
| *AICDA* | | | 2.54 | | *AIF1* | 767.01 | *AIRE* | 2.18 | | | *AKR1C3* | 54.31 |
| *AKT1* | | | 340.98 | | *AKT2* | 56.12 | *AKT3* | 15.47 | | | *ALAS1* | 104.99 |
| *ALCAM* | | | 14.38 | | *ALK* | 15.78 | *ALKBH2* | 13.77 | | | *ALKBH3* | 46.73 |
| *ALOX15B* | | | 26.64 | | *AMBP* | 0.57 | *AMER1* | 2.33 | | | *AMH* | 32.7 |
| *AMMECR1L* | | | 68.54 | | *ANGPT1* | 8.57 | *ANP32B* | 253.3 | | | *ANXA1* | 1463.1 |
| *APAF1* | | | 11.96 | | *APBB1* | 79.64 | *APC* | 31.89 | | | *APC2* | 0.37 |
| *APH1B* | | | 50.91 | | *APOE* | 1430.17 | *APP* | 538.76 | | | *APPL1* | 158.44 |
| *AR* | | | 218.16 | | *ARAF* | 218.84 | *AREG* | 29.46 | | | *ARF1* | 3859.98 |
| *ARG1* | | | 0.0 | | *ARG2* | 10.9 | *ARHGEF6* | 62.25 | | | *ARID1A* | 57.01 |
| *ARID1B* | | | 105.64 | | *ARID2* | 11.03 | *ARMH3* | 50.86 | | | *ARNT* | 88.53 |
| *ARNT2* | | | 58.93 | | *ASXL1* | 12.99 | *ATF1* | 82.64 | | | *ATF2* | 17.44 |
| *ATF4* | | | 1892.96 | | *ATG10* | 14.54 | *ATG12* | 29.29 | | | *ATG16L1* | 6.55 |
| *ATG5* | | | 186.99 | | *ATG7* | 45.19 | *ATM* | 44.41 | | | *ATP5F1E* | 1251.12 |
| *ATR* | | | 6.0 | | *ATRX* | 9.82 | *AURKA* | 16.29 | | | *AXIN1* | 30.8 |
| *AXIN2* | | | 2.93 | | *AXL* | 311.41 | *AZGP1* | 0.24 | | | *B2M* | 4983.57 |
| *B3GAT1* | | | 3.83 | | *BACH2* | 4.34 | *BAD* | 283.74 | | | *BAG1* | 6.75 |
| *BAIAP3* | | | 4.77 | | *BAK1* | 334.85 | *BAMBI* | 325.86 | | | *BAP1* | 112.68 |
| *BATF* | | | 136.69 | | *BAX* | 1265.03 | *BBC3* | 111.89 | | | *BCAT1* | 34.81 |
| *BCL10* | | | 224.96 | | *BCL2* | 12.59 | *BCL2A1* | 293.35 | | | *BCL2L1* | 110.11 |
| *BCL2L11* | | | 19.13 | | *BCL3* | 1267.4 | *BCL6* | 23.08 | | | *BCOR* | 10.33 |
| *BCR* | | | 41.46 | | *BDNF* | 0.38 | *BGN* | 2817.61 | | | *BID* | 124.22 |
| *BIRC2* | | | 411.14 | | *BIRC3* | 228.98 | *BIRC5* | 86.37 | | | *BIRC7* | 7.81 |
| *BLK* | | | 0.56 | | *BLNK* | 73.14 | *BMI1* | 103.51 | | | *BMP2* | 99.75 |
| *BMP4* | | | 17.52 | | *BMP5* | 32.61 | *BMP6* | 3.56 | | | *BMP7* | 8.91 |
| *BMP8A* | | | 410.87 | | *BMPR1B* | 0.56 | *BNIP3* | 222.9 | | | *BRAF* | 583.07 |
| *BRCA1* | | | 22.49 | | *BRCA2* | 4.79 | *BRD7* | 19.12 | | | *BRIP1* | 14.72 |
| *BST1* | | | 10.28 | | *BST2* | 574.49 | *BTK* | 56.25 | | | *BTLA* | 6.01 |
| *BUB1* | | | 66.25 | | *BUB1B-PAK6* | 7.32 | *C1QA* | 3274.05 | | | *C1QB* | 4357.84 |
| *C1QBP* | | | 88.73 | | *C1R* | 145.12 | *C1S* | 248.37 | | | *C2* | 308.91 |
| *C2CD5* | | | 15.86 | | *C3* | 93.74 | *C3AR1* | 61.18 | | | *C4B* | 86.89 |
| *C4BPA* | | | 0.0 | | *C5* | 22.36 | *C6* | 0.0 | | | *C7* | 0.67 |
| *C8A* | | | 0.2 | | *C8B* | 0.02 | *C8G* | 24.13 | | | *C9* | 0.74 |
| *CA4* | | | 0.47 | | *CACNA1C* | 5.83 | *CACNA1D* | 0.6 | | | *CACNA1E* | 0.09 |
| *CACNA1G* | | | 7.47 | | *CACNA1H* | 5.91 | *CACNA2D1* | 5.41 | | | *CACNA2D2* | 19.18 |
| *CACNA2D3* | | | 5.79 | | *CACNA2D4* | 0.28 | *CACNB2* | 2.6 | | | *CACNB3* | 78.7 |
| *CACNB4* | | | 1.23 | | *CACNG1* | 0.81 | *CACNG4* | 0.11 | | | *CACNG6* | 44.11 |
| *CALM1* | | | 1818.96 | | *CALM2* | 756.88 | *CALM3* | 883.91 | | | *CALML3* | 3.64 |
| *CALML4* | | | 6.2 | | *CALML5* | 0.44 | *CALML6* | 1.07 | | | *CAMK1* | 79.77 |
| *CAMK1D* | | | 16.2 | | *CAMK1G* | 2.7 | *CAMK2A* | 1.15 | | | *CAMK2B* | 2.21 |
| *CAMK2D* | | | 94.15 | | *CAMK2G* | 35.74 | *CAMK4* | 1.39 | | | *CAMP* | 16.09 |
| *CAPN2* | | | 408.26 | | *CARD11* | 14.19 | *CARD9* | 72.7 | | | *CASP1* | 83.59 |
| *CASP10* | | | 26.96 | | *CASP12* | 1.31 | *CASP3* | 58.24 | | | *CASP7* | 62.45 |
| *CASP8* | | | 50.78 | | *CASP9* | 61.94 | *CBL* | 23.6 | | | *CBLB* | 106.84 |
| *CBLC* | | | 1.36 | | *CC2D1B* | 45.85 | *CCDC6* | 355.77 | | | *CCL1* | 0.56 |
| *CCL11* | | | 45.73 | | *CCL13* | 274.31 | *CCL14* | 549.81 | | | *CCL15* | 6.01 |
| *CCL16* | | | 4.44 | | *CCL17* | 56.47 | *CCL18* | 1428.7 | | | *CCL19* | 22.32 |
| *CCL2* | | | 3932.63 | | *CCL20* | 12.37 | *CCL21* | 1.33 | | | *CCL22* | 19.98 |
| *CCL23* | | | 41.92 | | *CCL24* | 16.7 | *CCL25* | 0.29 | | | *CCL26* | 5.83 |
| *CCL27* | | | 6.42 | | *CCL28* | 13.92 | *CCL3* | 2264.1 | | | *CCL3L1* | 1480.85 |
| *CCL4* | | | 2449.82 | | *CCL5* | 1654.05 | *CCL7* | 4.13 | | | *CCL8* | 44.73 |
| *CCNA1* | | | 0.83 | | *CCNA2* | 125.46 | *CCNB1* | 28.89 | | | *CCNB2* | 110.42 |
| *CCNB3* | | | 0.73 | | *CCND1* | 506.28 | *CCND2* | 6.42 | | | *CCND3* | 157.59 |
| *CCNE1* | | | 7.73 | | *CCNE2* | 6.56 | *CCNO* | 14.43 | | | *CCR1* | 105.51 |
| *CCR2* | | | 46.42 | | *CCR3* | 3.12 | *CCR4* | 9.81 | | | *CCR5* | 8.45 |
| *CCR6* | | | 7.9 | | *CCR7* | 3.19 | *CCR9* | 0.02 | | | *CCRL2* | 23.72 |
| *CD101* | | | 14.6 | | *CD14* | 6157.44 | *CD160* | 0.33 | | | *CD163* | 1099.88 |
| *CD164* | | | 1415.65 | | *CD180* | 71.01 | *CD19* | 1.05 | | | *CD1A* | 15.93 |
| *CD1B* | | | 7.63 | | *CD1C* | 55.39 | *CD1D* | 8.43 | | | *CD1E* | 26.27 |
| *CD2* | | | 302.76 | | *CD200* | 112.21 | *CD207* | 4.51 | | | *CD209* | 20.26 |
| *CD22* | | | 8.2 | | *CD226* | 2.94 | *CD24* | 32.04 | | | *CD244* | 7.37 |
| *CD247* | | | 7.1 | | *CD27* | 55.31 | *CD274* | 16.45 | | | *CD276* | 163.84 |
| *CD28* | | | 64.3 | | *CD33* | 1002.02 | *CD34* | 43.64 | | | *CD36* | 151.79 |
| *CD37* | | | 618.73 | | *CD38* | 11.77 | *CD3D* | 128.59 | | | *CD3E* | 162.43 |
| *CD3EAP* | | | 45.25 | | *CD3G* | 28.75 | *CD4* | 1350.2 | | | *CD40* | 214.55 |
| *CD40LG* | | | 26.68 | | *CD44* | 289.07 | *CD46* | 318.3 | | | *CD47* | 94.47 |
| *CD48* | | | 67.9 | | *CD5* | 11.23 | *CD52* | 562.91 | | | *CD53* | 808.84 |
| *CD55* | | | 228.36 | | *CD58* | 1639.13 | *CD59* | 209.68 | | | *CD6* | 41.81 |
| *CD63* | | | 5105.25 | | *CD68* | 22293.01 | *CD69* | 44.47 | | | *CD7* | 77.18 |
| *CD70* | | | 7.6 | | *CD74* | 79512.58 | *CD79A* | 5.61 | | | *CD79B* | 4.59 |
| *CD80* | | | 39.33 | | *CD81* | 1345.56 | *CD83* | 115.57 | | | *CD84* | 67.8 |
| *CD86* | | | 325.23 | | *CD8A* | 2087.25 | *CD8B* | 10.69 | | | *CD9* | 956.51 |
| *CD96* | | | 25.5 | | *CD99* | 6504.44 | *CDC14A* | 31.11 | | | *CDC14B* | 69.13 |
| *CDC25A* | | | 1.78 | | *CDC25B* | 107.08 | *CDC25C* | 5.2 | | | *CDC42* | 507.05 |
| *CDC6* | | | 10.47 | | *CDC7* | 22.41 | *CDH1* | 1.14 | | | *CDH17* | 0.31 |
| *CDH5* | | | 30.29 | | *CDK1* | 66.14 | *CDK2* | 76.32 | | | *CDK4* | 429.09 |
| *CDK6* | | | 78.34 | | *CDKN1A* | 576.3 | *CDKN1B* | 91.39 | | | *CDKN1C* | 38.98 |
| *CDKN2A* | | | 30.32 | | *CDKN2B* | 95.12 | *CDKN2C* | 34.81 | | | *CDKN2D* | 74.9 |
| *CDKN3* | | | 262.81 | | *CDX2* | 0.28 | *CEACAM1* | 8.84 | | | *CEACAM6* | 7.88 |
| *CEACAM8* | | | 27.87 | | *CEBPA* | 155.21 | *CEBPB* | 494.73 | | | *CEBPE* | 3.61 |
| *CFB* | | | 16.05 | | *CFD* | 735.78 | *CFI* | 474.45 | | | *CFL1* | 2941.18 |
| *CFP* | | | 33.71 | | *CHAD* | 5604.67 | *CHEK1* | 20.82 | | | *CHEK2* | 43.87 |
| *CHIT1* | | | 84.23 | | *CHUK* | 14.67 | *CIC* | 143.82 | | | *CIITA* | 89.74 |
| *CKLF* | | | 511.04 | | *CKS1B* | 142.91 | *CKS2* | 87.8 | | | *CLCF1* | 137.98 |
| *CLEC10A* | | | 308.32 | | *CLEC4A* | 316.7 | *CLEC4C* | 1.03 | | | *CLEC5A* | 15.73 |
| *CLEC6A* | | | 1.92 | | *CLEC7A* | 200.1 | *CLTC* | 479.87 | | | *CLU* | 331.31 |
| *CMA1* | | | 7.24 | | *CMKLR1* | 132.82 | *CNOT10* | 40.26 | | | *CNOT4* | 42.0 |
| *CNTFR* | | | 2.34 | | *COG7* | 36.51 | *COL11A1* | 169.88 | | | *COL11A2* | 45.26 |
| *COL1A1* | | | 69551.15 | | *COL1A2* | 18707.19 | *COL24A1* | 4.8 | | | *COL27A1* | 232.92 |
| *COL2A1* | | | 2.83 | | *COL3A1* | 5047.07 | *COL4A1* | 185.48 | | | *COL4A2* | 1104.05 |
| *COL4A3* | | | 0.06 | | *COL4A4* | 0.41 | *COL4A5* | 2.09 | | | *COL4A6* | 0.09 |
| *COL5A1* | | | 440.45 | | *COL5A2* | 455.16 | *COL6A3* | 478.88 | | | *COL6A6* | 0.09 |
| *COLEC12* | | | 388.33 | | *COMP* | 76.46 | *CORO1A* | 689.14 | | | *CR1* | 11.22 |
| *CR2* | | | 0.06 | | *CREB1* | 15.75 | *CREB3* | 313.12 | | | *CREB3L1* | 821.09 |
| *CREB3L2* | | | 52.18 | | *CREB3L3* | 0.0 | *CREB3L4* | 5.98 | | | *CREB5* | 17.49 |
| *CREBBP* | | | 55.45 | | *CRK* | 143.52 | *CRKL* | 74.9 | | | *CRLF2* | 0.78 |
| *CRP* | | | 0.74 | | *CRTAM* | 30.22 | *CSF1* | 227.15 | | | *CSF1R* | 2260.58 |
| *CSF2* | | | 2.91 | | *CSF2RB* | 84.28 | *CSF3* | 0.25 | | | *CSF3R* | 72.45 |
| *CSNK1A1* | | | 566.51 | | *CSNK1A1L* | 0.62 | *CT45A1* | 2.19 | | | *CTAG1B* | 4.83 |
| *CTAG2* | | | 7.79 | | *CTAGE1* | 0.56 | *CTBP1* | 469.61 | | | *CTBP2* | 50.79 |
| *CTCFL* | | | 3.06 | | *CTLA4* | 14.93 | *CTNNA1* | 92.54 | | | *CTNNA2* | 0.46 |
| *CTNNA3* | | | 0.21 | | *CTNNB1* | 410.47 | *CTSG* | 65.76 | | | *CTSH* | 133.54 |
| *CTSL* | | | 817.09 | | *CTSS* | 154.67 | *CTSV* | 2.16 | | | *CTSW* | 59.24 |
| *CUL1* | | | 154.77 | | *CUL2* | 111.77 | *CUL3* | 98.16 | | | *CX3CL1* | 28.61 |
| *CX3CR1* | | | 18.03 | | *CXCL1* | 209.06 | *CXCL10* | 188.43 | | | *CXCL11* | 13.44 |
| *CXCL12* | | | 720.67 | | *CXCL13* | 24.85 | *CXCL14* | 512.94 | | | *CXCL16* | 141.84 |
| *CXCL2* | | | 358.62 | | *CXCL3* | 207.47 | *CXCL5* | 43.62 | | | *CXCL6* | 8.05 |
| *CXCL8* | | | 44.32 | | *CXCL9* | 135.32 | *CXCR1* | 26.79 | | | *CXCR2* | 5.86 |
| *CXCR3* | | | 43.61 | | *CXCR4* | 218.59 | *CXCR5* | 0.66 | | | *CXCR6* | 16.02 |
| *CXXC4* | | | 2392.3 | | *CYBB* | 304.37 | *CYCS* | 83.26 | | | *CYFIP2* | 17.03 |
| *CYLD* | | | 19.08 | | *CYP2D6* | 56.41 | *DAPK1* | 27.42 | | | *DAPK2* | 18.32 |
| *DAPK3* | | | 169.42 | | *DAXX* | 28.99 | *DCC* | 0.01 | | | *DDB2* | 567.7 |
| *DDIT3* | | | 15.41 | | *DDIT4* | 3323.18 | *DDX43* | 26.78 | | | *DDX50* | 38.21 |
| *DDX58* | | | 143.86 | | *DEFB1* | 0.51 | *DGAT2* | 11.31 | | | *DHX16* | 6.3 |
| *DKK1* | | | 7.65 | | *DKK2* | 1.46 | *DKK4* | 0.11 | | | *DLL1* | 22.81 |
| *DLL3* | | | 1.65 | | *DLL4* | 24.1 | *DLX2* | 41.35 | | | *DMBT1* | 0.63 |
| *DNAJC14* | | | 57.85 | | *DNMT1* | 91.15 | *DNMT3A* | 68.6 | | | *DOCK9* | 27.33 |
| *DPF1* | | | 0.71 | | *DPF3* | 1.74 | *DPP4* | 142.49 | | | *DTX1* | 1.94 |
| *DTX3* | | | 279.11 | | *DTX4* | 11.02 | *DUSP10* | 40.58 | | | *DUSP2* | 125.53 |
| *DUSP4* | | | 18.97 | | *DUSP5* | 66.72 | *DUSP6* | 121.46 | | | *DUSP8* | 29.17 |
| *DVL1* | | | 115.49 | | *DVL2* | 36.01 | *DVL3* | 181.2 | | | *E2F1* | 41.99 |
| *E2F2* | | | 9.07 | | *E2F3* | 84.35 | *E2F5* | 8.0 | | | *EBI3* | 73.32 |
| *ECSIT* | | | 261.9 | | *EDC3* | 61.23 | *EFNA1* | 37.31 | | | *EFNA2* | 56.96 |
| *EFNA3* | | | 12.15 | | *EFNA4* | 54.37 | *EFNA5* | 13.91 | | | *EGF* | 0.61 |
| *EGFR* | | | 30.17 | | *EGLN1* | 22.62 | *EGLN2* | 105.32 | | | *EGLN3* | 2.3 |
| *EGR1* | | | 3433.3 | | *EGR2* | 67.23 | *EGR3* | 649.42 | | | *EIF2AK2* | 74.99 |
| *EIF2B4* | | | 129.43 | | *EIF4EBP1* | 1215.27 | *ELANE* | 40.32 | | | *ELAVL4* | 3.81 |
| *ELK1* | | | 68.53 | | *ELOB* | 2757.68 | *ELOC* | 80.48 | | | *EML4* | 1012.45 |
| *ENDOG* | | | 94.26 | | *ENG* | 891.11 | *ENTPD1* | 35.91 | | | *EOMES* | 7.77 |
| *EP300* | | | 58.92 | | *EPAS1* | 676.82 | *EPCAM* | 16.77 | | | *EPHA2* | 102.42 |
| *EPO* | | | 2.18 | | *EPOR* | 29.01 | *ERBB2* | 113.82 | | | *ERCC1* | 99.86 |
| *ERCC2* | | | 40.36 | | *ERCC3* | 44.84 | *ERCC4* | 4.2 | | | *ERCC5* | 32.46 |
| *ERCC6* | | | 5.56 | | *EREG* | 1.72 | *ERG* | 44.82 | | | *ESR1* | 7.19 |
| *ESR2* | | | 0.09 | | *ETS1* | 52.03 | *ETS2* | 145.72 | | | *ETV1* | 7.49 |
| *ETV4* | | | 5.32 | | *ETV5* | 47.38 | *ETV7* | 5.98 | | | *EWSR1* | 2403.93 |
| *EYA1* | | | 83.53 | | *EZH2* | 72.33 | *F12* | 0.77 | | | *F13A1* | 683.08 |
| *F2RL1* | | | 3.37 | | *FAAP24* | 8.3 | *FADD* | 68.31 | | | *FAM13C* | 8.24 |
| *FANCA* | | | 4.77 | | *FANCB* | 14.52 | *FANCC* | 18.94 | | | *FANCD2* | 11.16 |
| *FANCE* | | | 6.45 | | *FANCF* | 24.94 | *FANCG* | 31.87 | | | *FANCL* | 125.55 |
| *FAP* | | | 478.18 | | *FAS* | 91.59 | *FASLG* | 266.56 | | | *FAU* | 11703.45 |
| *FBXW7* | | | 29.88 | | *FCER1A* | 53.92 | *FCER1G* | 3462.83 | | | *FCER2* | 4.94 |
| *FCF1* | | | 47.7 | | *FCGR1A* | 2999.09 | *FCGR2A* | 389.97 | | | *FCGR2B* | 399.54 |
| *FCGR3A* | | | 807.73 | | *FCGR3B* | 82.83 | *FCRLA* | 0.46 | | | *FEN1* | 22.47 |
| *FEZ1* | | | 20.05 | | *FGF1* | 5.35 | *FGF10* | 0.35 | | | *FGF11* | 23.89 |
| *FGF12* | | | 0.49 | | *FGF13* | 3.11 | *FGF14* | 1.01 | | | *FGF16* | 0.43 |
| *FGF17* | | | 3.15 | | *FGF18* | 1.87 | *FGF19* | 0.58 | | | *FGF2* | 3.53 |
| *FGF20* | | | 2.96 | | *FGF21* | 3.12 | *FGF22* | 13.78 | | | *FGF23* | 6.51 |
| *FGF3* | | | 3.07 | | *FGF4* | 0.83 | *FGF5* | 13.71 | | | *FGF6* | 2.31 |
| *FGF7* | | | 46.93 | | *FGF8* | 3.0 | *FGF9* | 5.89 | | | *FGFR1* | 4971.95 |
| *FGFR2* | | | 401.84 | | *FGFR3* | 167.67 | *FGFR4* | 6.69 | | | *FH* | 60.23 |
| *FHIT* | | | 11.04 | | *FLCN* | 94.52 | *FLNA* | 1033.67 | | | *FLNC* | 56.04 |
| *FLT1* | | | 32.97 | | *FLT3* | 0.71 | *FLT3LG* | 404.53 | | | *FLT4* | 23.87 |
| *FN1* | | | 5475.79 | | *FOS* | 11008.91 | *FOSL1* | 35.43 | | | *FOXJ1* | 2.68 |
| *FOXL2* | | | 3.38 | | *FOXM1* | 13.52 | *FOXO1* | 16.35 | | | *FOXO3* | 33.31 |
| *FOXO4* | | | 12.68 | | *FOXP3* | 8.19 | *FPR2* | 5.13 | | | *FRAT1* | 46.41 |
| *FRAT2* | | | 29.83 | | *FST* | 30.16 | *FUBP1* | 103.95 | | | *FUT4* | 4.3 |
| *FUT5* | | | 7.28 | | *FUT7* | 25.7 | *FUT8* | 34.5 | | | *FYB1* | 355.78 |
| *FYN* | | | 153.52 | | *FZD1* | 34.33 | *FZD10* | 7.83 | | | *FZD2* | 40.07 |
| *FZD3* | | | 3.99 | | *FZD4* | 13.89 | *FZD5* | 76.84 | | | *FZD6* | 4.14 |
| *FZD7* | | | 251.09 | | *FZD8* | 114.89 | *FZD9* | 3.24 | | | *G6PD* | 80.96 |
| *GAB1* | | | 26.81 | | *GAB2* | 28.86 | *GADD45A* | 476.41 | | | *GADD45B* | 1527.7 |
| *GADD45G* | | | 53.83 | | *GADD45GIP1* | 229.25 | *GAGE1* | 0.92 | | | *GAGE10* | 1.62 |
| *GAGE12F* | | | 38.03 | | *GAGE12I* | 3.27 | *GAGE12J* | 2.51 | | | *GAGE13* | 3.26 |
| *GAGE2A* | | | 1.38 | | *GAGE2C* | 2.75 | *GAGE2E* | 3.04 | | | *GAPDH* | 13242.58 |
| *GAS1* | | | 363.39 | | *GATA1* | 0.23 | *GATA2* | 37.02 | | | *GATA3* | 26.07 |
| *GBP1* | | | 68.58 | | *GDF6* | 0.9 | *GHR* | 36.15 | | | *GLI1* | 8.62 |
| *GLI2* | | | 18.71 | | *GLI3* | 13.52 | *GLS* | 189.25 | | | *GNA11* | 189.56 |
| *GNAQ* | | | 77.59 | | *GNAS* | 1235.94 | *GNG12* | 74.22 | | | *GNG4* | 15.2 |
| *GNG7* | | | 19.17 | | *GNGT1* | 0.0 | *GNLY* | 132.82 | | | *GPATCH3* | 21.09 |
| *GPC4* | | | 126.74 | | *GPI* | 123.87 | *GPR18* | 2.35 | | | *GPS1* | 393.64 |
| *GRAP2* | | | 26.82 | | *GRB2* | 322.07 | *GRB7* | 1.26 | | | *GRIA3* | 0.7 |
| *GRIN1* | | | 1.22 | | *GRIN2A* | 0.2 | *GRIN2B* | 0.23 | | | *GSK3B* | 21.18 |
| *GSN* | | | 1170.5 | | *GSTA1* | 5.57 | *GSTA2* | 3.05 | | | *GSTA3* | 0.42 |
| *GSTA4* | | | 40.57 | | *GSTA5* | 0.23 | *GSTM1* | 5.34 | | | *GSTM2* | 159.32 |
| *GSTM3* | | | 10.07 | | *GSTM4* | 232.28 | *GSTM5* | 21.36 | | | *GSTO1* | 608.49 |
| *GSTO2* | | | 1.63 | | *GSTP1* | 5882.28 | *GSTT1* | 0.09 | | | *GSTT2* | 47.22 |
| *GSTT2B* | | | 137.04 | | *GTF2H3* | 48.01 | *GTF3C1* | 19.6 | | | *GUSB* | 303.51 |
| *GZMA* | | | 86.97 | | *GZMB* | 90.25 | *GZMH* | 94.69 | | | *GZMK* | 122.94 |
| *GZMM* | | | 60.55 | | *H2AX* | 3161.77 | *H3-3A* | 638.9 | | | *H3-5* | 4788.82 |
| *H3C10* | | | 7410.87 | | *H3C2* | 6791.17 | *H3C8* | 3191.77 | | | *HAMP* | 69.79 |
| *HAVCR2* | | | 501.37 | | *HBEGF* | 86.6 | *HCK* | 123.93 | | | *HDAC1* | 136.55 |
| *HDAC10* | | | 91.05 | | *HDAC11* | 61.76 | *HDAC2* | 79.42 | | | *HDAC3* | 107.47 |
| *HDAC4* | | | 28.18 | | *HDAC5* | 99.61 | *HDAC6* | 16.27 | | | *HELLS* | 57.11 |
| *HERC6* | | | 22.98 | | *HES1* | 106.54 | *HES5* | 3.46 | | | *HEY1* | 16.61 |
| *HEY2* | | | 61.22 | | *HEYL* | 97.37 | *HGF* | 91.56 | | | *HHEX* | 70.62 |
| *HHIP* | | | 0.62 | | *HIF1A* | 1217.02 | *HLA-A* | 13780.0 | | | *HLA-B* | 24697.02 |
| *HLA-C* | | | 13941.94 | | *HLA-DMA* | 1485.25 | *HLA-DMB* | 1715.0 | | | *HLA-DOA* | 100.88 |
| *HLA-DOB* | | | 4.14 | | *HLA-DPA1* | 1868.27 | *HLA-DPB1* | 1449.77 | | | *HLA-DQA1* | 450.1 |
| *HLA-DQA2* | | | 1279.21 | | *HLA-DQB1* | 611.24 | *HLA-DQB2* | 1172.12 | | | *HLA-DRA* | 3932.18 |
| *HLA-DRB1* | | | 3539.14 | | *HLA-DRB3* | 2635.34 | *HLA-DRB4* | 4143.7 | | | *HLA-E* | 3708.24 |
| *HLA-F* | | | 862.02 | | *HLA-F-AS1* | 50.0 | *HLA-G* | 19.2 | | | *HMBS* | 36.0 |
| *HMGA1* | | | 456.93 | | *HMGA2* | 6.42 | *HMGB1* | 90.87 | | | *HMOX1* | 5693.12 |
| *HNF1A* | | | 0.56 | | *HNRNPL* | 769.8 | *HOXA10* | 60.87 | | | *HOXA11* | 20.94 |
| *HOXA9* | | | 38.98 | | *HPGD* | 35.9 | *HPRT1* | 645.48 | | | *HRAS* | 191.03 |
| *HSD11B1* | | | 1.86 | | *HSP90AA1* | 1155.47 | *HSP90AB1* | 617.42 | | | *HSP90B1* | 2644.29 |
| *HSPA1A* | | | 1954.77 | | *HSPA2* | 19.52 | *HSPA6* | 430.48 | | | *HSPB1* | 13262.1 |
| *IBSP* | | | 1474.37 | | *ICAM1* | 245.24 | *ICAM2* | 69.04 | | | *ICAM3* | 54.83 |
| *ICAM4* | | | 20.04 | | *ICOS* | 14.97 | *ICOSLG* | 13.57 | | | *ID1* | 837.9 |
| *ID2* | | | 504.09 | | *ID3* | 7135.04 | *ID4* | 56.23 | | | *IDH1* | 159.35 |
| *IDH2* | | | 1038.62 | | *IDO1* | 46.44 | *IDO2* | 0.37 | | | *IFI16* | 363.35 |
| *IFI27* | | | 3290.65 | | *IFI35* | 209.51 | *IFI44L* | 20.63 | | | *IFI6* | 983.58 |
| *IFIH1* | | | 7.47 | | *IFIT1* | 7.79 | *IFIT2* | 18.8 | | | *IFIT3* | 12.43 |
| *IFITM1* | | | 4335.93 | | *IFITM2* | 17074.91 | *IFNA1* | 3.65 | | | *IFNA17* | 2.54 |
| *IFNA2* | | | 0.33 | | *IFNA7* | 0.0 | *IFNA8* | 0.85 | | | *IFNAR1* | 288.18 |
| *IFNAR2* | | | 379.23 | | *IFNB1* | 0.17 | *IFNG* | 15.74 | | | *IFNGR1* | 390.95 |
| *IFNL1* | | | 8.08 | | *IFNL2* | 3.62 | *IGF1* | 33.26 | | | *IGF1R* | 5.68 |
| *IGF2* | | | 152.94 | | *IGF2R* | 69.48 | *IGFBP3* | 100.99 | | | *IGLL1* | 374.33 |
| *IGSF6* | | | 136.73 | | *IKBKB* | 39.81 | *IKBKE* | 18.8 | | | *IKBKG* | 272.85 |
| *IKZF1* | | | 12.69 | | *IKZF2* | 3.92 | *IKZF3* | 6.59 | | | *IKZF4* | 9.84 |
| *IL10* | | | 69.65 | | *IL10RA* | 601.71 | *IL11* | 5.42 | | | *IL11RA* | 117.21 |
| *IL12A* | | | 2.15 | | *IL12B* | 0.44 | *IL12RB1* | 35.89 | | | *IL12RB2* | 1.48 |
| *IL13* | | | 0.37 | | *IL13RA1* | 103.25 | *IL13RA2* | 2.89 | | | *IL15* | 9.89 |
| *IL15RA* | | | 215.43 | | *IL16* | 7.97 | *IL17A* | 0.08 | | | *IL17B* | 6.64 |
| *IL17F* | | | 0.24 | | *IL17RA* | 33.69 | *IL17RB* | 3.79 | | | *IL18* | 348.04 |
| *IL18R1* | | | 4.55 | | *IL18RAP* | 1.47 | *IL19* | 1.51 | | | *IL1A* | 0.14 |
| *IL1B* | | | 55.77 | | *IL1R1* | 532.07 | *IL1R2* | 66.83 | | | *IL1RAP* | 28.13 |
| *IL1RAPL2* | | | 0.25 | | *IL1RL1* | 2.39 | *IL1RL2* | 2.14 | | | *IL1RN* | 32.61 |
| *IL2* | | | 3.02 | | *IL20RA* | 0.5 | *IL20RB* | 2.15 | | | *IL21* | 0.03 |
| *IL21R* | | | 15.03 | | *IL22* | 0.37 | *IL22RA1* | 2.85 | | | *IL22RA2* | 0.12 |
| *IL23A* | | | 21.19 | | *IL23R* | 8.39 | *IL24* | 2.37 | | | *IL25* | 1.65 |
| *IL26* | | | 3.99 | | *IL27* | 6.64 | *IL2RA* | 119.18 | | | *IL2RB* | 34.08 |
| *IL2RG* | | | 262.84 | | *IL3* | 0.47 | *IL32* | 310.36 | | | *IL34* | 35.67 |
| *IL3RA* | | | 69.58 | | *IL4* | 0.85 | *IL4R* | 60.45 | | | *IL5* | 0.12 |
| *IL5RA* | | | 0.72 | | *IL6* | 10.64 | *IL6R* | 28.17 | | | *IL6ST* | 46.28 |
| *IL7* | | | 21.76 | | *IL7R* | 80.64 | *IL9* | 0.63 | | | *ILF3* | 169.12 |
| *ILK* | | | 329.29 | | *ING4* | 49.85 | *INHBA* | 22.1 | | | *INHBB* | 7.32 |
| *INPP5D* | | | 146.87 | | *INS* | 10.79 | *INSRR* | 4.77 | | | *IRAK1* | 524.78 |
| *IRAK2* | | | 22.87 | | *IRAK3* | 19.15 | *IRAK4* | 75.52 | | | *IRF1* | 103.6 |
| *IRF2* | | | 70.28 | | *IRF3* | 321.78 | *IRF4* | 1.21 | | | *IRF5* | 91.95 |
| *IRF7* | | | 100.73 | | *IRF8* | 118.21 | *IRF9* | 146.72 | | | *IRGM* | 12.01 |
| *IRS1* | | | 10.16 | | *ISG15* | 728.23 | *ISG20* | 113.0 | | | *ITCH* | 74.95 |
| *ITGA1* | | | 48.87 | | *ITGA2* | 24.98 | *ITGA2B* | 7.13 | | | *ITGA3* | 125.31 |
| *ITGA4* | | | 48.89 | | *ITGA5* | 210.89 | *ITGA6* | 28.24 | | | *ITGA7* | 9.33 |
| *ITGA8* | | | 33.06 | | *ITGA9* | 3.26 | *ITGAE* | 4.38 | | | *ITGAL* | 13.12 |
| *ITGAM* | | | 102.78 | | *ITGAV* | 433.89 | *ITGAX* | 311.78 | | | *ITGB1* | 1524.24 |
| *ITGB2* | | | 1101.04 | | *ITGB3* | 290.37 | *ITGB4* | 46.67 | | | *ITGB6* | 0.11 |
| *ITGB7* | | | 9.01 | | *ITGB8* | 4.19 | *ITK* | 2.45 | | | *JAG1* | 107.37 |
| *JAG2* | | | 12.46 | | *JAK1* | 106.08 | *JAK2* | 99.38 | | | *JAK3* | 77.74 |
| *JAM3* | | | 25.71 | | *JAML* | 57.64 | *JCHAIN* | 33.47 | | | *JUN* | 773.15 |
| *JUP* | | | 159.71 | | *KAT2B* | 40.23 | *KDM5C* | 41.45 | | | *KDM6A* | 9.9 |
| *KDR* | | | 51.59 | | *KEAP1* | 167.55 | *KIF7* | 26.48 | | | *KIR2DL1* | 4.06 |
| *KIR2DL2* | | | 1.14 | | *KIR2DL3* | 3.9 | *KIR3DL1* | 368.08 | | | *KIR3DL2* | 4.35 |
| *KIR3DL3* | | | 1.8 | | *KIR3DS1* | 1.73 | *KIT* | 4.3 | | | *KITLG* | 18.78 |
| *KLF2* | | | 1120.52 | | *KLF4* | 547.7 | *KLK2* | 1.35 | | | *KLK3* | 6.63 |
| *KLRB1* | | | 29.93 | | *KLRC1* | 6.35 | *KLRC2* | 177.09 | | | *KLRD1* | 10.49 |
| *KLRF1* | | | 5.67 | | *KLRG1* | 30.34 | *KLRK1* | 36.93 | | | *KMT2C* | 17.62 |
| *KMT2D* | | | 32.39 | | *KRAS* | 71.01 | *KREMEN1* | 27.65 | | | *KRT5* | 398.69 |
| *KRT7* | | | 30.23 | | *LAG3* | 18.86 | *LAIR2* | 1511.82 | | | *LAMA1* | 0.42 |
| *LAMA2* | | | 1.29 | | *LAMA3* | 0.75 | *LAMA4* | 413.81 | | | *LAMA5* | 41.37 |
| *LAMB1* | | | 103.38 | | *LAMB2* | 722.71 | *LAMB3* | 50.96 | | | *LAMB4* | 0.0 |
| *LAMC1* | | | 56.1 | | *LAMC2* | 25.64 | *LAMC3* | 5.75 | | | *LAMP1* | 448.62 |
| *LAMP2* | | | 151.14 | | *LAMP3* | 34.13 | *LAPTM5* | 3678.0 | | | *LAT* | 344.69 |
| *LBP* | | | 0.52 | | *LCK* | 35.92 | *LCN2* | 52.09 | | | *LCP1* | 109.85 |
| *LEF1* | | | 73.75 | | *LEFTY1* | 5.44 | *LEFTY2* | 6.98 | | | *LEP* | 0.43 |
| *LEPR* | | | 150.23 | | *LEXM* | 0.36 | *LFNG* | 399.35 | | | *LGALS3* | 976.57 |
| *LHX3* | | | 0.32 | | *LIF* | 81.5 | *LIFR* | 176.4 | | | *LIG1* | 84.64 |
| *LIG3* | | | 14.28 | | *LIG4* | 35.19 | *LILRA1* | 175.46 | | | *LILRA4* | 230.08 |
| *LILRA5* | | | 1441.65 | | *LILRB1* | 897.44 | *LILRB2* | 712.58 | | | *LILRB3* | 559.72 |
| *LMNA* | | | 4213.32 | | *LRG1* | 8.71 | *LRP1* | 593.14 | | | *LRP2* | 0.56 |
| *LRP5* | | | 41.72 | | *LRP6* | 10.03 | *LRRN3* | 1.9 | | | *LST1* | 148.93 |
| *LTA* | | | 3.64 | | *LTB* | 46.92 | *LTBP1* | 135.98 | | | *LTBR* | 1026.1 |
| *LTF* | | | 6.23 | | *LTK* | 66.35 | *LY86* | 227.49 | | | *LY9* | 6.45 |
| *LY96* | | | 1275.75 | | *LYN* | 43.69 | *LYZ* | 1120.24 | | | *M6PR* | 133.47 |
| *MAD2L1* | | | 7.45 | | *MAD2L2* | 91.7 | *MADCAM1* | 2.26 | | | *MAF* | 367.62 |
| *MAGEA1* | | | 1.01 | | *MAGEA10* | 2.13 | *MAGEA12* | 1.18 | | | *MAGEA3* | 1.68 |
| *MAGEA4* | | | 0.81 | | *MAGEB2* | 0.92 | *MAGEC1* | 0.47 | | | *MAGEC2* | 16.65 |
| *MALT1* | | | 25.0 | | *MAML2* | 104.65 | *MAP2K1* | 119.64 | | | *MAP2K2* | 997.3 |
| *MAP2K4* | | | 23.28 | | *MAP2K6* | 2.21 | *MAP3K1* | 13.72 | | | *MAP3K12* | 31.14 |
| *MAP3K13* | | | 3.17 | | *MAP3K14* | 28.28 | *MAP3K20* | 39.05 | | | *MAP3K5* | 31.32 |
| *MAP3K7* | | | 15.22 | | *MAP3K8* | 85.35 | *MAP4K2* | 21.81 | | | *MAPK1* | 328.69 |
| *MAPK10* | | | 23.67 | | *MAPK11* | 30.59 | *MAPK12* | 37.27 | | | *MAPK14* | 86.55 |
| *MAPK3* | | | 199.14 | | *MAPK8* | 14.67 | *MAPK8IP1* | 7.39 | | | *MAPK8IP2* | 6.64 |
| *MAPK9* | | | 360.94 | | *MAPKAPK2* | 174.42 | *MAPT* | 0.62 | | | *MARCKS* | 1524.71 |
| *MARCO* | | | 18.28 | | *MASP1* | 0.19 | *MASP2* | 3.43 | | | *MAVS* | 161.69 |
| *MAX* | | | 175.97 | | *MBL2* | 0.95 | *MCAM* | 244.49 | | | *MCL1* | 438.28 |
| *MCM2* | | | 17.04 | | *MCM4* | 16.53 | *MCM5* | 77.93 | | | *MCM7* | 66.99 |
| *MDC1* | | | 6.12 | | *MDM2* | 108.24 | *MECOM* | 6.25 | | | *MED12* | 94.74 |
| *MEF2C* | | | 71.43 | | *MEFV* | 10.04 | *MELK* | 41.29 | | | *MEN1* | 20.82 |
| *MERTK* | | | 55.68 | | *MET* | 70.35 | *MFGE8* | 288.2 | | | *MFNG* | 64.12 |
| *MGMT* | | | 57.14 | | *MGST1* | 63.27 | *MGST2* | 244.45 | | | *MGST3* | 588.2 |
| *MICA* | | | 147.77 | | *MICB* | 16.16 | *MIF* | 9834.03 | | | *MITF* | 36.71 |
| *MKI67* | | | 9.43 | | *MLANA* | 3.14 | *MLF1* | 6.81 | | | *MLH1* | 104.14 |
| *MLLT3* | | | 10.72 | | *MME* | 12.25 | *MMP1* | 0.34 | | | *MMP11* | 115.53 |
| *MMP2* | | | 1507.53 | | *MMP3* | 0.29 | *MMP7* | 0.6 | | | *MMP9* | 49093.81 |
| *MNAT1* | | | 57.83 | | *MNX1* | 6.39 | *MPL* | 4.09 | | | *MPO* | 13.42 |
| *MPPED1* | | | 0.03 | | *MR1* | 34.1 | *MRC1* | 547.38 | | | *MRE11* | 82.94 |
| *MRM2* | | | 41.5 | | *MRPS5* | 41.43 | *MS4A1* | 3.56 | | | *MS4A2* | 2.79 |
| *MSH2* | | | 10.74 | | *MSH3* | 50.56 | *MSH6* | 277.54 | | | *MSR1* | 406.5 |
| *MST1R* | | | 3.05 | | *MTMR14* | 135.43 | *MTOR* | 19.53 | | | *MTRR* | 51.12 |
| *MUC1* | | | 41.35 | | *MUC2* | 0.4 | *MUTYH* | 27.24 | | | *MX1* | 258.84 |
| *MYB* | | | 0.93 | | *MYBL2* | 69.97 | *MYC* | 355.56 | | | *MYCN* | 2.49 |
| *MYD88* | | | 85.22 | | *NASP* | 99.62 | *NBN* | 28.18 | | | *NCAM1* | 156.1 |
| *NCF1* | | | 236.34 | | *NCF4* | 133.94 | *NCL* | 301.07 | | | *NCOA1* | 20.52 |
| *NCOA3* | | | 69.12 | | *NCOA4* | 1266.97 | *NCOR1* | 111.78 | | | *NCR1* | 2.4 |
| *NCR3* | | | 6.25 | | *NECTIN2* | 821.41 | *NEFL* | 0.11 | | | *NF1* | 54.9 |
| *NF2* | | | 29.59 | | *NFATC1* | 361.0 | *NFATC2* | 99.27 | | | *NFATC3* | 46.98 |
| *NFATC4* | | | 42.44 | | *NFE2L2* | 114.35 | *NFKB1* | 157.66 | | | *NFKB2* | 141.4 |
| *NFKBIA* | | | 4049.31 | | *NFKBIZ* | 100.04 | *NGF* | 6.12 | | | *NGFR* | 27.91 |
| *NKD1* | | | 1.44 | | *NKG7* | 368.46 | *NKX3-1* | 14.09 | | | *NLRC5* | 67.52 |
| *NLRP3* | | | 13.12 | | *NOD1* | 8.54 | *NOD2* | 3.62 | | | *NODAL* | 0.49 |
| *NOG* | | | 29.12 | | *NOL7* | 538.2 | *NOS2* | 0.41 | | | *NOS3* | 47.45 |
| *NOTCH1* | | | 82.84 | | *NOTCH2* | 120.09 | *NOTCH3* | 360.23 | | | *NOTCH4* | 84.04 |
| *NPM1* | | | 3730.97 | | *NPM2* | 17.64 | *NQO1* | 88.62 | | | *NR4A1* | 450.31 |
| *NR4A3* | | | 235.49 | | *NRAS* | 50.16 | *NRP1* | 416.15 | | | *NSD1* | 10.13 |
| *NSD2* | | | 14.47 | | *NSD3* | 19.11 | *NT5E* | 165.35 | | | *NTF3* | 6.13 |
| *NTHL1* | | | 81.13 | | *NTN3* | 6.77 | *NTRK1* | 79.89 | | | *NTRK2* | 15.83 |
| *NUBP1* | | | 123.27 | | *NUMB* | 125.36 | *NUMBL* | 75.16 | | | *NUP107* | 8.55 |
| *NUPR1* | | | 104.58 | | *OAS1* | 84.51 | *OAS2* | 28.15 | | | *OAS3* | 54.22 |
| *OAZ1* | | | 7681.56 | | *OLFML2B* | 506.51 | *OSM* | 34.71 | | | *PAK1* | 124.32 |
| *PAK2* | | | 153.09 | | *PAK3* | 12.21 | *PAK4* | 79.13 | | | *PAK5* | 0.22 |
| *PAK6* | | | 1.34 | | *PARG* | 39.71 | *PARP2* | 37.28 | | | *PASD1* | 0.0 |
| *PAX3* | | | 14.13 | | *PAX5* | 3.83 | *PAX8* | 153.78 | | | *PBK* | 63.99 |
| *PBRM1* | | | 53.58 | | *PBX1* | 4.65 | *PBX3* | 35.82 | | | *PCBP1* | 945.42 |
| *PCK1* | | | 0.34 | | *PCLAF* | 53.0 | *PCNA* | 860.13 | | | *PDCD1* | 16.22 |
| *PDCD1LG2* | | | 214.87 | | *PDGFA* | 292.58 | *PDGFB* | 140.58 | | | *PDGFC* | 70.97 |
| *PDGFD* | | | 100.55 | | *PDGFRA* | 201.71 | *PDGFRB* | 276.31 | | | *PDK1* | 4.16 |
| *PDPK1* | | | 17.96 | | *PECAM1* | 125.47 | *PER2* | 43.58 | | | *PGF* | 62.58 |
| *PGK1* | | | 140.93 | | *PGR* | 0.18 | *PHF10* | 68.04 | | | *PHF6* | 140.79 |
| *PIAS1* | | | 89.62 | | *PIK3CA* | 27.96 | *PIK3CB* | 107.95 | | | *PIK3CD* | 17.83 |
| *PIK3CG* | | | 50.94 | | *PIK3R1* | 50.44 | *PIK3R2* | 98.28 | | | *PIK3R3* | 55.44 |
| *PIK3R4* | | | 17.16 | | *PIK3R5* | 175.38 | *PIM1* | 136.04 | | | *PIM2* | 13.36 |
| *PIN1* | | | 477.87 | | *PITX2* | 1.69 | *PKM* | 2352.94 | | | *PKMYT1* | 46.74 |
| *PLA1A* | | | 2.99 | | *PLA2G10* | 38.01 | *PLA2G1B* | 3.03 | | | *PLA2G2A* | 1.27 |
| *PLA2G3* | | | 0.44 | | *PLA2G4A* | 41.47 | *PLA2G4C* | 139.19 | | | *PLA2G4E* | 1.24 |
| *PLA2G4F* | | | 0.07 | | *PLA2G5* | 100.56 | *PLA2G6* | 25.5 | | | *PLAT* | 10.05 |
| *PLAU* | | | 138.18 | | *PLAUR* | 551.76 | *PLCB1* | 4.95 | | | *PLCB4* | 1.51 |
| *PLCE1* | | | 3.89 | | *PLCG1* | 21.42 | *PLCG2* | 13.6 | | | *PLD1* | 50.96 |
| *PLD2* | | | 27.07 | | *PMAIP1* | 83.43 | *PMCH* | 1.65 | | | *PMEL* | 0.48 |
| *PML* | | | 217.53 | | *PMS2* | 36.87 | *PNKP* | 145.77 | | | *PNMA1* | 36.3 |
| *POLB* | | | 34.45 | | *POLD1* | 36.6 | *POLD4* | 1036.35 | | | *POLE2* | 8.98 |
| *POLK* | | | 33.89 | | *POLR2A* | 200.72 | *POLR2D* | 9.74 | | | *POLR2H* | 364.46 |
| *POLR2J* | | | 927.78 | | *POU2AF1* | 31.28 | *POU2F2* | 12.49 | | | *POU5F1* | 30.93 |
| *PPA1* | | | 783.54 | | *PPARD* | 128.86 | *PPARG* | 157.1 | | | *PPARGC1A* | 5.76 |
| *PPBP* | | | 129.99 | | *PPIA* | 2216.9 | *PPP2CB* | 202.14 | | | *PPP2R1A* | 169.21 |
| *PPP2R2B* | | | 0.95 | | *PPP2R2C* | 0.79 | *PPP3CA* | 401.18 | | | *PPP3CB* | 216.59 |
| *PPP3CC* | | | 24.16 | | *PPP3R1* | 116.89 | *PPP3R2* | 0.41 | | | *PRAME* | 0.08 |
| *PRCC* | | | 136.34 | | *PRDM1* | 262.56 | *PRDX1* | 5112.69 | | | *PRF1* | 60.77 |
| *PRG2* | | | 9.75 | | *PRKAA2* | 0.18 | *PRKACA* | 362.76 | | | *PRKACB* | 62.67 |
| *PRKACG* | | | 4.41 | | *PRKAR1B* | 8.16 | *PRKAR2A* | 13.03 | | | *PRKAR2B* | 36.64 |
| *PRKCA* | | | 9.07 | | *PRKCB* | 8.1 | *PRKCD* | 112.41 | | | *PRKCE* | 27.04 |
| *PRKCG* | | | 0.35 | | *PRKDC* | 47.56 | *PRKX* | 26.24 | | | *PRL* | 1.44 |
| *PRLR* | | | 1.33 | | *PRM1* | 0.96 | *PRMT8* | 0.68 | | | *PROM1* | 0.01 |
| *PRPF38A* | | | 95.9 | | *PRSS1* | 1.54 | *PSEN1* | 28.13 | | | *PSEN2* | 105.39 |
| *PSMB10* | | | 491.33 | | *PSMB7* | 340.72 | *PSMB8* | 202.55 | | | *PSMB9* | 216.25 |
| *PSMD7* | | | 271.41 | | *PTCH1* | 2.26 | *PTCH2* | 6.93 | | | *PTCRA* | 13.93 |
| *PTEN* | | | 218.88 | | *PTGDR2* | 0.53 | *PTGS2* | 23.53 | | | *PTK2* | 27.53 |
| *PTK7* | | | 51.8 | | *PTPN11* | 264.53 | *PTPN5* | 10.91 | | | *PTPN6* | 191.0 |
| *PTPN7* | | | 70.16 | | *PTPRC* | 153.27 | *PTPRCAP* | 162.2 | | | *PTPRR* | 0.01 |
| *PTTG2* | | | 237.52 | | *PVR* | 78.47 | *PYCARD* | 468.51 | | | *PYGL* | 80.81 |
| *RAB7A* | | | 492.44 | | *RAC1* | 1892.76 | *RAC2* | 4996.07 | | | *RAC3* | 118.57 |
| *RAD21* | | | 149.09 | | *RAD50* | 36.96 | *RAD51* | 2.35 | | | *RAD51C* | 18.89 |
| *RAD52* | | | 8.66 | | *RAD54L* | 6.04 | *RAF1* | 67.21 | | | *RAG1* | 2.9 |
| *RALA* | | | 837.61 | | *RALB* | 81.76 | *RALBP1* | 12.48 | | | *RALGDS* | 193.12 |
| *RAP1A* | | | 91.23 | | *RAP1B* | 231.33 | *RAPGEF1* | 58.65 | | | *RARA* | 160.93 |
| *RARB* | | | 465.94 | | *RASA4* | 76.45 | *RASAL1* | 1.98 | | | *RASGRF1* | 0.54 |
| *RASGRF2* | | | 7.14 | | *RASGRP1* | 9.08 | *RASGRP2* | 22.6 | | | *RASSF1* | 189.2 |
| *RASSF5* | | | 21.38 | | *RB1* | 141.19 | *RBM45* | 120.47 | | | *RBX1* | 198.43 |
| *RCC1* | | | 181.73 | | *REG4* | 0.35 | *REL* | 22.26 | | | *RELA* | 286.77 |
| *RELB* | | | 416.55 | | *RELN* | 9.15 | *REPS1* | 61.31 | | | *RET* | 39.09 |
| *RFC3* | | | 16.04 | | *RFC4* | 35.21 | *RHOA* | 3625.55 | | | *RIN1* | 90.19 |
| *RIPK2* | | | 144.32 | | *RNF43* | 0.86 | *RNF8* | 4.86 | | | *ROPN1* | 1.5 |
| *RORA* | | | 4.27 | | *RORC* | 1.29 | *RPA3* | 0.69 | | | *RPL4* | 1890.74 |
| *RPLP0* | | | 7550.31 | | *RPS11* | 15615.25 | *RPS14* | 5192.82 | | | *RPS27A* | 1963.74 |
| *RPS6* | | | 2054.04 | | *RPS6KA5* | 7.73 | *RPS6KA6* | 245.01 | | | *RPS6KB1* | 23.28 |
| *RPS6KB2* | | | 476.44 | | *RPS9* | 14354.42 | *RRAD* | 46.86 | | | *RRAS2* | 73.98 |
| *RUNX1* | | | 263.75 | | *RUNX1T1* | 7.91 | *RUNX3* | 315.15 | | | *RXRA* | 183.6 |
| *RXRB* | | | 79.28 | | *RXRG* | 0.46 | *S100A12* | 10.93 | | | *S100A4* | 6989.03 |
| *S100A7* | | | 1.56 | | *S100A8* | 200.72 | *S100A9* | 222.22 | | | *S100B* | 15.77 |
| *SAA1* | | | 28.13 | | *SAMHD1* | 284.49 | *SAP130* | 138.14 | | | *SBNO2* | 546.89 |
| *SCUBE2* | | | 2.48 | | *SDHA* | 16.29 | *SELE* | 2.48 | | | *SELL* | 194.62 |
| *SELPLG* | | | 479.44 | | *SEMG1* | 0.29 | *SENP1* | 69.85 | | | *SERPINB2* | 0.28 |
| *SERPINE1* | | | 370.91 | | *SERPING1* | 1038.58 | *SETBP1* | 14.04 | | | *SETD2* | 20.19 |
| *SF3A3* | | | 115.64 | | *SF3B1* | 64.85 | *SFN* | 8.55 | | | *SFRP1* | 42.15 |
| *SFRP2* | | | 0.72 | | *SFRP4* | 707.54 | *SGK2* | 5.01 | | | *SH2B2* | 67.35 |
| *SH2D1A* | | | 3.56 | | *SH2D1B* | 0.62 | *SHC1* | 464.89 | | | *SHC2* | 92.07 |
| *SHC3* | | | 1.18 | | *SHC4* | 1.01 | *SHH* | 0.76 | | | *SIGIRR* | 103.67 |
| *SIGLEC1* | | | 97.73 | | *SIN3A* | 25.04 | *SIRT4* | 7.88 | | | *SIT1* | 23.11 |
| *SIX1* | | | 10.93 | | *SKAP2* | 275.68 | *SKP1* | 116.15 | | | *SKP2* | 136.12 |
| *SLAMF1* | | | 2.83 | | *SLAMF6* | 23.81 | *SLAMF7* | 81.61 | | | *SLAMF8* | 49.74 |
| *SLC11A1* | | | 47.87 | | *SLC23A2* | 33.47 | *SLC2A1* | 41.67 | | | *SLC4A1AP* | 80.13 |
| *SMAD2* | | | 45.32 | | *SMAD3* | 34.99 | *SMAD4* | 18.85 | | | *SMAD9* | 11.39 |
| *SMARCA2* | | | 85.66 | | *SMARCA4* | 61.05 | *SMARCB1* | 180.51 | | | *SMARCC1* | 36.7 |
| *SMARCC2* | | | 98.13 | | *SMARCD1* | 75.21 | *SMARCD2* | 96.22 | | | *SMARCD3* | 42.44 |
| *SMARCE1* | | | 116.74 | | *SMC1A* | 5.77 | *SMC1B* | 0.33 | | | *SMC3* | 97.92 |
| *SMO* | | | 11.41 | | *SMPD3* | 19.9 | *SNAI1* | 214.09 | | | *SNAI2* | 820.61 |
| *SOCS1* | | | 485.88 | | *SOCS2* | 44.27 | *SOCS3* | 474.94 | | | *SOS1* | 86.98 |
| *SOS2* | | | 16.23 | | *SOST* | 16.5 | *SOX17* | 58.76 | | | *SOX9* | 20.19 |
| *SP1* | | | 29.76 | | *SPA17* | 20.81 | *SPACA3* | 3.76 | | | *SPANXB1* | 2.87 |
| *SPI1* | | | 5022.58 | | *SPINK5* | 0.22 | *SPINT1* | 149.1 | | | *SPN* | 24.65 |
| *SPO11* | | | 0.0 | | *SPOP* | 52.37 | *SPP1* | 4848.89 | | | *SPRY1* | 68.76 |
| *SPRY2* | | | 93.15 | | *SPRY4* | 76.5 | *SRC* | 145.22 | | | *SRD5A2* | 1.55 |
| *SRGN* | | | 1520.44 | | *SRSF2* | 618.16 | *SSBP1* | 753.52 | | | *SSX1* | 1.75 |
| *SSX2* | | | 3.76 | | *SSX4* | 1.78 | *ST6GAL1* | 143.23 | | | *STAG2* | 120.7 |
| *STAT1* | | | 235.61 | | *STAT2* | 82.9 | *STAT3* | 372.1 | | | *STAT4* | 3.21 |
| *STAT5A* | | | 98.71 | | *STAT5B* | 64.44 | *STAT6* | 817.39 | | | *STC1* | 6.3 |
| *STK11* | | | 242.77 | | *STK4* | 26.27 | *STMN1* | 248.63 | | | *SUFU* | 60.13 |
| *SULF1* | | | 1023.21 | | *SUMO1* | 735.03 | *SUV39H2* | 44.39 | | | *SYCP1* | 0.01 |
| *SYK* | | | 39.27 | | *SYT17* | 2.88 | *TAB1* | 61.75 | | | *TAGAP* | 13.65 |
| *TAL1* | | | 11.19 | | *TANK* | 836.74 | *TAP1* | 59.27 | | | *TAP2* | 125.42 |
| *TAPBP* | | | 563.71 | | *TARP* | 107.19 | *TBK1* | 61.77 | | | *TBL1XR1* | 171.71 |
| *TBP* | | | 577.9 | | *TBX21* | 33.89 | *TCF3* | 83.53 | | | *TCF7* | 61.28 |
| *TCF7L1* | | | 58.21 | | *TCF7L2* | 25.34 | *TCIM* | 36.65 | | | *TCL1B* | 6.36 |
| *TDO2* | | | 3.37 | | *TERC* | 2053.75 | *TERF2* | 215.85 | | | *TERT* | 0.63 |
| *TET2* | | | 31.95 | | *TFDP1* | 69.74 | *TFE3* | 541.55 | | | *TFEB* | 192.24 |
| *TFG* | | | 2544.25 | | *TFRC* | 28.8 | *TGFA* | 25.91 | | | *TGFB1* | 1141.31 |
| *TGFB2* | | | 43.23 | | *TGFB3* | 78.27 | *TGFBR1* | 52.83 | | | *TGFBR2* | 121.0 |
| *THBD* | | | 128.91 | | *THBS1* | 1539.76 | *THBS4* | 9.24 | | | *THEM4* | 27.22 |
| *THY1* | | | 582.79 | | *TIAM1* | 21.55 | *TICAM1* | 61.48 | | | *TICAM2* | 19.42 |
| *TIGIT* | | | 4.33 | | *TIRAP* | 115.52 | *TLK2* | 20.91 | | | *TLR1* | 42.6 |
| *TLR10* | | | 1.45 | | *TLR2* | 32.99 | *TLR3* | 181.94 | | | *TLR4* | 26.36 |
| *TLR5* | | | 29.04 | | *TLR6* | 18.4 | *TLR7* | 19.42 | | | *TLR8* | 22.14 |
| *TLR9* | | | 14.52 | | *TLX1* | 3.62 | *TMEFF2* | 0.0 | | | *TMPRSS2* | 3.7 |
| *TMUB2* | | | 56.81 | | *TNC* | 264.66 | *TNF* | 26.25 | | | *TNFAIP3* | 73.41 |
| *TNFAIP8* | | | 8.23 | | *TNFRSF10A* | 30.8 | *TNFRSF10B* | 264.91 | | | *TNFRSF10C* | 72.47 |
| *TNFRSF10D* | | | 107.63 | | *TNFRSF11A* | 84.1 | *TNFRSF11B* | 15.87 | | | *TNFRSF12A* | 2422.98 |
| *TNFRSF13B* | | | 4.43 | | *TNFRSF13C* | 12.99 | *TNFRSF14* | 242.9 | | | *TNFRSF17* | 0.86 |
| *TNFRSF18* | | | 14.82 | | *TNFRSF19* | 652.89 | *TNFRSF1A* | 1641.56 | | | *TNFRSF1B* | 185.43 |
| *TNFRSF4* | | | 94.36 | | *TNFRSF6B* | 2377.92 | *TNFRSF8* | 1.11 | | | *TNFRSF9* | 38.9 |
| *TNFSF10* | | | 71.67 | | *TNFSF11* | 51.38 | *TNFSF12* | 180.29 | | | *TNFSF13* | 157.69 |
| *TNFSF13B* | | | 53.91 | | *TNFSF14* | 3.6 | *TNFSF15* | 4.69 | | | *TNFSF18* | 7.09 |
| *TNFSF4* | | | 10.37 | | *TNFSF8* | 13.31 | *TNFSF9* | 11.05 | | | *TNN* | 1.51 |
| *TNR* | | | 0.29 | | *TOLLIP* | 189.97 | *TOP2A* | 20.08 | | | *TOX* | 14.75 |
| *TP53* | | | 538.72 | | *TP63* | 24.4 | *TPM2* | 2303.53 | | | *TPM3* | 761.09 |
| *TPO* | | | 0.6 | | *TPR* | 69.97 | *TPSAB1* | 792.69 | | | *TPTE* | 22.45 |
| *TPX2* | | | 26.14 | | *TRAF1* | 51.33 | *TRAF2* | 59.48 | | | *TRAF3* | 38.57 |
| *TRAF4* | | | 34.54 | | *TRAF5* | 60.42 | *TRAF6* | 1.48 | | | *TRAF7* | 31.78 |
| *TREM1* | | | 10.73 | | *TREM2* | 417.08 | *TRIM29* | 1.33 | | | *TRIM39* | 14.28 |
| *TSC1* | | | 12.14 | | *TSC2* | 189.67 | *TSHR* | 0.01 | | | *TSLP* | 0.0 |
| *TSPAN7* | | | 14.37 | | *TTC31* | 126.67 | *TTK* | 30.83 | | | *TUBB* | 354.08 |
| *TUSC3* | | | 45.08 | | *TWIST1* | 609.72 | *TWIST2* | 37.03 | | | *TXK* | 7.72 |
| *TXNIP* | | | 705.3 | | *TXNRD1* | 39.75 | *TXNRD2* | 72.27 | | | *TXNRD3* | 7.78 |
| *TYK2* | | | 101.08 | | *TYMP* | 629.94 | *TYROBP* | 5428.09 | | | *U2AF1* | 338.98 |
| *UBB* | | | 14539.97 | | *UBC* | 5291.53 | *UBE2T* | 17.69 | | | *ULBP2* | 62.42 |
| *UNC5D* | | | 0.04 | | *UNG* | 42.65 | *UPK3A* | 4.06 | | | *USP39* | 41.72 |
| *USP9Y* | | | 48.09 | | *UTY* | 61.75 | *VCAM1* | 779.67 | | | *VCAN* | 93.86 |
| *VEGFA* | | | 238.84 | | *VEGFC* | 88.64 | *VEGFD* | 1.32 | | | *VHL* | 197.12 |
| *VPS33B* | | | 14.89 | | *VSIR* | 173.49 | *VTCN1* | 0.83 | | | *WEE1* | 64.49 |
| *WIF1* | | | 7.37 | | *WNT1* | 3.24 | *WNT10A* | 0.23 | | | *WNT10B* | 2.02 |
| *WNT11* | | | 3.97 | | *WNT16* | 9.25 | *WNT2* | 0.56 | | | *WNT2B* | 2.33 |
| *WNT3* | | | 14.96 | | *WNT3A* | 3.29 | *WNT4* | 1.35 | | | *WNT5A* | 22.62 |
| *WNT5B* | | | 197.86 | | *WNT6* | 2.72 | *WNT7A* | 0.65 | | | *WNT7B* | 4.7 |
| *WNT8A* | | | 0.26 | | *WNT8B* | 0.13 | *WNT9A* | 19.29 | | | *WNT9B* | 3.13 |
| *WT1* | | | 2.14 | | *XAGE1B* | 19.51 | *XCL2* | 26.44 | | | *XCR1* | 3.12 |
| *XIAP* | | | 64.49 | | *XPA* | 188.78 | *XRCC2* | 13.4 | | | *XRCC4* | 157.89 |
| *YTHDF2* | | | 87.88 | | *ZAP70* | 55.52 | *ZBTB16* | 9.75 | | | *ZBTB17* | 110.17 |
| *ZBTB32* | | | 2.04 | | *ZBTB46* | 41.93 | *ZC3H14* | 32.06 | | | *ZEB1* | 120.83 |
| *ZIC2* | | | 41.93 | | *ZKSCAN5* | 15.25 | *ZNF143* | 13.35 | | | *ZNF205* | 45.91 |
| *ZNF346* | | | 20.07 | | *ZNF384* | 72.62 |  |  | | |  |  |

注：TPM(Transcripts Per Million) 是归一化后的基因或转录本表达值。