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Original Article

Gene Expression Profile in Patients with Axial Spondyloarthritis: Meta-analysis of Publicly Accessible Microarray Datasets

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Objective. To identify a gene expression signature in axial spondyloarthritis/ankylosing spondylitis (SpA/AS) and genomic pathways likely to be involved in pathogenesis of SpA/AS patients. **Methods.** Four publicly accessible microarray studies from SpA/AS patients were integrated, and a transcriptomic and network-based meta-analysis was performed. This meta-analysis was compared with a published microarray study in whole blood of AS patients. **Results.** According to our meta-analysis, 1,798 genes were differentially expressed in the whole blood of SpA/AS patients compared to healthy controls, while 674 genes were differentially expressed in the synovium of SpA/AS patients compared to healthy controls. When the whole blood meta-analysis data was compared with a published microarray study that also analyzed whole blood in SpA/AS patients, pathways involved in Toll-like receptor signaling, osteoclast differentiation, T cell receptor signaling and janus kinase–signal transducer and activator of transcription (Jak-STAT) signaling were often enriched in SpA/AS. On the other hand, eomesodermin, RUNX3, and interleukin-7 receptor (IL7R) were usually decreased in SpA/AS patients, suggesting that deficiency of these genes contributes to increased IL-17 production in AS. **Conclusion.** Several common enrichment pathways including Toll-like receptor signaling pathway, osteoclast differentiation, T cell receptor signaling pathway and Jak-STAT signaling pathway were identified in the differentially expressed genes of whole blood and synovium from SpA/AS patients, suggesting that these pathways are involved in the pathogenesis of SpA/AS. **(J Rheum Dis 2016;23:363-372)**

Key Words. Axial spondyloarthritis, Ankylosing spondylitis, Microarray, Network analysis

INTRODUCTION

Axial spondyloarthritis (SpA), including ankylosing spondylitis (AS) is a group of chronic inflammatory diseases characterized by inflammation of axial skeleton, enthesitis, uveitis and association with human leukocyte antigen (HLA)-B27 [1]. Initial symptoms of SpA/AS appear in the late teen to early adult years, but due to the lack of biomarkers facilitating early diagnosis, diagnosis and treatment are usually delayed, ultimately resulting in disability during the productive years of life. Although HLA-B27, erythrocyte sedimentation rate, C-reactive protein and inflammation detected by magnetic resonance imaging (MRI) have been extensively studied as biomarker for diagnosis and disease activity in SpA/AS [2], single biomarker that by itself is highly sensitive and specific for discriminating patients with SpA/AS from healthy people has not been discovered yet.

Gene expression profiling with microarrays has become a standard technology for identifying the changes underlying the initiation and progression of the disease and discovering biomarkers for diagnosis, disease activity and response to treatment [3,4]. A number of microarray studies have previously been undertaken in SpA/AS [5-10]. Although all these studies have successfully identified gene expression signatures distinguishing SpA/AS pa-

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tients from healthy controls, the expression profiles identified in these studies were not consistent with each other, and the differentially expressed genes (DEGs) reported in each study had little overlap. Therefore in this study, we integrated four publicly accessible microarray studies from SpA/AS patients and performed a transcriptomic and network-based meta-analysis to identify a SpA/AS gene expression signature and genomic pathways likely to be involved in SpA/AS pathogenesis.

MATERIALS AND METHODS

Data collection

Microarray datasets were obtained from the Gene Expression Omnibus (GEO) at the National Center for Biotechnology Information (NCBI) and the ArrayExpress at the European Bioinformatics Institute (EBI) by using the terms "ankylosing spondylitis" and "axial spondyloarthritis" on May 28, 2015. Studies were included in the analysis if they met the following criteria: (1) case-control studies, (2) studies containing gene expression data, and (3) studies including patients diagnosed with AS or SpA. Seven microarray datasets including GSE11886 (E-GEOD-11886), GSE14442 (E-GEOD-14442), GSE18781 (E-GEOD-18781), GSE25101 (E-GEOD-25101), GSE30023 (E-GEOD-30023), GSE39340 (E-GEOD-39340), and GSE41038 (E-GEOD-41038) were identified by fulfilling the inclusion criteria (Figure 1). GSE11886 was excluded from analysis because macrophages cultured for 7 days were used in this experiment. GSE14442 was excluded because of gene expression study in gut biopsies. GSE30023 was also excluded because only samples of rheumatoid arthritis (RA) and spondyloarthropathy were analyzed, not including healthy or non-inflammatory control. Finally, a total of four microarray studies that used whole blood (GSE18781, GSE25101) or synovium (GSE39340 and GSE41038) were considered for subsequent analysis.

Meta-analysis and network-based analysis

To integrate the results of individual studies and obtain a list of more robust DEGs between SpA/AS patients and controls, we followed the guideline provided by Ramasamy et al. [11] for meta-analysis of gene expression microarray. We conducted a microarray meta-analysis using NetworkAnalyst, a web interface for the integrative analysis of gene expression data (http://www.networkanalyst.ca/NetworkAnalyst/faces/home.xhtml) [12]. In this study, we performed meta-analysis using the protocol provided as a step-wise description [12]. Because the optimum method for generating overlapping gene lists between different platforms was suggested to use a ranked fold change analysis, we used combing rank orders algorithm, with 100 times of permutation tests for meta-analysis [13]. After identification of DEGs, we performed network analysis using NetworkAnalyst. The DEGs identified from meta-analysis were presented within protein-protein interaction (PPI) networks to extract enriched functional pathways involved in the pathogenesis of SpA/AS. In this study, we used a PPI database based on InnateDB, which

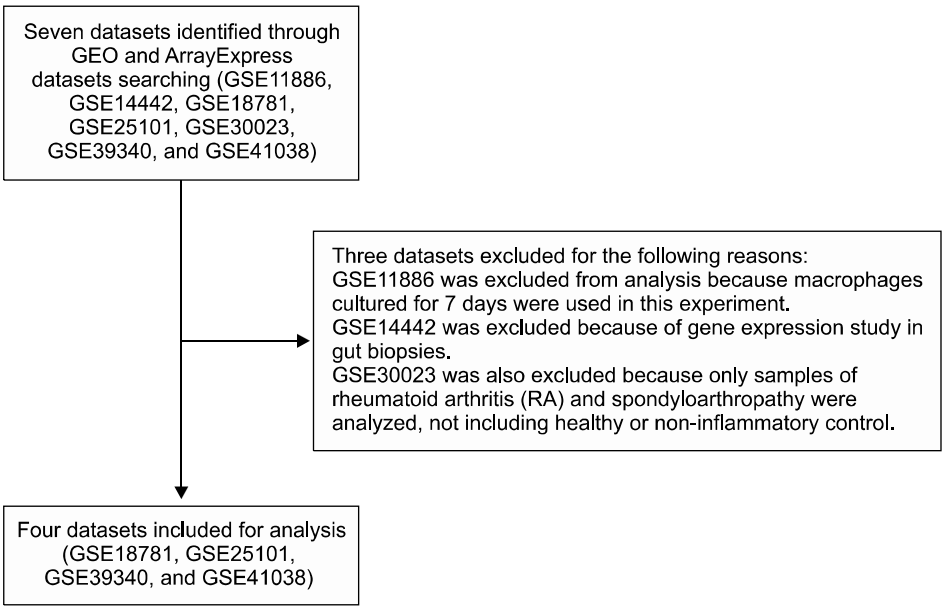

Figure 1. Flow chart of selection process for meta-analysis.

currently contains 14,755 proteins and 145,955 interactions for human [14]. The properties of nodes in network were displayed as hub degree and betweenness values. The degree centrality of hub is the number of connections that a node has to other nodes, whereas betweenness centrality represents to the number of shortest paths passing through the node [12]. Based on pathways according to the Kyoto Encyclopedia of Genes and Genomes (KEGG), pathway analysis was performed using NetworkAnalyst.

RESULTS

Study characteristics

This study includes four microarray datasets that examined either whole blood or synovium from SpA/AS patients. Detailed information of these four datasets is described in Table 1. Of the included datasets, GSE18781 is a microarray dataset of whole blood from 18 SpA patients and 25 healthy controls. GSE25101 is also a dataset of whole blood from 16 AS patients and 16 healthy controls. GSE39340 and GSE41038 are microarray datasets that gene expression was compared in synovium from SpA/AS patients and osteoarthritis (OA) patients. Different microarray platforms were used in all four datasets.

Analysis of gene expression profile in whole blood of AS patients

To identify a common transcriptional signature in whole blood of SpA/AS patients, two microarray datasets including GSE18781 and GSE25101 were analyzed using NetworkAnalyst. We selected the DEGs with p-value <0.05. Meta-analysis using combing rank orders identified a total of 1,798 genes to be differentially expressed between SpA/AS patients and healthy controls across microarray datasets. Among the 1,798 DEGs, 1,077 genes were upregulated and 721 genes were downregulated in SpA/AS patients compared with healthy controls. The most significantly upregulated genes are *EIF1AY*, *DEFA4*, *TXLNG2P*, *USP9Y*, *PRKY*, *S100P*, *SLPI*, *CLEC12A*, *CLEC1B*, and *TMEM158*, and the most significantly downregulated genes are *XIST*, *HLA-DRB4*, *LRRN3*, *GZMK*, *NLRP2*, *GZMM*, *KLRG1*, *POMZP3*, *KLRC3*, and *CFD*. A list of the top 10 most significantly upregulated and downregulated genes is presented in Table 2 and the complete list of DEGs is provided in Supplementary Table 1. Interestingly, eomesodermin (EOMES), RUNX3, and interleukin-7 receptor (IL7R) were decreased in whole blood of SpA/AS patients, which are reported to be involved in the inhibition of IL-17 production.

To identify the overrepresented biological pathway dysregulated in whole blood of SpA/AS patients, we conducted a network-based analysis of these 1,798 significant SpA/AS genes using NetworkAnalyst. The resulting zero-order interaction network contained 897 nodes and 2,190 edges. The complete list of nodes in the obtained network is provided in Supplementary Table 2. *TP53*, *ITGA4*, *HDAC1*, *HSP90AB1*, *EP300*, *YWHAQ*, *FYN*, *IL7R*, *PXN*, and *NOTCH1* were identified as potential key hub genes in whole blood of SpA/AS patients by hub explorer in NetworkAnalyst. Next we identified enriched functional pathways within the obtained network by conducting pathway analysis based on KEGG database. We identified 47 significant pathways in the pathway analysis (Table 3 and Supplementary Table 3). The most sig-

Table 1. Summary information of studies included in analysis

GEO dataset (ArrayExpress)	Published study	Platform	Number of samples			Tissue
			Healthy control	OA	SpA/AS	
GSE18781 (E-GEOD-18781)	[8]	Affymetrix Human Genome U133Plus2	25	-	18 (SpA)	Whole blood
GSE25101 (E-GEOD-25101)	[9]	Illumina HumanHT-12 V3 BeadArray	16	-	16 (AS)	Whole blood
GSE39340 (E-GEOD-39340)	-	Illumina HumanHT-12 V4 BeadArray	-	7	5 (AS)	Synovium
GSE41038 (E-GEOD-41038)	-	Illumina HumanRef-8 V3 BeadArray	-	3	2 (AS) 6 (SpA)	Synovium

GEO: Gene Expression Omnibus, OA: osteoarthritis, SpA: spondyloarthritis, AS: ankylosing spondylitis, -: none.

Table 2. The 10 most significantly upregulated and downregulated genes in axial spondyloarthritis/ankylosing spondylitis

Entrez ID	*Gene symbol*	Combined rank product	Average log fold change	p-value
10 most significantly upregulated genes				
9086	EIF1AY	141.3028291	2.027392248	0.0
1669	DEFA4	253.2385423	1.156735547	0.0
246126	TXLNG2P	378.0883468	1.253128194	0.0
8287	USP9Y	446.9559003	1.413623981	0.0
5616	PRKY	463.644046	0.835877122	0.0
6286	S100P	478.0240351	1.037021707	0.0
6590	SLPI	493.4733103	0.862581578	0.0
160364	CLEC12A	540.7452082	0.783896925	0.0
51266	CLEC1B	546.28354	0.820509913	0.0
25907	TMEM158	565.3296841	0.815786885	0.0
10 most significantly downregulated genes				
7503	XIST	127.3141031	−1.955798302	0.0
3126	HLA-DRB4	357.9742089	−0.82126813	0.0
54674	LRRN3	478.9544631	−0.704669601	0.0
3003	GZMK	534.8128051	−0.652832803	0.0
55655	NLRP2	535.2706088	−0.745163013	0.0
3004	GZMM	752.3180524	−0.654795802	0.0
10219	KLRG1	754.5010324	−0.61957876	0.0
22932	POMZP3	785.6893853	−0.552535982	0.0
3823	KLRC3	790.7957129	−0.582500988	0.0
1675	CFD	796.8163084	−0.465831033	0.0

nificant pathway in our KEGG analysis was measles ($p=3.11\times10^{-10}$). Other significant pathways included Natural killer cell mediated cytotoxicity ($p=1.67\times10^{-6}$), T cell receptor signaling pathway ($p=1.43\times10^{-5}$), janus kinase–signal transducer and activator of transcription (Jak-STAT) signaling pathway ($p=5.66\times10^{-5}$), Osteoclast differentiation ($p=2.82\times10^{-4}$) and Toll-like receptor (TLR) signaling pathway ($p=4.06\times10^{-4}$).

Analysis of gene expression profile in synovium of SpA/AS patients

To verify the dysregulation of gene expression observed in whole blood of SpA/AS patients, we analyzed two microarray data from synovium of SpA/AS patients using NetworkAnalyst. To our knowledge, these microarray data from synovium were not published. In synovium, a total of 674 genes were identified to be differentially expressed between SpA/AS patients and healthy control. Among the 674 DEGs, 177 genes were upregulated and 497 genes were downregulated. The most significantly upregulated genes are *IGLL1*, *JSRP1*, *MZB1*, *HBA2*, *ACAP1*, *CD300LF*, *CXXC11*, *APOBEC3A*, *ALPK2*, and *APOC1*, and the most significantly downregulated genes are *FGFBP2*, *MFAP5*, *THBS4*, *CILP*, *CRTAC1*, *MAMDC2*, *CXCR7*, *COMP*, *PCOLCE2*, and *TIMP3*. The complete list of DEGs is provided in Supplementary Table 4. Next we tried to identify the overlapped genes between lists of DEGs in whole blood and synovium of SpA/AS patients. A total of 120 DEGs were identified to be overlapped between whole blood and synovium of SpA/AS patients, and the list of these genes is provided in Supplementary Table 5.

Furthermore we conducted a network-based analysis of the 674 significant SpA/AS genes in synovium using NetworkAnalyst. The resulting zero-order interaction network only contained 269 nodes and 426 edges. Because the zero-order network is too sparse, we created the minimum interaction network by trimming the first-order network to keep only those nodes that are necessary to connect the seed nodes [12]. The resulting network contained 1,652 nodes and 6,984 edges. The complete list of nodes in the obtained network is provided in Supplementary Table 6. Next we identified enriched pathways within the obtained network by conducting pathway analysis based on KEGG database. We identified 88 significant pathways in the pathway analysis (Table 4 and Supplementary Table 7). The most significant pathway in our KEGG analysis was Pathways in cancer ($p=4.61\times10^{-33}$). Consistent with the results of pathway analysis in whole blood, significant enrichment pathways in synovium of SpA/AS

Table 3. The significant pathways identified in whole blood of axial spondyloarthritis/ankylosing spondylitis patients

Pathway	DEGs	p-value
Measles	TNFRSF10B PIK3CG PIK3CB FYN FAS IFNGR1 DDX58 CBLB CD3G TP53 EIF2AK2 TLR4 CD3D SLAMF1 JAK1 STAT5B IRAK4 TNFRSF10C SH2D1A IL2RB CD28 JAK2 TNFSF10 TNFRSF10A PRKCQ IL2RG CD3E TBK1 IFNAR1	3.11×10^{-10}
Influenza A	TNFRSF10B PIK3CG PIK3CB DNAJC3 FAS TRIM25 IFNGR1 DDX58 OAS3 EIF2AK2 OAS1 TLR4 IL1B JAK1 IRAK4 SOCS3 TNFRSF10C HSPA6 JAK2 TNFSF10 TNFRSF10A MAPK14 TBK1 IFNAR1	1.46×10^{-6}
Natural killer cell mediated cytotoxicity	TNFRSF10B PIK3CG NFAT5 PIK3CB FYN FAS IFNGR1 LCK TNF NCR3 ICAM2 KIR2DL3 KIR3DL1 ITGAL TNFRSF10C ITGB2 SH2D1A KIR2DL1 TNFSF10 ZAP70 PPP3R1 TNFRSF10A SH2D1B CD247 SOS2 CHP1 GZMB IFNAR1	1.67×10^{-6}
Apoptosis	TNFRSF10B PIK3CG IL1R1 PIK3CB FAS PRKAR1A TNF TP53 IL1B IRAK3 CFLAR IRAK4 TNFRSF10C TNFSF10 IL1RAP PPP3R1 TNFRSF10A PRKX FADD CHP1	3.47×10^{-6}
Amoebiasis	PIK3CG IL1R1 PIK3CB HSPB1 SERPINB2 TLR4 IL1B IL1R2 ITGB2 GNA15 GNAQ CTSG SERPINB1 PRKX	5.74×10^{-6}
Chagas disease (American trypanosomiasis)	IK3CG PIK3CB FAS IFNGR1 TNF CD3G TLR4 CD3D CFLAR IRAK4 GNA15 FOS GNAQ PPP2R1A GNAI3 TLR6 CD247 FADD MAPK14 CD3E	1.09×10^{-5}
T cell receptor signaling pathway	PIK3CG NFAT5 PIK3CB CD8B FYN PTPRC LCK CBLB ITK FOS CD28 ZAP70 PPP3R1 PRKCQ GRAP2 CD247 SOS2 MAPK14 CHP1 CD3E CD8A	1.43×10^{-5}
Jak-STAT signaling pathway	PIK3CG PIK3CB EP300 IFNGR1 STAT4 IL13RA1 CBLB IL7R IL21R JAK1 STAT5B SOCS3 IL2RB JAK2 IL10RA IL4R SOS2 IL2RG IL12RB2 IFNAR1	5.66×10^{-5}
Osteoclast differentiation	PIK3CG IL1R1 PIK3CB NCF2 FYN IFNGR1 LCK FCGR2A TNF IL1B JAK1 FHL2 SOCS3 FOS CSF1R FOSL2 NCF4 GAB2 MAPK14 IFNAR1 SIRPA	2.82×10^{-4}
Toll-like receptor signaling pathway	PIK3CG PIK3CB TLR5 LY96 CXCL10 CCL5 TNFA TLR8 TLR4 IL1B IRAK4 FOS TLR1 TLR6 FADD MAPK14 TBK1 IFNAR1	4.06×10^{-4}

DEGs: differentially expressed genes, Jak-STAT: janus kinase–signal transducer and activator of transcription.

Table 4. The significant pathways identified in synovium of axial spondyloarthritis/ankylosing spondylitis patients

Pathway	DEGs	p-value
Toll-like receptor signaling pathway	CCL5 FOS MAPK13 IFNAR1 MAP3K8 LY96 IL8 CCL3	7.33×10^{-11}
TGF-beta signaling pathway	COMP THBS2 ACVR1 RHOA DCN SMAD3 TGFB3 MYC	5.65×10^{-10}
Osteoclast differentiation	FOS MAPK13 LILRB1 FOSB IFNAR1 TNFRSF11B	9.06×10^{-10}
T cell receptor signaling pathway	FOS MAPK13 RHOA MAP3K8 CBLB	2.90×10^{-7}
Jak-STAT signaling pathway	IL13RA1 IFNAR1 SPRED1 IL7R CCND2 MYC CCND1 CBLB	1.06×10^{-5}

DEGs: differentially expressed genes, TGF: transforming growth factor, Jak-STAT: janus kinase–signal transducer and activator of transcription.

patients included T cell receptor signaling pathway ($p=2.90\times10^{-7}$), Jak-STAT signaling pathway ($p=1.06\times10^{-5}$), Osteoclast differentiation ($p=9.06\times10^{-10}$) and TLR signaling pathway ($p=7.33\times10^{-11}$).

We also performed a network-based analysis of the overlapped genes between lists of DEGs in whole blood and synovium of SpA/AS patients. We created the minimum interaction network which contained 348 nodes and 889 edges. *UBC*, *DDX5*, *IL7R*, *FOS*, *RPL21*, *ISG15*, and *EZR* were identified as potential key hub genes in the created

network of the overlapped DEGs. The complete list of nodes in the obtained network is provided in Supplementary Table 8. We identified enriched pathways of the overlapped DEGs by conducting pathway analysis. Consistent with the results of each whole blood and synovium in SpA/As patients, significant enrichment pathways in the overlapped DEGs included T cell receptor signaling pathway ($p=1.55\times10^{-9}$), Jak-STAT signaling pathway ($p=4.01\times10^{-7}$), Osteoclast differentiation ($p=9.51\times10^{-9}$) and TLR signaling pathway ($p=8.41\times10^{-9}$) (Supplementary Table 9).

Comparison between the results of previous microarray study in whole blood of AS patients and our meta-analysis results in whole blood of SpA/AS patients

In a previously carried out gene expression analysis, Assassi et al. [10] revealed that TLR signaling pathway is significantly dysregulated in AS, and that AS patients had higher TLR4 and TLR5 levels than healthy controls. Similar to the studies included in our meta-analysis, whole blood was used in this study. Therefore, we compared the results of this study with the results of our meta-analysis. A list of 81 DEGs was provided in Appendix table of original article. We looked for genes that overlapped between the 81 DEGs of this previous study and 1,798 DEGs identified by our meta-analysis of whole blood samples, and found that a total of 32 DEGs overlapped. TLR4 and TLR5 were overexpressed in SpA/AS patients of both studies; the list of these overlapped DEGs is provided in Supplementary Table 10. We also conducted the pathway analysis in the 81 DEGs of the previous study. A minimum interaction network was created and contained 128 nodes and 235 edges. *UBC*, *STAT1*, *CDC20*, *GADD45A*, and *TLR4* were identified as potential key hub genes in the created network, and the complete list of nodes in the obtained network is provided in Supplementary Table 11. Significant enrichment pathways in previous study included cell cycle ($p=4.78\times10^{-9}$), TLR signaling pathway ($p=2.4\times10^{-8}$), Osteoclast differentiation ($p=1.41\times10^{-5}$), Jak-STAT signaling pathway ($p=8.65\times10^{-4}$) and T cell receptor signaling pathway ($p=4.25\times10^{-3}$) (Supplementary Table 12).

DISCUSSION

We performed a network-based meta-analysis integrating gene expression profiles in whole blood and synovium of SpA/AS patients to identify a unique gene expression profile in SpA/AS patients and to extract enriched functional pathways involved in the pathogenesis of SpA/AS. Across two studies using whole blood, a total of 1,798 genes were identified to be differentially expressed between SpA/AS patients and healthy controls. Next, a network-based analysis of these 1,798 DEGs showed that Natural killer cell mediated cytotoxicity, T cell receptor signaling pathway, Jak-STAT signaling pathway, Osteoclast differentiation and TLR signaling pathway were significantly enriched. To verify the results observed in our meta-analysis of whole blood microarray data, we compared the result of a previously reported study on the whole blood of AS patients with the result of our meta-analysis. A total of 81 DEGs was reported in this article [10], and 32 DEGs were identified to be overlapped between DEGs of this study and our meta-analysis. These overlapped genes represent only 39.5% and 1.8% of DEGs in this article and our meta-analysis, respectively. We conducted the pathway analysis in 81 DEGs of this study. Consistent with the results in our meta-analysis of whole blood microarray data, TLR signaling pathway, Osteoclast differentiation, Jak-STAT signaling pathway and T cell receptor signaling pathway were significantly enriched with DEGs in this previous sturdy. The problem of having a small overlap between DEGs coming from different datasets that examine the same biologic conditions has been already reported by several reports [15-17]. The main causes of this problem were suggested to be derived from the small sample size and large number of genes examined [18]. Pathway analysis was suggested to diminish the discrepancies observed in direct comparisons of lists of DEGs obtained from different datasets [15]. Actually, pathway analysis is more consistent and reproducible across studies than DEG detection [19]. Consistent with this suggestion, our results showed that pathway analysis reveals functional convergence of gene expression profiles in different datasets of SpA/AS patients. To identify unique DEGs in tissue of SpA/AS patients and compare these DEGs with those in whole blood of SpA/AS patients, we also performed the network meta-analysis of two microarray data from synovium of SpA/AS patients. Interestingly, consistent with the results of whole blood, significant enrichment pathways in synovium of SpA/AS patients included TLR signaling pathway, Osteoclast differentiation, T cell receptor signaling pathway and Jak-STAT signaling pathway.

Pathways involved in TLR signaling, osteoclast differentiation, T cell receptor signaling and Jak-STAT signaling were enriched in SpA/AS in both our meta-analysis and the previous study. TLR signaling pathway has been suggested to play a potential role in the pathogenesis of spondyloarthritis [20]. HLA-B27 transgenic rats, animal model of SpA, do not develop intestinal inflammation or peripheral arthritis under germ-free state, suggesting that commensal flora play an essential role in sensitizing the immune system and subsequent development of inflammation [21]. TLRs may be involved in the interaction between microbial flora and the immune system, and then play an important role in driving inflammation in SpA. Actually, increased TLR2 and TLR4 expressions were observed in peripheral blood mononuclear cells (PBMCs) and synovium of SpA patients, which is significantly reduced by anti-tumor necrosis factor (TNF) treatment [22]. Previous study using whole blood gene-expression profiling demonstrated that TLR4 and 5 expression is significantly increased in AS [10]. In addition, increased TLR4 and TLR5 expression was observed to be downregulated by anti-TNF treatment in this study, suggesting that TNF blockade attenuates an activation of the innate immune system via the TLR pathway in AS. However, this suggested hypothesis needs more experimental studies to be verified.

In our study, osteoclast differentiation pathway was also identified as the enriched functional pathway in SpA/AS. Previous study on bone turnover markers showed that normal osteoblastic activity and increased osteoclastic activity were observed in AS patients [23]. The number of osteoclasts in the subchondral areas of femoral heads from AS patients was reported to be significantly increased as compared to RA patients and to OA patients [24]. In line with these results, examination of surgical specimens obtained from the spine of AS patients revealed that Cathepsin K is mainly expressed by mononuclear cells, fibroblast-like cells and multinuclear cells attached to bone and at sites of bone destruction, reflecting high osteoclastic activity in those regions [25]. Furthermore receptor activator of nuclear factor kappa-B ligand (RANKL)-induced osteoclastogenesis from PBMCs was increased in AS patients and this increase of osteoclastogenesis in AS patients was associated with radiographic ankylosis of the sacroiliac joint [26]. Our results of meta-analysis showed that suppressive genes of osteoclastogenesis including *IFNGR*, *FHL2*, *IFNAR*, and *SOCS3* are increased and essential genes of osteoclastogenesis including *CSF1R*, *LCK*, and *FYN* are decreased in whole blood of SpA/AS patients (Figure 2 and Supplementary Table 1). In contrast to the increased osteoclastogenic activity shown in the previous studies of AS patients, these changes of osteoclast-related gene expressions in our meta-analysis reflect decreased osteoclastogenic activity in SpA/AS. Most recently, AS patients with active disease was reported to have significantly higher concentrations of osteoprotegerin (OPG) compared to the inactive group, and OPG levels were lower in the anti-TNF treatment group compared to group with conventional therapy [27]. OPG is a natural decoy receptor for RANKL, which inhibits osteoclast formation and shifts the balance from bone resorption to bone formation [28]. Therefore higher concentrations of OPG in AS patients with active disease suggest there is a shifting of balance from bone resorption to bone formation in these patients. The discrepancies between the results of previous studies and our study may be due to the influences of disease states and treatments on osteoclastogenesis.

Pathways involved in T cell receptor signaling and Jak-STAT signaling were also identified as the enriched functional pathways in SpA/AS. The IL-23/Th17 pathway has been suggested to play a critical role in the disease susceptibility and the pathogenesis of AS [29]. Genome-wide association studies have identified common single nucleotide polymorphisms in genes influencing the IL-23/Th17 pathway, which is significantly associated with AS susceptibility [30]. Cumulative evidence from studies using animal models and human samples strongly indicates the involvement of the IL-23/Th17 pathway in the pathogenesis of SpA/AS [31]. Multiple genes involved in lymphocyte development and activation have been associated with AS [32]. These genes include *EOMES*, *RUNX3*, and *IL7R*. IL-7 induces RUNX3 expression through IL-7R, and RUNX3 induces EOMES encoding eomesodermin. CD8+ T cells lacking both T-bet and EOMES differentiate into an IL-17 secreting lineage [33]. In our study, *EOMES*, *RUNX3*, and *IL7R* were decreased in whole blood of SpA/AS patients, suggesting the possibility that deficiency of these genes increase IL-17 production in AS (Figure 3 and Supplementary Table 1). In study using autoimmune-prone SKG mice with mutation of zeta-associated protein (ZAP)-70, a key signal transduction molecule in T cells, injection of β-glucan-containing products has been reported to induce enthesitis, sacroiliitis, dactylitis, plantar fasciitis, vertebral inflammation and ileitis [34]. In these mice, arthritis

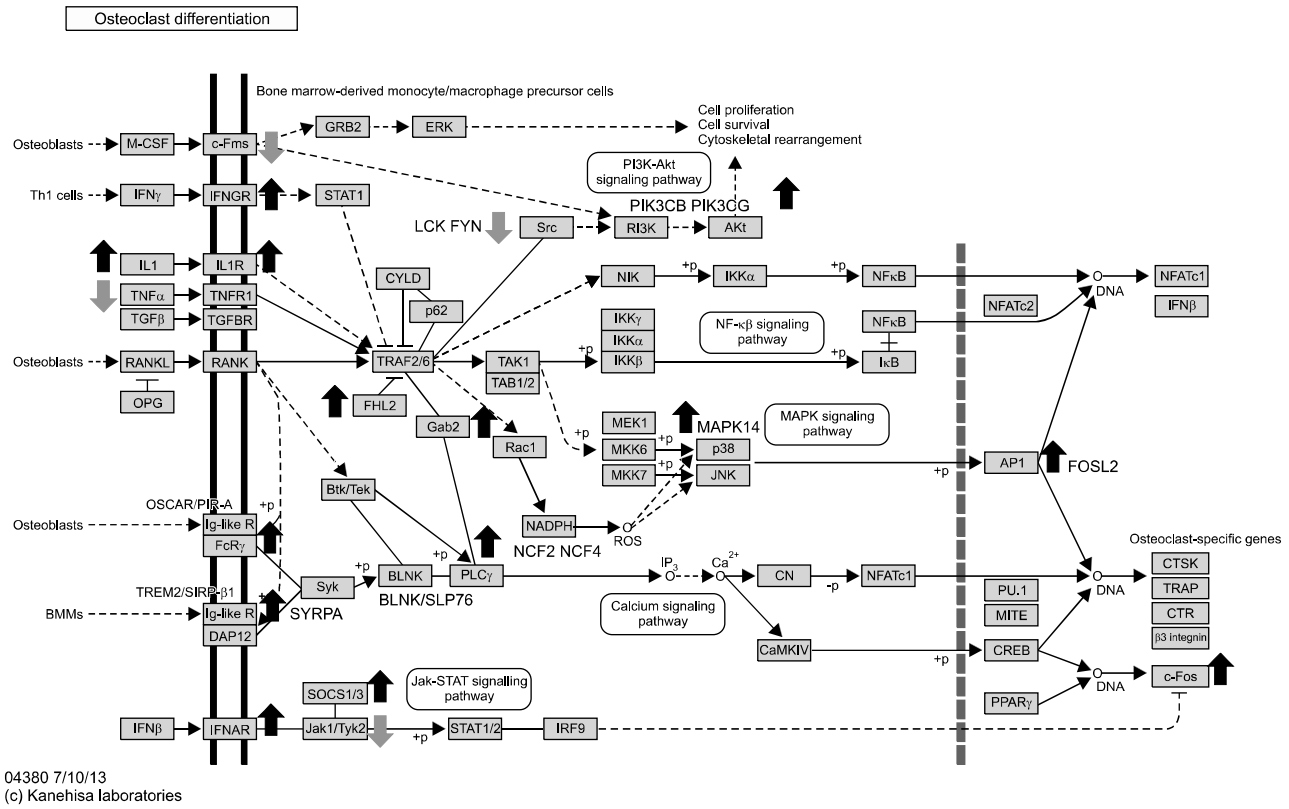

Figure 2. Osteoclast differentiation pathway (Kyoto Encyclopedia of Genes and Genomes [KEGG] PATHWAY map04380) identified as the enriched functional pathway in spondyloarthritis/ankylosing spondylitis (SpA/AS).

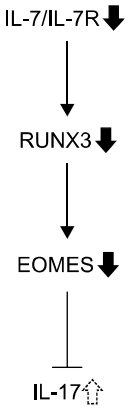

Figure 3. Deficiency of EOMES, RUNX3, and IL7R in whole blood of spondyloarthritis/ankylosing spondylitis (SpA/AS) patients may be able to induce the increased production of IL-17. IL7R: interleukin-7 receptor, EOMES: eomesodermin.

and spondylitis were IL-23 and T cell-dependent, and CD4+ T cells transferred arthritis and spondylitis to severe combined immunodeficiency recipient mice. In line with these results, our meta-analysis also showed decreased expression of ZAP-70 in whole blood of SpA/AS patients.

In this study, some limitations have to be considered. The magnitude of differential expression of genes observed in the included studies was generally low. Several cellular components are included when using whole blood. Therefore gene expression profile obtained from whole blood is the combined gene expression profile from each cell subpopulation included in whole blood. Furthermore we found little overlap in the DEGs that were observed in each meta-analysis. However, several common enrichment pathways were observed in the results of meta-analysis and the previous microarray result using whole blood. Previous report suggested that it is possible to get significant enrichment pathways of genes with small change, even if gene expression change is small and the significance is difficult to detect [35]. Actually, pathway analysis was reported to be more consistent and reproducible across studies than individual gene detection [19].

CONCLUSION

We identified several common enrichment pathways in

DEGs of whole blood and synovium from SpA/AS patients including pathways involved in TLR signaling, Osteoclast differentiation, T cell receptor signalling and Jak-STAT signalling. Furthermore, our results indicated that multiple genes involved in IL-23/Th17 pathway and T cell activation were dysregulated in SpA/AS patients. Further studies to verify our results may provide insight into the pathogenesis of SpA/AS.

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CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

SUPPLEMENTARY MATERIALS

Supplementary material can be found with this article online at https://doi.org/10.4078/jrd.2016.23.6.363.

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Supplementary Table 1. The complete list of DEGs in whole blood of SpA/AS patients

Entrez ID	Name	Combined RP	Ave Log FC	P val
7503	XIST	127.3141031	-1.955798302	0
9086	EIF1AY	141.3028291	2.027392248	0
1669	DEFA4	253.2385423	1.156735547	0
3126	HLA-DRB4	357.9742089	-0.82126813	0
246126	TXLNG2P	378.0883468	1.253128194	0
8287	USP9Y	446.9559003	1.413623981	0
5616	PRKY	463.644046	0.835877122	0
6286	S100P	478.0240351	1.037021707	0
54674	LRRN3	478.9544631	-0.704669601	0
6590	SLPI	493.4733103	0.862581578	0
3003	GZMK	534.8128051	-0.652832803	0
55655	NLRP2	535.2706088	-0.745163013	0
160364	CLEC12A	540.7452082	0.783896925	0
51266	CLEC1B	546.28354	0.820509913	0
25907	TMEM158	565.3296841	0.815786885	0
249	ALPL	584.0541717	0.748907815	0
5266	PI3	625.9167856	0.724056285	0
7504	XK	637.7026025	0.730813337	0
55432	YOD1	651.1813351	0.802570838	0
5197	PF4V1	651.8565313	0.71766316	0
116369	SLC26A8	653.2374286	0.755958361	0
2994	GYPB	656.2040855	0.658723872	0
23643	LY96	656.6242435	0.747169029	0
8460	TPST1	666.3325273	0.736748134	0
3957	LGALS2	670.3172419	0.678310035	0
54097	FAM3B	670.7251032	0.830293615	0
5627	PROS1	722.7358531	0.748588133	0
340205	TREML1	723.8779563	0.723682802	0
10398	MYL9	727.9734486	0.739617311	0
8727	CTNNAL1	732.3892979	0.749073427	0
338339	CLEC4D	736.0148473	0.678188605	0
3004	GZMM	752.3180524	-0.654795802	0
10219	KLRG1	754.5010324	-0.61957876	0
3240	HP	777.4195529	0.625526557	0
3429	IFI27	783.6702691	0.641439387	0
22932	POMZP3	785.6893853	-0.552535982	0

3823	KLRC3	790.7957129	-0.582500988	0
7111	TMOD1	791.2114702	0.589849032	0
6283	S100A12	791.4726279	0.684478371	0
27284	SULT1B1	795.9999496	0.675864023	0
1675	CFD	796.8163084	-0.465831033	0
199675	C19orf59	801.6014909	0.655776874	0
7404	UTY	824.1115865	0.67165895	0
2815	GP9	827.0112157	0.617229778	0
925	CD8A	832.9153433	-0.564223262	0
4057	LTF	837.1117253	0.579046856	0
2791	GNG11	858.6278216	0.72368324	0
8320	EOMES	866.5812482	-0.578193109	0
759	CA1	866.7042182	0.582027603	0
2153	F5	868.8108158	0.576762713	0
306	ANXA3	874.7051637	0.640186867	0
83853	ROPN1L	878.4982873	0.635688346	0
3674	ITGA2B	880.733849	0.631412689	0
8292	COLQ	884.1866111	-0.566930324	0
259197	NCR3	886.862244	-0.598845563	0
7130	TNFAIP6	892.5182899	0.592776043	0
11126	CD160	902.2833155	-0.547698924	0
11026	LILRA3	907.9476238	-0.37963438	0
1824	DSC2	909.5538694	0.612799589	0
917	CD3G	912.0078079	-0.346623967	0
4709	NDUFB3	916.2797528	0.619986599	0
9241	NOG	918.2730543	-0.505622869	0
710	SERPING1	919.9332261	0.447050442	0
54855	FAM46C	921.7188621	0.528933427	0
660	BMX	933.0333184	0.58629105	0
916	CD3E	934.4432323	-0.532825834	0
54502	RBM47	937.107035	0.591820879	0
1521	CTSW	951.9660984	-0.566759862	0
3560	IL2RB	954.0397199	-0.582314153	0
8436	SDPR	965.0594232	0.574306401	0
932	MS4A3	965.8030123	0.533428023	0
4318	MMP9	976.9806106	0.447939119	0
83888	FGFBP2	989.1874974	-0.477191883	0
8876	VNN1	990.5469797	0.521307034	0

140807	KRT72	993.4144592	-0.420063574	0
140606	SELM	993.6548566	-0.49106486	0
10335	MRVI1	999.7366626	0.43302474	0
9289	GPR56	1008.81247	-0.45723616	0
820	CAMP	1009.528207	0.499846743	0
388228	SBK1	1028.110471	-0.553290478	0
6947	TCN1	1031.812697	0.453597556	0
343171	OR2W3	1034.066096	0.410808969	0
55007	FAM118A	1039.072725	-0.34627675	0
5909	RAP1GAP	1043.502987	0.655386905	0
55363	HEMGN	1045.472901	0.500507893	0
23500	DAAM2	1051.080815	0.579956065	0
994	CDC25B	1053.158061	-0.528344682	0
5473	PPBP	1056.059801	0.581202428	0
7544	ZFY	1057.284271	0.556181813	0
3212	HOXB2	1059.164644	-0.40946058	0
7049	TGFBR3	1061.308136	-0.508585645	0
81671	VMP1	1062.058014	0.483054216	0
2999	GZMH	1065.698779	-0.322029189	0
2053	EPHX2	1071.739806	-0.452887084	0
64105	CENPK	1079.356829	-0.318465452	0
8175	SF3A2	1082.783932	-0.468846709	0
2235	FECH	1083.863752	0.500562175	0
9334	B4GALT5	1085.743566	0.448410604	0
79037	PVRIG	1091.083969	-0.523928605	0
7439	BEST1	1092.196435	0.463030737	0
1178	CLC	1097.237029	0.442125106	0
91612	CHURC1	1099.064165	0.372771667	0
6622	SNCA	1105.91022	0.316565019	0
79971	WLS	1115.05093	0.428142745	0
5551	PRF1	1117.546499	-0.487471071	0
7850	IL1R2	1122.893831	0.529649353	0
10223	GPA33	1124.948277	-0.408627795	0
8857	FCGBP	1127.667914	-0.471305832	0
170622	COMMD6	1129.595488	0.515773425	0
239	ALOX12	1130.635963	0.488226689	0
3434	IFIT1	1133.663759	0.360520467	0
3811	KIR3DL1	1136.444384	-0.387539238	0

4001	LMNB1	1139.18919	0.402590094	0
7127	TNFAIP2	1139.811413	0.368233417	0
1028	CDKN1C	1142.507426	-0.468976349	0
3017	HIST1H2BD	1143.779927	0.52604823	0
3001	GZMA	1148.459847	-0.352880526	0
669	BPGM	1150.716719	0.505589875	0
3512	IGJ	1153.459743	0.360520729	0
762	CA4	1156.091152	0.400653791	0
838	CASP5	1157.504049	0.4862741	0
6678	SPARC	1160.430598	0.527259253	0
51191	HERC5	1163.219037	0.362804934	0
9349	RPL23	1163.861438	0.533656489	0
53637	S1PR5	1168.745816	-0.496744115	0
338440	ANO9	1170.180769	-0.425166552	0
55356	SLC22A15	1173.651055	0.503688685	0
10516	FBLN5	1176.734479	-0.420514662	0
387837	CLEC12B	1181.88317	0.494320406	0
4818	NKG7	1194.139383	-0.462182614	0
1844	DUSP2	1194.723914	-0.414356103	0
10578	GNLY	1198.681919	-0.356792375	0
48	ACO1	1202.990169	-0.406987486	0
6154	RPL26	1206.055763	0.339825842	0
2710	GK	1212.972239	0.518397823	0
116173	CMTM5	1213.38497	0.47929481	0
939	CD27	1213.491154	-0.423580058	0
6583	SLC22A4	1214.546313	0.496504556	0
146225	CMTM2	1217.934894	0.551382101	0
140809	SRXN1	1218.324107	0.506402712	0
26499	PLEK2	1218.582514	0.38160923	0
919	CD247	1225.116967	-0.494395657	0
1349	COX7B	1228.096192	0.493830535	0
117157	SH2D1B	1231.230951	-0.341497545	0
634	CEACAM1	1233.907701	0.498910075	0
25893	TRIM58	1234.530619	0.382846324	0
3902	LAG3	1235.365973	-0.418613019	0
6521	SLC4A1	1240.952981	0.293280498	0
222487	GPR97	1243.538273	0.442757395	0
1991	ELANE	1244.474226	0.496810205	0

9022	CLIC3	1245.983529	-0.407782327	0
2210	FCGR1B	1249.442466	0.471403982	0
116071	BATF2	1249.682688	0.518331973	0
23253	ANKRD12	1251.437669	0.309465583	0
152518	NFXL1	1252.513527	-0.26068533	0
1524	CX3CR1	1259.498194	-0.503440979	0
51510	CHMP5	1261.535491	0.507571555	0
3437	IFIT3	1273.931829	0.401235425	0
51372	CCDC72	1274.00623	0.49879496	0
284058	KANSL1	1275.330505	-0.398369108	0
9214	FAIM3	1275.708823	-0.478801331	0
152189	CMTM8	1291.176219	-0.365848418	0
79050	NOC4L	1292.434659	-0.359979332	0
79908	BTNL8	1293.663611	0.232373525	0
2946	GSTM2	1294.442694	-0.311218456	0
84418	CYSTM1	1296.726499	0.513288668	0
2766	GMPR	1301.187614	0.285421071	0
9823	ARMCX2	1304.88558	-0.410863886	0
8870	IER3	1305.129418	0.325290511	0
8638	OASL	1309.000781	0.390460359	0
83699	SH3BGRL2	1309.051999	0.513238427	0
9185	REPS2	1310.1616	0.440287128	0
154	ADRB2	1311.215839	-0.456872806	0
100	ADA	1314.507974	-0.474633782	0
257101	ZNF683	1314.631996	-0.385614542	0
7295	TXN	1319.695401	0.497444031	0
1236	CCR7	1325.544908	-0.385178005	0
2162	F13A1	1328.248208	0.437973191	0
122402	TDRD9	1329.048749	0.414534037	0
53347	UBASH3A	1331.576677	-0.417001246	0
10663	CXCR6	1332.063089	-0.428403127	0
57730	ANKRD36B	1337.059765	-0.219135006	0
7099	TLR4	1337.996314	0.463130685	0
1545	CYP1B1	1343.39745	0.352217279	0
89872	AQP10	1346.988495	0.494120056	0
1593	CYP27A1	1347.145387	0.347184576	0
671	BPI	1348.327888	0.326307637	0
29901	SAC3D1	1351.270681	-0.378422786	0

54210	TREM1	1351.538094	0.456238065	0
3772	KCNJ15	1355.393909	0.471054685	0
3433	IFIT2	1357.664237	0.412816569	0
8825	LIN7A	1359.317317	0.45338379	0
1084	CEACAM3	1364.040118	0.446825426	0
79156	PLEKHF1	1365.839359	-0.430536589	0
51058	ZNF691	1367.229911	-0.317464432	0
2150	F2RL1	1367.584481	0.359340534	0
5166	PDK4	1371.202557	0.354608933	0
27258	LSM3	1378.017903	0.497644325	0
220929	ZNF438	1378.073004	0.449463017	0
149628	PYHIN1	1378.254064	-0.435849894	0
5729	PTGDR	1379.647188	-0.436900212	0
6732	SRPK1	1380.471935	0.468081812	0
1397	CRIP2	1389.598871	-0.299680931	0
378938	MALAT1	1390.60607	0.343038684	0
3804	KIR2DL3	1391.337735	-0.261360253	0
51466	EVL	1392.077119	-0.429824464	0
116151	FAM210B	1392.93318	0.260937032	0
116844	LRG1	1396.602768	0.374245282	0
7739	ZNF185	1402.193744	0.442299418	0
23157	42253	1404.119923	-0.411642235	0
64180	DPEP3	1405.321548	0.352689025	0
23531	MMD	1406.365963	0.397259538	0
81027	TUBB1	1408.301104	0.36494962	0
51206	GP6	1408.394471	0.387954622	0
3690	ITGB3	1415.066258	0.463223062	0
91523	FAM113B	1416.098374	-0.368771835	0
64407	RGS18	1418.90392	0.385306511	0
116236	ABHD15	1421.807338	-0.436011144	0
4753	NELL2	1422.14301	-0.398644274	0
5790	PTPRCAP	1423.702913	-0.388247534	0
23347	SMCHD1	1423.783343	0.355352633	0
79616	CCNJL	1427.153113	0.388032659	0
1117	CHI3L2	1428.039227	-0.306250179	0
121551	BTBD11	1429.591736	-0.372826779	0
118932	ANKRD22	1433.076957	0.444554566	0
54900	LAX1	1440.351202	-0.41443032	0

5990	RFX2	1441.377812	0.391061176	0
9636	ISG15	1442.506548	0.33389747	0
5742	PTGS1	1444.299841	0.434367626	0
3810	KIR2DS5	1446.096109	-0.346317717	0
92304	SCGB3A1	1446.118507	-0.434555935	0
969	CD69	1450.641489	-0.281432831	0
1847	DUSP5	1452.367881	-0.394522943	0
433	ASGR2	1456.510907	0.369900474	0
7706	TRIM25	1457.729343	0.422246556	0
157285	SGK223	1458.021829	-0.419154159	0
6648	SOD2	1462.084987	0.433524708	0
3084	NRG1	1463.302023	0.438051283	0
115294	PCMTD1	1464.868291	0.441905179	0
266747	RGL4	1469.423336	0.392143245	0
4084	MXD1	1470.644617	0.416276834	0
126282	TNFAIP8L1	1472.947423	-0.37938861	0
114882	OSBPL8	1477.330343	0.314942683	0
79865	TREML2	1477.335926	0.41730955	0
6036	RNASE2	1481.064308	0.286360462	0
7381	UQCRB	1482.449153	0.39039566	0
23462	HEY1	1484.105691	0.351826431	0
1901	S1PR1	1484.749201	-0.428308484	0
7391	USF1	1487.673073	0.277159038	0
914	CD2	1489.176551	-0.41507604	0
1350	COX7C	1491.776863	0.247728346	0
6775	STAT4	1493.54613	-0.428311508	0
133	ADM	1493.770811	0.31704117	0
2944	GSTM1	1495.290201	-0.218282035	0
9886	RHOBTB1	1495.756956	0.40138611	0
58484	NLRC4	1496.113488	0.390688853	0
4680	CEACAM6	1497.421837	0.369088871	0
2833	CXCR3	1498.654146	-0.391553716	0
57134	MAN1C1	1499.998808	-0.362023369	0
143686	SESN3	1501.917247	0.360197308	0
1609	DGKQ	1505.318533	-0.436025749	0
2882	GPX7	1507.711948	-0.348881654	0
10857	PGRMC1	1509.622281	0.418296039	0
665	BNIP3L	1512.648848	0.445067092	0

387066	SNHG5	1516.230643	-0.239132737	0
3824	KLRD1	1516.590749	-0.343910149	0
8291	DYSF	1517.376812	0.313266566	0
81892	SLIRP	1520.252299	0.307464176	0
6809	STX3	1522.040391	0.409418727	0
255488	RNF144B	1523.606282	0.398336522	0
5743	PTGS2	1524.69867	0.3602278	0
115653	KIR3DL3	1525.459033	-0.342377867	0
23659	PLA2G15	1530.315547	-0.285965678	0
162394	SLFN5	1533.86309	-0.187906788	0
57568	SIPA1L2	1538.148561	0.383002157	0
4082	MARCKS	1538.584283	0.391440022	0
80216	ALPK1	1539.722813	0.342830503	0
340348	TSPAN33	1540.676242	0.401552794	0
9840	KIAA0748	1541.428556	-0.340921828	0
5583	PRKCH	1541.532417	-0.423663748	0
4697	NDUFA4	1541.574621	0.244322814	0
10135	NAMPT	1544.415895	0.374677481	0
167227	DCP2	1544.469446	0.427869262	0
1066	CES1	1545.147041	0.317158069	0
340542	BEX5	1546.479321	-0.324537902	0
3002	GZMB	1553.771737	-0.267815173	0
54536	EXOC6	1556.396355	0.422363704	0
113246	C12orf57	1556.627154	-0.280211265	0
57520	HECW2	1559.372514	0.417119279	0
6228	RPS23	1559.442733	-0.331640834	0
27065	D4S234E	1559.87751	-0.189172566	0
643977	FLJ32255	1560.750391	-0.287564155	0
604	BCL6	1560.830291	0.353213063	0
158295	MGC24103	1563.16879	-0.22111149	0
255231	MCOLN2	1564.428091	-0.352391583	0
212	ALAS2	1564.589297	0.378346087	0
2323	FLT3LG	1566.143323	-0.366310041	0
340527	NHSL2	1569.205567	0.284440369	0
7264	TSTA3	1570.562112	0.411817668	0
284415	VSTM1	1571.643036	0.30151544	0
85002	FAM86B1	1573.520552	-0.328223581	0
975	CD81	1573.847693	-0.400619777	0

11184	MAP4K1	1574.460551	-0.395975075	0
2212	FCGR2A	1575.561174	0.378880638	0
10911	UTS2	1575.880951	0.690484549	0
6478	SIAH2	1576.166557	0.413651655	0
51099	ABHD5	1577.466607	0.387472466	0
6352	CCL5	1579.045132	-0.372118986	0
79144	PPDPF	1581.64664	-0.346233594	0
57419	SLC24A3	1584.776335	0.424538624	0
84281	C2orf88	1586.743222	0.333200031	0
90952	ESAM	1587.081441	0.418174822	0
8379	MAD1L1	1587.345305	-0.383930247	7.46E-05
1649	DDIT3	1589.086324	0.39181301	0
5816	PVALB	1592.635575	0.292763924	0
8804	CREG1	1592.696077	0.440058648	0
9447	AIM2	1593.947635	0.36767473	0
6129	RPL7	1595.093067	0.441001873	0
6160	RPL31	1595.354348	0.29427384	0
1462	VCAN	1597.07506	0.16526294	0
9235	IL32	1597.528568	-0.346798048	7.41E-05
84874	ZNF514	1602.086797	-0.359868974	7.35E-05
1378	CR1	1602.262692	0.394204288	0
54843	SYTL2	1602.50256	-0.352558206	7.30E-05
11057	ABHD2	1602.798502	0.367831073	0
10225	CD96	1607.67193	-0.369563376	7.25E-05
11213	IRAK3	1608.211593	0.41843575	0
1622	DBI	1608.433597	0.286978708	0
2842	GPR19	1608.953542	-0.271667715	7.19E-05
81606	LBH	1612.357499	-0.376809332	7.14E-05
400986	ANKRD36C	1612.554599	-0.327466599	7.09E-05
4063	LY9	1612.780152	-0.40359785	7.04E-05
5685	PSMA4	1618.418632	0.371859976	0
6504	SLAMF1	1620.327965	-0.363422954	6.99E-05
10838	ZNF275	1621.086794	-0.357870594	6.94E-05
114769	CARD16	1621.278522	0.447898948	0
3620	IDO1	1624.090179	0.202390518	0
121512	FGD4	1626.277256	0.371800791	0
930	CD19	1627.830106	-0.18877372	6.85E-05
387882	C12orf75	1629.682895	-0.29750648	6.80E-05

166	AES	1629.791634	-0.339194464	6.76E-05
51218	GLRX5	1631.988387	0.285215556	0
1786	DNMT1	1633.000304	-0.41271258	6.71E-05
55350	VNN3	1635.313754	0.322686127	0
122416	ANKRD9	1635.614967	0.427925892	0
9806	SPOCK2	1635.863258	-0.418743573	6.67E-05
55619	DOCK10	1638.284416	-0.394706105	6.62E-05
2204	FCAR	1639.511011	0.313444591	0
1964	EIF1AX	1640.593229	-0.340845483	6.58E-05
597	BCL2A1	1641.703464	0.352048494	3.98E-05
129642	MBOAT2	1641.858797	0.392264288	3.97E-05
4145	MATK	1642.386996	-0.363655782	6.54E-05
10333	TLR6	1643.58456	0.330766196	3.95E-05
51065	RPS27L	1643.905649	0.32726052	3.94E-05
6403	SELP	1644.013333	0.401665227	3.92E-05
2811	GP1BA	1647.285998	0.344144281	3.91E-05
51257	42065	1648.919151	0.320496762	3.89E-05
152485	ZNF827	1649.035875	-0.376061153	6.49E-05
399761	BMS1P5	1650.132432	0.240943779	3.88E-05
2180	ACSL1	1650.596204	0.410394823	3.86E-05
51326	ARL17A	1651.121606	-0.324194344	6.45E-05
200942	KLHDC8B	1654.114515	0.322139156	3.85E-05
147184	TMEM99	1655.44675	-0.340359197	6.41E-05
7941	PLA2G7	1656.574343	0.288687813	3.83E-05
10184	LHFPL2	1659.704989	0.419621941	3.82E-05
51313	FAM198B	1660.425832	0.286440697	3.80E-05
400713	ZNF880	1660.618275	-0.276106787	6.37E-05
3985	LIMK2	1661.521323	0.371836849	3.79E-05
80127	C14orf45	1663.362616	0.350718242	3.77E-05
1230	CCR1	1665.7112	0.305700625	3.76E-05
4317	MMP8	1668.437007	0.356443474	3.75E-05
9911	TMCC2	1668.461308	0.388291204	3.73E-05
124935	SLC43A2	1669.117834	0.31400284	3.72E-05
4900	NRGN	1669.595073	0.249211686	3.70E-05
387751	GVINP1	1673.557764	-0.278552695	0.0001266
9397	NMT2	1675.994589	-0.353043173	0.0001258
4061	LY6E	1678.36313	-0.169071222	0.000125
4824	NKX3-1	1679.669638	-0.229795152	0.0001242

22806	IKZF3	1679.870968	-0.379799185	0.0001235
285172	FAM126B	1680.012661	0.232711489	3.69E-05
3695	ITGB7	1680.044859	-0.403642833	0.0001227
57192	MCOLN1	1680.784434	0.216815909	3.68E-05
3575	IL7R	1681.967238	-0.36369288	0.000122
221061	FAM171A1	1682.079192	-0.332563133	0.0001212
7351	UCP2	1682.306366	-0.379564305	0.0001205
10320	IKZF1	1683.151005	-0.223239211	0.0001198
7267	TTC3	1685.966594	-0.343431772	0.0001183
81932	HDHD3	1686.181571	-0.334800105	0.0001176
6139	RPL17	1690.063517	0.249365846	7.30E-05
682	BSG	1693.265654	-0.144942399	0.000117
84851	TRIM52	1694.674668	-0.315630413	0.0001163
602	BCL3	1696.021901	0.344955229	7.27E-05
56949	XAB2	1699.188778	-0.317763332	0.0001156
58528	RRAGD	1700.744328	0.383366062	7.25E-05
383	ARG1	1700.989768	0.376294196	7.22E-05
10417	SPON2	1702.060488	-0.273473046	0.0001143
10610	ST6GALNAC2	1702.175683	0.337039088	0.0001079
8218	CLTCL1	1704.33862	0.315521493	0.0001075
3006	HIST1H1C	1704.63201	0.331790493	0.0001071
373	TRIM23	1705.973135	0.212096301	0.0001068
84514	GHDC	1707.559598	-0.28766579	0.0001136
2161	F12	1708.061748	0.274588033	0.0001064
3932	LCK	1712.292879	-0.368156525	0.000113
84324	SARNP	1714.007242	0.350287317	0.0001056
58488	PCTP	1714.085934	0.408797116	0.0001053
162966	ZNF600	1714.63646	-0.334157846	0.0001124
259215	LY6G6F	1715.277289	0.40371265	0.0001049
51167	CYB5R4	1716.11316	0.387053627	0.0001045
22921	MSRB2	1716.134134	0.404040636	0.0001042
1743	DLST	1716.315765	-0.284203298	0.0001117
953	ENTPD1	1718.029157	0.380861438	0.0001038
7145	TNS1	1718.699447	0.139224236	0.0001034
2137	EXTL3	1720.840618	0.261696634	0.0001031
5023	P2RX1	1723.317391	0.293837291	0.0001027
8357	HIST1H3H	1726.804367	0.274465763	0.0001706
5728	PTEN	1728.398495	0.431008635	0.0001701

84771	DDX11L2	1731.196594	0.23255986	0.0001695
51121	RPL26L1	1732.949396	0.287169293	0.0001689
26278	SACS	1736.35384	-0.302393035	0.0001111
27236	ARFIP1	1736.461413	0.335907182	0.0001684
58191	CXCL16	1737.639076	0.301548532	0.0001678
7292	TNFSF4	1738.337348	0.348795948	0.0001672
1362	CPD	1738.644119	0.331161137	0.0001661
7535	ZAP70	1741.946685	-0.385779492	0.0001099
10801	42256	1742.214437	-0.324924599	0.0001093
9978	RBX1	1742.278631	0.306322234	0.0001987
10855	HPSE	1743.752635	0.345111612	0.000198
2289	FKBP5	1744.307009	0.31745681	0.0001974
10236	HNRNPR	1744.634775	-0.391031279	0.0001087
162466	PHOSPHO1	1748.698435	0.216231289	0.0001954
4835	NQO2	1749.264246	0.283469825	0.0001948
3702	ITK	1750.39514	-0.349681961	0.0001081
84058	WDR54	1750.625246	-0.342748083	0.0001075
29093	MRPL22	1750.920947	0.157659196	0.0001942
1432	MAPK14	1754.546327	0.29985051	0.0002251
22848	AAK1	1755.184023	-0.407189988	0.000107
1871	E2F3	1755.661984	0.370131607	0.0002244
3820	KLRB1	1757.553225	-0.218533027	0.0001064
64965	MRPS9	1758.114108	-0.335876751	0.0001058
3148	HMGB2	1758.688046	0.408523458	0.0002236
51639	SF3B14	1758.834481	0.388499191	0.0002229
9047	SH2D2A	1759.667698	-0.323311474	0.0001053
158248	TTC16	1760.718891	-0.307118032	0.0001047
4311	MME	1760.943412	0.311224335	0.0002222
128646	SIRPD	1761.649385	0.285094307	0.0002215
3326	HSP90AB1	1761.798917	-0.379296295	0.0001042
114823	LENG8	1762.46619	-0.301875716	0.0001036
29097	CNIH4	1763.483444	0.423152932	0.0002524
22934	RPIA	1764.332581	0.333998774	0.0002516
222166	C7orf41	1767.248931	0.402414648	0.0002508
3005	H1F0	1769.248118	0.1990581	0.00025
30061	SLC40A1	1769.876605	0.38823246	0.0002492
4306	NR3C2	1771.011865	-0.322486887	0.0001031
79961	DENND2D	1771.328832	-0.373148453	0.0001026

22898	DENND3	1772.061816	0.318124638	0.0002484
64847	SPATA20	1772.137398	0.212095924	0.0002477
84984	CEP19	1775.118645	0.35230206	0.0002469
84649	DGAT2	1775.320382	0.342868578	0.0002462
9466	IL27RA	1776.425559	-0.369135513	0.000102
22875	ENPP4	1777.056192	-0.248382721	0.0001015
978	CDA	1777.174024	0.291078602	0.0002454
257019	FRMD3	1782.555465	0.350181212	0.0002446
56996	SLC12A9	1785.033825	0.311399374	0.0002439
6279	S100A8	1785.198683	0.377556075	0.0002432
57095	PITHD1	1785.811159	0.304786467	0.0002424
84247	LDOC1L	1786.058148	-0.369670329	0.0001508
5037	PEBP1	1787.863988	-0.310094808	0.00015
5775	PTPN4	1789.74689	-0.322515946	0.0001493
83988	NCALD	1791.403539	-0.365389837	0.0001485
440270	GOLGA8B	1791.682143	-0.301909115	0.0001478
28955	DEXI	1795.199468	-0.331835292	0.0001471
2017	CTTN	1795.523051	0.338383365	0.0002719
274	BIN1	1795.570215	-0.35616237	0.0001463
120224	TMEM45B	1796.384018	0.236694302	0.0002711
3553	IL1B	1796.501566	0.292301227	0.0002703
231	AKR1B1	1796.942875	-0.362037467	0.0001942
641649	TMEM91	1797.792093	0.351136369	0.0002695
51673	TPPP3	1798.672191	-0.235921107	0.0001932
402055	SRRD	1799.439726	0.215051566	0.0002687
93058	COQ10A	1799.503873	-0.335034404	0.0001923
2358	FPR2	1799.966988	0.255117351	0.0002679
3475	IFRD1	1800.90287	0.353013786	0.0002671
26253	CLEC4E	1801.532419	0.325173442	0.0002959
4354	MPP1	1803.913197	0.323430453	0.0002941
84243	ZDHHC18	1804.256824	0.385081191	0.0002933
140885	SIRPA	1805.018602	0.313839365	0.0002924
57616	TSHZ3	1805.367164	0.244405385	0.0002915
5066	PAM	1807.80815	-0.25795593	0.0002871
79772	MCTP1	1808.164712	0.326144461	0.0002907
2272	FHIT	1810.688747	-0.19603144	0.0002857
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7056	THBD	1812.498426	0.327844765	0.0003478

9170	LPAR2	1814.234478	0.203492899	0.0003468
51192	CKLF	1814.356213	0.363957143	0.0003458
3590	IL11RA	1814.543165	-0.334285793	0.0003302
6556	SLC11A1	1821.104004	0.302457112	0.0003725
8365	HIST1H4H	1821.170686	0.309739202	0.0003714
150000	ABCC13	1821.740764	0.342379372	0.0003704
1209	CLPTM1	1823.256663	-0.260772373	0.0003756
59338	PLEKHA1	1825.172229	-0.352999507	0.0003738
9921	RNF10	1825.54503	0.248944014	0.0003966
9535	GMFG	1825.618854	0.356823205	0.0003955
8685	MARCO	1825.678835	0.174148451	0.0003944
8631	SKAP1	1825.82731	-0.326239382	0.0003721
153527	ZMAT2	1826.720356	0.368627324	0.0003933
64218	SEMA4A	1826.910084	0.232723289	0.0003922
139105	BEND2	1827.691718	0.373036234	0.0003911
165140	OXER1	1827.786212	0.230811039	0.00039
387357	THEMIS	1828.245562	-0.241785567	0.0003704
90075	ZNF30	1828.381135	-0.290225262	0.0003687
19	ABCA1	1830.35617	0.317706597	0.0003889
4121	MAN1A1	1831.454579	0.34321878	0.0003878
80124	VCPIP1	1838.97473	0.358569881	0.0003867
7294	TXK	1840.953922	-0.321447007	0.0004545
2123	EVI2A	1841.820845	0.222170868	0.0004132
6218	RPS17	1841.875073	0.216290717	0.0004121
5359	PLSCR1	1842.165167	0.369834072	0.000411
1880	GPR183	1843.221268	-0.27561415	0.0004977
1992	SERPINB1	1843.485041	0.373527055	0.0004372
1511	CTSG	1844.425842	0.292190395	0.000436
57126	CD177	1845.741349	0.377203936	0.0004336
51348	KLRF1	1847.020022	-0.159177816	0.0005405
924	CD7	1847.702474	-0.275478033	0.0005381
114799	ESCO1	1847.731192	0.234690354	0.0004324
6812	STXBP1	1848.138629	-0.220471121	0.0005357
64149	C17orf75	1848.805048	-0.300382888	0.0005333
1503	CTPS	1849.003599	-0.321386906	0.000531
64757	42064	1850.232933	0.28567241	0.0004313
94241	TP53INP1	1850.785494	0.367107506	0.0004301
50852	TRAT1	1854.1643	-0.137625189	0.0005727

8339	HIST1H2BG	1855.27375	0.364252748	0.0004826
5610	EIF2AK2	1858.277218	0.262210666	0.0004813
9015	TAF1A	1858.364555	-0.310006099	0.000614
10435	CDC42EP2	1858.452064	0.236450776	0.00048
27089	UQCRQ	1860.084303	0.245378641	0.0004787
10097	ACTR2	1861.712227	0.262981544	0.0004775
51338	MS4A4A	1861.81037	0.319693726	0.0004762
136051	ZNF786	1862.014026	-0.263177419	0.0006987
24138	IFIT5	1862.984499	0.314551716	0.0004749
80700	UBXN6	1863.368436	0.234760437	0.0004737
1089	CEACAM4	1864.188985	0.282230436	0.0004712
84519	ACRBP	1864.296266	0.339553588	0.00047
84707	BEX2	1866.173849	-0.140268933	0.0007391
2867	FFAR2	1866.565553	0.277575021	0.0004688
2648	KAT2A	1867.665238	-0.28172145	0.0007328
79033	ERI3	1867.778323	-0.237782303	0.0007296
23569	PADI4	1868.130705	0.175552807	0.0004675
54951	COMMD8	1868.177368	0.138448438	0.0004663
79056	PRRG4	1869.135808	0.307236418	0.0004651
9489	PGS1	1870.794019	0.257261842	0.0004639
11275	KLHL2	1872.156016	0.335908251	0.0004627
5588	PRKCQ	1873.525655	-0.340876572	0.0007265
8676	STX11	1874.487642	0.296023561	0.0004615
25911	DPCD	1874.755317	0.295926291	0.0004604
64651	CSRNP1	1875.523456	0.311312461	0.0004592
5611	DNAJC3	1876.133865	0.335551109	0.000458
5730	PTGDS	1876.410893	-0.256055022	0.0007234
4851	NOTCH1	1877.177736	0.266350073	0.0004569
51176	LEF1	1877.459563	-0.278654374	0.0007203
6533	SLC6A6	1877.855602	0.298211446	0.0004557
1955	MEGF9	1878.004378	0.295435167	0.0004545
493856	CISD2	1878.460867	0.397076995	0.0004534
23052	ENDOD1	1878.740417	0.322310836	0.0004523
5210	PFKFB4	1880.792583	0.305306482	0.0004762
55311	ZNF444	1880.919766	-0.225182977	0.0007173
23604	DAPK2	1882.707778	0.3072759	0.000475
7268	TTC4	1882.934765	-0.310267051	0.0007143
8242	KDM5C	1883.699282	-0.308279794	0.0007113

147015	DHRS13	1885.061107	0.274638284	0.0004988
50862	RNF141	1887.050847	0.363885238	0.0005224
439949	LOC439949	1887.668654	-0.219045715	0.0007438
56911	C21orf7	1890.814604	0.288533549	0.0005459
54517	PUS7	1891.283779	-0.288136969	0.0007347
29851	ICOS	1891.580928	-0.108754599	0.0007287
4724	NDUFS4	1891.677801	0.268473444	0.0005446
722	C4BPA	1891.94557	-0.359953311	0.0007258
84263	HSDL2	1895.275654	0.375583385	0.0005679
1803	DPP4	1896.269188	-0.314352126	0.0007229
319085	ITPK1-AS1	1897.418659	0.254444436	0.0005665
85369	FAM40A	1898.067377	0.197280373	0.0005897
973	CD79A	1899.702668	-0.16873356	0.00072
11343	MGLL	1900.032377	0.283189936	0.0005882
116448	OLIG1	1901.404335	-0.266705794	0.0007171
23639	LRRC6	1903.087199	0.144545693	0.0006112
10644	IGF2BP2	1903.749391	0.202206348	0.0006341
155066	ATP6V0E2	1904.579734	-0.26880517	0.0007143
6016	RIT1	1905.219085	0.288842568	0.0006326
522	ATP5J	1907.872426	0.295745595	0.0006553
66008	TRAK2	1907.9915	0.305763314	0.0006538
9249	DHRS3	1910.455586	-0.304135888	0.0007905
353514	LILRA5	1911.374409	0.297478408	0.0007005
4635	MYL4	1912.055472	0.259105718	0.0006988
965	CD58	1912.266798	0.335403683	0.0006971
23390	ZDHHC17	1913.482491	0.293224398	0.0007194
51042	ZNF593	1913.983783	-0.224428399	0.0007874
8877	SPHK1	1915.238874	0.280747231	0.0007416
471	ATIC	1915.803262	-0.332661716	0.0008203
222235	FBXL13	1916.459897	0.258679948	0.0007399
3398	ID2	1916.503157	-0.312897011	0.0008171
9927	MFN2	1916.789119	0.233329692	0.0007381
283521	LINC00282	1917.976348	0.298611644	0.0007363
8663	EIF3C	1918.370033	0.162724276	0.0007346
2793	GNGT2	1919.065216	-0.3081823	0.000814
9019	MPZL1	1920.081506	0.319578067	0.0007565
5204	PFDN5	1920.658838	0.19579906	8.00E-04
8131	NPRL3	1920.907772	0.179466571	0.0007981

640	BLK	1921.207291	-0.260232213	0.0008108
128611	ZNF831	1921.530723	-0.300904888	0.0008077
161253	REM2	1921.625616	0.271590398	0.0007963
55769	ZNF83	1921.743142	-0.232722942	0.0008046
5291	PIK3CB	1923.041276	0.263144333	0.0007944
22915	MMRN1	1923.705948	0.328532754	0.0007925
116362	RBP7	1929.90675	0.256252974	0.0008372
6397	SEC14L1	1930.7899	0.286822242	0.0008353
27439	CECR6	1931.147062	0.163276977	0.0008565
84034	EMILIN2	1931.542392	0.276806358	0.0008545
51523	CXXC5	1932.301353	-0.32267469	0.0007985
56666	PANX2	1932.82358	0.327654427	0.0008525
6164	RPL34	1933.948907	0.107970997	0.0008966
221178	SPATA13	1936.242471	-0.351736045	0.0007955
8349	HIST2H2BE	1937.476903	0.293387381	0.0009174
23645	PPP1R15A	1940.559184	0.301028943	0.0009611
3595	IL12RB2	1940.625139	-0.295276796	0.0007925
64795	RMND5A	1941.738825	0.353550105	0.0009589
79673	ZNF329	1941.788655	-0.295809463	0.0007895
57228	SMAGP	1943.889505	-0.277218826	0.0007865
1968	EIF2S3	1943.991418	-0.308776839	0.0007836
4783	NFIL3	1944.434397	0.339899066	0.0009567
355	FAS	1945.106014	0.321121572	0.0009545
3399	ID3	1946.14362	-0.269332709	0.0008178
79895	ATP8B4	1947.492065	0.295285603	0.0009751
6637	SNRPG	1947.496958	0.195807221	0.0009729
3566	IL4R	1949.957767	0.225080655	0.0009707
79002	C19orf43	1950.510335	0.18622971	0.0009685
864	RUNX3	1950.912156	-0.352358197	0.0008889
11098	PRSS23	1952.668891	-0.285922457	0.0008856
9958	USP15	1953.343897	0.331044435	0.0009888
10521	DDX17	1955.910118	-0.138458224	0.0008824
5243	ABCB1	1958.644947	-0.34937046	0.0009158
4780	NFE2L2	1961.42693	0.272821021	0.0010291
81030	ZBP1	1962.038891	0.202711367	0.0010268
3717	JAK2	1962.047211	0.330182574	0.0010245
83452	RAB33B	1962.291312	0.313865788	0.0010222
64374	SIL1	1962.435252	-0.179944053	0.0009489

9500	MAGED1	1963.222359	-0.316373712	0.0009455
2534	FYN	1966.283115	-0.349241207	0.0010145
55340	GIMAP5	1966.297928	-0.308481527	0.0010108
3315	HSPB1	1968.076801	-0.322725089	0.0010072
8807	IL18RAP	1969.918172	-0.08718395	0.001
9422	ZNF264	1970.041156	-0.29226786	0.0009964
79730	NSUN7	1970.68724	0.301044439	0.0010865
57062	DDX24	1971.953189	-0.304883544	0.0009929
84953	MICALCL	1973.493572	0.231284585	0.0010841
8328	GFI1B	1973.519193	0.323454139	0.0010817
65018	PINK1	1973.674553	0.327450233	0.0010793
64859	OBFC2A	1973.79096	0.323555232	0.0010769
2035	EPB41	1974.364647	0.248137583	0.0010746
8347	HIST1H2BC	1974.803991	0.304293264	0.0010722
8972	MGAM	1974.827216	0.251499404	0.0010699
28998	MRPL13	1975.882041	0.154762658	0.0010893
51719	CAB39	1976.000403	0.267879637	0.001087
5294	PIK3CG	1976.533042	0.187633434	0.001128
203228	C9orf72	1977.497641	0.305964759	0.0011255
9452	ITM2A	1979.21227	-0.29885149	0.0011661
1731	42248	1980.359732	-0.298549781	0.001162
115352	FCRL3	1981.644085	-0.272082586	0.0011579
9189	ZBED1	1983.122739	0.234736758	0.0011422
3806	KIR2DS1	1983.218841	-0.154084334	0.0011888
60675	PROK2	1983.353815	0.254650555	0.0011398
113791	PIK3IP1	1983.738217	-0.304373405	0.0012195
4913	NTHL1	1984.923312	-0.201035263	0.0012847
54918	CMTM6	1985.83329	0.330585719	0.0011373
55701	ARHGEF40	1987.110185	0.258730455	0.0011563
8140	SLC7A5	1987.820793	0.173805672	0.0011514
10155	TRIM28	1988.324016	-0.327375587	0.0013149
643008	C17orf109	1988.968135	0.262768743	0.0011702
8991	SELENBP1	1989.879304	0.098332336	0.001189
50615	IL21R	1990.269232	-0.307587298	0.0014138
5899	RALB	1990.369378	0.348200321	0.0011864
959	CD40LG	1990.790127	-0.273607006	0.0014089
9556	C14orf2	1991.683728	0.221976689	0.0011839
3071	NCKAP1L	1992.518892	0.119119446	0.0011814

5557	PRIM1	1992.771702	-0.197122922	0.0013993
55317	AP5S1	1994.819332	-0.176924614	0.0013946
830	CAPZA2	1995.381755	0.301701724	0.0012
23001	WDFY3	1997.765963	0.297339569	0.0011975
50856	CLEC4A	1999.798913	0.311182841	0.0012159
131583	FAM43A	2000.266171	-0.318023197	0.0013898
1438	CSF2RA	2001.766882	0.30115583	0.0012134
59307	SIGIRR	2002.05296	-0.329721114	0.0014527
5732	PTGER2	2002.146847	-0.295781475	0.0014478
25853	DCAF12	2003.132661	0.109663677	0.0012317
11156	PTP4A3	2003.206571	0.234378557	0.0012292
79901	CYBRD1	2004.933485	0.242725916	0.0012448
6189	RPS3A	2005.510402	0.131642282	0.0012422
8216	LZTR1	2006.073318	-0.318418546	0.0014381
116115	ZNF526	2006.493992	-0.238592051	0.0014333
151516	ASPRV1	2006.858928	0.223160237	0.001281
3693	ITGB5	2007.517865	0.330669149	0.001299
5045	FURIN	2009.337848	0.301982965	0.0013169
339344	MYPOP	2009.928821	-0.212816858	0.0014618
3020	H3F3A	2010.935033	0.294327523	0.001373
9540	TP53I3	2011.071838	0.259792184	0.0013701
221037	JMJD1C	2011.197677	0.24172599	0.0013673
10870	HCST	2011.533115	-0.332025273	0.001457
5571	PRKAG1	2011.83457	0.155686255	0.0013646
7124	TNF	2012.487148	-0.258548557	0.0014521
5027	P2RX7	2013.129528	0.112727314	0.0013618
7100	TLR5	2015.941216	0.268265347	0.0013996
25949	SYF2	2016.605727	0.317986382	0.0013968
55	ACPP	2016.674685	0.31559964	0.0013939
2026	ENO2	2017.716806	-0.267904895	0.0016447
6038	RNASE4	2018.719011	0.204420776	0.0014315
3128	HLA-DRB6	2018.761709	-0.256934809	0.0016393
55911	APOBR	2019.84925	0.297318042	0.0014487
57396	CLK4	2020.589729	0.234303372	0.0014458
2274	FHL2	2021.194196	0.301838244	0.0014629
80005	DOCK5	2021.840934	0.271275589	0.00146
5586	PKN2	2022.493533	0.256400822	0.0014571
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923	CD6	2026.54123	-0.292898836	0.0016287
3759	KCNJ2	2028.800741	0.261544605	0.0015079
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55295	KLHL26	2030.522819	-0.245270718	0.0016883
57466	SCAF4	2031.491189	-0.325775741	0.0017152
7871	SLMAP	2031.564615	0.326279822	0.0015415
340061	TMEM173	2031.753575	-0.343896888	0.0017097
5799	PTPRN2	2032.045369	0.33888698	0.0015385
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79660	PPP1R3B	2036.742654	0.318439438	0.0016142
84134	TOMM40L	2041.703988	-0.177316217	0.001859
57864	SLC46A2	2041.977926	0.266127921	0.0016471
64167	ERAP2	2043.152892	0.159801429	0.0016438
5687	PSMA6	2043.35329	0.205807349	0.0016406
92342	METTL18	2044.408614	-0.226168582	0.001885
5087	PBX1	2045.323007	0.291529026	0.0017349
400916	CHCHD10	2045.920615	-0.300246237	0.001879
117854	TRIM6	2047.077402	0.250960227	0.0017899
26505	CNNM3	2047.748759	-0.173258243	0.0019683
5866	RAB3IL1	2048.162883	0.238447529	0.0018058
8360	HIST1H4D	2049.164377	0.297163979	0.0018411
1984	EIF5A	2050.353413	-0.097521951	0.001962
27301	APEX2	2050.872095	-0.257360552	0.0019558
56943	ENY2	2050.934477	0.342585361	0.0018726
6580	SLC22A1	2051.098076	0.355877478	0.001869
57655	GRAMD1A	2051.568332	0.309888364	0.0019038
145567	TTC7B	2052.101181	0.268211905	0.0019002
9640	ZNF592	2052.225374	0.207749112	0.0018966
8897	MTMR3	2052.586913	0.275493942	0.0018929
54930	HAUS4	2053.698615	0.289072071	0.0019466
84628	NTNG2	2053.811257	0.313912575	0.0019619
6785	ELOVL4	2053.819247	-0.262326208	0.0020126
84617	TUBB6	2055.368471	0.255384172	0.0019962
51237	MZB1	2056.541241	0.219155704	0.0020114
54682	MANSC1	2057.12965	0.284880717	0.0020076
2745	GLRX	2058.232816	0.287866963	0.0020038
283131	NEAT1	2058.458167	0.271695866	0.002
64919	BCL11B	2059.423118	-0.320132613	0.0021563

10211	FLOT1	2060.035011	0.291679427	0.0020527
760	CA2	2061.147871	0.214772111	0.0020677
8743	TNFSF10	2061.969983	0.351144041	0.0020826
440712	C1orf186	2063.78413	0.283693015	0.0020974
9656	MDC1	2063.816036	-0.237238133	0.0023364
1604	CD55	2064.164767	0.309661844	0.0021122
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440352	SNX29P2	2065.380378	-0.240430693	0.0023839
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55556	ENOSF1	2066.548438	-0.251895789	0.0024
3482	IGF2R	2068.229129	0.104551826	0.002216
57092	PCNP	2068.382412	0.153542584	0.0022119
1843	DUSP1	2068.938968	0.219185536	0.0022078
1647	GADD45A	2070.603915	0.306313534	0.0022593
4118	MAL	2070.73849	-0.196369645	0.0024847
55615	PRR5	2072.075031	-0.222817038	0.0025076
84892	C3orf39	2072.120607	-0.169808201	0.0025
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51596	CUTA	2073.246068	-0.276980642	0.0025228
286319	TUSC1	2073.381594	0.218064197	0.0022836
51100	SH3GLB1	2073.427248	0.334335866	0.0022978
192670	EIF2C4	2074.169592	0.310159853	0.0023486
1997	ELF1	2074.525262	0.19947513	0.0023443
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3029	HAGH	2076.287576	0.160973451	0.00234
85464	SSH2	2076.338002	0.207545269	0.0023358
3959	LGALS3BP	2076.38412	-0.170332761	0.0026284
5424	POLD1	2076.797137	-0.274743502	0.0026205
83666	PARP9	2076.819612	0.312907376	0.0023315
214	ALCAM	2077.259238	0.312642464	0.0023455
55652	SLC48A1	2078.104468	0.211325927	0.0023412
2625	GATA3	2078.160658	-0.288879138	0.0026126
25801	GCA	2078.699287	0.308329092	0.002337
147968	CAPN12	2079.279161	-0.293682149	0.0026647
8334	HIST1H2AC	2079.516891	0.305714187	0.0023508
57458	TMCC3	2080.314508	0.285871296	0.0024007
53829	P2RY13	2080.84956	0.328890881	0.0024144
3049	HBQ1	2080.966804	0.148108218	0.0024101

4215	MAP3K3	2081.157204	0.254073588	0.0024057
23	ABCF1	2082.070922	-0.317139493	0.0026786
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140801	RPL10L	2082.811787	-0.22074946	0.0026923
80315	CPEB4	2084.964341	0.222135625	0.0024731
3958	LGALS3	2086.050908	0.246353392	0.0025224
23254	KAZN	2090.399487	0.26101987	0.0026429
10444	ZER1	2091.408426	0.289255996	0.0026381
1889	ECE1	2093.67448	0.289400676	0.0026512
5706	PSMC6	2093.75166	0.220160741	0.0026465
58475	MS4A7	2093.899468	-0.135151044	0.0030117
57096	RPGRIP1	2094.066628	0.153378656	0.0026418
23208	SYT11	2095.389696	-0.266451125	0.0030321
5984	RFC4	2095.397545	-0.263938728	0.0030233
10661	KLF1	2095.601705	0.117360008	0.0026903
79689	STEAP4	2095.885126	0.258804994	0.0026855
7433	VIPR1	2096.017565	-0.268726436	0.0030145
5003	SLC22A18AS	2096.315823	0.234368496	0.0026984
868	CBLB	2097.184911	-0.31312874	0.0030259
6634	SNRPD3	2099.773731	-0.300081015	0.0030747
65220	NADK	2101.998021	0.266444402	0.0029049
1522	CTSZ	2102.482313	-0.22485523	0.0031519
25864	ABHD14A	2103.085362	-0.284352103	0.0031429
23175	LPIN1	2104.014697	-0.280302482	0.0031339
200916	RPL22L1	2104.121378	-0.213429157	0.003125
222229	LRWD1	2105.495567	0.140841199	0.0029525
9284	NPIP	2106.026338	-0.304729103	0.0032295
23092	ARHGAP26	2109.606124	0.280893105	0.0030594
9360	PPIG	2110.626833	0.208347447	0.0030541
3728	JUP	2111.440761	-0.129686889	0.0034181
921	CD5	2111.935278	-0.289326759	0.0034366
83538	TTC25	2113.463209	0.110656526	0.0031359
366	AQP9	2114.135396	0.312138304	0.0031304
10170	DHRS9	2114.708828	0.268408434	0.0031424
481	ATP1B1	2115.58649	-0.265383069	0.0036695
55316	RSAD1	2116.481583	-0.252019025	0.0036872
65982	ZSCAN18	2118.602023	-0.285760425	0.0037047
84188	FAR1	2118.766325	0.250036785	0.0032236

93622	LOC93622	2119.206703	-0.265728323	0.0037222
2841	GPR18	2119.292591	-0.264742838	0.0037119
27071	DAPP1	2119.407578	0.233178002	0.003218
9674	KIAA0040	2119.920807	0.296415102	0.003247
124221	PRSS30P	2121.212714	-0.325543011	0.003719
55281	TMEM140	2121.73392	0.269348344	0.0032931
114836	SLAMF6	2123.19703	-0.26996651	0.0037637
64326	RFWD2	2124.114519	0.333064051	0.0032874
3142	HLX	2124.33708	0.224983284	0.0032818
8942	KYNU	2125.544873	0.300004724	0.0033105
92359	CRB3	2125.729402	0.218281965	0.0033048
63891	RNF123	2126.024838	0.196453932	0.0032991
91624	NEXN	2126.393134	0.201818942	0.0032935
29855	UBN1	2126.771406	0.21816278	0.0032879
23135	KDM6B	2126.871607	0.262430604	0.0032993
9895	TECPR2	2126.965163	0.263230167	0.0032937
201633	TIGIT	2127.281567	-0.282784505	0.0038356
64926	RASAL3	2127.951179	-0.25852947	0.0038798
23315	SLC9A8	2128.618253	0.227380534	0.0033051
120534	C11orf46	2128.681773	-0.18347049	0.0038965
5351	PLOD1	2128.759801	0.191266244	0.0032995
55681	SCYL2	2129.46741	0.226192546	0.0033108
126382	NR2C2AP	2130.3845	-0.310511482	0.0039946
79073	TMEM109	2132.882056	-0.323517876	0.0040921
6563	SLC14A1	2133.09314	0.226645663	0.0034064
283130	SLC25A45	2133.356336	-0.22912827	0.0040811
915	CD3D	2133.483398	-0.181081356	0.0040701
26994	RNF11	2133.528034	0.256797346	0.0034175
90273	CEACAM21	2133.727995	-0.23963001	0.0040591
27347	STK39	2133.970154	-0.259839256	0.0040374
10673	TNFSF13B	2134.861979	0.298504611	0.0035126
9043	SPAG9	2136.497252	0.230820902	0.0035403
2971	GTF3A	2136.993282	-0.236141818	0.0040584
10217	CTDSPL	2138.659698	0.290813245	0.0035678
132949	AASDH	2138.819429	0.154724905	0.0035953
8718	TNFRSF25	2138.885918	-0.265325488	0.0041005
25851	TECPR1	2139.725938	-0.292628283	0.0041689
83547	RILP	2141.970838	0.237684917	0.0036895

1606	DGKA	2142.985737	-0.295593123	0.0043158
4689	NCF4	2143.267275	0.289759511	0.0037167
55711	FAR2	2144.07556	0.257999513	0.0037271
5270	SERPINE2	2144.597325	-0.189989041	0.0043307
130355	C2orf76	2144.731559	0.187436462	0.0037375
9934	P2RY14	2146.296354	0.264402835	0.0037977
5534	PPP3R1	2146.32379	0.226373827	0.0037914
26996	GPR160	2147.40629	0.270118024	0.0038017
80063	ATF7IP2	2148.637479	-0.243449805	0.0045026
7096	TLR1	2149.095077	0.291595421	0.0039109
127943	FCRLB	2149.202415	-0.271765542	0.004517
57161	PELI2	2149.418611	0.293873809	0.0039209
23710	GABARAPL1	2149.54274	0.155464078	0.0039309
7570	ZNF22	2150.976816	-0.133179892	0.0045573
5836	PYGL	2151.04654	0.287351456	0.0039737
25984	KRT23	2152.563081	0.129329822	0.0039836
3577	CXCR1	2152.5682	0.256239544	0.0039771
7090	TLE3	2152.889654	0.231749656	0.0039706
10607	TBL3	2153.304423	-0.239075789	0.0045974
54	ACP5	2153.752969	-0.206403517	0.0046114
5613	PRKX	2154.125141	-0.282604102	0.0045995
9100	USP10	2154.64781	0.190131045	0.0039967
8277	TKTL1	2154.965462	-0.210259119	0.0046392
5209	PFKFB3	2155.718798	0.244077209	0.0040554
5878	RAB5C	2156.40615	-0.070610512	0.0046787
142	PARP1	2159.366667	-0.290365603	0.0048718
6229	RPS24	2159.968186	0.203114264	0.0041951
132320	SCLT1	2162.035604	0.233092516	0.0042857
84969	TOX2	2162.423483	-0.183944245	0.0051151
5514	PPP1R10	2164.05792	0.146356956	0.0043366
22800	RRAS2	2166.704514	-0.267167153	0.0052806
321	APBA2	2167.083839	-0.231278259	0.0053181
84658	EMR3	2169.175464	0.21939052	0.0044588
6144	RPL21	2169.347161	0.128209778	0.0044516
9665	KIAA0430	2169.862117	0.192404248	0.0044605
1070	CETN3	2171.155267	0.153581998	0.0045338
59084	ENPP5	2171.671167	-0.270162171	0.0054315
9749	PHACTR2	2171.929428	-0.123694636	0.005443

283149	BCL9L	2172.652118	-0.28973986	0.0054798
7979	SHFM1	2172.814738	0.256207	0.0045746
6932	TCF7	2173.131488	-0.281998885	0.005466
83716	CRISPLD2	2173.414697	0.184453435	0.0045833
92106	OXNAD1	2173.603453	-0.230903634	0.0054774
28959	TMEM176B	2174.50399	0.107392545	0.004592
11171	STRAP	2174.61556	0.179398215	0.0046326
6039	RNASE6	2176.006519	0.237227028	0.0046411
3683	ITGAL	2176.916004	-0.315401704	0.0055362
136319	MTPN	2177.107795	0.215391084	0.0046815
27099	SND1-IT1	2177.27186	-0.266175463	0.0055224
113457	TUBA3D	2177.408987	0.245603848	0.0046741
374907	B3GNT8	2177.720466	0.231828921	0.0046984
5442	POLRMT	2178.557445	-0.316589025	0.0055335
54487	DGCR8	2179.546991	-0.259668674	0.0055693
51094	ADIPOR1	2180.513904	0.183303495	0.0048494
58476	TP53INP2	2180.960604	0.1913716	0.0048576
8853	ASAP2	2181.962026	0.249194173	0.0048973
5287	PIK3C2B	2182.30981	-0.239416687	0.0055556
55437	STRADB	2183.18893	0.082760711	0.0049134
4671	NAIP	2185.319531	0.214042535	0.0049843
197258	FUK	2185.777127	-0.242327143	0.0057108
91662	NLRP12	2187.047355	0.261498036	0.0050078
57700	FAM160B1	2187.510381	0.307112939	0.005
1241	LTB4R	2188.473431	0.214279877	0.0050548
683	BST1	2188.578567	0.2628107	0.0050625
216	ALDH1A1	2189.665876	-0.185959825	0.005868
114876	OSBPL1A	2189.991365	0.287680526	0.0051014
29094	LGALSL	2191.248976	0.305759902	0.0051402
55073	LRRC37A4	2191.30568	0.210981524	0.0051322
396	ARHGDIA	2192.067775	-0.25915612	0.005878
51023	MRPS18C	2192.56999	0.321118695	0.0052019
54680	ZNHIT6	2193.305548	-0.286326384	0.0058881
9095	TBX19	2194.114975	-0.176759366	0.0058981
10588	MTHFS	2194.340115	0.307994209	0.0052868
79913	ACTR5	2195.237245	-0.292370845	0.005908
246734	NPCDR1	2195.443998	-0.191123248	0.005942
374986	FAM73A	2195.714299	-0.158374409	0.0059518

83989	FAM172A	2196.111377	0.221840483	0.0053406
474344	GIMAP6	2196.303283	-0.30135414	0.0059856
85379	KIAA1671	2196.864432	-0.306226121	0.0060192
1396	CRIP1	2197.159405	-0.229849509	0.0060048
51312	SLC25A37	2199.429739	0.214650359	0.005456
9531	BAG3	2199.956659	-0.266272324	0.0062053
874	CBR3	2199.971252	0.175117576	0.0054784
57162	PELI1	2201.191981	0.27457063	0.0055077
54461	FBXW5	2204.57259	-0.205279069	0.0064286
146540	ZNF785	2204.897892	-0.12828124	0.0064455
5819	PVRL2	2205.370712	0.243754215	0.0056442
57659	ZBTB4	2205.4408	-0.295556371	0.0064387
255783	PRR24	2205.44307	0.195618113	0.0056355
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6655	SOS2	2205.879716	0.213020947	0.0056183
50628	GEMIN4	2206.398086	-0.299089637	0.0064319
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286053	NSMCE2	2207.695702	0.207778624	0.005686
10043	TOM1	2208.623557	0.209411857	0.005723
9989	PPP4R1	2209.742359	0.308073807	0.0057903
256380	SCML4	2209.986947	-0.233966663	0.0065187
2769	GNA15	2210.933491	0.275864534	0.005827
23130	ATG2A	2211.348449	0.172734668	0.0058485
64755	C16orf58	2211.590077	-0.271463633	0.0065967
54739	XAF1	2211.848037	0.176812658	0.0058396
1475	CSTA	2212.508023	0.19647789	0.0058459
10672	GNA13	2212.806444	0.20789261	0.0058371
132299	OCIAD2	2212.997215	-0.185756787	0.0066977
54847	SIDT1	2214.99061	-0.294117857	0.0067981
81542	TMX1	2215.148316	0.146398857	0.0059789
7328	UBE2H	2216.86684	0.235904242	0.006015
80310	PDGFD	2218.296994	-0.233511124	0.0069676
8481	OFD1	2219.19651	-0.254359158	0.0069515
55013	CCDC109B	2219.340441	-0.226418355	0.0069355
3597	IL13RA1	2219.590796	0.262182691	0.0060661
79609	METTL21D	2220.702167	0.247273701	0.0061319
3676	ITGA4	2221.370963	-0.173524845	0.0069885
1299	COL9A3	2221.439236	0.205411178	0.0061228

6146	RPL22	2223.092422	-0.259776217	0.0069954
54832	VPS13C	2223.126391	-0.233222781	0.0069794
9821	RB1CC1	2223.509564	0.246278819	0.0062033
10125	RASGRP1	2225.443323	-0.227927443	0.0070776
64231	MS4A6A	2227.440132	0.231721577	0.006403
5198	PFAS	2227.755122	-0.235144898	0.0072437
286530	P2RY8	2228.3613	-0.3042263	0.0072727
10923	SUB1	2229.27362	0.219379162	0.006468
89849	ATG16L2	2230.34465	0.183305163	0.0064636
26128	KIAA1279	2230.500039	-0.276269221	0.0074603
5376	PMP22	2231.028383	0.244543289	0.0065134
9159	PCSK7	2231.142506	-0.297324644	0.0074434
4637	MYL6	2231.649501	0.3173812	0.0065333
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2947	GSTM3	2232.414258	-0.191898163	0.0074718
100133941	CD24	2232.448116	0.245404532	0.0065436
55362	TMEM63B	2232.668242	0.226443693	0.0065339
23178	PASK	2233.30041	-0.23190023	0.0075
3945	LDHB	2233.749501	-0.205739214	0.0074831
8970	HIST1H2BJ	2235.27709	0.307039415	0.0065832
51307	FAM53C	2236.184008	0.192373921	0.0066176
4864	NPC1	2236.188541	-0.292929105	0.0075785
4117	MAK	2237.14709	0.225738273	0.0066373
83715	ESPN	2237.255423	0.089690217	0.0066276
4303	FOXO4	2237.760261	0.208070895	0.0066471
10322	SMYD5	2238.538086	-0.249456364	0.0076957
2120	ETV6	2239.037149	0.259145759	0.0066813
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8649	LAMTOR3	2240.584444	0.251490772	0.0068029
55268	ECHDC2	2240.728309	-0.276143057	0.0078444
221895	JAZF1	2241.728662	0.246398946	0.0069388
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4675	NAP1L3	2244.215061	-0.252658667	0.0080132
9645	MICAL2	2245.031249	0.246394705	0.0070349
8408	ULK1	2245.573493	0.184743749	0.0070392
11072	DUSP14	2245.784524	-0.298166539	0.0081057
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2058	EPRS	2246.460461	-0.052761344	0.0081099
53346	TM6SF1	2247.276538	0.218623096	0.0070231
11145	PLA2G16	2247.654502	-0.215697609	0.008136
9976	CLEC2B	2248.31627	0.207186653	0.0070851
55006	TRMT61B	2249.255544	-0.261331475	0.0082276
374403	TBC1D10C	2249.565955	-0.2969611	0.0082533
84306	PDCD2L	2249.921683	-0.234533592	0.0082571
2353	FOS	2250.523095	0.167194193	0.007219
140735	DYNLL2	2250.813178	-0.128085688	0.0082391
1845	DUSP3	2250.977777	0.215820278	0.0072662
7039	TGFA	2251.867468	0.296766954	0.0072884
55796	MBNL3	2252.098462	0.13744254	0.0072923
118433	RPL23AP7	2252.135368	0.10974586	0.0072818
83938	C10orf11	2252.310645	0.217666374	0.0072857
25873	RPL36	2252.722525	-0.255216186	0.0084382
51241	COX16	2253.338621	0.169089648	0.0073324
6272	SORT1	2253.556376	0.228196155	0.0073219
1318	SLC31A2	2254.156347	0.270309156	0.00734
642	BLMH	2254.699226	-0.188845387	0.0085714
9260	PDLIM7	2254.908202	0.274387934	0.0073722
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10257	ABCC4	2255.880677	0.273356398	0.0074079
347734	SLC35B2	2255.95864	-0.266069444	0.0086177
129607	CMPK2	2256.414288	0.129582992	0.0074257
27239	GPR162	2257.0814	-0.118033589	0.0087069
23403	FBXO46	2257.267401	-0.211683875	0.0086882
10114	HIPK3	2259.191432	0.202641687	0.0075141
8887	TAX1BP1	2259.809442	0.252693472	0.0075317
284129	SLC26A11	2260.375293	-0.238262179	0.0089056
9670	IPO13	2260.856795	-0.208349858	0.0089507
1429	CRYZ	2261.32567	-0.107607815	0.0089316
2806	GOT2	2262.623537	-0.286143125	0.0089552
118788	PIK3AP1	2262.802004	0.238824401	0.0077606
26119	LDLRAP1	2266.109829	-0.242662793	0.0091083
84669	USP32	2266.357938	0.237274968	0.0079606
10410	IFITM3	2266.389372	0.19568044	0.0079494
221927	BRAT1	2267.458648	-0.184118768	0.0091525
23370	ARHGEF18	2267.461598	-0.302361913	0.0091332

3556	IL1RAP	2268.678281	0.228026829	0.0080645
27042	DIEXF	2269.072322	-0.242735103	0.0092
56261	GPCPD1	2269.351954	0.24452168	0.0080672
84446	BRSK1	2269.528499	-0.178650299	0.0092437
8884	SLC5A6	2270.192941	-0.213165504	0.0092453
9541	CIR1	2270.212205	0.26507573	0.0080699
401505	TOMM5	2270.372175	0.09829153	0.0080587
55972	SLC25A40	2270.792895	0.195590156	0.0080753
4926	NUMA1	2270.793437	-0.254858196	0.0092678
3065	HDAC1	2270.904553	-0.291936754	0.0092693
3310	HSPA6	2271.965777	0.26378082	0.0081059
8507	ENC1	2272.057869	0.277272891	0.0080946
5526	PPP2R5B	2272.786149	0.252561039	0.008125
7263	TST	2272.841678	0.218046853	0.0081137
317649	EIF4E3	2272.860168	0.27004649	0.0081025
79871	RPAP2	2272.884471	-0.216240667	0.0093958
55509	BATF3	2272.971424	0.15838734	0.0080913
9236	CCPG1	2273.071985	0.269457864	0.0081077
6727	SRP14	2274.23937	0.246307742	0.0082345
51513	ETV7	2275.399733	0.218260433	0.0083196
55196	C12orf35	2276.223445	0.203879396	0.0083356
8760	CDS2	2276.329462	0.265755748	0.0083242
10451	VAV3	2276.672725	0.222400302	0.0083402
55723	ASF1B	2277.070408	0.150789076	0.0083562
84255	SLC37A3	2277.21704	0.237221325	0.0083447
10745	PHTF1	2277.433656	0.295290851	0.0083333
8078	USP5	2278.186646	-0.202017733	0.0097921
89848	FCHSD1	2278.59477	-0.141508832	0.0097718
51363	CHST15	2278.648826	0.207024834	0.0083765
6650	SOLH	2278.830852	-0.268207701	0.0097516
26270	FBXO6	2279.305359	0.245299822	0.0084196
55287	TMEM40	2279.414342	0.25950887	0.0084218
57210	SLC45A4	2280.579401	0.207575685	0.0085054
9991	PTBP3	2280.936717	0.241569129	0.008521
9522	SCAMP1	2281.049164	0.173272063	0.0085095
283899	INO80E	2281.071002	-0.233925549	0.0098967
80152	CENPT	2282.728552	-0.299823597	0.01
57696	DDX55	2283.482442	-0.234414166	0.0100617

256236	NAPSB	2285.144006	0.149641272	0.0087027
27257	LSM1	2285.7352	0.237257387	0.0087314
1912	PHC2	2286.441319	0.296638669	0.0087332
8445	DYRK2	2286.4536	-0.260130643	0.0101848
8650	NUMB	2286.715769	0.261492911	0.0087483
283989	TSEN54	2287.029179	-0.292025902	0.010184
128869	PIGU	2287.497306	-0.238256177	0.0102245
8344	HIST1H2BE	2287.771817	0.267536564	0.0088172
29887	SNX10	2288.168788	0.22250162	0.0088322
23082	PPRC1	2288.954431	-0.217512352	0.0103055
25824	PRDX5	2289.012791	0.289673749	0.0088472
6710	SPTB	2289.086663	0.271106625	0.0088487
7086	TKT	2289.169575	0.217799618	0.0088503
165631	PARP15	2290.094989	-0.229077409	0.0103455
57823	SLAMF7	2290.644864	-0.211143867	0.0103651
26001	RNF167	2291.120946	0.159360398	0.0089453
60685	ZFAND3	2291.267151	0.199714647	0.0089467
51314	TXNDC3	2292.530202	0.220788014	0.009028
122060	SLAIN1	2292.882424	-0.249519959	0.0104049
1890	TYMP	2293.293008	0.219027277	0.0090957
8813	DPM1	2293.306899	0.237905862	0.0090837
7738	ZNF184	2294.564823	-0.216956788	0.0105051
80896	NPL	2294.571064	0.264794725	0.0091512
56342	PPAN	2294.651826	-0.203910498	0.0104839
3802	KIR2DL1	2295.608682	-0.175054853	0.010503
10400	PEMT	2295.738856	-0.255116208	0.010502
26999	CYFIP2	2297.265214	-0.292986246	0.0106613
5920	RARRES3	2298.826555	-0.227148511	0.01074
64417	C5orf28	2299.854892	-0.226230524	0.0108383
4938	OAS1	2299.959137	-0.070893402	0.0108167
9256	BZRAP1	2300.196688	-0.276873895	0.0107952
23483	TGDS	2300.372299	-0.20039138	0.0107937
22856	CHSY1	2300.666151	0.250857595	0.009457
84836	ABHD14B	2301.642813	-0.243202532	0.0108911
51526	C20orf111	2302.165641	0.291829229	0.0095106
2633	GBP1	2302.217672	0.152926693	0.009498
387103	CENPW	2302.285777	0.216650348	0.0094855
9262	STK17B	2302.500513	0.282878365	0.0094862

23179	RGL1	2302.770477	0.197386269	0.0095
79746	ECHDC3	2302.972869	0.200602103	0.0094875
26051	PPP1R16B	2303.496591	-0.292526391	0.0110474
51762	RAB8B	2303.626848	0.222350517	0.0095144
5829	PXN	2304.270596	0.168369035	0.0095413
57118	CAMK1D	2304.689603	0.232963156	0.009555
27244	SESN1	2304.884358	-0.216853025	0.0111243
8611	PPAP2A	2305.174696	-0.221003094	0.0111024
2995	GYPC	2305.593932	-0.074927316	0.0111198
10163	WASF2	2305.771063	0.127792103	0.0096601
131616	TMEM42	2306.099403	-0.228062325	0.0111765
153443	SRFBP1	2306.267048	-0.234916919	0.0111546
79652	TMEM204	2306.801368	-0.039219235	0.0112305
55088	C10orf118	2307.606335	0.175436379	0.0097258
389634	LOC389634	2307.870278	0.147808548	0.0097262
4778	NFE2	2309.377308	0.233086361	0.0098438
147339	C18orf25	2309.815683	0.241390242	0.009883
11235	PDCD10	2309.856081	0.204912946	0.0098701
7940	LST1	2309.930946	0.290872939	0.0098573
23312	DMXL2	2310.268529	0.215599341	0.0098575
1053	CEBPE	2310.292718	0.220224286	0.0098448
375387	LRRC33	2310.505786	-0.269423872	0.0114815
6827	SUPT4H1	2310.566585	0.222713926	0.009832
3092	HIP1	2310.881812	0.152845944	0.0098452
57590	WDFY1	2311.595598	0.202147777	0.0098969
6777	STAT5B	2312.199884	0.228031497	0.0099228
28957	MRPS28	2312.508363	0.062836054	0.0099614
58515	SELK	2312.570986	0.279205607	0.0099487
83857	TMTC1	2313.034087	0.147848512	0.0099615
9975	NR1D2	2313.116707	-0.250968563	0.0117121
54482	CCDC76	2313.535832	-0.205337654	0.0117282
51296	SLC15A3	2314.822977	0.180300315	0.0100768
55179	FAIM	2314.958438	-0.241839488	0.0118605
7091	TLE4	2315.303087	0.217430684	0.0101149
375033	PEAR1	2315.924043	0.275791536	0.0101531
6596	HLTF	2316.721178	-0.219501303	0.0119884
7516	XRCC2	2317.925978	0.108053948	0.0102548
10970	CKAP4	2318.801723	0.222648049	0.0102672

5684	PSMA3	2319.381383	0.279569878	0.0103177
5055	SERPINB2	2319.574401	0.126718178	0.0103046
10788	IQGAP2	2319.785551	0.105369026	0.0102915
5782	PTPN12	2320.581703	0.216152521	0.0103544
252969	NEIL2	2322.195356	-0.144017353	0.0123608
6709	SPTAN1	2322.45251	-0.281560667	0.0123563
284367	SIGLECP3	2322.785005	-0.24346641	0.0123901
23077	MYCBP2	2323.078506	-0.284007032	0.0123664
7571	ZNF23	2323.354398	-0.148748313	0.0124
64135	IFIH1	2323.43351	0.264444975	0.0105436
10526	IPO8	2323.619397	0.099719493	0.0105808
84817	TXNDC17	2323.676798	0.288544339	0.0105675
222658	KCTD20	2324.480288	0.211365593	0.0106171
84284	NTPCR	2324.520351	-0.199259572	0.0124715
55272	IMP3	2325.507649	-0.283966581	0.0125237
7374	UNG	2325.751339	-0.274263366	0.0125
55784	MCTP2	2326.557662	0.224891935	0.0108428
3557	IL1RN	2326.854336	0.264334717	0.0108794
7122	CLDN5	2327.225065	0.188857634	0.0108908
168544	ZNF467	2327.297727	0.230054001	0.0108772
22880	MORC2	2328.082406	-0.266114193	0.0126843
54518	APBB1IP	2328.239515	-0.061588955	0.0126981
2135	EXTL2	2328.240339	-0.264727482	0.0126742
27018	NGFRAP1	2328.454426	0.194764421	0.0109887
8780	RIOK3	2328.9222	0.243119745	0.0109875
50650	ARHGEF3	2331.048369	-0.237287478	0.012833
8237	USP11	2331.064675	-0.27118844	0.012809
4051	CYP4F3	2332.180446	0.201662808	0.0114107
51293	CD320	2332.376714	-0.195139049	0.0129907
64844	42070	2332.682317	0.275036705	0.0114214
22904	SBNO2	2333.040172	0.139806411	0.0114695
27240	SIT1	2333.269627	-0.256478309	0.0129851
5008	OSM	2333.380366	0.286938839	0.0114552
1856	DVL2	2333.856185	-0.221441831	0.0130354
10989	IMMT	2334.675535	-0.262519562	0.0130483
23360	FNBP4	2335.3484	-0.237751227	0.0130798
126014	OSCAR	2335.354314	0.173974192	0.0116273
29994	BAZ2B	2335.368969	0.268357263	0.0116129

23708	GSPT2	2335.629255	-0.230024588	0.0130741
9846	GAB2	2335.89859	0.236594124	0.0116729
11240	PADI2	2337.018993	0.230291722	0.0117327
64127	NOD2	2337.238557	0.187559329	0.0117305
27090	ST6GALNAC4	2337.879023	0.160638465	0.0117531
4154	MBNL1	2340.061296	0.149708881	0.0118742
5383	PMS2P5	2340.691641	-0.22490331	0.0134381
6510	SLC1A5	2340.960743	0.103927865	0.0119212
84916	CIRH1A	2341.102257	-0.283884216	0.0134502
2531	KDSR	2341.702067	-0.228247775	0.0134622
2021	ENDOG	2342.252786	-0.240032264	0.0134495
10384	BTN3A3	2342.44843	-0.265321598	0.0134432
80304	C2orf44	2342.449163	-0.264508883	0.0134186
83862	TMEM120A	2342.979008	0.205481405	0.0121402
55116	TMEM39B	2343.796082	-0.09119859	0.0136314
80781	COL18A1	2344.224886	0.066402977	0.0122482
25932	CLIC4	2344.834111	0.270116413	0.0122822
2919	CXCL1	2345.50573	0.213379566	0.0122794
166012	CHST13	2345.650564	0.105528111	0.0122644
10569	SLU7	2347.011647	0.276483399	0.0123227
101	ADAM8	2348.161	0.080193387	0.0124664
25777	SUN2	2348.94104	-0.281720293	0.0141894
79873	NUDT18	2348.973967	-0.160210625	0.0141636
847	CAT	2351.295526	0.206629015	0.0127683
84803	AGPAT9	2351.654755	0.234673734	0.0127771
137994	LETM2	2353.620453	0.18653621	0.0129684
7041	TGFB1I1	2353.919776	0.252476873	0.0129891
23117	NPIPL3	2354.357293	-0.179961337	0.0148276
23396	PIP5K1C	2355.214273	-0.186227856	0.0149094
84557	MAP1LC3A	2355.530041	0.158588371	0.0130947
51495	PTPLAD1	2355.629079	-0.282867418	0.0148736
8935	SKAP2	2356.09391	0.261053047	0.0131273
59271	C21orf63	2356.1497	-0.171824668	0.0149369
54947	LPCAT2	2356.481833	0.176323237	0.0131235
64581	CLEC7A	2356.829229	0.171515848	0.013156
55466	DNAJA4	2357.139766	0.187398196	0.0131763
493861	EID3	2357.414132	-0.228626287	0.014982
2764	GMFB	2359.268778	0.214934396	0.0134138

84286	TMEM175	2359.557048	-0.142201139	0.0151526
8969	HIST1H2AG	2359.937573	0.170590386	0.0134458
7286	TUFT1	2363.544569	-0.09848283	0.0156093
79887	PLBD1	2363.632052	0.239866594	0.0137304
157680	VPS13B	2363.695967	0.13164523	0.0137139
8021	NUP214	2365.206266	0.274276463	0.013729
219844	HYLS1	2366.016939	-0.273237659	0.0157782
254065	BRWD3	2367.942559	0.244694888	0.0140311
11237	RNF24	2369.420342	0.167595536	0.0142174
84925	DIRC2	2369.476335	0.247169698	0.0142243
8766	RAB11A	2369.910535	0.28751076	0.0142074
81544	GDPD5	2371.756255	-0.186590002	0.0162389
9867	PJA2	2373.112261	0.268334714	0.0145714
8660	IRS2	2373.578011	0.200395746	0.0146017
23338	PHF15	2375.08941	-0.27174068	0.0165302
9990	SLC12A6	2375.790108	0.262227531	0.0147506
528	ATP6V1C1	2376.201669	0.279760744	0.0147568
54765	TRIM44	2376.476887	-0.271307671	0.0166785
4814	NINJ1	2376.91591	0.22366216	0.0147986
55840	EAF2	2377.12535	0.277397687	0.0148166
5997	RGS2	2377.991678	0.27772611	0.0148936
648	BMI1	2380.194674	-0.160647344	0.0171099
10321	CRISP3	2380.697058	0.188971354	0.0151594
440823	MIAT	2381.114513	-0.156919681	0.0171504
23161	SNX13	2381.190751	0.245846407	0.0151533
9524	TECR	2381.439284	-0.261931908	0.0171731
3101	HK3	2382.095643	0.182744513	0.0152297
83999	KREMEN1	2382.348554	0.256211224	0.0152235
124936	CYB5D2	2383.504343	-0.135102433	0.0174956
8111	GPR68	2383.592081	-0.284712219	0.0174824
51019	CCDC53	2384.357866	0.241192533	0.0154054
131076	CCDC58	2384.708333	0.212532743	0.0154225
3430	IFI35	2385.205254	0.217009582	0.0154162
6201	RPS7	2385.287507	0.046453267	0.0153981
339122	RAB43	2385.512742	0.057603634	0.0154035
64005	MYO1G	2385.569544	-0.26231376	0.0176274
54509	RHOF	2385.986817	-0.286188847	0.0176491
146850	PIK3R6	2386.160415	0.185922464	0.0154907

282809	POC1B	2387.412416	0.252989423	0.0156009
571	BACH1	2387.670223	0.218690334	0.0156527
7903	ST8SIA4	2387.825996	0.270231718	0.0156461
3454	IFNAR1	2387.879567	0.221777314	0.0156279
5329	PLAUR	2387.937243	0.22680646	0.015633
64837	KLC2	2389.152095	-0.188819098	0.0180035
115361	GBP4	2389.786555	-0.091623828	0.0181469
90871	C9orf123	2390.242902	-0.157008004	0.0182199
2050	EPHB4	2391.204259	0.169313011	0.0160209
7150	TOP1	2391.595573	0.138039536	0.0160023
79080	CCDC86	2393.415728	-0.253143063	0.0185889
23586	DDX58	2394.928525	0.189524427	0.016331
3034	HAL	2395.361038	0.251317875	0.0163699
1352	COX10	2395.646124	-0.213609546	0.0188174
10634	GAS2L1	2396.430209	0.248220013	0.0164203
10553	HTATIP2	2396.520093	0.297763983	0.0164129
55799	CACNA2D3	2397.292084	-0.186999594	0.0189775
10927	SPIN1	2397.461658	-0.224919564	0.0190138
8818	DPM2	2398.1794	0.104677186	0.0166014
56970	ATXN7L3	2399.222594	0.13812921	0.0167204
6392	SDHD	2399.869439	0.112798944	0.0167701
144423	GLT1D1	2399.881396	0.251573715	0.0167509
639	PRDM1	2399.9475	0.135285599	0.0167317
1870	E2F2	2400.104833	0.103154629	0.0167125
55647	RAB20	2400.378063	0.28178281	0.0167391
80199	FUZ	2400.448783	0.15723786	0.0167429
56925	LXN	2400.699967	0.233183136	0.016758
1347	COX7A2	2401.116678	0.198136313	0.0168187
9238	TBRG4	2401.36435	-0.216423135	0.019361
339324	ZNF260	2404.42593	-0.234570359	0.0198276
340206	TREML3	2404.811945	0.122247963	0.0172665
118987	PDZD8	2404.994018	0.234475168	0.0173038
51439	FAM8A1	2405.809143	0.268460067	0.0173977
445347	TARP	2406.264908	-0.235398658	0.0199656
23355	VPS8	2406.297023	0.215931427	0.017412
5525	PPP2R5A	2406.428464	0.262997498	0.0174036
51367	POP5	2406.759179	-0.22874099	0.0200172
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4069	LYZ	2407.431436	-0.033322679	0.0200684
54441	STAG3L1	2407.475546	-0.179411231	0.0200341
9562	MINPP1	2408.120097	-0.16671845	0.0201022
54726	OTUD4	2408.296266	-0.047600577	0.020102
829	CAPZA1	2408.977274	0.276839324	0.0176897
115548	FCHO2	2408.998942	0.231828587	0.017681
10666	CD226	2409.121642	-0.147869677	0.0202377
2309	FOXO3	2409.166896	0.189601133	0.0176723
2033	EP300	2410.700899	-0.260713318	0.0205085
3561	IL2RG	2411.770835	-0.291221104	0.0205405
65990	FAM173A	2411.927121	-0.237453922	0.0205396
566	AZU1	2412.690137	0.239164224	0.0179233
23373	CRTC1	2412.701095	0.10038555	0.017903
56729	RETN	2413.071796	0.170528214	0.0179392
54541	DDIT4	2413.165226	-0.114167414	0.0207912
92799	SHKBP1	2414.07087	0.113178812	0.0180202
2355	FOSL2	2414.098168	0.219014973	0.018
79671	NLRX1	2414.264252	0.194350664	0.0180247
9402	GRAP2	2414.301814	0.192495345	0.0180157
2801	GOLGA2	2414.319907	0.205311912	0.0179955
26048	ZNF500	2414.784141	-0.236031959	0.0208908
155400	NSUN5P1	2415.385235	-0.243556549	0.0208725
2015	EMR1	2415.522322	0.142813346	0.0181767
16	AARS	2415.935703	-0.274580462	0.020938
64748	LPPR2	2416.233735	0.1924394	0.0182905
54499	TMCO1	2416.468722	0.167633708	0.0183036
29780	PARVB	2417.136024	0.183284971	0.0182943
9488	PIGB	2417.294985	0.20505553	0.0182962
51251	NT5C3	2417.403814	0.16339203	0.018287
55450	CAMK2N1	2417.555943	-0.266013677	0.0212207
161882	ZFPM1	2417.764089	-0.185056138	0.0211853
23097	CDK19	2418.130338	0.229466891	0.0184333
27163	NAAA	2418.414908	-0.205443994	0.0212333
51070	NOSIP	2418.448503	-0.175355234	0.021198
1655	DDX5	2419.026093	-0.220647545	0.021196
115761	ARL11	2419.065901	0.228143684	0.0185461
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284757	LOC284757	2419.425446	0.094878538	0.0185477

55024	BANK1	2419.56821	-0.123112814	0.0212252
27350	APOBEC3C	2421.120003	-0.246176853	0.0215372
55066	PDPR	2421.781955	-0.226873713	0.0215512
81577	GFOD2	2423.154729	0.156137994	0.0189369
60592	SCOC	2423.59716	0.060699181	0.0189823
11261	CHP	2423.687754	0.214103379	0.0189613
4092	SMAD7	2424.872215	-0.253163323	0.0219275
8761	PABPC4	2425.700146	-0.273044476	0.0219212
3094	HINT1	2426.030187	0.07411829	0.0192053
80232	WDR26	2426.857947	0.212896047	0.0192944
3554	IL1R1	2428.028134	0.252037294	0.0194383
8295	TRRAP	2428.18676	-0.21432724	0.0222386
84280	BTBD10	2428.320994	0.261964378	0.0194719
6483	ST3GAL2	2428.362305	0.246536914	0.0194615
132789	GNPDA2	2429.626731	-0.155115235	0.0224144
3113	HLA-DPA1	2430.240675	-0.213783933	0.022443
85013	TMEM128	2431.242807	-0.210064905	0.0225041
80228	ORAI2	2431.412824	0.213892446	0.0199232
23160	WDR43	2431.833033	-0.233121309	0.0225649
51646	YPEL5	2431.864087	0.249018776	0.0199452
1193	CLIC2	2432.666804	0.238192363	0.0199781
137872	ADHFE1	2432.769702	-0.189893346	0.0226256
7462	LAT2	2433.508184	0.212144334	0.0200547
2907	GRINA	2434.904439	0.099056926	0.0202623
79572	ATP13A3	2435.625271	0.18190931	0.0203275
7840	ALMS1	2436.4991	-0.257314165	0.0232039
124222	PAQR4	2436.583175	-0.098060674	0.0231664
29035	C16orf72	2437.142154	0.249989126	0.0204689
29922	NME7	2438.108454	-0.167942231	0.0233011
125950	RAVER1	2438.499495	-0.208707678	0.0232958
157697	ERICH1	2438.533204	0.232723452	0.0206318
3797	KIF3C	2439.440553	0.239060454	0.0206848
7175	TPR	2439.65991	0.071596629	0.0206623
23648	SSBP3	2440.821908	-0.201820079	0.0237239
1019	CDK4	2441.474226	-0.262951317	0.0237981
138474	TAF1L	2441.995298	0.14446802	0.0210846
5509	PPP1R3D	2443.291705	0.250173072	0.0212134
6814	STXBP3	2444.888401	0.193904048	0.0213203

2672	GFI1	2444.919568	-0.22181133	0.024352
4332	MNDA	2445.083554	0.243233383	0.0212973
150291	MORC2-AS1	2445.129395	-0.2438446	0.024377
3627	CXCL10	2445.701433	0.440303616	0.0214255
2242	FES	2446.890423	0.109743964	0.0215642
11031	RAB31	2446.953039	0.253792534	0.0215409
10262	SF3B4	2447.617507	-0.254098911	0.0247209
79650	C16orf57	2447.720391	0.204266859	0.0216362
7775	ZNF232	2448.535414	-0.228839932	0.0247611
2776	GNAQ	2448.567041	0.193996943	0.0216989
5239	PGM5	2449.742725	0.200851547	0.021826
10528	NOP56	2449.80006	-0.265826257	0.0249285
57048	PLSCR3	2451.22496	-0.242564196	0.0251111
10994	ILVBL	2451.487268	-0.216848947	0.025103
1874	E2F4	2451.770617	0.150308699	0.0219528
6232	RPS27	2452.722515	0.183614875	0.0220364
23215	PRRC2C	2453.923003	-0.076204222	0.0253712
57698	KIAA1598	2454.185394	0.151486236	0.0221199
132001	TAMM41	2454.593587	-0.211629159	0.0254416
55846	ITFG2	2454.620131	-0.254926447	0.0254016
3689	ITGB2	2455.120726	0.06668852	0.0222032
80024	SLC24A6	2455.261812	0.164594117	0.0221795
3710	ITPR3	2455.275179	-0.273876809	0.025416
23593	HEBP2	2456.084636	0.253020377	0.0222946
284837	LOC284837	2456.168109	-0.154181643	0.0255016
3840	KPNA4	2457.239922	0.296715822	0.0224094
728489	DNLZ	2457.425397	-0.099809675	0.0256808
92162	TMEM88	2457.469408	0.174141336	0.0224175
10194	TSHZ1	2457.739169	-0.271994182	0.0257031
375341	C3orf62	2457.99907	0.224848663	0.0224894
9314	KLF4	2458.037345	-0.142440811	0.0257722
140	ADORA3	2458.409424	0.208745693	0.0225399
284021	MILR1	2458.697695	0.16676315	0.0225027
79930	DOK3	2459.01371	0.263071343	0.0225
4925	NUCB2	2459.61952	0.076289075	0.0226032
91947	ARRDC4	2460.075429	0.170515653	0.0226427
7430	EZR	2460.381314	-0.214449125	0.0261994
10295	BCKDK	2460.79794	0.199899197	0.0226582

126231	ZNF573	2460.85291	-0.265622311	0.0262675
837	CASP4	2461.072634	0.25059446	0.0226976
6621	SNAPC4	2461.253445	-0.13654557	0.0263199
57533	TBC1D14	2462.052899	0.216280852	0.0227895
708	C1QBP	2462.078459	-0.202230483	0.0266512
23770	FKBP8	2462.0987	0.120302079	0.022776
8797	TNFRSF10A	2462.511505	-0.230054054	0.0266718
8906	AP1G2	2464.367471	-0.248263616	0.0269397
8031	NCOA4	2464.722341	0.244113299	0.0232739
9332	CD163	2465.152017	0.179302218	0.0233333
254863	C17orf61	2465.266472	0.074640311	0.0233194
90693	CCDC126	2465.736812	0.166601261	0.0233891
53831	GPR84	2466.38203	0.131967311	0.0234587
926	CD8B	2466.853966	-0.203260124	0.0272531
4074	M6PR	2467.038358	-0.259709046	0.0272573
54498	SMOX	2467.950934	0.170503037	0.0236221
8301	PICALM	2468.935583	0.212052376	0.0237956
7283	TUBG1	2469.351327	-0.192855178	0.0276462
4580	MTX1	2469.474384	0.249250583	0.0238333
158747	MOSPD2	2469.563201	0.220693882	0.0238502
6431	SRSF6	2469.630322	-0.098729328	0.0276498
51317	PHF21A	2470.441818	0.240891752	0.0238877
6907	TBL1X	2470.530237	0.073818718	0.0238733
202134	FAM153B	2470.63293	-0.110367074	0.0277454
2805	GOT1	2472.343646	-0.276823503	0.0280245
8345	HIST1H2BH	2472.841141	0.223964331	0.0241701
23048	FNBP1	2473.145412	-0.240302993	0.0280887
1039	CDR2	2473.650476	-0.212669123	0.0281221
972	CD74	2474.035179	-0.192900283	0.0282012
57292	KIR2DL5A	2474.564496	-0.130916442	0.0282067
6886	TAL1	2474.605163	0.208470746	0.0243627
4172	MCM3	2474.686244	-0.270471218	0.0281639
255043	TMEM86B	2475.177666	0.095088544	0.0244099
6515	SLC2A3	2475.50098	0.168980313	0.0244157
30817	EMR2	2475.506273	0.135889779	0.0243905
8565	YARS	2475.598592	-0.248064584	0.0282727
9111	NMI	2476.106354	0.276318021	0.0244066
80256	FAM214B	2477.290301	0.20477956	0.0245361

284996	RNF149	2477.694415	0.261091303	0.0245417
57571	CARNS1	2478.581217	-0.179239085	0.0286707
150771	ITPRIPL1	2478.69269	-0.27799141	0.0286576
56948	SDR39U1	2478.746231	-0.217920399	0.0286295
57463	AMIGO1	2478.835878	-0.19112066	0.0286466
54892	NCAPG2	2480.567467	-0.233836485	0.028964
8795	TNFRSF10B	2480.747434	0.151031077	0.0249177
201164	PLD6	2481.148671	-0.164517644	0.0289805
4068	SH2D1A	2482.87859	-0.011168663	0.0292365
57647	DHX37	2482.900658	-0.179548805	0.0291928
997	CDC34	2483.448646	0.102047599	0.0253135
5341	PLEK	2483.472841	0.13076471	0.0252977
2203	FBP1	2483.518756	0.13373809	0.0252821
199	AIF1	2484.436986	0.240971108	0.0253484
2357	FPR1	2484.498387	0.152561608	0.0253429
3659	IRF1	2484.901635	0.199738509	0.0253272
2051	EPHB6	2485.961177	-0.192360496	0.0297612
10791	VAMP5	2486.298213	0.266941306	0.0254592
966	CD59	2487.192666	0.257796924	0.0256371
85315	PAQR8	2487.277154	-0.220984138	0.0299404
403341	ZBTB34	2487.536266	0.221545456	0.0257026
66002	CYP4F12	2488.268951	0.176040174	0.0258698
388962	BOLA3	2488.332742	-0.180502428	0.0300595
126272	EID2B	2489.180267	-0.203803883	0.0301189
10746	MAP3K2	2489.267255	0.173674655	0.025935
10261	IGSF6	2490.133496	0.172062632	0.0260609
63906	GPATCH3	2490.295884	-0.167206371	0.0303412
5089	PBX2	2490.296841	0.155420747	0.0260446
641518	LOC641518	2490.504087	-0.145351489	0.0303111
5973	RENBP	2491.093616	0.19365375	0.0261499
51278	IER5	2491.340727	-0.240686181	0.030503
10585	POMT1	2491.794695	-0.199532587	0.0305908
11180	WDR6	2492.21187	-0.271898484	0.0306637
51699	VPS29	2492.524482	0.254727465	0.0263563
10079	ATP9A	2493.133814	0.193505506	0.026451
3145	HMBS	2494.132969	0.173722641	0.0264747
55591	VEZT	2494.306752	-0.224487841	0.0310751
1345	COX6C	2494.438677	0.050959407	0.0264884

83982	IFI27L2	2494.470953	0.194670968	0.0264819
374443	LOC374443	2494.679251	-0.23911622	0.0311324
27087	B3GAT1	2495.074726	-0.172790473	0.0311601
7027	TFDP1	2495.454207	0.257834535	0.0267271
7644	ZNF91	2495.879328	-0.126333557	0.0312317
84061	MAGT1	2496.306311	-0.18935636	0.0312592
51645	PPIL1	2498.750544	-0.193795238	0.0316642
3336	HSPE1	2498.812715	0.137251966	0.0272636
50865	HEBP1	2499.041632	0.195421549	0.0272764
84886	C1orf198	2499.045198	0.227767199	0.027249
10724	MGEA5	2499.163481	0.152380068	0.0272217
663	BNIP2	2499.50524	0.240327373	0.0272545
9586	CREB5	2499.841599	0.188049448	0.0273273
9021	SOCS3	2500.815405	0.248907963	0.0275
1973	EIF4A1	2500.914833	-0.244107092	0.0319942
10008	KCNE3	2501.598749	0.142127092	0.0276124
51020	HDDC2	2502.35253	0.108543516	0.0276747
5925	RB1	2502.45289	0.160350713	0.0276471
2752	GLUL	2502.97532	0.23870275	0.0277092
57801	HES4	2503.137583	0.096649626	0.0276915
8772	FADD	2503.987829	0.171128495	0.0277634
6499	SKIV2L	2504.084682	-0.134960682	0.0325544
240	ALOX5	2504.329934	0.169338648	0.0277954
971	CD72	2504.462152	-0.046331931	0.0325507
128272	ARHGEF19	2505.139025	-0.207196617	0.0327062
734	OSGIN2	2505.339899	0.233480669	0.027877
22978	NT5C2	2505.535885	0.266273941	0.0278989
4302	MLLT6	2506.350662	-0.239019481	0.0329335
2982	GUCY1A3	2506.607312	0.166711029	0.0280099
4856	NOV	2507.450265	-0.028389692	0.0331746
89894	TMEM116	2507.506235	-0.138038554	0.0331268
7169	TPM2	2508.025552	-0.24962579	0.0331942
3384	ICAM2	2508.244611	-0.238468075	0.0332328
55201	MAP1S	2508.317623	-0.137137471	0.0332138
8569	MKNK1	2508.572221	0.227372256	0.0283877
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134957	STXBP5	2508.919425	0.221051863	0.0283909
9926	LPGAT1	2509.742181	0.25033218	0.0284714

11068	CYB561D2	2512.366691	-0.230914426	0.0339971
23256	SCFD1	2512.822044	0.079289289	0.0289754
50807	ASAP1	2513.301165	0.184169837	0.0290453
196883	ADCY4	2513.692872	0.111318472	0.0290757
4688	NCF2	2514.700683	0.264651746	0.0291945
2091	FBL	2515.216411	-0.161202341	0.0345494
10594	PRPF8	2515.519508	-0.259276341	0.0345714
55284	UBE2W	2515.720733	0.238455521	0.0293425
9605	C16orf7	2515.855955	0.104326982	0.0293529
54923	LIME1	2516.65422	-0.20807592	0.034622
55819	RNF130	2517.462336	0.239798004	0.0295597
389289	C5orf39	2518.538899	-0.203816561	0.0349288
51663	ZFR	2519.604226	0.131236041	0.0299022
1436	CSF1R	2519.890994	-0.201446287	0.0352063
7094	TLN1	2519.961729	0.094835027	0.0299414
11025	LILRB3	2520.096259	0.193421904	0.0299122
10347	ABCA7	2520.30968	0.093926991	0.029922
8303	SNN	2520.32355	0.254545219	0.0298929
286257	C9orf142	2520.441184	-0.233702267	0.0352699
58517	RBM25	2521.102357	0.197816277	0.0300486
10326	SIRPB1	2521.441799	0.207343191	0.0300972
4694	NDUFA1	2521.966061	0.202228372	0.0300582
55795	PCID2	2522.667972	-0.226085082	0.0358156
23761	PISD	2522.930474	0.17798689	0.030155
5217	PFN2	2523.54103	-0.194304435	0.0357627
2760	GM2A	2524.310329	0.041154188	0.0303872
84002	B3GNT5	2524.572053	0.247623061	0.0304062
79707	NOL9	2525.319717	-0.256064312	0.0361636
5464	PPA1	2525.818924	-0.118356869	0.036169
79758	DHRS12	2526.317052	0.226335806	0.0306957
28978	TMEM14A	2526.408127	-0.208255064	0.0362729
5734	PTGER4	2526.481136	-0.037571006	0.036236
51550	CINP	2527.035104	0.173786519	0.0308012
84640	USP38	2527.067066	0.239045414	0.0307715
27175	TUBG2	2527.098454	-0.20948898	0.0363114
152100	CMC1	2527.677196	-0.174441565	0.0363165
3965	LGALS9	2528.041427	-0.113767844	0.0363497
9537	TP53I11	2529.14098	0.238081673	0.031079

432	ASGR1	2529.281181	0.174641284	0.0310876
203197	C9orf91	2529.361846	-0.119309916	0.0365922
55226	NAT10	2529.408076	-0.225577932	0.0365551
26118	WSB1	2529.83447	0.149466438	0.0311827
51311	TLR8	2530.014733	0.154359794	0.0311912
7589	ZSCAN21	2530.181379	-0.243495889	0.0367131
1611	DAP	2530.274861	0.239046956	0.0311804
353	APRT	2530.499052	-0.196948885	0.0367455
5476	CTSA	2531.065318	0.224914493	0.0312848
2205	FCER1A	2531.097039	0.099857659	0.0312548
2182	ACSL4	2532.183006	0.222483565	0.0314545
9673	SLC25A44	2532.715208	0.219231327	0.0315488
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23603	CORO1C	2532.917035	0.243858158	0.0315664
1130	LYST	2533.0282	0.164240924	0.0315458
283234	CCDC88B	2533.469187	-0.042941072	0.0371151
84164	ASCC2	2533.683648	0.030449078	0.0316492
10677	AVIL	2535.350516	0.206785712	0.0320286
9491	PSMF1	2535.513925	0.090827963	0.0320837
146857	SLFN13	2536.02514	-0.185016744	0.0375519
5868	RAB5A	2536.545842	0.216301931	0.0322148
5305	PIP4K2A	2536.818041	0.032852865	0.0322602
4122	MAN2A2	2537.029929	0.212305541	0.0322581
64118	DUS1L	2538.035968	-0.229489991	0.0379282
5339	PLEC	2538.684231	-0.141343612	0.0380552
25948	KBTBD2	2538.877561	0.177043419	0.0325403
7157	TP53	2538.962515	-0.244673065	0.0380303
2773	GNAI3	2539.110698	0.229885154	0.0325473
10402	ST3GAL6	2539.201496	0.227706047	0.032526
4179	CD46	2539.31921	0.166979348	0.0325236
55863	TMEM126B	2539.876642	0.224703622	0.0325968
51759	C9orf78	2539.881398	0.149856875	0.032566
9392	TGFBRAP1	2539.942634	-0.256766956	0.0382118
257160	RNF214	2540.193174	-0.147167946	0.0382143
91875	TTC5	2540.330244	-0.262930022	0.0381893
6253	RTN2	2540.657316	0.202796968	0.0327144
1407	CRY1	2541.007317	-0.216451835	0.0383699
140803	TRPM6	2541.05688	0.208469576	0.0327401

1486	CTBS	2542.526281	0.211449431	0.0328947
79153	GDPD3	2544.104054	0.057023056	0.033108
3632	INPP5A	2545.294739	0.201169237	0.0333114
940	CD28	2546.090561	-0.155577605	0.0394536
6916	TBXAS1	2546.110078	0.152221061	0.0334302
139818	DOCK11	2546.536155	0.190989804	0.0334644
65108	MARCKSL1	2547.074355	-0.180426807	0.0396044
55062	WIPI1	2547.717968	0.216893962	0.0337792
10867	TSPAN9	2548.394989	0.240633768	0.0339159
25956	SEC31B	2548.49039	-0.190086561	0.0398501
29902	FAM216A	2548.595185	-0.181973568	0.0397959
5788	PTPRC	2548.993871	-0.149279385	0.0398777
4747	NEFL	2550.013939	0.092086158	0.034099
191	AHCY	2550.09177	-0.20502919	0.0401221
55790	CSGALNACT1	2550.336366	0.190514761	0.0340951
6920	TCEA3	2550.861024	-0.189750054	0.0402033
1269	CNR2	2551.31176	0.138915808	0.0342404
6118	RPA2	2551.717296	-0.234591277	0.0402571
23011	RAB21	2553.273467	0.24688501	0.0346089
197135	PATL2	2554.307027	-0.169632944	0.0406748
64092	SAMSN1	2555.140969	0.194704242	0.034893
5552	SRGN	2555.404033	0.16664449	0.0349164
26040	SETBP1	2555.443668	-0.168416565	0.0408491
89890	KBTBD6	2555.965395	-0.218471761	0.0409018
27180	SIGLEC9	2556.331521	0.150488468	0.0350604
9856	KIAA0319	2556.506372	0.092855606	0.0350649
26031	OSBPL3	2556.716303	-0.234397666	0.0410484
55297	CCDC91	2556.833478	-0.159153625	0.0410336
7597	ZBTB25	2558.699138	-0.186392267	0.0413788
255394	TCP11L2	2559.074076	0.240550525	0.0354588
10077	TSPAN32	2559.108975	-0.238812933	0.0413904
10971	YWHAQ	2559.144485	-0.196057416	0.0413351
64219	PJA1	2559.705639	-0.259903492	0.0414
3150	HMGN1	2560.937686	-0.190131081	0.041731
344558	SH3RF3	2563.199428	0.061588893	0.0361481
79711	IPO4	2563.821374	-0.165706005	0.0423537
286	ANK1	2564.619661	0.189101322	0.0364477
2887	GRB10	2564.909522	0.246051004	0.0364787

8417	STX7	2564.986773	0.245422432	0.0364543
57665	RDH14	2565.250967	-0.137460323	0.0427357
7203	CCT3	2565.677519	-0.251872827	0.0427586
84981	MIR22HG	2565.695502	0.214329299	0.0365498
1933	EEF1B2	2566.226786	-0.007635327	0.0428477
55758	RCOR3	2566.904261	0.159996892	0.0367926
6604	SMARCD3	2567.983416	0.257308073	0.0369521
3187	HNRNPH1	2568.484346	-0.151472128	0.0434127
115362	GBP5	2568.921423	0.113137106	0.0370193
4066	LYL1	2569.30907	-0.106206421	0.0435931
80344	DCAF11	2570.130681	0.221369456	0.0372151
5905	RANGAP1	2570.413109	-0.113058654	0.0437154
10100	TSPAN2	2570.886474	0.204128801	0.0373278
54834	GDAP2	2571.079545	0.172930698	0.037367
10494	STK25	2571.25843	-0.234954031	0.0438026
79979	TRMT2B	2571.604348	-0.218261111	0.0438108
29126	CD274	2571.709945	0.212622749	0.0375344
6614	SIGLEC1	2571.760537	-0.130188163	0.0437795
6813	STXBP2	2572.280427	0.07722805	0.0376465
57125	PLXDC1	2572.524826	-0.199912779	0.0438743
23344	ESYT1	2572.625789	-0.279702394	0.0438562
5573	PRKAR1A	2572.660469	0.144913369	0.0376304
55128	TRIM68	2572.921417	-0.200570128	0.0438773
51315	KRCC1	2573.999107	0.168069479	0.0378976
55690	PACS1	2574.138587	-0.178815216	0.0440939
147694	ZNF548	2574.253852	-0.216578156	0.0440755
10455	ECI2	2574.776998	-0.216115583	0.0441352
328	APEX1	2575.323566	-0.239911323	0.0441299
220972	42071	2575.657147	0.168446565	0.0382648
4940	OAS3	2576.455736	0.13778711	0.0384398
56339	METTL3	2576.619089	-0.249087854	0.0443969
84941	HSH2D	2576.845378	0.181830727	0.038505
92912	UBE2Q2	2577.268043	-0.119776689	0.0445207
55454	CSGALNACT2	2578.785822	0.176759685	0.0388342
148932	MOB3C	2579.761228	0.209145399	0.0390446
146330	FBXL16	2579.807118	-0.234455089	0.0452393
56953	NT5M	2579.80926	0.247030257	0.0390182
1663	DDX11	2580.014103	-0.1520283	0.0452196

7342	UBP1	2580.673902	-0.181685896	0.0453806
147199	SCGB1C1	2581.264539	0.215625963	0.0392189
55114	ARHGAP17	2581.562017	-0.227725407	0.0455799
1902	LPAR1	2582.13625	0.19459159	0.0393019
3587	IL10RA	2582.373061	-0.238212544	0.0456757
6844	VAMP2	2582.519485	-0.22722582	0.0456684
3716	JAK1	2582.735233	-0.080681657	0.0457125
11118	BTN3A2	2582.741965	-0.028140644	0.0456538
25909	AHCTF1	2583.513172	0.188323462	0.0395566
10212	DDX39A	2584.351494	-0.258803053	0.0459923
339559	ZNF642	2584.40353	-0.172428363	0.0459335
81847	RNF146	2585.020842	0.135800173	0.0397559
4170	MCL1	2585.247601	0.215836238	0.0397471
8837	CFLAR	2585.289716	0.189153226	0.0397473
1052	CEBPD	2585.366537	0.174813063	0.0397295
57680	CHD8	2586.323731	-0.136727977	0.0465006
441124	LOC441124	2586.487683	0.195982619	0.0398739
4820	NKTR	2586.720832	-0.087519698	0.0465306
4493	MT1E	2586.979601	0.132846977	0.0399371
5036	PA2G4	2587.071915	-0.187805788	0.0465478
401647	GOLGA7B	2587.679447	-0.098582266	0.0466074
10755	GIPC1	2587.968047	-0.241143975	0.0466244
147700	KLC3	2588.090895	0.221941819	0.0400988
51574	LARP7	2588.462801	0.205526674	0.0401347
59345	GNB4	2588.771854	0.232412911	0.0401973
51135	IRAK4	2588.912043	0.228346243	0.0401792
56987	BBX	2589.242419	-0.203479658	0.0469075
81858	SHARPIN	2589.761936	0.092461539	0.0403312
85027	C5orf62	2590.398599	0.233914878	0.0404383
64210	MMS19	2590.665382	-0.265092205	0.0472152
10826	C5orf4	2591.276689	0.124114853	0.040625
3298	HSF2	2591.413997	-0.214474283	0.0474083
6723	SRM	2591.488646	-0.221094879	0.0473611
29102	DROSHA	2591.740241	-0.212236658	0.0473392
2079	ERH	2592.410213	0.128683415	0.0408653
84527	ZNF559	2592.987664	-0.207589611	0.0475441
55172	DNAAF2	2593.139024	-0.177952436	0.0475472
3459	IFNGR1	2594.419627	0.186492845	0.0412823

92703	TMEM183A	2594.46483	0.183595815	0.0412544
29071	C1GALT1C1	2594.510385	0.217627431	0.0412178
730092	RRN3P1	2595.441761	-0.219085286	0.048191
57473	ZNF512B	2595.952214	-0.220418071	0.0483814
84450	ZNF512	2596.148872	-0.245120586	0.048396
10574	CCT7	2596.286568	-0.242313656	0.0483479
64411	ARAP3	2597.131393	0.176290927	0.0417851
81846	SBF2	2597.645534	0.208964536	0.0418988
5471	PPAT	2598.674631	-0.172475184	0.0487875
3978	LIG1	2598.879387	-0.213151985	0.048764
338657	CCDC84	2599.027752	-0.198461276	0.0488155
51537	MTFP1	2599.765387	-0.176385325	0.0489664
9658	ZNF516	2599.820679	0.146360263	0.0424025
6647	SOD1	2599.996706	-0.194311802	0.0489552
26123	TCTN3	2600.074293	-0.241661504	0.0489068
29110	TBK1	2600.077277	0.200009757	0.0424181
23287	AGTPBP1	2600.433042	0.255378233	0.0424602
56905	C15orf39	2601.266542	0.062379273	0.0425995
10432	RBM14	2601.584857	-0.177801221	0.04933
10725	NFAT5	2602.490583	-0.036675357	0.0495043
51303	FKBP11	2603.47626	-0.218308995	0.0497153
92344	GORAB	2603.64784	-0.162477047	0.0496786
23064	SETX	2604.191021	0.101634564	0.0432951
246	ALOX15	2604.487935	0.01032317	0.0499012
8178	ELL	2604.623495	0.147743101	0.0433186
4815	NINJ2	2604.962743	0.047604404	0.0433333
10928	RALBP1	2604.991285	0.219174395	0.0433216
4660	PPP1R12B	2605.688761	0.200316557	0.0434507
57149	LYRM1	2606.306133	0.216965782	0.0435268
2011	MARK2	2609.735197	0.135397901	0.0442091
90637	ZFAND2A	2610.423874	0.164981497	0.0443547
137835	TMEM71	2610.835277	0.222382688	0.044386
10221	TRIB1	2612.201649	0.242800502	0.0447239
134147	CMBL	2613.556154	0.23387167	0.0449124
9479	MAPK8IP1	2613.802881	0.207036778	0.0449519
79065	ATG9A	2614.983288	0.12780154	0.0451399
948	CD36	2614.998799	0.147364296	0.0451004
116092	DNTTIP1	2617.010784	0.212521827	0.0456108

27005	USP21	2618.879034	0.050583397	0.0460506
8778	SIGLEC5	2620.769964	0.141163051	0.0464808
53826	FXYD6	2621.564482	0.12153679	0.0465796
55924	FAM212B	2621.807447	0.130256407	0.0466348
5914	RARA	2622.906678	0.152946807	0.046907
535	ATP6V0A1	2622.913169	0.140777838	0.0468663
51279	C1RL	2628.390377	0.229652344	0.0483781
290	ANPEP	2629.158309	0.178979688	0.0485355
120892	LRRK2	2629.699346	0.204639075	0.0486234
120103	SLC36A4	2632.421272	0.169388092	0.0493858
79957	PAQR6	2632.44582	0.094478524	0.0493518
114785	MBD6	2633.261128	0.093661507	0.0495078
8794	TNFRSF10C	2633.853	0.179058896	0.049629
23670	TMEM2	2634.968897	0.223893069	0.0498793

Supplementary Table 2. The complete list of nodes in the obtained network from DEGs in whole blood of SpA/AS patients

Label	Degree	Betweenness
TP53	79	8706.95
ITGA4	75	5088.83
HDAC1	66	2115.63
HSP90AB1	62	6947.5
EP300	55	4641.5
YWHAQ	52	1761.88
FYN	40	2151.7
IL7R	39	2137.42
PXN	35	1018.79
NOTCH1	33	3599.24
ISG15	28	2925.71
IRF1	28	2007.37
MAP3K3	27	110.33
PARP1	27	1242.64
TRIM28	25	1417.24
LCK	25	2613.29
RB1	25	2537.28
SRPK1	25	2817.53
MAPK14	25	1838.68
LRRK2	24	1538.43
TOP1	23	1259.81
CEBPD	23	1685.36
RPL7	23	441.85
FOS	23	874.9
RPL23	22	226.75
RPS24	21	350.18
FBXO6	21	389.35
RPS3A	20	870.42
HNRNPR	20	1403.21
HIST1H4E	20	552.45
DDX17	19	0
RPL21	19	124.12
MAP1LC3A	19	919.32
TBK1	19	415.68

PPP2R1A	18	82.3
DDX5	18	260.84
JAK1	18	766.67
RPS7	18	674.7
MMS19	18	797.98
BCL6	17	0
SNCA	17	0
EPB41	17	660.81
RPS23	17	397.63
RPL31	17	8.15
DDIT3	16	37.2
FBL	16	90.65
H3F3B	16	912.22
MCM3	16	1296.51
PSMA3	16	245.83
EZR	15	0
HIST1H3H	15	833.68
E2F4	15	895.7
PTPRC	15	520.07
SPTAN1	15	645.6
FAS	15	395.2
HNRNPH1	15	759.3
RPL22	15	0
HSPB1	15	0
TLN1	14	225.12
SNRPD3	14	718.11
CDK4	14	556.55
CCT3	13	68.01
GABARAPL1	13	408.51
NOP56	13	172.15
PRKAR1A	13	365.44
RPS27L	13	16.75
LAMTOR3	12	0
KAT2A	12	0
SF3A2	12	85.33
ELANE	12	46.33
FADD	12	163.18
CFLAR	12	255.09

FLOT1	12	539.79
JAK2	12	55.63
GNAI3	12	560.9
EIF2AK2	12	0
SOCS3	12	22.5
RARA	12	499.33
TAL1	12	0
PTP4A3	12	293
RB1CC1	11	66.47
CD247	11	92.2
TNF	11	0
RPS27	11	259.29
TLR4	11	355.78
TNFSF10	11	286.93
USF1	11	1326.75
ZAP70	11	136.33
PRPF8	11	1215.29
RPS17	11	349.51
LYL1	11	42
GADD45A	11	624.3
USP5	11	543.3
SMAD7	11	92.97
TNFRSF10B	11	0
CCT7	10	0
CEBPE	10	85.16
PABPC4	10	76.7
PA2G4	10	431.94
DNMT1	10	559.17
HIST2H2BE	10	393.13
IMMT	10	169.4
PSMA6	10	241.17
SH2D1A	10	206
PRDM1	10	131.5
GZMB	10	0
HIST1H1C	9	160.33
IRAK4	9	59.2
LGALS3	9	0
PDCD10	9	43.83

MDC1	9	0
RPL10L	9	0
USP11	9	0
USP15	9	256.07
PLAUR	9	324.65
RPL26	9	169.02
CTTN	9	379.83
VAMP2	9	96.57
STAT5B	9	176.41
CAPZA1	9	137.95
SIAH2	9	84.75
TXN	9	737.64
IFIT3	9	273
PFN2	9	260
RBX1	9	373.5
RUNX3	9	231.8
DYRK2	8	0
SCFD1	8	0
ELF1	8	0
RNF10	8	334.57
TRRAP	8	185.67
IFIT1	8	345.53
IFIT2	8	36.49
DDX58	8	0
DGCR8	8	22.94
STRAP	8	0
SF3B4	8	234.29
CD5	8	401.33
SH3GLB1	8	0
CBLB	8	140.93
JUP	8	134
APEX1	8	1982.75
LDHB	8	260.53
TGFB1I1	8	44.7
E2F3	8	25.26
PSMC6	8	147.33
HIPK3	8	364.1
RPA2	8	21.15

C1QBP	8	90
IKZF1	8	191.28
POLD1	8	235.85
RANGAP1	8	190.53
RBM14	8	273.55
STAT4	8	148.12
LEF1	8	0
RFC4	8	0
IL1R1	8	29.5
BMI1	8	23.08
ULK1	8	234.99
TUBA3D	8	0
GFI1	7	0
ITGB2	7	0
ITGB3	7	0
CD2	7	23.69
TUBB6	7	211.96
PRKCQ	7	0
CD36	7	209.32
ARHGDIA	7	4
GAB2	7	32.08
ACTN4	7	278.3
CHMP5	7	395.35
RNF11	7	0
BMX	7	0
CD8A	7	404.2
FHL2	7	149.75
SOD2	7	270.77
RAB5A	7	88.5
ACTR2	7	206.54
UBE2H	7	63.35
GFI1B	7	105.25
STRIP1	7	7.7
RAB5C	7	0
GNAQ	7	35.34
MYL6	7	68.37
RFWD2	7	59.96
MMP9	7	0

IL2RB	7	0
PTEN	7	0
TMEM173	7	0
PTGS2	7	0
NKX3-1	6	58.1
ASF1B	6	0
IFNGR1	6	12.35
TXNDC17	6	0
DDX24	6	282
FKBP8	6	0
CDC34	6	0
PPBP	6	309.31
NFE2L2	6	6.67
RPL36	6	13
LMNB1	6	34.27
CD3E	6	7.5
GATA3	6	536.97
LGALS9	6	109.86
VPS29	6	186.6
TFDP1	6	50.35
RALBP1	6	21.83
MAGED1	6	79.66
BIN1	6	8.92
TRIM25	6	1248.55
PLEC	6	597.18
IL2RG	6	73.07
GEMIN4	6	49.96
PINK1	6	291.8
MME	6	96.67
NOD2	6	188.5
UBXN6	6	267
STK25	6	20.9
FOXO3	6	320.27
HSPA6	6	26.39
ASCC2	6	58.37
EEF1B2	6	0
GRAP2	6	0
FKBP5	6	41.92

PICALM	6	0
RGS2	6	98.75
CCL5	6	268
NUDT18	6	7
USP21	6	90.33
ASAP1	6	274
TRIM23	6	0
MARK2	6	0
ASAP2	6	0
ITK	5	0
RNF146	5	0
DLST	5	7.5
S100A8	5	18.45
EPRS	5	0
TPR	5	0
CD81	5	72.63
IPO4	5	78.7
IRS2	5	50.5
BCL3	5	0
NMI	5	0
MRPS28	5	0
ARHGAP17	5	173.97
IGF2BP2	5	95
LARP7	5	66.58
NFAT5	5	0
FES	5	15.75
CSF1R	5	118.13
PPA1	5	105.65
KIAA1279	5	22.5
MRPS9	5	64.45
IGF2R	5	53
EIF2C4	5	97.88
IL4R	5	33.52
SNRPG	5	0
DVL2	5	568.75
GOLGA2	5	0
CEACAM1	5	128.51
ENC1	5	30.34

ATIC	5	0
PLSCR1	5	235
NUMA1	5	68.29
UBE2W	5	117.67
PFAS	5	0
ATP6V1C1	5	0
BNIP3L	5	0
PSMA4	5	0
IL1RAP	5	14.5
MBNL1	5	0
GIPC1	5	0
CAMK1D	4	0
SOD1	4	0
PRF1	4	0
WASF2	4	0
ATXN7L3	4	0
ZNF512B	4	0
TPM2	4	0
CTPS1	4	0
CXCL10	4	0
RNF144B	4	116.2
AARS	4	0
ID3	4	0
IFIT5	4	0
BAG3	4	281
PHC2	4	0
TAF1A	4	36.91
PGRMC1	4	464.75
MAPK8IP1	4	5.5
ITGAL	4	34.07
TNFRSF10A	4	0
CDK19	4	17.34
SPTB	4	0
SLAMF1	4	0
SRSF6	4	0
NAT10	4	56.4
NOC4L	4	0
RALB	4	4.5

SLMAP	4	0
FOSL2	4	8.53
NME7	4	0
CAMP	4	50.5
NT5C2	4	22
AHCY	4	26.33
GZMA	4	0
PELI1	4	32.12
TUBB1	4	15.81
SCAF4	4	87.05
AES	4	88.48
TOM1	4	96.4
SRP14	4	40.33
HMGB2	4	0
ENY2	4	0
PTPN12	4	8.5
LSM3	4	0
DYSF	4	8
ABCF1	4	30.07
VCAN	4	2.67
EIF4A1	4	0
TBL1X	4	34
KLF4	4	44
SHFM1	4	92
RAB11A	4	63
CD28	4	3
LGALS3BP	4	6
NFE2	4	189
NUCB2	4	0
CKAP4	4	38.48
LSM1	4	0
PFDN5	4	2.47
ATP6V0A1	4	11.06
ACO1	4	23.1
TAX1BP1	4	22.42
EVL	4	230.87
METTL18	4	0
TNFRSF10C	4	0

IFNAR1	4	0
RAB31	4	0
CAPZA2	4	11.86
MARCKSL1	4	0
TRAT1	4	44.58
SLU7	4	0
NCF2	4	0
NLRC4	4	0
PIK3CG	4	0
NDUFS4	4	0
BATF3	4	0
PDLIM7	4	0
LIMK2	3	0
GTF3A	3	0
F13A1	3	0
IL1B	3	0
SUN2	3	0
IL12RB2	3	0
ID2	3	0
C9orf72	3	24.98
SLIRP	3	0
MRPL22	3	1.5
CD226	3	112.87
HSPE1	3	0
USP10	3	0
ITGB7	3	0
CD55	3	0
KANSL1	3	0
RAB8B	3	0
MAP4K1	3	0
SLC4A1	3	0
PIK3CB	3	0
LTF	3	180
PPP4R1	3	24.83
ENO2	3	0
GRB10	3	0
HIST1H2AL	3	0
GNB4	3	0

ALOX5	3	118
PELI2	3	30.52
UBP1	3	184
MATK	3	280.5
SIT1	3	0
CXCR3	3	0.67
CASP4	3	59
PRIM1	3	12
ANXA3	3	160
APRT	3	0
SELENBP1	3	133.17
SUB1	3	0
SPHK1	3	0
FHIT	3	2
NECAB2	3	24
NUMB	3	0
PEBP1	3	114.38
HINT1	3	1
PRKAG1	3	2.58
FCGR2A	3	103.64
NR3C2	3	43
SOS2	3	0
SHARPIN	3	13
MAP3K2	3	21.83
SERPING1	3	9
OAS3	3	0
MRPL13	3	3.5
CLIC4	3	0
CD3G	3	17.08
SRXN1	3	0
IFRD1	3	16
PLEK	3	0
E2F2	3	223.5
IL1R2	3	1
ITGA2B	3	0
CD3D	3	8.87
42253	3	2
IDO1	3	7.17

BCL11B	3	3.28
FNBP1	3	8
KPNA4	3	0
SARNP	3	4
PADI4	3	4.36
CORO1C	3	184.01
ILVBL	3	116.4
DPM1	3	6.1
PROS1	3	15.5
TMX1	3	0
CTSA	3	0
TLR5	3	0
TUBG1	3	2
FAM173A	3	188.8
STX7	3	31.17
CRY1	3	27.57
PBX2	3	20.17
PKN2	3	7.22
PBX1	3	33.78
DPP4	3	88.95
PPP1R15A	3	1.48
RCOR3	3	46
CYSTM1	3	23
PJA1	3	0
EPHB6	3	0
NPC1	3	3
IL13RA1	3	0
BACH1	3	8
42256	3	0
DROSHA	3	0
STX11	3	43.48
NLRP3	3	17.33
SIGIRR	3	12.5
SELP	3	0
SPAG9	3	0
DUSP1	3	0
CD79A	3	0
DOCK5	3	0

TCF7	3	0
IKZF3	3	0
PLOD1	3	0
RARRES3	3	0
SKAP1	3	0
ABCA1	3	0
PJA2	3	0
SMCHD1	2	0
UNG	2	0
CLTCL1	2	0
ZNF516	2	0
SLPI	2	0
UBE2Q2	2	0
PVRL2	2	0
CEP63	2	0
FBP1	2	0
C2orf88	2	0
ETV6	2	0
CHP1	2	0
SERPINB2	2	0
HMGN1	2	0
EIF3C	2	0
CD19	2	0
CXCL1	2	0
PACS1	2	0
SMARCD3	2	0
MKNK1	2	0
ESCO1	2	0
RFX2	2	0
BBX	2	0
PYGL	2	2.33
CD6	2	0
STK39	2	0
SLC1A5	2	0
ABHD14A	2	0
ARFIP1	2	0
ZBED1	2	0
ZFR	2	0

LZTR1	2	0
ABCB1	2	0
TLE3	2	0
ATG2A	2	0
RIT1	2	0
CDC25B	2	0
GBP1	2	0
RNF123	2	0
VCPIP1	2	0
HLTF	2	16.35
MAP1S	2	0
GLUL	2	0
GOT2	2	72
NUP214	2	0
MCL1	2	0
KLF1	2	0
SDPR	2	0
RAB33B	2	0
SACS	2	0
PRKCH	2	262.67
PPAT	2	0
CTSG	2	32
YARS	2	0
FXYD6	2	0
GSPT2	2	0
CCDC53	2	5
PPIL1	2	0
TLR1	2	0
STX3	2	38
RBM25	2	1.31
CXCR1	2	0
C4BPA	2	4.5
MYL9	2	56.22
PRKX	2	0
DDX39A	2	0
PRDX5	2	9.04
CAB39	2	0
CTNNAL1	2	3.71

KLC2	2	7.25
NLRP12	2	0
WDFY3	2	0
SESN1	2	0
LST1	2	0
BATF2	2	0
NDUFA4	2	0
ZNF593	2	0
BTN3A3	2	0
CDKN1C	2	0
PPP2R5A	2	0.5
IRAK3	2	0
NAIP	2	0
PTPLAD1	2	4
IER3	2	0
CD46	2	0
UQCRB	2	0
WDR6	2	0
TRIM44	2	0
IL21R	2	49.48
NCF4	2	0
NAMPT	2	0
CD59	2	35
42071	2	0
C19orf43	2	0
MXD1	2	1.07
ARHGAP26	2	15.93
HES4	2	11.11
USP38	2	0
ABI3	2	0
CHD8	2	0
KIR3DL1	2	1.5
GP6	2	0
CYP4F12	2	43
BLK	2	42
MTPN	2	0
YOD1	2	0
H1F0	2	116.76

MARCKS	2	34.96
SH2D2A	2	0
IPO8	2	0
CNNM3	2	0
HLA-DPA1	2	0
HECW2	2	0
CDC42EP2	2	0
GZMM	2	0
ACP5	2	23.01
ERH	2	0
TRIM6	2	0
NFIL3	2	0
GMFB	2	0
WIPI1	2	0
TP53I3	2	0
PRSS23	2	0
NELL2	2	0
NADK	2	0
PPIG	2	154.03
SAMSN1	2	0
CREG1	2	0
OFD1	2	0
N4BP2	2	0
NTHL1	2	0
SRGN	2	0
KDM5C	2	152.2
PTGDS	2	0
AIM2	2	0
BCKDK	2	0
RGS18	2	0
IL1RN	2	1
ELL	2	0
P2RX7	2	0
ANK1	2	0
ADA	2	4.95
MYCBP2	2	0
TLR6	2	0
CENPW	2	0

MPP1	2	204
ICAM2	2	0
VIPR1	2	0
RAB3IL1	2	0
C2orf44	2	0
HIST1H2BE	2	0
MGEA5	2	0
PPP1R10	2	0
SLAMF7	2	0
WDR26	2	0
TLR8	2	0
PASK	2	0
LIG1	2	0
UQCRQ	2	0
FCHSD1	2	0
URGCP	1	0
ANKRD12	1	0
CD72	1	0
NKTR	1	0
ZNF592	1	0
ESYT1	1	0
SPARC	1	0
DCP2	1	0
DSC2	1	0
RPL34	1	0
STK17B	1	0
DPM2	1	0
BTBD10	1	0
NTPCR	1	0
TGFBRAP1	1	0
CXXC5	1	0
EIF2S3	1	0
ARG1	1	0
MBNL3	1	0
ZNF184	1	0
GNA13	1	0
LAT2	1	0
ACPP	1	0

STXBP2	1	0
C12orf57	1	0
KIR3DL3	1	0
ALMS1	1	0
TMEM39B	1	0
LY96	1	0
LYST	1	0
FBXW5	1	0
CIRH1A	1	0
F5	1	0
LYZ	1	0
CMTM6	1	0
DUSP2	1	0
TBRG4	1	0
BNIP2	1	0
NPRL3	1	0
GLRX	1	0
ATG9A	1	0
DCAF11	1	0
ZNF514	1	0
TLE4	1	0
ZFPM1	1	0
MAK	1	0
ARAP3	1	0
MTFP1	1	0
BSG	1	0
NLRP2	1	0
TKT	1	0
JMJD1C	1	0
AKR1B1	1	0
ADHFE1	1	0
COX7A2	1	0
LAX1	1	0
TP53INP2	1	0
FBLN5	1	0
TTC4	1	0
CLK4	1	0
AGTPBP1	1	0

FURIN	1	0
RGL1	1	0
RPAP2	1	0
DHX37	1	0
HIP1	1	0
EPHB4	1	0
EIF5A	1	0
FNBP4	1	0
SSBP3	1	0
NT5C3	1	0
APBB1IP	1	0
PTBP3	1	0
DNAJC3	1	0
STXBP3	1	0
IL27RA	1	0
ZBP1	1	0
MAGT1	1	0
42248	1	0
DNTTIP1	1	0
SIRPA	1	0
FLT3LG	1	0
PLEK2	1	0
FCER1A	1	0
M6PR	1	0
BLVRB	1	0
CD58	1	0
SLC25A44	1	0
PLA2G16	1	0
MRVI1	1	0
RGL4	1	0
MAD1L1	1	0
HK3	1	0
ERAP2	1	0
ACSL1	1	0
CACNA2D3	1	0
ZNF600	1	0
PTPN4	1	0
FTSJD2	1	0

DUS1L	1	0
GZMK	1	0
PPP3R1	1	0
EXTL3	1	0
PSMF1	1	0
SEC14L1	1	0
ZNF444	1	0
PPP2R5B	1	0
HEY1	1	0
TGFBR3	1	0
SYF2	1	0
RENBP	1	0
CD74	1	0
DDX11	1	0
PRRC2C	1	0
PAM	1	0
EMILIN2	1	0
ZNF827	1	0
RHOBTB1	1	0
OSBPL1A	1	0
BEX2	1	0
EID3	1	0
LGALSL	1	0
FOXO4	1	0
DBI	1	0
PPAP2A	1	0
ITGB5	1	0
TUFT1	1	0
CCDC88B	1	0
DHRS12	1	0
LY9	1	0
PLEKHF1	1	0
STRADB	1	0
SLFN5	1	0
SCYL2	1	0
SERPINB1	1	0
CYFIP2	1	0
DUSP14	1	0

PPRC1	1	0
PLA2G15	1	0
TMCO1	1	0
SRM	1	0
C1GALT1C1	1	0
LPAR2	1	0
VAMP5	1	0
TREM1	1	0
ADORA3	1	0
ST3GAL2	1	0
NPIP	1	0
GNA15	1	0
MYL4	1	0
PFKFB4	1	0
CLDN5	1	0
KIR2DL3	1	0
KIR2DL1	1	0
OSBPL8	1	0
DAPP1	1	0
DGKQ	1	0
AZU1	1	0
CMBL	1	0
SLAMF6	1	0
DUSP3	1	0
KLHL26	1	0
ASGR2	1	0
ASGR1	1	0
PRRG4	1	0
TSPAN2	1	0
CENPT	1	0
MAL	1	0
AP1G2	1	0
SIGLEC5	1	0
42064	1	0
BCL2A1	1	0
IFI35	1	0
FBXL13	1	0
GNGT2	1	0

EAF2	1	0
ZNF23	1	0
RPL26L1	1	0
CD27	1	0
UCP2	1	0
C18orf25	1	0
OSM	1	0
CD69	1	0
TBXAS1	1	0
PDK4	1	0
PIK3C2B	1	0
CD8B	1	0
NDUFB3	1	0
PHF21A	1	0
TMEM63B	1	0
TDRD9	1	0
CRYZ	1	0
CUTA	1	0
BANK1	1	0
LDOC1L	1	0
HIST1H2AC	1	0
HIST1H2BH	1	0
TIGIT	1	0
TGFA	1	0
F2RL1	1	0
HP	1	0
F12	1	0
XAF1	1	0
CTBS	1	0
NR1D2	1	0
TP53INP1	1	0
KBTBD6	1	0
CCDC84	1	0
FECH	1	0
42070	1	0
SLC12A6	1	0
STXBP1	1	0
TBL3	1	0

PIP5K1C	1	0
APOBEC3C	1	0
RNASE2	1	0
IL32	1	0
SBK1	1	0
PLSCR3	1	0
CEACAM6	1	0
CEACAM3	1	0
TCTN3	1	0
FCAR	1	0
MLLT6	1	0
SKAP2	1	0
FCRL3	1	0
IQGAP2	1	0
KDM6B	1	0
TECPR2	1	0
GMFG	1	0
METTL21D	1	0
CA4	1	0
SH2D1B	1	0
GOT1	1	0
S100P	1	0
NQO2	1	0
MTX1	1	0
RIOK3	1	0
NCKAP1L	1	0
RPL17	1	0
HERC5	1	0
CA2	1	0
REPS2	1	0
GYPC	1	0
SLC5A6	1	0
PPP1R3D	1	0
CCR1	1	0
OAS1	1	0
IL10RA	1	0
TSTA3	1	0
CCDC86	1	0

PPP1R3B	1	0
NCAPG2	1	0
ZNF91	1	0
RAP1GAP	1	0
CIR1	1	0
LENG8	1	0
GNG11	1	0
PTPRCAP	1	0
PPAN	1	0
SHKBP1	1	0
NMT2	1	0
RNF167	1	0
IFITM3	1	0
UBN1	1	0
ALPK1	1	0
ALAS2	1	0
TUBG2	1	0
S1PR1	1	0
SBF2	1	0
ACSL4	1	0
NOV	1	0
SEC31B	1	0
RAB21	1	0
NCR3	1	0
RRAGD	1	0
ALCAM	1	0
PCID2	1	0

Supplementary Table 3. Enriched functional pathways identified in whole blood of SpA/AS patients

Pathway	Total	Expected	Hits	P Value	FDR
Measles	102	7.96	29	3.11E-10	6.74E-08
Influenza A	107	8.35	24	1.46E-06	0.000121
Natural killer cell mediated cytotoxicity	138	10.8	28	1.67E-06	0.000121
Apoptosis	83	6.47	20	3.47E-06	0.000188
Amoebiasis	46	3.59	14	5.74E-06	0.000249
Chagas disease (American trypanosomiasis)	89	6.94	20	1.09E-05	0.000393
T cell receptor signaling pathway	98	7.64	21	1.43E-05	0.000444
Jak-STAT signaling pathway	99	7.72	20	5.66E-05	0.00153
Osteoclast differentiation	119	9.28	21	0.000282	0.0068
Toll-like receptor signaling pathway	97	7.57	18	0.000406	0.00881
Leishmaniasis	51	3.98	11	0.00154	0.0304
Herpes simplex infection	103	8.03	17	0.00227	0.041
Legionellosis	40	3.12	9	0.00301	0.0502
Cell adhesion molecules (CAMs)	121	9.44	18	0.00543	0.0801
HTLV-I infection	199	15.5	26	0.00576	0.0801
Pertussis	52	4.06	10	0.006	0.0801
Prostate cancer	87	6.79	14	0.0068	0.0801
Phagosome	53	4.13	10	0.0069	0.0801
Cytokine-cytokine receptor interaction	253	19.7	31	0.00701	0.0801
Tuberculosis	174	13.6	23	0.00797	0.0865
Hepatitis C	100	7.8	15	0.00994	0.0986
Chronic myeloid leukemia	73	5.69	12	0.01	0.0986
Arrhythmogenic right ventricular cardiomyopathy (ARVC)	12	0.936	4	0.0109	0.103
Rheumatoid arthritis	19	1.48	5	0.0131	0.114
Graft-versus-host disease	19	1.48	5	0.0131	0.114
Cytosolic DNA-sensing pathway	20	1.56	5	0.0164	0.136
Fc gamma R-mediated phagocytosis	97	7.57	14	0.0173	0.137
Non-small cell lung cancer	52	4.06	9	0.0177	0.137
Leukocyte transendothelial migration	108	8.42	15	0.0194	0.145
Prion diseases	21	1.64	5	0.0201	0.146
Salmonella infection	72	5.62	11	0.0224	0.157
Pathways in cancer	310	24.2	34	0.0243	0.162

Regulation of actin cytoskeleton	182	14.2	22	0.0247	0.162
Toxoplasmosis	93	7.25	13	0.0271	0.171
Glioma	65	5.07	10	0.0276	0.171
B cell receptor signaling pathway	75	5.85	11	0.0295	0.177
Cell cycle	124	9.67	16	0.0302	0.177
VEGF signaling pathway	76	5.93	11	0.0322	0.184
Complement and coagulation cascades	67	5.23	10	0.0333	0.185
Pancreatic cancer	69	5.38	10	0.0398	0.215
African trypanosomiasis	25	1.95	5	0.0407	0.215
Cysteine and methionine metabolism	34	2.65	6	0.045	0.224
Antigen processing and presentation	61	4.76	9	0.045	0.224
Synaptic vesicle cycle	18	1.4	4	0.0464	0.224
Viral myocarditis	26	2.03	5	0.0473	0.224
Riboflavin metabolism	11	0.858	3	0.0485	0.224
Malaria	11	0.858	3	0.0485	0.224

Supplementary Table 4. The complete list of DEGs in synovium of SpA/AS patients

Entrez ID	Name	Combined RP	Ave Log FC	P val
7060	THBS4	72.96119813	-1.671537569	0
83888	FGFBP2	79.52630478	-1.85230405	0
8076	MFAP5	85.36016586	-1.825448055	0
3543	IGLL1	112.1131707	1.796058602	0
55118	CRTAC1	113.3681801	-1.492315327	0
256691	MAMDC2	161.9363602	-1.385034644	0
54206	ERRFI1	163.991487	-1.249435151	0
5320	PLA2G2A	174.011559	-1.228507613	0
8483	CILP	176.5397988	-1.542804383	0
26577	PCOLCE2	177.9863287	-1.343164416	0
23452	ANGPTL2	183.6115019	-1.300209865	0
57007	CXCR7	187.1047482	-1.373031375	0
7078	TIMP3	202.3166425	-1.331976022	0
1311	COMP	207.3984324	-1.345717122	0
286133	SCARA5	214.744389	-1.170623147	0
3040	HBA2	279.7207987	1.143607317	0
27122	DKK3	283.7677665	-1.14824638	0
8404	SPARCL1	297.9978816	-1.122541257	0
1839	HBEGF	298.0788498	-1.080243456	0
347	APOD	300.098305	-0.98265674	0
5654	HTRA1	312.7191264	-0.896627005	0
241	ALOX5AP	329.8011517	-0.91165459	0
4681	NBL1	342.7150873	-0.908196386	0
4256	MGP	342.87864	-0.923161644	0
23213	SULF1	345.7936165	-0.985053622	0
5627	PROS1	348.6461359	-1.012009956	0
126306	JSRP1	355.462811	1.677804359	0
3043	HBB	358.8082435	0.896212103	0
7123	CLEC3B	359.1758084	-0.956117413	0
341	APOC1	361.6179629	0.967403606	0
6422	SFRP1	362.1327236	-1.170737163	0
84952	CGNL1	373.6767233	-0.974778329	0
253935	ANGPTL5	387.1983071	-1.016503804	0
1036	CDO1	387.216725	-1.07302543	0
3489	IGFBP6	390.1829181	-1.009371674	0

4060	LUM	392.0629581	-0.931707472	0
5066	PAM	403.8201276	-0.901162691	0
79901	CYBRD1	415.2143685	-1.009596029	0
27253	PCDH17	420.2410001	0.830370599	0
928	CD9	423.9258468	-0.989750303	0
1672	DEFB1	430.960246	-0.710055003	0
9945	GFPT2	436.3159382	-0.61395337	0
1809	DPYSL3	444.8835605	-0.799419262	0
11167	FSTL1	452.7802545	-0.842035349	0
51237	MZB1	455.3438178	1.28843025	0
84417	C2orf40	462.3114507	-0.844117469	0
8870	IER3	462.6970822	-0.803000912	0
64102	TNMD	463.920363	-1.194370018	0
7077	TIMP2	475.320024	-0.863343001	0
5156	PDGFRA	477.8459572	-0.791715402	0
3127	HLA-DRB5	485.4618233	-0.608295892	0
301	ANXA1	494.1139418	-0.838413136	0
91937	TIMD4	496.0459024	-0.674581113	0
1490	CTGF	497.3232546	-0.844780399	0
5214	PFKP	507.4934497	-0.837299192	0
1446	CSN1S1	518.3742598	-0.599665829	0
4489	MT1A	528.8121443	-0.808099486	0
10149	GPR64	532.0813993	-0.700770229	0
348	APOE	534.9363596	0.668927964	0
4856	NOV	551.6732135	-0.834370539	0
7049	TGFBR3	556.839729	-0.853110897	0
81035	COLEC12	559.4804393	-0.68770544	0
2202	EFEMP1	569.1120375	-0.79315687	0
117248	GALNTL2	571.3622725	-0.917699704	0
3075	CFH	572.9344389	-0.735627037	0
7059	THBS3	577.4462435	-0.867909637	0
8553	BHLHE40	587.5183582	-0.750605861	0
11098	PRSS23	588.1070485	-0.762761341	0
2012	EMP1	591.5308082	-0.866843578	0
2199	FBLN2	605.0075664	-0.955100823	0
2331	FMOD	605.161668	-0.918005033	0
10186	LHFP	605.4586126	-0.828154839	0
4499	MT1M	605.5701682	-0.715392966	0

6192	RPS4Y1	609.8704722	0.412678983	0.001
57488	ESYT2	618.2534558	-0.710462022	0
59338	PLEKHA1	620.9974732	-0.646027002	0
2619	GAS1	624.8185562	-0.745599978	0
1462	VCAN	630.5392555	-0.678861153	0
1842	ECM2	633.8900723	-0.738418042	0
8853	ASAP2	634.5107776	-0.793537338	0
1958	EGR1	634.8312759	-0.448567003	0
4502	MT2A	641.6460736	-0.664472803	0
3123	HLA-DRB1	641.6622866	-0.507034151	0
51474	LIMA1	652.5882582	-0.750060183	0
4239	MFAP4	655.1177863	-0.798705617	0
8910	SGCE	655.1785162	-0.966944447	0
2934	GSN	658.6023409	-0.886564403	0.0001282
10875	FGL2	658.7400105	-0.674005119	0.0001266
7412	VCAM1	663.9812072	-0.603052016	0.000125
28984	RGCC	673.8060763	-0.620076362	0.0001235
8613	PPAP2B	678.777373	-0.737116008	0.000122
26053	AUTS2	680.0893839	-0.707257887	0.0001205
6275	S100A4	685.1482197	-0.660393323	0.000119
7058	THBS2	686.4029376	-0.722086421	0.0001176
283120	H19	692.5638246	0.566287276	0.0027273
558	AXL	698.0412956	-0.673309609	0.0002326
53405	CLIC5	702.2628777	-0.639143653	0.0002299
6280	S100A9	708.5207169	0.726707259	0.0041667
249	ALPL	708.6937257	0.827058029	0.0038462
152273	FGD5	708.705394	-0.62271657	0.0002273
687	KLF9	711.768185	-0.720679423	0.0002247
83700	JAM3	720.2714449	-0.830842397	0.0002222
6352	CCL5	721.100227	0.669126037	0.0035714
716	C1S	721.3612848	-0.684561759	0.0002198
4629	MYH11	723.5170473	-0.846860619	0.0002174
6363	CCL19	723.7490859	0.94307564	0.0033333
55273	TMEM100	724.1089609	-0.615565774	0.0002151
254863	C17orf61	728.4396919	0.481247642	0.003125
1808	DPYSL2	734.2384786	-0.719106689	0.0002128
85004	RERG	736.939335	-0.640490942	0.0002105
90	ACVR1	738.6050329	-0.738448106	0.0002083

5157	PDGFRL	742.9524313	-0.745146768	0.0002062
51435	SCARA3	743.7087883	-0.606286164	0.0002041
3597	IL13RA1	751.2133746	-0.668269344	0.000202
25890	ABI3BP	753.8628025	-0.68888733	3.00E-04
4493	MT1E	758.7599827	-0.635053388	0.000396
1879	EBF1	760.0348483	-0.71740983	0.0003922
6518	SLC2A5	762.2385384	0.948404543	0.0035294
22801	ITGA11	764.8007888	-0.992107333	0.0004854
23705	CADM1	769.8065563	-0.887018162	0.0004808
220	ALDH1A3	774.6130183	-0.710286377	0.0004762
3117	HLA-DQA1	778.1499394	0.682933565	0.0038889
114990	VASN	779.7037247	-0.715057914	0.0004717
1805	DPT	782.0502552	-0.666662741	0.0004673
9452	ITM2A	783.2590909	-0.688542995	0.000463
55002	TMCO3	786.5294947	-0.762287994	0.0004587
4501	MT1X	787.5879129	-0.599053882	0.0004545
23328	SASH1	790.9328693	-0.792586732	0.0004505
649853	649853	793.5665662	1.150898877	0.0047368
146722	CD300LF	798.4050441	1.037861704	0.005
53342	IL17D	798.9700294	-0.579533252	0.0004464
960	CD44	800.2956077	-0.592990219	0.0004425
10870	HCST	805.1378097	0.676810711	0.0052381
3426	CFI	809.8496674	-0.542761298	0.0005263
9719	ADAMTSL2	814.6176072	-0.731763347	0.0005217
4696	NDUFA3	814.7279084	0.633289716	0.0054545
10218	ANGPTL7	815.485301	-0.713878839	0.0005172
11341	SCRG1	817.7773172	-0.55791571	0.0005128
8685	MARCO	820.6773496	-0.531082776	0.0005085
115701	ALPK2	821.2498403	0.974631589	0.0052174
2014	EMP3	824.5042131	-0.638878475	0.0005042
54453	RIN2	825.5035366	-0.649125042	5.00E-04
9445	ITM2B	825.5253348	-0.629356822	0.0004959
84624	FNDC1	829.2450514	-0.612266651	0.0004918
27129	HSPB7	831.1025132	-1.005162927	0.0004878
5376	PMP22	831.4648298	-0.519535649	0.0004839
9744	ACAP1	832.4158954	1.054122295	0.005
1776	DNASE1L3	836.1064907	-0.606097118	0.00048
8839	WISP2	838.5129294	-0.673234785	0.0004762

5947	RBP1	841.8124441	0.642097889	0.0052
152503	SH3D19	842.0622413	-0.726957763	0.0005512
3021	H3F3B	842.7776839	-0.582869263	0.0005469
65108	MARCKSL1	844.8942041	0.595091933	0.0053846
414062	CCL3L3	847.7355424	-0.286190604	0.0005426
128553	TSHZ2	852.3981141	-0.714482542	0.0005385
64764	CREB3L2	859.2137348	-0.556192319	0.0005344
586	BCAT1	866.5086309	-0.580542307	0.0006061
4147	MATN2	867.0423049	-0.657821975	0.0006015
1281	COL3A1	870.8287704	-0.709705873	0.000597
57178	ZMIZ1	875.3227182	-0.596679417	0.0005926
1902	LPAR1	877.0672521	-0.552617187	0.0005882
3488	IGFBP5	879.3782445	-0.811407831	0.0006569
388	RHOB	880.7845564	-0.666091726	0.0006522
9639	ARHGEF10	884.1840107	-0.771374501	0.0007194
51693	TRAPPC2L	888.9571978	0.407928318	0.0081481
6678	SPARC	893.3186884	-0.789455583	0.0007857
729	C6	895.5737666	-0.921311627	0.0007801
6867	TACC1	898.7772705	-0.527473653	0.0007746
1396	CRIP1	900.9164609	-0.579315045	0.0007692
9314	KLF4	902.5271257	-0.484972522	0.0007639
169044	COL22A1	907.5453787	-0.266694025	0.0007586
3385	ICAM3	907.9397711	0.719061458	0.0092857
8425	LTBP4	915.2971326	-0.657024442	0.0007534
54855	FAM46C	915.4352342	0.933118939	0.0089655
9899	SV2B	919.2843002	-0.473018245	0.0007483
3693	ITGB5	922.2914223	-0.658154327	0.0007432
80176	SPSB1	923.1714538	-0.773767933	0.0007383
2009	EML1	923.3261235	-0.542857233	0.0007333
349236	349236	923.3320968	1.186286504	0.0086667
961	CD47	924.2174755	-0.559612294	0.0007285
2219	FCN1	928.5435024	0.704271384	0.0083871
79625	NDNF	930.402336	-0.483800611	0.0008553
5919	RARRES2	936.6928343	0.014249694	0.0090625
1675	CFD	940.9816357	-0.68451372	0.0009804
7431	VIM	941.6822629	-0.719648835	0.001039
6281	S100A10	942.8471813	-0.554912691	0.0010968
3685	ITGAV	950.7957205	-0.485985743	0.0011538

360132	FKBP9L	952.7862173	-0.457725407	0.0012102
633	BGN	956.580355	-0.559359499	0.0012658
2353	FOS	960.1471487	-0.254816499	0.0012579
80310	PDGFD	960.8206966	-0.538038742	0.00125
6695	SPOCK1	961.1262954	-0.75825165	0.0012422
1043	CD52	963.2028942	0.467537643	0.0109091
11344	TWF2	963.4977761	0.632726642	0.0105882
200315	APOBEC3A	963.8409201	0.980899637	0.0102857
9244	CRLF1	964.8214091	-0.555070135	0.0012346
1843	DUSP1	967.8711449	-0.5487507	0.001227
23273	23273	968.0543829	-0.46519158	0.0012195
219348	PLAC9	969.4080511	-0.580321677	0.0012727
84168	ANTXR1	969.813189	-0.582648438	0.0012651
29116	MYLIP	971.2422692	-0.543544562	0.0012575
5603	MAPK13	974.095522	0.946773664	0.0108333
22998	LIMCH1	974.323483	-0.554131387	0.00125
3418	IDH2	980.0103443	0.650483321	0.0116216
29899	GPSM2	981.5001317	-0.604052216	0.0014793
387066	SNHG5	984.4852899	0.566273048	0.0115789
5740	PTGIS	985.0533447	-0.969715953	0.0015882
4708	NDUFB2	986.1456868	0.519206788	0.0117949
64928	MRPL14	986.8351683	0.754664755	0.0115
2296	FOXC1	988.6679786	-0.616020062	0.0016959
3983	ABLIM1	992.1785129	-0.653271399	0.0017442
84935	C13orf33	993.6497597	-0.431837834	0.0017919
3683	ITGAL	994.8371035	0.94417484	0.0121951
54998	AURKAIP1	995.8940538	0.463632133	0.0119048
25878	MXRA5	1001.211222	-0.583214275	0.0018966
6675	UAP1	1007.025493	-0.411673806	0.0020571
3371	TNC	1007.628741	-0.50880571	0.0020455
5358	PLS3	1007.86502	-0.695418477	0.0020339
253738	EBF3	1008.101256	-0.686342457	0.0020225
1655	DDX5	1011.329078	-0.418144359	0.002067
23580	CDC42EP4	1016.144433	-0.647163327	0.0021111
26509	MYOF	1017.046433	-0.551236585	0.0021547
1290	COL5A2	1017.792652	-0.521705342	0.0021429
51673	TPPP3	1018.593319	-0.5396194	0.0021311
27242	TNFRSF21	1018.95681	-0.633392843	0.0021196

857	CAV1	1019.280071	-0.63222874	0.0021081
1793	DOCK1	1022.32755	-0.716198939	0.0021505
3304	HSPA1B	1025.224654	-0.595937058	0.002139
3002	GZMB	1025.493965	0.665944105	0.0130233
338773	TMEM119	1025.900579	-0.622766982	0.0021277
4312	MMP1	1028.11664	0.894569895	0.0127273
10632	ATP5L	1029.182729	0.423319892	0.0126667
303	ANXA2P1	1034.703956	-0.639149425	0.0022751
7430	EZR	1034.865678	-0.422194102	0.0022632
1293	COL6A3	1035.856435	-0.634447497	0.0022513
11034	DSTN	1036.695643	-0.590153945	0.0022396
169611	OLFML2A	1042.747826	-0.669081784	0.0023316
1601	DAB2	1043.539376	-0.612336967	0.0023196
7832	BTG2	1045.251612	-0.417959094	0.002359
51025	PAM16	1046.779803	0.710070746	0.0152174
1238	CCBP2	1050.026811	-0.90070937	0.002449
56963	RGMA	1052.022243	-0.461921628	0.0024873
10859	LILRB1	1053.152996	0.51871144	0.0159574
4128	MAOA	1053.581487	-0.613775452	0.0025253
54463	FAM134B	1055.165507	-0.409709831	0.0025628
25891	PAMR1	1057.493663	-0.668212322	0.0026
84300	MNF1	1057.884717	0.296375734	0.0158333
1329	COX5B	1059.028909	0.507172141	0.0159184
2308	FOXO1	1065.58285	-0.503815745	0.0027363
51079	NDUFA13	1066.005671	0.470337819	0.0162
285093	CXXC11	1069.242502	1.025695111	0.0166667
2952	GSTT1	1069.350972	0.727892705	0.0163462
51181	DCXR	1070.18869	0.392540835	0.0162264
84886	C1orf198	1073.722184	-0.708312517	0.0028218
2825	GPR1	1074.597224	-0.553758883	0.0028079
1727	CYB5R3	1075.498326	-0.497047043	0.0027941
8826	IQGAP1	1082.387431	-0.595269109	0.0030244
4716	NDUFB10	1083.657123	0.510960662	0.0177778
4818	NKG7	1084.242007	0.659809291	0.0174545
130497	OSR1	1084.62244	-0.643681275	0.0030583
91663	MYADM	1090.585177	-0.498067332	0.0031401
27020	NPTN	1094.471723	-0.517509854	0.003125
5730	PTGDS	1095.756871	0.380324271	0.0175

2995	GYPC	1096.162785	0.360804791	0.017193
4130	MAP1A	1097.722279	-0.387997133	0.0031579
27295	PDLIM3	1101.413785	-0.575704405	0.0032857
7905	REEP5	1111.85236	-0.499910479	0.0034123
140823	ROMO1	1113.930383	0.358619034	0.0182759
4907	NT5E	1115.311758	-0.45105999	0.0034906
974	CD79B	1116.459538	0.596694745	0.0183051
2354	FOSB	1117.234563	0.250425486	0.0181667
23516	SLC39A14	1117.666805	-0.270937579	0.0034742
5501	PPP1CC	1121.558337	-0.35308025	0.0035981
7277	TUBA4A	1122.413688	0.565708281	0.0183607
4784	NFIX	1123.205868	-0.611266921	0.0036279
10184	LHFPL2	1125.836525	-0.388272977	0.0036574
1890	TYMP	1126.154832	0.495853811	0.0185484
89932	PAPLN	1128.881025	-0.383891078	0.0036406
80008	TMEM156	1131.564047	0.697721453	0.0188889
475	ATOX1	1132.81529	0.412966422	0.0185938
27089	UQCRQ	1138.743613	0.509915695	0.0184615
1117	CHI3L2	1140.246657	0.52557089	0.0183333
1519	CTSO	1140.667157	-0.386783126	0.0038991
513	ATP5D	1141.483149	0.438316266	0.0180597
100133941	CD24	1141.489323	-0.701673727	0.0038813
2273	FHL1	1144.838097	-0.443311104	0.0039091
3454	IFNAR1	1145.523487	0.818944071	0.0186765
161742	SPRED1	1154.668654	-0.541242397	0.0041176
7167	TPI1	1156.357619	0.525071809	0.0194203
6923	TCEB2	1157.296164	0.4010941	0.0192857
5621	PRNP	1160.983365	-0.406708444	0.0041441
117247	SLC16A10	1166.591675	0.810401687	0.02
8270	LAGE3	1167.815398	0.464888583	0.0198611
9528	TMEM59	1171.80783	-0.594028552	0.0046637
1278	COL1A2	1171.891987	-0.57809281	0.0046429
5159	PDGFRB	1172.512785	-0.557378739	0.0046667
79686	LINC00341	1172.61345	-0.52693395	0.004646
4728	NDUFS8	1172.848832	0.438815115	0.019863
54539	NDUFB11	1176.707245	0.64026547	0.0204054
9551	ATP5J2	1178.257737	0.267816966	0.0204
1903	S1PR3	1179.087893	-0.18601806	0.0048458

400916	CHCHD10	1179.459554	0.346086603	0.0201316
11040	PIM2	1180.472115	0.660405742	0.02
6366	CCL21	1181.672595	0.540711315	0.02
8530	CST7	1184.298063	0.756696886	0.0201266
521	ATP5I	1184.426779	0.442917824	0.019875
7286	TUFT1	1187.058217	-0.536510611	0.0050439
10903	MTMR11	1193.552485	-0.492016222	0.0052838
26137	ZBTB20	1197.962399	-0.507643389	0.0053913
25777	SUN2	1198.644307	-0.554995558	0.0054545
136051	ZNF786	1199.064151	0.381274665	0.0208642
59	ACTA2	1200.66865	-0.602320505	0.0054741
79188	TMEM43	1203.407765	-0.466371117	0.0055365
23136	EPB41L3	1207.563463	-0.512353622	0.0057265
4774	NFIA	1208.29954	-0.456759471	0.0057021
57452	GALNTL1	1208.618214	-0.79013507	0.005678
59277	NTN4	1210.659124	-0.496626037	0.0056962
9277	WDR46	1214.208005	0.795444689	0.0219512
51655	RASD1	1216.688432	-0.445028335	0.0058403
10106	CTDSP2	1216.862933	-0.525969863	0.0058159
3512	IGJ	1217.54966	0.631388512	0.0218072
5050	PAFAH1B3	1219.609406	0.403923151	0.0217857
6387	CXCL12	1222.085471	-0.421753157	0.0059583
120425	AMICA1	1224.956426	0.64923201	0.0221176
2317	FLNB	1225.424986	-0.48272454	0.0060166
4478	MSN	1225.86897	-0.416213742	0.0060744
7533	YWHAH	1226.566202	-0.484637093	0.0060905
7114	TMSB4X	1228.40161	-0.399559622	0.0061066
256236	NAPSB	1230.10893	0.398933287	0.0222093
10894	LYVE1	1231.262541	-0.612073309	0.0061633
387	RHOA	1231.931692	-0.47261472	0.0061382
25976	TIPARP	1231.942846	-0.44146062	0.0061134
23353	SUN1	1232.433823	-0.515990857	0.0060887
118429	ANTXR2	1234.50198	-0.408291711	0.0061446
1831	TSC22D3	1238.182658	-0.510845139	0.00628
347733	TUBB2B	1241.669222	-0.438470662	0.0064143
79801	SHCBP1	1244.103352	0.406126695	0.0235632
1959	EGR2	1244.696462	-0.408448032	0.0065476
6274	S100A3	1244.916939	-0.552042074	0.0065217

9804	TOMM20	1246.803474	-0.3983157	0.0065354
6362	CCL18	1248.2565	0.599577471	0.0236364
64332	NFKBIZ	1248.626117	-0.113083517	0.0066275
30812	SOX8	1249.556043	-0.648247025	0.0066406
3958	LGALS3	1252.255865	-0.654847574	0.0066926
2195	FAT1	1257.086795	-0.452186612	0.0068605
973	CD79A	1259.652424	0.861735218	0.0244944
6588	SLN	1260.525914	-0.22683636	0.007027
23022	PALLD	1261.536026	-0.515910505	0.0070385
23127	GLT25D2	1261.716335	-0.571675612	0.0070498
79026	AHNAK	1262.636195	-0.477253579	0.0070992
10432	RBM14	1264.176408	0.208687795	0.0246667
79191	IRX3	1264.449859	-0.537605841	0.0072243
80205	CHD9	1268.17122	-0.546627248	0.0074621
8864	PER2	1268.978745	-0.539406108	0.007434
8703	B4GALT3	1275.937647	0.575930315	0.0264835
3936	LCP1	1276.097339	0.520896105	0.0261957
7390	UROS	1277.299855	0.391381267	0.0262366
3910	LAMA4	1286.322447	-0.467766196	0.0082331
1351	COX8A	1287.354929	0.483478768	0.0276596
5549	PRELP	1288.160919	-0.613500518	0.0082772
374291	NDUFS7	1289.825192	0.502633139	0.0276842
1634	DCN	1295.044167	-0.512405087	0.008806
10791	VAMP5	1298.125571	0.503675594	0.02875
9627	SNCAIP	1301.806694	-0.618815509	0.0089963
388115	C15orf52	1303.431215	0.573617314	0.0286598
10550	ARL6IP5	1304.357493	-0.533807608	0.009037
400156	RPS26P47	1308.043396	0.379074478	0.0290816
64859	OBFC2A	1308.466291	0.552668867	0.0287879
56256	SERTAD4	1309.262281	-0.49048852	0.0091513
4653	MYOC	1311.552344	-0.647604423	0.0092279
9636	ISG15	1312.085813	0.394480919	0.029
4318	MMP9	1312.560764	0.523984455	0.0289109
116496	FAM129A	1313.678252	-0.484339613	0.0093773
22921	MSRB2	1320.715915	0.136979064	0.0297059
1397	CRIP2	1321.683328	-0.554923669	0.009781
23387	SIK3	1324.010826	-0.370574175	0.0098909
7260	TSSC1	1326.08499	0.708513468	0.03

330	BIRC3	1326.502596	0.52290474	0.0298077
6347	CCL2	1327.062655	-0.388530751	0.0100725
5997	RGS2	1330.651501	0.315965147	0.029619
2318	FLNC	1331.020169	-0.330921963	0.0102527
2167	FABP4	1331.971504	0.203162734	0.029434
65124	SOWAHC	1334.815968	-0.632065369	0.0103597
8402	SLC25A11	1335.293399	0.488068376	0.0297196
143888	KDELC2	1337.289334	-0.476064311	0.0106093
55778	ZNF839	1337.476972	0.824048458	0.0298148
11214	AKAP13	1340.190969	-0.391002458	0.0108214
8082	SSPN	1340.580076	-0.529634398	0.0107829
1892	ECHS1	1340.695252	0.010867604	0.0300917
85236	HIST1H2BK	1342.13419	0.481451871	0.03
4050	LTB	1342.601784	0.584719896	0.0298198
10090	UST	1346.090436	-0.332625854	0.0110993
4088	SMAD3	1347.222391	-0.322321655	0.0110601
192286	HIGD2A	1347.443616	0.325296926	0.0301786
56603	CYP26B1	1347.842442	-0.444323838	0.0110915
5222	PGA5	1348.531125	-0.681365061	0.0111228
100008589	RN28S1	1361.665881	0.319811433	0.0325664
1012	CDH13	1362.074829	-0.689039929	0.0122028
6182	MRPL12	1362.189424	0.541619299	0.0323684
2746	GLUD1	1362.777808	-0.475136002	0.0121951
57728	WDR19	1363.893531	-0.567647438	0.0122569
9867	PJA2	1365.4742	-0.454924971	0.0123875
12	SERPINA3	1365.48143	-0.198419481	0.0123448
3916	LAMP1	1367.160915	-0.497567555	0.0123368
83604	TMEM47	1367.182859	-0.502928135	0.0122945
25873	RPL36	1369.411246	0.364116782	0.0330435
10993	SDS	1371.895269	0.509310668	0.0332759
201895	C4orf34	1371.910878	-0.441743625	0.0125597
56925	LXN	1372.337183	0.452171512	0.0331624
1646	AKR1C2	1372.525493	-0.544263842	0.012585
83643	CCDC3	1374.169876	-0.696737657	0.0126102
10963	STIP1	1374.640248	0.342902392	0.0333898
72	ACTG2	1374.85107	-0.616837302	0.0126351
1277	COL1A1	1378.877812	-0.058030201	0.0340336
152007	GLIPR2	1381.012043	-0.52025236	0.0130976

5880	RAC2	1382.86317	0.450645007	0.0339167
4693	NDP	1383.877708	-0.293213069	0.0132886
1652	DDT	1385.598415	0.309101106	0.0341322
6507	SLC1A3	1387.270796	0.450241531	0.0339344
114902	C1QTNF5	1390.421435	-0.464746681	0.0135117
930	CD19	1390.443436	0.936560461	0.0339024
60673	C12orf44	1391.404166	0.604096186	0.0337903
25862	USP49	1392.230535	0.307950625	0.03352
84446	BRSK1	1392.676114	0.578076974	0.0334921
6279	S100A8	1394.481811	-0.230344228	0.0136667
4495	MT1G	1395.494711	0.456920682	0.0338583
286530	P2RY8	1395.726916	0.575856807	0.0335938
23059	CLUAP1	1396.021245	0.335597424	0.0334109
10974	C10orf116	1396.776825	-0.46447156	0.0137542
187	APLNR	1399.680875	0.378530155	0.0333846
1266	CNN3	1400.165785	-0.603738265	0.0139073
6035	RNASE1	1401.133063	-0.427596378	0.0139274
51070	NOSIP	1403.145375	0.471986565	0.0338168
23645	PPP1R15A	1405.459905	-0.513063374	0.0142105
9802	DAZAP2	1406.233239	-0.395592226	0.0142295
6423	SFRP2	1406.662904	-0.375685069	0.0142157
55082	ARGLU1	1408.73282	-0.275373549	0.014202
81618	ITM2C	1409.01914	-0.195669634	0.0141883
950	SCARB2	1411.227482	-0.080428997	0.0143042
51621	KLF13	1412.61307	-0.391379838	0.0143226
50486	G0S2	1412.677795	0.135423943	0.0350758
5118	PCOLCE	1413.731079	-0.412028868	0.0143408
84293	C10orf58	1413.787933	0.229543489	0.0350376
57584	ARHGAP21	1418.43717	-0.474632364	0.0147436
4709	NDUFB3	1419.391561	0.43940301	0.0364179
56895	AGPAT4	1419.810249	-0.274899735	0.0147604
8140	SLC7A5	1421.818793	0.813002525	0.0368889
4833	NME4	1422.17834	0.356719123	0.0366912
11151	CORO1A	1425.250367	0.626944333	0.0373723
140465	MYL6B	1425.619147	0.44469932	0.0372464
9697	TRAM2	1426.312305	-0.271654502	0.0152866
1291	COL6A1	1426.42942	-0.426606265	0.0152698
1734	DIO2	1426.785361	-0.359912965	0.0152215

3108	HLA-DMA	1427.582961	0.260321445	0.037482
79887	PLBD1	1429.183611	-0.152506984	0.0152997
54	ACP5	1429.860576	0.521947365	0.0376429
10457	GPNMB	1431.529338	-0.294586952	0.015566
6748	SSR4	1434.693016	0.625711113	0.0385106
1759	DNM1	1436.105963	-0.449760888	0.0159561
9370	ADIPOQ	1440.670257	-1.059565694	0.0161563
5412	UBL3	1440.737387	-0.371274309	0.0161059
23753	SDF2L1	1440.930372	0.39058696	0.0393662
7388	UQCRH	1443.437791	0.536158133	0.0395804
4289	MKLN1	1444.329472	-0.421366878	0.0162422
11165	NUDT3	1444.407288	0.440523764	0.0395139
5905	RANGAP1	1444.537245	0.46774382	0.0392414
3575	IL7R	1444.676067	0.77034123	0.0390411
22809	ATF5	1448.552345	0.37947945	0.0392517
84182	FAM188B	1451.959559	-0.590154482	0.016904
5236	PGM1	1453.548165	0.42885438	0.0397973
9972	NUP153	1453.624329	-0.573199944	0.0169444
5480	PPIC	1455.056235	-0.271817979	0.0170154
8854	ALDH1A2	1456.888345	-0.529120315	0.0172393
64285	RHBDF1	1457.643624	-0.41171131	0.0172171
4781	NFIB	1460.274936	-0.486722671	0.017439
84159	ARID5B	1461.460181	-0.313524691	0.017386
2878	GPX3	1462.117788	-0.422230312	0.0174242
4026	LPP	1462.275409	-0.408495323	0.017432
89796	NAV1	1462.861766	-0.339840911	0.0174096
30968	STOML2	1463.840555	0.28214127	0.0416107
51372	CCDC72	1463.994793	0.43399587	0.0414
203100	HTRA4	1464.923769	-0.135160071	0.0175075
48	ACO1	1466.186987	0.241675341	0.041457
7453	WARS	1467.485313	0.344491515	0.0411842
25840	METTL7A	1471.939792	-0.229179302	0.0181437
221037	JMJD1C	1472.479548	-0.443465147	0.0180896
25963	TMEM87A	1474.534701	-0.400608598	0.0181548
130814	PQLC3	1477.33224	-0.371283504	0.0182789
55384	MEG3	1478.082236	-0.276335428	0.0183136
51734	MSRB1	1478.185255	0.366407075	0.0424183
203062	TSNARE1	1478.399402	-0.981464529	0.0182891

9040	UBE2M	1480.913386	0.301971463	0.0423377
56951	C5orf15	1481.006032	-0.349599264	0.0184412
1326	MAP3K8	1481.146022	-0.245405947	0.0184164
151126	ZNF385B	1481.322028	-0.262943659	0.0183918
3005	H1F0	1483.126266	-0.474039292	0.018484
51253	MRPL37	1484.121436	0.347204524	0.0425161
83590	TMUB1	1486.513261	0.5414701	0.0428205
7358	UGDH	1487.675534	-0.389048338	0.0187791
6132	RPL8	1488.356772	0.298189627	0.0427389
7052	TGM2	1488.74142	0.447321926	0.0427215
11259	FILIP1L	1489.414987	-0.487530228	0.0189275
2357	FPR1	1493.550193	0.688024843	0.0432075
284018	C17orf58	1497.828107	-0.404582744	0.0195954
3001	GZMA	1497.878169	0.499794419	0.0435625
23208	SYT11	1498.386456	-0.56474917	0.0196254
55902	ACSS2	1498.419332	0.434688097	0.0434161
1382	CRABP2	1499.399622	-0.714898536	0.0196839
7164	TPD52L1	1499.450875	-0.332040741	0.0196275
3915	LAMC1	1502.164627	-0.385623111	0.0197429
9547	CXCL14	1503.565639	-0.570991966	0.0198575
1264	CNN1	1505.408875	-0.77652507	0.0200852
4982	TNFRSF11B	1508.587561	-0.419150689	0.0205099
4713	NDUFB7	1509.112219	0.356313483	0.0455556
9768	KIAA0101	1509.296165	0.336464705	0.0453374
126003	TRAPPC5	1512.561655	0.287379722	0.0455488
3586	IL10	1514.461354	0.279223721	0.0457576
23471	TRAM1	1515.01504	-0.353224891	0.0211582
84972	84972	1516.99073	0.30290635	0.0457229
56901	NDUFA4L2	1517.583393	-0.220187019	0.0213521
57484	RNF150	1523.221101	-0.615848635	0.0219101
1050	CEBPA	1524.711624	0.184030473	0.0468263
10512	SEMA3C	1525.839938	-0.303563289	0.0221008
2218	FKTN	1525.89029	0.32347926	0.0469643
3125	HLA-DRB3	1528.124374	-0.095248721	0.0223743
1052	CEBPD	1529.019719	-0.368478346	0.0223677
7704	ZBTB16	1529.559864	-0.598932157	0.0224167
3710	ITPR3	1535.98084	-0.504577258	0.0230471
4071	TM4SF1	1536.170862	-0.588899354	0.0229834

8320	EOMES	1536.641548	0.609001205	0.0486982
65990	FAM173A	1539.615726	0.292197932	0.0490588
11031	RAB31	1539.998949	-0.330716897	0.0232231
440275	EIF2AK4	1542.61634	0.39135644	0.0494737
894	CCND2	1544.012472	-0.139177886	0.0237088
6446	SGK1	1545.891541	-0.331186531	0.0238904
126205	NLRP8	1548.493208	0.236904215	0.05
23643	LY96	1549.627753	0.267711348	0.0498844
4069	LYZ	1551.467795	0.467300857	0.05
2153	F5	1554.717643	-0.20664358	0.0247814
5396	PRRX1	1555.245758	-0.437649501	0.0247139
23529	CLCF1	1561.695456	-0.48924576	0.0252717
2869	GRK5	1564.201014	-0.401930476	0.0256369
5792	PTPRF	1565.988588	-0.349418182	0.0257297
10404	CPQ	1566.892609	-0.355701385	0.0259299
8714	ABCC3	1566.940839	-0.094440653	0.0258602
130271	PLEKHH2	1569.343326	-0.577105964	0.0259249
805	CALM2	1572.629926	-0.34793775	0.0261497
9935	MAFB	1575.530595	-0.484080984	0.0263467
125	ADH1B	1577.25247	-0.845685565	0.0264894
286102	TMED10P1	1577.81452	-0.29810538	0.0264456
730	C7	1581.938854	-0.2806683	0.0268783
22883	CLSTN1	1582.122972	-0.348445992	0.0268074
713	C1QB	1582.322998	-0.328691997	0.0267368
3576	IL8	1585.211568	0.217133127	0.0270341
29091	STXBP6	1586.114508	-0.674287778	0.0270942
55740	ENAH	1588.586133	-0.454410599	0.0272585
287	ANK2	1588.699203	-0.425576415	0.0271875
23166	STAB1	1594.511432	-0.273913089	0.0278701
3684	ITGAM	1597.259191	-0.26081365	0.0281088
1289	COL5A1	1597.993394	-0.437877357	0.0281654
5166	PDK4	1601.654926	-0.367133083	0.0286082
4779	NFE2L1	1602.907914	-0.322706471	0.0288689
22856	CHSY1	1606.569592	-0.388592189	0.0293333
1465	CSRP1	1610.229625	-0.429759891	0.0297698
5990	RFX2	1610.459939	-0.462631524	0.0297449
3487	IGFBP4	1612.868676	-0.375431676	0.0298728
2947	GSTM3	1615.122471	-0.46893767	0.030203

7045	TGFBI	1615.235405	-0.338314432	0.0301266
4144	MAT2A	1616.55701	-0.29452193	0.0301768
629	CFB	1617.75152	0.0201362	0.0302015
7043	TGFB3	1618.821289	-0.278500838	0.0302261
79656	BEND5	1618.990507	-0.712829587	0.0302005
10979	FERMT2	1620.714065	-0.440860462	0.030275
4609	MYC	1620.964014	-0.360320379	0.0302494
9749	PHACTR2	1622.69173	-0.450091073	0.0302488
579	NKX3-2	1623.194406	-0.236410849	0.0302233
57088	PLSCR4	1626.325298	-0.366905864	0.0304703
3908	LAMA2	1627.324464	-0.473354065	0.0304444
10990	LILRB5	1627.533697	-0.415953151	0.0303695
23608	MKRN1	1628.589994	-0.337697906	0.030344
220323	OAF	1630.869183	-0.402145511	0.0304657
55638	SYBU	1632.908343	-0.362484359	0.0305868
9403	15-Sep	1633.074863	-0.274092414	0.0305122
1292	COL6A2	1637.086709	-0.384415417	0.0311192
85012	TCEAL3	1637.434229	-0.344873126	0.031068
5641	LGMN	1638.425534	-0.335875916	0.0311864
80270	HSD3B7	1639.473174	-0.314842948	0.031256
57568	SIPA1L2	1640.372836	-0.258378919	0.0313012
9792	SERTAD2	1641.690604	-0.39907305	0.0312981
2303	FOXC2	1643.765738	-0.672117431	0.0314149
139818	DOCK11	1649.784526	-0.350745946	0.032201
9332	CD163	1654.921446	-0.074250444	0.0329117
56301	SLC7A10	1655.093415	-0.717645795	0.0328333
9341	VAMP3	1655.718255	-0.321711391	0.0328029
92370	ACPL2	1658.670801	-0.502411212	0.0329858
55930	MYO5C	1661.760518	-0.635141103	0.0333806
9469	CHST3	1662.792515	-0.505990235	0.0334434
493	ATP2B4	1663.928519	-0.419800574	0.0335059
5782	PTPN12	1665.539358	-0.354479838	0.0336854
79180	EFHD2	1668.112982	-0.407890809	0.0340281
84981	MIR22HG	1670.336629	0.100148745	0.0341589
10269	ZMPSTE24	1671.267915	-0.29542086	0.0342424
57092	PCNP	1672.690969	-0.366419773	0.0343023
3074	HEXB	1673.323642	-0.166393087	0.0343387
9375	TM9SF2	1674.236842	-0.256233349	0.0344213

5757	PTMA	1677.47673	-0.410638493	0.0349192
6348	CCL3	1680.504116	0.27508824	0.0352304
714	C1QC	1682.30863	-0.293967318	0.0355172
8939	FUBP3	1685.103503	-0.393024679	0.0358945
10487	CAP1	1685.110477	-0.348293257	0.0358124
1580	CYP4B1	1685.438683	-0.81928844	0.0357991
6349	CCL3L1	1688.126959	-0.18056205	0.0360364
7155	TOP2B	1688.710076	-0.219566063	0.0360227
8490	RGS5	1688.796759	-0.360293505	0.0359864
26040	SETBP1	1688.856916	-0.544513386	0.0359502
2359	FPR3	1690.037615	-0.111094263	0.0360045
874	CBR3	1692.681297	-0.397443892	0.0362387
81031	SLC2A10	1693.777059	-0.517428067	0.0362921
84858	ZNF503	1695.183691	-0.337901917	0.0363229
221895	JAZF1	1696.961037	-0.325943423	0.036443
6144	RPL21	1698.226797	-0.195712593	0.0365848
6456	SH3GL2	1703.751406	-0.59684658	0.0371715
79899	PRR5L	1704.861238	-0.299107668	0.0372
10231	RCAN2	1706.087712	-0.355690276	0.0373836
5364	PLXNB1	1706.680062	-0.702210588	0.0374115
27254	CSDC2	1708.018606	-0.922238544	0.0374614
55603	FAM46A	1714.163729	-0.407779786	0.0382379
9922	IQSEC1	1716.929173	-0.380012233	0.0384835
9560	CCL4L1	1719.750747	-0.205690372	0.0387309
25996	REXO2	1721.511684	-0.351825023	0.038952
90102	PHLDB2	1724.662753	-0.456965138	0.0395643
6431	SRSF6	1725.790359	-0.40423876	0.039587
10867	TSPAN9	1726.171831	-0.618932747	0.0395228
8611	PPAP2A	1726.407921	-0.324481594	0.0394805
7433	VIPR1	1726.714828	-0.585055595	0.0394384
5573	PRKAR1A	1727.16127	-0.376640327	0.0393534
10417	SPON2	1731.212206	-0.604611599	0.0398925
114899	C1QTNF3	1731.822097	-0.440917282	0.0398927
2191	FAP	1733.857646	-0.240122186	0.0400428
7857	SCG2	1735.580761	-0.338301394	0.0402991
4313	MMP2	1737.604588	-0.337341956	0.0406823
8408	ULK1	1740.200864	-0.330219158	0.0410426
975	CD81	1746.675472	-0.363603688	0.0421231

7802	DNALI1	1749.161058	-0.324974424	0.0425
2114	ETS2	1753.333913	-0.554607644	0.0428753
284119	PTRF	1754.251057	-0.379493018	0.0429536
685	BTC	1755.693181	-0.425372877	0.0431579
165	AEBP1	1755.703017	-0.318176849	0.0430672
64770	CCDC14	1756.016967	-0.407303254	0.0430818
23258	DENND5A	1756.456098	-0.28883199	0.0430335
23369	PUM2	1757.714663	-0.44814228	0.0430689
10586	MAB21L2	1761.026583	-0.394123511	0.0434375
29801	ZDHHC8	1761.202667	-0.531775281	0.0434096
308	ANXA5	1765.780132	-0.52413624	0.0438589
2192	FBLN1	1768.643317	-0.457771545	0.0443271
2596	GAP43	1770.842626	-0.667161026	0.0446281
4487	MSX1	1773.11682	-0.551109937	0.0448454
595	CCND1	1775.07578	-0.474135568	0.045144
3913	LAMB2	1776.566419	-0.337921023	0.045462
65062	TMEM237	1781.09389	-0.366936212	0.046127
5307	PITX1	1782.243124	-0.167609568	0.0462168
57758	SCUBE2	1783.729018	-0.7255312	0.0463673
55788	LMBRD1	1784.902365	-0.251227194	0.046334
221091	LRRN4CL	1787.348282	-0.471007611	0.046565
2706	GJB2	1790.954736	0.246892768	0.0470183
3939	LDHA	1793.664448	-0.259407763	0.0472267
283298	OLFML1	1794.315352	-0.382346727	0.0473535
3988	LIPA	1796.157898	-0.130455846	0.0476008
10418	SPON1	1797.498257	-0.277127383	0.0477867
4783	NFIL3	1797.739669	-0.355555698	0.0477711
868	CBLB	1800.289413	-0.439285219	0.0479359
219749	ZNF25	1807.22564	-0.393005845	0.04886
9665	KIAA0430	1813.304773	-0.341936269	0.0496208
10983	CCNI	1814.526053	-0.372282132	0.0496813

Supplementary Table 5. Overlapped DEGs between whole blood and synovium of SpA/AS patients

Overlapped DEGs in "Whole blood" and "Synovium":
ALPL
LY96
PROS1
CFD
EOMES
F5
NDUFB3
FAM46C
MMP9
FGFBP2
TGFBR3
GZMA
IGJ
SPARC
NKG7
ACO1
CCDC72
IER3
PDK4
CRIP2
CHI3L2
RFX2
ISG15
SNHG5
SIPA1L2
GZMB
CD81
CCL5
VCAN
CD19
LHFPL2
IL7R
SPON2
MSRB2
H1F0

S100A8
TPPP3
PAM
PLEKHA1
MARCO
UQCRQ
ZNF786
PTGDS
CD79A
PPP1R15A
NFIL3
PRSS23
OBFC2A
ITM2A
SLC7A5
CYBRD1
ITGB5
JMJD1C
HCST
CHCHD10
MZB1
PCNP
DUSP1
LGALS3
SYT11
VIPR1
CBLB
ACP5
RPL21
KIAA0430
PHACTR2
ITGAL
ASAP2
CRIP1
CBR3
PDGFD
IL13RA1
P2RY8

PMP22
GSTM3
CD24
JAZF1
ULK1
FOS
RPL36
BRSK1
NAPSB
TYMP
CHSY1
PPAP2A
GYPC
PTPN12
SUN2
TUFT1
PLBD1
PJA2
RGS2
IFNAR1
LXN
LYZ
FAM173A
NOSIP
DDX5
RAB31
ITPR3
KLF4
EZR
CD163
C17orf61
SRSF6
FPR1
VAMP5
C1orf198
NOV
DOCK11
MARCKSL1

TSPAN9
SETBP1
MIR22HG
RANGAP1
PRKAR1A
LPAR1
CEBPD
MT1E
RBM14

Supplementary Table 6. The complete list of nodes in the obtained network from DEGs in synovium of SpA/AS patients

Label	Degree	Betweenness
UBC	378	179400.3
KIAA0101	232	37822.9
MYC	218	50470.89
VCAM1	174	38379.8
EGR1	149	16979.97
SMAD3	137	31892.78
ELAVL1	126	22588.49
CALM3	123	1608.74
HSPA1B	117	22461.4
VIM	100	13595.1
IL7R	94	4947.35
ISG15	89	2663
FOS	87	12362.66
APP	82	11508.28
DDX5	82	15538.94
CEBPA	78	9243.2
CAV1	70	2060.29
PPP1CC	68	12444.15
GRK5	64	0
RPL21	63	6216.93
EZR	61	8590.82
RPL8	58	618.95
IQGAP1	57	6281.29
ZBTB16	57	4188.09
CCND1	55	6809.39
MAPK13	53	8874.37
YWHAH	53	5585.96
HNF4A	52	6284.42
CEBPD	50	6226.39
TUBA4A	47	5445.95
BIRC3	46	8245.22
MSN	45	6471.19
LGALS3	44	3477.42
ESR1	44	4880.2

FN1	44	5117.38
SGK1	44	1825.55
SP1	43	6249.9
CDK2	43	2472.54
GRB2	43	889.28
LDHA	42	4418.01
RBM14	42	5117.23
PDGFRB	42	295.67
RHOA	41	6946.96
FLNC	40	9350.91
S100A9	40	4233.02
TGM2	39	6950.38
PRKAR1A	38	3133.65
RPL36	38	3681.2
CD44	38	2176.99
SUMO2	38	1379.04
YWHAZ	36	3671.89
IL8	35	2656.56
RANGAP1	35	6088.58
ACTA2	35	1238.23
RELA	34	9475.55
CBLB	34	3757.47
CUL3	34	1141.42
TP53	33	839.53
EGFR	33	2583.02
ANXA1	33	4091.68
TCEB2	33	1370.96
H3F3B	32	1302.49
MYOC	32	5300.31
DSTN	32	4816.29
SUMO1	32	268.51
STIP1	31	3406.48
CCL5	31	5910.34
TPI1	29	2581.48
HDAC1	29	4692.89
COL1A1	29	2502.8
HBA1	29	587.1
DAB2	28	0

PAFAH1B3	28	0
FOXO1	28	4324.88
FLNB	28	485.7
S100A8	27	3130.34
EP300	27	1852.65
BHLHE40	27	3993.48
ECHS1	27	1690.88
PRNP	27	598.12
TOP2B	27	331.26
UBE2M	27	268.96
PFKP	26	238.39
DAZAP2	26	2604.85
TRAF6	26	2452.57
GZMB	26	3097.54
VHL	26	1695.63
FHL1	26	996.75
PTPN12	25	2802.12
ITGA4	25	819.09
CUL1	25	282.48
PTMA	25	413.72
APOE	24	0
C12orf44	24	1979.48
SH3GL2	24	2862.43
MAP3K8	24	1125.98
TUBB2B	24	892.69
NUP153	24	1774.68
MMP2	24	1839.73
YWHAE	23	109.57
FBLN1	23	2996.36
HSP90AA1	23	1186.53
RGS2	23	2310.47
YWHAQ	23	1841.31
SSR4	23	853.01
GSN	23	0
DNM1	22	3100.26
AXL	22	578.18
CREBBP	22	1504.13
DUSP1	22	428.95

MMP9	22	0
ATF2	21	2364.9
ANXA5	21	1422.05
COL1A2	21	3317.66
ETS2	21	1549.37
PLS3	21	3035.48
JUN	21	2703.24
CAND1	21	2014.1
PAN2	21	2123.83
EPB41L3	21	1706.38
CTNNB1	21	0
IKBKE	21	0
MAT2A	20	391.82
ITGAV	20	783.73
KLF4	20	3003.52
PPP1R15A	20	1565.82
COPS5	20	2333.62
SRSF6	20	1893.21
AR	20	1085.54
NFKB1	20	179.44
S100A4	20	0
ITGB5	19	0
PDGFRA	19	2176.69
FERMT2	19	900.42
CCL2	19	971.99
TSC22D3	19	997.19
LAMA4	19	433.43
IKBKG	19	365.06
ULK1	19	2364.92
LYZ	18	980.06
SRC	18	701.77
SMAD2	18	1215.84
S100A10	18	3487.48
IFNAR1	18	89.75
RHOB	18	0
HSP90AB1	18	599.65
HSPA8	18	102
POT1	17	0

WARS	17	476.9
CEBPB	17	1179.72
TMSB4X	17	933.55
MYH11	17	2179.98
TWF2	17	1346.93
ARRB2	17	2541.69
ACTB	17	772.33
CAP1	17	143.14
CBL	17	924.43
PXN	17	191.23
CUL2	17	121.21
ASAP2	17	0
SPARC	16	798.46
NFE2L1	16	952.4
IL10	16	1253.66
STAT3	16	1873.11
USP49	16	380.93
CDKN1A	16	1399.47
XRCC6	16	1592.26
PGM1	16	1590.34
ILF3	16	580.36
LAGE3	16	2763.18
CD9	16	3036.04
CD81	16	2081.81
HNF1A	16	696.15
SMAD4	16	1430.17
EEF1A1	16	994.53
NFIA	16	978.47
MAPK1	16	877.64
TOMM20	16	878.47
AKT1	16	536.28
NR3C1	16	978.31
TERF1	16	138.5
GZMA	16	0
PIK3R1	16	64.03
MMP1	15	383.1
AHNAK	15	48.59
HDAC2	15	165.75

GAPDH	15	1364.17
MAP1A	15	2220.44
SERPINA3	15	1162.42
AKAP13	15	941.77
HLA-B	15	1095.49
TIMP2	15	0
STOML2	15	678.93
LAMB2	15	1993.58
MRPL14	15	81.69
LAMC1	15	423.99
BAG6	14	0
STAT1	14	0
VAMP3	14	437.42
CRK	14	1639.99
CREB1	14	2141.6
LPP	14	2825.2
DCN	14	1481.1
PLA2G2A	14	308.09
CFH	14	291.2
COPS6	14	129.91
NUDT3	14	524.63
PPP1CA	14	0
HSPA5	14	0
HSPA4	14	313.06
ENAH	13	0
ACAP1	13	0
CCL19	13	300.35
MRPL12	13	1138.55
PTRF	13	1045.93
VCAN	13	1458.66
SH3KBP1	13	150.26
ACVR1	13	288.23
SHC1	13	208.37
MT2A	13	1072.89
CCND2	13	1635.6
CSNK2B	13	1069.4
ACO1	13	798.38
LIMA1	13	1029.68

CFTR	13	1102.4
ITGAM	13	1358.92
ITGB1	13	419.17
HNRNPK	13	1355.9
EIF1B	12	31.98
VASN	12	278.88
NCK1	12	209.87
PIM2	12	541.2
ADH1B	12	34.86
MRPL37	12	1254.87
H1F0	12	448.75
EIF4A3	12	135.06
NCL	12	672.7
ARRB1	12	135.01
YWHAB	12	771.67
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HLA-DRB1	12	1693.38
TGFB1	12	868.27
SLC25A11	12	371.95
CLEC3B	12	107.22
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MYL6B	12	718.27
FUBP3	12	301.82
ATP5D	12	236.72
DOCK1	12	148.13
GSK3B	12	0
PJA2	12	0
FBLN2	11	0
ATP5J2	11	0
SIRT1	11	0
CRIP2	11	402.32
MAP3K3	11	131.38
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CDK4	11	1022.38
NDUFS7	11	208.76
CD19	11	15.66
VKORC1	11	489.3
ZMPSTE24	11	349.77

ENO1	11	1922
DPYSL2	11	335.66
PDIA3	11	292.96
ILF2	11	122.77
UBD	11	1154.26
TNFRSF1A	11	670.9
CSNK2A1	11	26.65
THBS1	11	914.84
RAC2	11	638.23
BRCA1	11	700.89
PLCG1	11	89.95
ACTG1	11	322.46
ATF5	11	769.87
ONECUT1	11	1004.21
KLF13	11	0
SNCAIP	11	453.9
RAB31	11	0
PSMA3	11	236.09
MARCKSL1	11	160.08
NDUFB7	11	190.23
ATP5I	11	0
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PITX3	11	112.2
ATXN1	11	147.66
UCHL5	11	242.23
IKBKB	11	0
UQCRQ	11	0
SRPK1	10	0
XRCC5	10	0
TGFBR2	10	1105.75
IQCB1	10	180.35
PTPRF	10	562.07
RIF1	10	128.44
SUN2	10	568.76
MYH9	10	0
SMURF1	10	0
CDH1	10	685.15
SIN3A	10	52.8

MDM2	10	1330.54
VCL	10	97.51
HDAC3	10	252.93
UBL4A	10	113.79
MT1X	10	1074.44
ABLIM1	10	365.18
TNF	10	154.48
LIMCH1	10	866.14
ALB	10	217.92
PRSS23	10	1218.33
HEXB	10	772.55
ANK2	10	659.08
CHUK	10	683.85
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PTGDS	10	484.68
PARP1	10	1009.62
CCL3	10	196.09
UBQLN4	10	988.16
LAMP1	10	0
LTBP4	10	305.97
RXRA	10	881.47
FYN	10	121.24
HNRNPA1	10	0
CD79A	10	125.78
MAFB	10	72.4
PPARG	10	177.1
HBB	10	564.7
PLXNB1	10	0
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UGDH	9	563.36
HBEGF	9	125.14
CDK1	9	109.27
FOSB	9	572.91
LMNA	9	219.23
APOD	9	763.79
TPD52L1	9	0
GLUD1	9	127.85

RIPK2	9	202.62
EEF2	9	68.68
VDR	9	548.69
PALLD	9	1055.2
TRAF2	9	416.05
FABP4	9	703.99
UQCRH	9	1433.29
RPL3	9	226.36
PTPN6	9	193.46
IRF1	9	396.07
SPSB1	9	1459.09
IGFBP5	9	496.49
ABL1	9	239.55
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FLNA	9	1160.12
GJA1	9	471.8
CLTC	9	176.91
NFKB2	9	132.8
BTG2	9	150.9
MYOF	9	504.32
NDUFA4L2	9	266.51
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ACTG2	9	419.35
MAPK3	9	375.58
A2M	9	285.1
H2AFX	9	460.2
EFEMP1	9	314.76
TERF2IP	9	9.15
GSTM3	9	149.95
TUBB	9	0
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CSN1S1	9	22.76
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DCUN1D1	9	483.49
CLSTN1	9	0
CCL4	9	348.83
ERRFI1	9	175.29
GABARAPL2	9	0

RB1	9	0
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MLH1	8	0
CAPNS1	8	275.67
TGFB3	8	0
ERBB2	8	0
RPS3	8	0
RPS16	8	0
SYK	8	39.71
ZYX	8	817.2
RPSA	8	21.98
SSRP1	8	1618.23
SP3	8	0
ZBTB20	8	0
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NOP56	8	187.92
NME2	8	667.61
PRKACA	8	1245.51
SRA1	8	137.94
PHLDB2	8	51.89
DIO2	8	0
REL	8	233.87
FOXO3	8	147.97
TMEM43	8	606.23
SPI1	8	201.61
HSPD1	8	146.82
NOS3	8	21.46
RPS20	8	79.24
PML	8	396.25
EEF1D	8	149.26
PPP2R1A	8	1355.01
HNRNPM	8	166.81
HLA-DRB5	8	353.99
WHSC1	8	178.84
NDUFB10	8	598.25
TLE1	8	189.15
C1QB	8	690.53

MAPK8	8	447.6
NFIL3	8	584.99
ATG5	8	8.81
TRAM1	8	1201.87
DHX9	8	805.26
EFHD2	8	964.87
HLA-DQA1	8	990.2
ARHGDIA	8	249.6
UNC119	8	482.83
SRRM2	8	65.4
MSX1	8	312.39
ECT2	8	218.26
CNBP	8	1198.32
GNB2L1	8	308.91
SET	8	127.09
PKM	8	25.34
TTN	8	1428.61
PER2	8	0
FSTL1	8	865.73
SCG2	8	187.3
RANBP2	8	557.91
SIK3	8	986.05
RAD21	8	882.87
NOSIP	8	148.35
SQSTM1	8	45.04
CD79B	8	125.17
DPYSL3	8	306.72
POLR2F	8	410.44
NEDD4L	8	658.8
MAX	8	0
TACC1	8	617.02
CASP8	8	0
PIK3R2	8	1075.23
MATR3	8	0
CAPN1	8	0
NOV	8	0
ARID5B	8	64.13
SHBG	8	0

TSC1	8	0
ELN	8	0
SCARB2	8	0
BCL6	7	38.98
EEF1G	7	0
WNK1	7	0
EZH2	7	0
LDHB	7	39.1
PCNA	7	0
NFIB	7	0
SPTAN1	7	0
PHACTR2	7	110.37
DDX3X	7	189.49
CORO1A	7	272.88
CACNA1A	7	17.7
ACTN1	7	816.26
FAS	7	778.62
MAGOH	7	115.11
HNRNPR	7	58.49
ITSN1	7	270.61
ATP6V1B1	7	0
SNRPD2	7	36.5
CDC42EP4	7	685.44
LY96	7	590.36
CDKN2A	7	250.31
NEDD4	7	0
EIF4A1	7	666.86
PTPN11	7	134.58
TANK	7	34.65
TSC22D1	7	53.43
TAB1	7	70.64
TUFM	7	82.31
ACP5	7	617.93
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ARGLU1	7	245.81
SFN	7	18.7
IRF7	7	429.81
CREB3L2	7	1061.57

HIF1A	7	242.39
KAT5	7	599.47
ITPR3	7	677.54
JMJD1C	7	584.93
COL6A1	7	1146.77
TIMP3	7	87.03
CCL18	7	93.3
PLSCR1	7	362.8
SPTBN1	7	116.87
E2F1	7	163.95
FAM46A	7	568.38
C1S	7	537.92
ACTA1	7	29.8
PRKDC	7	766.21
NFIX	7	115.38
HUWE1	7	915.82
G3BP1	7	450.86
SMARCB1	7	35.27
RUNX1	7	1755.19
PARK2	7	714.78
DNMT3B	7	444
CSRP1	7	31
RPS6	7	9.47
VTN	7	0
APC	7	0
THRAP3	7	0
ELANE	7	34.43
DDT	7	54.51
SRPK2	7	713.25
SPRED1	7	57.09
PITX1	7	0
GTF2I	7	732
VIPR1	7	62.2
RELB	7	0
CRMP1	7	0
UBE2D2	7	126.81
SAP18	7	37.03
ARHGAP21	7	870.44

RPL30	7	1.98
DISC1	7	0
CCR5	7	0
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TGFBR3	7	197.44
DNMT1	7	0
IER3	7	0
ATF4	7	0
MATN2	7	0
BCL2	7	0
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USF1	6	0
SERBP1	6	0
PRKAR2A	6	0
ETS1	6	0
JUP	6	0
ATP5B	6	0
BGN	6	0
PCNP	6	0
STAT5A	6	0
RANBP9	6	0
COX5B	6	0
TUBB2A	6	41.97
EWSR1	6	332.08
RNF150	6	0
RPS8	6	60.58
RPS15A	6	60.51
NDUFA13	6	424.36
SETDB1	6	40.34
SOCS1	6	0
TXN	6	0
PROS1	6	34.19
PRDX1	6	148.09
CALR	6	0
CCL21	6	0
STUB1	6	0

RPL15	6	12.08
BARD1	6	0
OSGEP	6	31.66
PTBP1	6	300.23
CYB5R3	6	87.98
SFPQ	6	55.59
MYBPC2	6	100.04
FAM173A	6	27.66
FBXO25	6	211.26
MAP1LC3A	6	0
SNCA	6	63.56
CCT5	6	49.59
CGNL1	6	72.9
MAP1LC3B	6	102.07
GNAI3	6	46.33
TSSC1	6	91.96
FASN	6	38.84
ARL6IP5	6	0
SH3D19	6	0
C6	6	86.95
EPRS	6	90.12
INPPL1	6	373.2
UBE3A	6	20.95
DDB1	6	209.7
CDC37	6	16.93
TUBB4B	6	905.3
NPM1	6	644.36
KAT2B	6	85.34
HTRA2	6	77.78
TGFBR1	6	439.93
STAB1	6	11
GANAB	6	271.7
ANXA7	6	64.41
GSTP1	6	324.51
CNN1	6	452.96
IRF3	6	13.79
LCP1	6	160.29
HNRNPC	6	163.03

C1QC	6	71.15
C1QA	6	565.94
NCK2	6	9.03
CDC42	6	23.43
PDK4	6	576.49
MAPK6	6	257.64
CLU	6	227.22
CRABP2	6	339.66
BAG1	6	124.86
NFYB	6	85.82
MCM3	6	222.74
PGK1	6	11.89
LRIF1	6	39.31
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PINX1	6	32.05
ENO2	6	64.64
DDIT3	6	80.72
SPARCL1	6	171.55
USP15	6	706.35
PLEKHA1	6	0
USP7	6	590.11
HSPA9	6	85.58
B2M	6	256.76
ABI3BP	6	542.75
IL13RA1	6	0
FUBP1	6	0
CLIC1	6	58.17
LRPPRC	6	25.36
HDAC4	6	180.05
MKRN1	6	0
MEN1	6	0
PFN1	6	181.74
SIRT3	6	213.68
REXO2	6	0
SHCBP1	6	0
PAM16	6	295.5
CHD3	6	27.71
SFRP2	6	9.17

RARA	6	119.47
FHL2	6	389.75
NFIC	6	49.23
CHD9	6	328.76
VAV1	6	59.39
PTPRC	6	77.05
CD47	6	0
CCR3	6	0
UBE2D1	6	74.81
ATN1	6	0
TK1	6	0
REEP5	6	0
IRAK1	6	0
MKLN1	6	0
MYO5C	6	0
ACIN1	6	6.18
HDAC9	6	0
BID	6	0
TRA2B	6	0
TUBA1A	6	0
COPA	5	0
RPL29	5	0
SKIL	5	0
PDLIM3	5	0
AGER	5	0
RPA1	5	0
PTPN1	5	0
TM4SF1	5	0
MEPCE	5	0
TM9SF2	5	0
CAMKK2	5	12.09
KLF9	5	0
RPS23	5	0
ZMIZ1	5	13.25
SIAH2	5	0
PDIA6	5	462.66
TINF2	5	111.58
EFTUD2	5	0

LAMTOR3	5	0
SOD1	5	0
RYK	5	0
RGS5	5	0
CEBPG	5	0
TRAF3IP1	5	0
VDAC1	5	100.44
EBF1	5	225.61
ATP5L	5	0
PSMA5	5	0
FLOT1	5	10.47
HDAC7	5	17.88
PRPF8	5	0
AP2M1	5	22.91
MPV17	5	0
ATXN2	5	275.72
RPS13	5	34.28
RPS11	5	45.73
PDCD6IP	5	0
UBA1	5	0
TXNRD1	5	18.24
CDK9	5	0
HTRA1	5	3.65
MMS19	5	0
YY1	5	0
KIT	5	0
TUBA1C	5	99.72
RUNX2	5	0
TLR2	5	89.54
MYBBP1A	5	162.73
LGALS1	5	0
SLC25A5	5	503.91
ADIPOQ	5	0
ARF6	5	181.6
EIF3C	5	168.42
NASP	5	87.56
SNRPF	5	147.94
RPS17	5	209.21

RPS2	5	714.55
ESYT2	5	593.37
LYL1	5	68.61
MAPK14	5	21.61
LAMTOR5	5	295.03
MYLIP	5	180.23
FOXC1	5	583.17
NCOA6	5	152.28
KPNA2	5	157.22
SMAD1	5	389.84
CD55	5	17.37
FTSJ1	5	24.84
DAXX	5	26.37
KIAA1377	5	80.49
COL5A1	5	400.73
CRKL	5	0
DDR1	5	4.18
ATF7IP	5	0
SUMO3	5	53.15
FH	5	18.74
HNRNPH1	5	42.4
HNRNPH3	5	51.88
ARF1	5	132.12
EEF1B2	5	759.85
SDHB	5	76.73
COPS4	5	33.78
SRSF7	5	34.48
SMN1	5	34.96
MTOR	5	164.7
PIK3CA	5	73.48
NME4	5	240.36
ENG	5	60.42
TF	5	158.25
LTF	5	14.93
NDUFA2	5	66.99
BCAR1	5	13.8
MPG	5	27.84
LYAR	5	44.59

SNCG	5	51.43
TKT	5	113.42
MCM6	5	17.45
GNAQ	5	11.09
GATA1	5	83.1
NFATC2	5	16.23
PLG	5	40.46
CLIC5	5	109.48
CSK	5	6.82
LAMA2	5	8.33
NID1	5	20.14
PLSCR4	5	0
TNK2	5	38.78
LGMN	5	941.64
MED31	5	22.06
GPSM2	5	415.39
RIN2	5	0
ARHGEF10	5	28.65
TGFB2	5	636.8
NAV1	5	207.32
USP20	5	0
TNC	5	81.87
RASD1	5	76.89
SAP130	5	527.56
TOLLIP	5	49.71
NUDC	5	24.05
NKX3-2	5	85.33
TMUB1	5	0
CCR1	5	245.44
BEND5	5	0
NDUFS3	5	54.31
TCF7L2	5	0
GNAI2	5	0
NFKBIZ	5	7.19
LAMC3	5	216.62
LEF1	5	0
CASP9	5	0
TCEB1	5	343

GNAI1	5	147.16
ANXA2	5	0
PTEN	5	26.13
BRD7	5	0
MET	5	70.85
CTSD	5	146.66
MT1A	5	0
CCNI	5	0
HAP1	5	0
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CD2AP	5	0
CXCR4	5	0
ITGA11	5	0
SPP1	5	22.74
SASH1	5	0
TRAPPC2L	5	0
C14orf1	5	0
TYMP	5	0
PTGS2	5	0
ICAM1	5	0
ICAM3	5	0
LILRB1	5	0
RPL10	4	0
PRKCI	4	0
PCBD1	4	0
WIBG	4	0
EEF1E1	4	0
CCT7	4	0
CAPZA1	4	0
APEX1	4	0
STAT6	4	0
HIST2H2BE	4	0
SELL	4	0
LXN	4	0
RPS14	4	60.98
GRB7	4	7.07
CREM	4	0
RNF31	4	0

IGF1	4	0
ALOX5AP	4	0
NOD2	4	548.97
KARS	4	0
CORO1C	4	0
PDPK1	4	0
CFLAR	4	0
YTHDC1	4	0
AGL	4	0
SNX2	4	5.64
MYH10	4	0
FBN1	4	30.05
CAPN2	4	0
SLX1A	4	12.85
TXNIP	4	0
SMAD5	4	0
PACSIN2	4	167.37
NUP133	4	393.2
SDF2L1	4	23.03
LCN2	4	0
DIAPH1	4	0
NFYC	4	0
MAPT	4	23.97
SERPINE1	4	0
ITGB3	4	0
SNRPD1	4	0
CBX1	4	62.86
PPT2	4	0
GSS	4	50.62
TRAPPC5	4	469
DDX24	4	29.61
NIF3L1	4	46.15
PIAS1	4	89.78
CSNK2A2	4	0
CD82	4	78.53
GFI1B	4	0
HK1	4	137.6
HSD3B7	4	135.81

TRIM63	4	181.74
BTK	4	21.65
SIRT5	4	31.27
TCF4	4	585.8
TPR	4	19.76
F5	4	2.47
RAP1GDS1	4	0
ABCC2	4	8.22
HBD	4	32.39
PYGL	4	350.29
ZNF839	4	5.05
KAT2A	4	70.17
TPM3	4	135.94
SYBU	4	6
CASP10	4	15.84
PAICS	4	9.92
WRAP73	4	73.13
PDCD10	4	34.8
CEBPE	4	8
PUM1	4	163.24
HNRNPUL1	4	108.29
DNALI1	4	100.26
ZNF512B	4	33.32
PTX3	4	205
LGALS3BP	4	186.93
LARS	4	17.76
FAF2	4	31.18
SLC3A2	4	12.85
MAG	4	8.27
RPL10L	4	51.71
CDC34	4	22.34
WDR46	4	0
LAMA5	4	51.03
GADD45A	4	110.57
UPF1	4	55.82
ATXN7	4	0
MACF1	4	66.2
CRP	4	10.36

PPBP	4	4.48
SOX2	4	23.31
SH3GL3	4	15.63
HIST3H3	4	76.13
TNFRSF14	4	10.77
HIST1H2BK	4	268.59
PSTPIP1	4	52.01
AURKAIP1	4	0
PRMT1	4	35.11
LONP1	4	48.05
COL6A2	4	0
NFKBIB	4	0
TRIP13	4	34.85
EIF2AK2	4	29.17
DSP	4	56.25
FAT1	4	283.53
UBR1	4	0
PDGFB	4	10.79
MCL1	4	109.68
HLA-DRA	4	251.25
CFB	4	81.87
PARK7	4	232.53
SREBF2	4	24.73
SMAD7	4	0
LGALS8	4	67.05
APBB1	4	3.75
CLUAP1	4	0
RNH1	4	170.22
CXCR7	4	63.68
SURF2	4	697.19
DFFA	4	709.06
LMNB1	4	146.27
JAM3	4	729.73
CIRBP	4	48.06
ANKRD28	4	0
C3	4	254.79
MSRB2	4	368.12
TAF9	4	77.02

UST	4	74.96
PCMT1	4	36.04
FAP	4	162.83
PRELP	4	3.28
IGBP1	4	7.11
MYB	4	458.55
MED19	4	318.65
LGALS9	4	54.36
UBE2D4	4	1.26
ITM2B	4	63.15
EIF2S1	4	0
ITGA5	4	7.83
CLNS1A	4	0
CSTB	4	7.78
ATXN1L	4	37.4
TRAF3	4	564.39
APOB	4	0
RBBP4	4	0
NOTCH1	4	67.76
NPTN	4	0
FAM46C	4	0
PUM2	4	0
CCL11	4	0
DENND5A	4	0
FPR1	4	0
JAZF1	4	0
GEMIN4	4	21.17
ITM2C	4	0
XIAP	4	0
CSDC2	4	42.27
PAM	4	90.86
HADHA	4	0
GFPT2	4	0
TMEM59	4	0
CEP70	4	0
CADM1	4	0
CD46	4	0
TXNDC5	3	0

TUBGCP4	3	0
C5orf15	3	0
SMARCAD1	3	0
ZNF326	3	0
NDUFA5	3	0
PPAP2B	3	0
TUFT1	3	0
TARS	3	0
VARS	3	0
MAP3K7	3	0
SH3BP4	3	0
MYADM	3	0
SCHIP1	3	0
MYD88	3	0
SDHA	3	0
TMEM87A	3	0
RBL1	3	0
APOC1	3	20.71
DUT	3	0
TRIB3	3	0
SGCD	3	0
APPBP2	3	0
EXOC1	3	0
KPNA4	3	0
ERBB2IP	3	0
NTRK1	3	20.87
BMPR2	3	0
SENP1	3	0
HES1	3	0
SART1	3	0
TGFB1I1	3	0
CCL8	3	0
TPM1	3	0
CLTA	3	0
MBP	3	3.52
ATP1B1	3	0
42249	3	98.87
SARNP	3	0

RRS1	3	0
TMBIM4	3	0
SLC39A14	3	0
RANBP1	3	0
NR2F6	3	0
EBF3	3	0
IRS1	3	0
ALDH1A2	3	0
GABARAP	3	37.29
UBL3	3	0
RBP1	3	94.08
DNMBP	3	114.65
OTUD4	3	0
TCF12	3	0
VAMP5	3	0
PCK1	3	32.89
TRIO	3	22.26
POU1F1	3	0
PSMB6	3	621.26
UGP2	3	1.41
KRTAP4-12	3	0
MAGEB2	3	147.72
EIF3E	3	0
TMPO	3	16.48
FAM118B	3	0
OPTN	3	1.87
HGF	3	0
ABCC3	3	78.6
ESR2	3	0
PSMD6	3	0
SNX6	3	4.03
CHGB	3	0
CLIP1	3	9.38
SYN1	3	38.56
CCRL1	3	5.96
IMMT	3	16.45
TP63	3	0
FCN1	3	0

MAP3K5	3	223.38
GFI1	3	0
DLG3	3	0
C7	3	0
UBA5	3	19.27
ACVRL1	3	4.1
TALDO1	3	0
PPIB	3	36.57
SREBF1	3	5.64
ITGB2	3	0
C12orf57	3	0
MYO10	3	0
PSMC6	3	0
SERTAD4	3	0
BLK	3	24.66
UBE2E2	3	1.86
MRPL38	3	157.79
SNRPG	3	29.18
JAK2	3	346.34
ARFGAP1	3	1.77
AKR1C2	3	0
SETBP1	3	8.22
PIAS2	3	32.15
SNAPIN	3	0
THBS2	3	0
TAF1	3	2.39
HIST2H3A	3	36.02
THOP1	3	2.62
ATP5H	3	24.24
MT1G	3	0
SYNE2	3	2.12
YAP1	3	94.38
SSBP1	3	33.31
PRKCSH	3	38.33
IRF2	3	50.79
TAF15	3	14.99
UBE2E1	3	13.39
DCPS	3	0

RFX2	3	0
NEK2	3	0
LAMA1	3	2
BIRC5	3	90.23
TENC1	3	0
CRY1	3	0
ARHGEF1	3	0
PPIC	3	0
THRA	3	17.71
PKN1	3	89.62
SGCE	3	0
NDUFAF3	3	0
GPI	3	4.49
G0S2	3	0
NFX1	3	0
BNIP2	3	0
RASA1	3	5.43
DCXR	3	75.06
PSMC4	3	4.07
PTMS	3	0
PPP2R1B	3	17.39
DLG1	3	21.09
UROS	3	0
MMP7	3	3
FAF1	3	16.09
ITGA3	3	5
NDUFV2	3	0.83
MDC1	3	1.23
SIPA1L2	3	0
CBR3	3	0
ITPR1	3	8.28
GZMM	3	60.03
GLI1	3	0
PLK1	3	20.53
EIF2AK4	3	54.4
CENPA	3	7.87
TRIM21	3	0
PRR5L	3	5.02

CTDSP2	3	0
BAD	3	13.55
LAMB1	3	0
SURF4	3	47.59
ATP5F1	3	3.55
RAB5C	3	0
TRAPPC3	3	21.54
PFKL	3	4.88
COL6A3	3	4.15
TJP1	3	10.62
SYT11	3	456.23
DVL3	3	1
FSCN1	3	17.94
CTPS1	3	37.45
PF4	3	16.21
CDC25A	3	23.74
ARHGEF2	3	231.56
TFRC	3	0
NDUFB3	3	76.53
AARS	3	11.34
CASP1	3	43.95
PDE4DIP	3	3.92
ACTN2	3	0
FSHR	3	43.05
SPRY2	3	11.52
PLBD1	3	253.88
CCND3	3	12.37
UNK	3	6.03
UBR5	3	26.24
IGFBP6	3	11.65
CCL3L1	3	0
ATP2A2	3	132.93
IQSEC1	3	2.5
PTP4A1	3	12.73
RPA2	3	72.83
SPINK7	3	3.49
KRAS	3	0
MFAP4	3	0

BCAT1	3	0
KIAA0430	3	50.89
SNAI1	3	0
IGFBP7	3	96.29
COX8A	3	493.99
USP2	3	46.48
NDP	3	72.3
SDC4	3	181.5
CRIP1	3	284.22
E2F4	3	123.57
MAOA	3	426.34
CCR10	3	5.25
SLC1A3	3	325.71
UBE2W	3	1.2
KRT18	3	134.39
SGTA	3	57.49
HOXA1	3	0
SFRP1	3	335.39
PGRMC1	3	0
NR1H2	3	19.4
VEGFA	3	0
NFATC1	3	2.2
ITGB4	3	28.63
ARHGEF11	3	3.87
TIMP1	3	7.5
SOX8	3	0
TFCP2	3	0
PTN	3	0
TNFRSF21	3	11.74
IPO9	3	0
SLC2A5	3	0
LUM	3	2.5
TMCO3	3	0
CYP4B1	3	0
MST1R	3	30.61
HCST	3	45.89
UTP14A	3	0
RPS6KA1	3	7.07

CNN3	3	0
GULP1	3	0
C17orf61	3	0
ADRBK1	3	2.25
PLAUR	3	0
GYPC	3	0
PPP6R3	3	0.97
BCAN	3	0
SYT1	3	0
GJB2	3	575.61
STK24	3	0
BCAP31	3	0
USP4	3	0
TFAP4	3	0
CFI	3	393.21
COL2A1	3	0
PRKAA1	3	253.47
NDUFB9	3	0
GGA1	3	0
NT5E	3	0
LNX1	3	66
COPG1	3	0
SFTPD	3	9.83
SLC7A5	3	0
ORC5	3	0
SUN1	3	0
TULP3	3	0
CCR4	3	485.34
GBAS	3	0
GMPS	3	0
MAEA	3	4.21
MLL	3	0
MXRA5	3	0
HTT	3	0
UAP1	3	0
MBNL1	3	0
SDC1	3	0
VWF	3	0

SERTAD2	3	0
PCDH17	3	0
GAS1	3	0
DYNLL1	3	0
HDAC8	3	0
NID2	3	0
MGP	3	0
RPTOR	3	0
KDM5B	2	0
NOA1	2	0
ID1	2	0
CTSC	2	0
SKI	2	0
GINS3	2	0
FAM213A	2	0
KCNN3	2	0
WDR1	2	0
TGM3	2	0
PPAP2A	2	0
ARF4	2	0
KRT16	2	0
42258	2	0
PAX8	2	0
IFNB1	2	0
BMP7	2	0
TSG101	2	0
ARHGDIG	2	0
MYOZ3	2	272.76
BRSK1	2	0
WDR33	2	0
EPAS1	2	0
PCOLCE	2	0
APOA2	2	0
FGA	2	0
NEFM	2	1.88
IFNAR2	2	0
TRAPPC10	2	0
SLN	2	0

PPIF	2	0
FNBP1	2	0
USP28	2	0
TNNT1	2	0
ETFA	2	0
DEF6	2	0
CCL22	2	0
CHST3	2	0
KCNA5	2	0.66
CDK7	2	0
TP53RK	2	0
GINS4	2	0
UBE2Q2	2	0
RXRB	2	0
GLIPR2	2	0
MNF1	2	0
ELF1	2	0
GFAP	2	0
TOMM7	2	0
UBAC1	2	0
DLAT	2	431.11
ACOX1	2	0
F13A1	2	0
ANP32B	2	0
RBFOX2	2	0
CD300LF	2	0
SENP2	2	0
NCAPD2	2	0
SART3	2	0
TNIP1	2	0
KCMF1	2	0
GCLM	2	22.4
APBA2	2	0
MRPL53	2	0
POU3F3	2	12.67
TXN2	2	0
MAFG	2	316.37
IGJ	2	0

CDC37L1	2	3
MYO6	2	0
LEO1	2	0
CEP63	2	0
MTA2	2	0
PDE3A	2	0
PYCARD	2	0
NDUFB8	2	0
USP1	2	0
MSX2	2	0
ZNF503	2	82.81
ABT1	2	0
RGCC	2	0
DPM1	2	0
CCL7	2	0
GTF2F2	2	0
COLEC12	2	498.89
TSPAN9	2	0
CNOT8	2	0
RRBP1	2	0
GAP43	2	0
MXD1	2	0
MPDZ	2	0
SYVN1	2	0
UBE2R2	2	0
ECSIT	2	6.73
RHOXF2	2	7
ADAMTS4	2	0
RBL2	2	0
MAPKAP1	2	0
DOCK11	2	0
DNAJB6	2	0
FBLIM1	2	0
HSD17B10	2	7.39
MAGED2	2	0
SIGMAR1	2	0
FAM129A	2	469
SDCBP	2	0

RND1	2	0
SPTA1	2	0
ADSL	2	1.58
HDAC11	2	0
AGTR1	2	0
ALDH1A3	2	0
EIF2C4	2	0
CDO1	2	0
BCCIP	2	0
ZNF579	2	6.28
ING4	2	0
ZNRD1	2	0
FEZ1	2	0
UPF3B	2	6.8
GADD45G	2	4.29
CBFB	2	0
TPD52L2	2	12.34
STAM	2	0
MRPL45	2	0
S100A1	2	0
WDR74	2	0
DAPP1	2	0
FNTA	2	0
HMGN1	2	0
SNRNP40	2	241.93
IL4	2	12.28
MZB1	2	0
PRKD2	2	0
GPX4	2	0
CXCL6	2	0.33
MAPK15	2	0
TAGLN	2	0
C10orf116	2	0
RNF139	2	12.68
LMBRD1	2	0
SPSB2	2	0
PTPN23	2	0
IL4R	2	0

STX7	2	1.11
UBQLN1	2	2
C1orf198	2	0
NENF	2	0
MAFK	2	1.51
POLR1E	2	11.23
DYSF	2	0
SEC23IP	2	0
EDC4	2	0
FKBP8	2	7
RBM15B	2	0
GTF2B	2	0
TEX10	2	0
GNPDA1	2	0
MLF1IP	2	0
FANCA	2	0
C9orf3	2	0
G6PD	2	0
HDAC10	2	0
PSMD10	2	0
PIP	2	0
BCL2L11	2	0
OSTF1	2	0
RARB	2	7.15
UVRAG	2	0.46
PKN2	2	0
PBX1	2	30.95
JAK3	2	0
CD6	2	45.74
HLA-A	2	0
SGCA	2	1.7
FRAT1	2	0
MRPL22	2	0
IGFBP3	2	0
THG1L	2	0
NOS1	2	41.88
HOXC8	2	0
CTSB	2	0

EIF4E	2	0
TYK2	2	0
SCYL1	2	0
VAMP8	2	0
BNIP3	2	0
TSLP	2	0
TCEAL3	2	5.19
ARL15	2	0
GATA4	2	0
DLG2	2	0
BMPR1A	2	0
SLC1A5	2	6.48
KPNA1	2	0
MYO1E	2	0
BCAR3	2	0.79
TRIP12	2	0
EIF3J	2	0
PTPN13	2	12.28
EPS8	2	0
GOLGA2	2	1.57
KCNJ11	2	4.95
NEB	2	1.43
MARK4	2	0
IGLL1	2	0
MCAT	2	0
COMMD1	2	0
ABCB1	2	1.37
MATN3	2	0
USP47	2	0
S100A11	2	0
RGMA	2	0
DMD	2	0
PPP6R1	2	93.54
OCLN	2	23.46
MAPK9	2	2.43
MAP2K4	2	15.32
PTGIS	2	5.41
FKBP10	2	71.92

FOXC2	2	1.85
FTL	2	0
HPX	2	0
NDUFB5	2	1.05
USP5	2	4.83
AMBP	2	0
RNASE1	2	0
MAVS	2	7.89
SARS	2	76.38
WISP2	2	3.13
UBE2O	2	0.33
PRAF2	2	0.5
URM1	2	0
HTR1A	2	7.04
ATP7B	2	0
NPEPPS	2	12.12
HIST1H1A	2	4.96
DPYSL4	2	0
SULF1	2	0
SCARA3	2	270.49
HSPB7	2	35.78
FZD5	2	0
COPS7A	2	0
PCYT2	2	6.46
IKZF1	2	0
CFD	2	0
SMAD9	2	0
UCHL1	2	278.6
NR1I3	2	1.36
PSME4	2	695.7
MMP14	2	0
DEGS1	2	0
NTN4	2	50.95
ZNF423	2	0
RNF115	2	0
TOMM22	2	30.05
CCL20	2	0
TGFBI	2	66.18

GPNMB	2	0
BTC	2	1
NBL1	2	0
ZNF148	2	2.25
AGPAT4	2	0
NABP1	2	0
MSRB1	2	0
ATOX1	2	0
SERPINA1	2	8.25
WNT4	2	13.09
C5	2	0
CUTC	2	0
CXCL14	2	0
S1PR3	2	0
LIPA	2	0
RPS4Y1	2	0
CLCF1	2	100
PPP1R16A	2	0
CTSL1	2	0
SOWAHC	2	0
PLCG2	2	0
SH3YL1	2	0
DCC	2	0
PFKM	2	0
TMA7	2	0
C2orf18	2	0
MT1M	2	37.77
METTL7A	2	0
SHPRH	2	0
HK2	2	0
UQCRC2	2	4.5
IGFBP4	2	1
TRAPPC9	2	12.74
FAM134B	2	0
ALPL	2	6.16
HK3	2	0
TMEM237	2	120.85
GGA2	2	0

HSPB8	2	0
WASL	2	0
B4GALT3	2	0
CPQ	2	0
GNB1	2	0
ANTXR1	2	0
RBCK1	2	0
C4orf34	2	0
OSR1	2	0
CD14	2	0
BMP2	2	10.35
KRR1	2	0
LAMC2	2	0
TSHZ2	2	0.87
POLR2M	2	3
ANTXR2	2	0
PTGES3	2	0
PGM2	2	0
OLFML2A	2	0
PPARD	2	0
ADAM12	2	0
QTRT1	2	0
CYP26B1	2	0
ATG4B	2	0
TNFRSF11B	2	0
TMEM173	2	0
DIABLO	2	0
GIPC1	2	0
ACSS2	2	0
MAB21L2	2	0
SPOCK1	2	0
FKTN	1	0
TMEM100	1	0
LPAR1	1	0
TRAM2	1	0
DPT	1	0
NDUFA3	1	0
ACPL2	1	0

NDUFB2	1	0
FMOD	1	0
ADAMTSL2	1	0
JSRP1	1	0
ALPK2	1	0
AEBP1	1	0
HTRA4	1	0
PDGFD	1	0
PLAC9	1	0
MTMR11	1	0
PLEKHH2	1	0
KDELC2	1	0
RHBDF1	1	0
SEMA3C	1	0
CHI3L2	1	0
ZNF25	1	0
CD52	1	0
TIPARP	1	0
APOBEC3A	1	0
LRRN4CL	1	0
SV2B	1	0
DEFB1	1	0
RARRES2	1	0
C2orf40	1	0
CST7	1	0
SLC16A10	1	0
SLC2A10	1	0
CD163	1	0
PMP22	1	0
STXBP6	1	0
MEDAG	1	0
S100A3	1	0
ITM2A	1	0
GALNTL2	1	0
WDR19	1	0
GLT25D2	1	0
COMP	1	0
CYBRD1	1	0

DKK3	1	0
TPPP3	1	0
ANGPTL7	1	0
HIGD2A	1	0
CRLF1	1	0
FGFBP2	1	0
GPR64	1	0
SSPN	1	0
COL5A2	1	0
EML1	1	0
CTSO	1	0
CDH13	1	0
RCAN2	1	0
MT1E	1	0
SCARA5	1	0
ZDHHC8	1	0
CILP	1	0
LTB	1	0
CHSY1	1	0
PRRX1	1	0
EMP3	1	0
LHFPL2	1	0

Supplementary Table 7. Enriched functional pathways identified in synovium of SpA/AS patients

Pathway	Total	Expected	Hits	P Value	FDR
Pathways in cancer	310	49.1	134	4.61E-33	1.00E-30
Focal adhesion	200	31.7	92	5.25E-25	5.69E-23
Toxoplasmosis	93	14.7	54	5.80E-21	4.19E-19
Prostate cancer	87	13.8	46	7.62E-16	4.13E-14
Epstein-Barr virus infection	91	14.4	47	1.22E-15	5.30E-14
Chronic myeloid leukemia	73	11.6	41	1.81E-15	6.53E-14
Chagas disease (American trypanosomiasis)	89	14.1	45	1.42E-14	4.39E-13
Herpes simplex infection	103	16.3	47	4.93E-13	1.34E-11
Pancreatic cancer	69	10.9	36	1.99E-12	4.80E-11
Hepatitis C	100	15.8	45	2.89E-12	6.28E-11
Small cell lung cancer	80	12.7	39	3.84E-12	7.58E-11
Colorectal cancer	49	7.76	29	4.41E-12	7.98E-11
ECM-receptor interaction	84	13.3	40	5.25E-12	8.77E-11
Acute myeloid leukemia	57	9.02	31	1.71E-11	2.65E-10
Adherens junction	70	11.1	35	2.01E-11	2.91E-10
Toll-like receptor signaling pathway	97	15.4	42	7.33E-11	9.93E-10
Chemokine signaling pathway	189	29.9	65	1.10E-10	1.40E-09
HTLV-I infection	199	31.5	67	1.62E-10	1.95E-09
NOD-like receptor signaling pathway	49	7.76	27	2.40E-10	2.74E-09
TGF-beta signaling pathway	84	13.3	37	5.65E-10	6.13E-09
Osteoclast differentiation	119	18.8	46	9.06E-10	9.36E-09
Pertussis	52	8.23	27	1.43E-09	1.41E-08
Neurotrophin signaling pathway	123	19.5	46	3.20E-09	3.02E-08
Cell cycle	124	19.6	46	4.34E-09	3.92E-08
Leishmaniasis	51	8.07	26	4.83E-09	4.19E-08
RIG-I-like receptor signaling pathway	49	7.76	25	9.41E-09	7.85E-08
Transcriptional misregulation in cancer	19	3.01	14	2.98E-08	2.39E-07
Measles	102	16.2	38	8.77E-08	6.80E-07
Shigellosis	47	7.44	23	1.02E-07	7.62E-07
Influenza A	107	16.9	39	1.17E-07	8.50E-07
Insulin signaling pathway	137	21.7	46	1.51E-07	1.06E-06
Non-small cell lung cancer	52	8.23	24	2.19E-07	1.48E-06
Tuberculosis	174	27.6	54	2.42E-07	1.59E-06
T cell receptor signaling pathway	98	15.5	36	2.90E-07	1.85E-06
B cell receptor signaling pathway	75	11.9	30	3.41E-07	2.12E-06

ErbB signaling pathway	87	13.8	33	3.86E-07	2.33E-06
Epithelial cell signaling in Helicobacter pylori infection	37	5.86	19	5.16E-07	3.03E-06
Glioma	65	10.3	27	5.42E-07	3.09E-06
Thyroid cancer	28	4.43	16	6.23E-07	3.47E-06
Cytosolic DNA-sensing pathway	20	3.17	13	9.34E-07	5.07E-06
Bacterial invasion of epithelial cells	56	8.87	24	1.18E-06	6.18E-06
Viral myocarditis	26	4.12	15	1.20E-06	6.18E-06
MAPK signaling pathway	265	42	71	1.82E-06	9.19E-06
Endometrial cancer	44	6.97	20	3.06E-06	1.51E-05
Apoptosis	83	13.1	30	4.23E-06	2.04E-05
Renal cell carcinoma	60	9.5	24	5.17E-06	2.44E-05
Salmonella infection	72	11.4	27	5.76E-06	2.66E-05
Regulation of actin cytoskeleton	182	28.8	52	6.53E-06	2.95E-05
Jak-STAT signaling pathway	99	15.7	33	1.06E-05	4.71E-05
Prion diseases	21	3.32	12	1.68E-05	7.27E-05
Leukocyte transendothelial migration	108	17.1	34	3.10E-05	0.000132
Legionellosis	40	6.33	17	4.97E-05	0.000204
Staphylococcus aureus infection	40	6.33	17	4.97E-05	0.000204
Melanoma	68	10.8	24	6.05E-05	0.000243
Complement and coagulation cascades	67	10.6	23	0.00014	0.000552
Gap junction	89	14.1	28	0.000156	0.000604
p53 signaling pathway	68	10.8	23	0.00018	0.000687
Bladder cancer	29	4.59	13	0.000203	0.000758
Type II diabetes mellitus	48	7.6	18	0.00021	0.000771
Glycolysis / Gluconeogenesis	65	10.3	22	0.000246	0.000888
Alzheimer's disease	49	7.76	18	0.000283	0.00101
Malaria	11	1.74	7	0.000446	0.00156
Dorso-ventral axis formation	12	1.9	7	0.000925	0.00314
mTOR signaling pathway	45	7.12	16	0.000927	0.00314
Progesterone-mediated oocyte maturation	80	12.7	24	0.000977	0.00326
VEGF signaling pathway	76	12	23	0.00108	0.00357
Adipocytokine signaling pathway	63	9.98	20	0.00117	0.0038
Pathogenic Escherichia coli infection	35	5.54	13	0.00175	0.00559
Fc epsilon RI signaling pathway	75	11.9	22	0.00216	0.00679
Cytokine-cytokine receptor interaction	253	40.1	57	0.00256	0.00795
Wnt signaling pathway	144	22.8	36	0.0026	0.00796
Hypertrophic cardiomyopathy (HCM)	25	3.96	10	0.00315	0.00949

Arrhythmogenic right ventricular cardiomyopathy (ARVC)	12	1.9	6	0.00605	0.018
Endocytosis	101	16	26	0.00652	0.0191
Fc gamma R-mediated phagocytosis	97	15.4	25	0.00743	0.0215
Protein processing in endoplasmic reticulum	129	20.4	31	0.00923	0.0263
GnRH signaling pathway	94	14.9	24	0.00974	0.0274
African trypanosomiasis	25	3.96	9	0.0111	0.031
Aldosterone-regulated sodium reabsorption	34	5.38	11	0.0126	0.0347
Pentose phosphate pathway	27	4.28	9	0.019	0.0516
Cholinergic synapse	95	15	23	0.0211	0.0566
Rheumatoid arthritis	19	3.01	7	0.0214	0.0566
Natural killer cell mediated cytotoxicity	138	21.8	31	0.0238	0.0623
Cocaine addiction	43	6.81	12	0.0308	0.0795
Amyotrophic lateral sclerosis (ALS)	39	6.18	11	0.0351	0.0896
Amino sugar and nucleotide sugar metabolism	45	7.12	12	0.0428	0.108
Axon guidance	118	18.7	26	0.0451	0.111
Tight junction	118	18.7	26	0.0451	0.111

Supplementary Table 8. The complete list of nodes in the obtained network from overlapped DEGs between whole blood and synovium of SpA/AS patients

Label	Degree	Betweenness
UBC	77	969.26
DDX5	46	884.97
IL7R	44	2566.54
FOS	42	512.16
RPL21	37	517.47
ISG15	37	2190.84
EZR	31	1356.6
ELAVL1	29	873.87
RBM14	26	451.95
RPL36	24	471.92
PRKAR1A	24	541.7
CEBPD	22	1100.24
LGALS3	22	355.48
CBLB	21	995.97
RANGAP1	18	460.17
S100A8	18	280.78
APP	17	491.55
MMP9	16	161.55
SRSF6	15	446.14
DUSP1	15	204.9
GZMB	14	89.17
PTPN12	14	115.9
KLF4	14	227.1
RGS2	13	34.9
PPP1R15A	13	737.48
ASAP2	13	0
CCL5	12	304.67
IFNAR1	12	71.6
LYZ	12	117.3
HNF4A	11	191.74
H1F0	11	142.75
ITGB5	10	66.58
CD81	10	133.9

GZMA	10	0
SP1	10	0
RAB31	9	84.93
SUMO2	9	134.35
ESR1	9	38.36
SUMO1	9	30.96
PRSS23	9	0
PJA2	9	0
ACO1	8	65.16
RELA	8	61.86
CAND1	8	148.78
ITGAL	8	188.26
EP300	8	128.56
CUL3	8	59.26
ULK1	8	27.95
FN1	8	0
PIK3R1	8	6.23
SPARC	7	107.33
CRIP2	7	44.74
VHL	7	291.06
HDAC1	7	29.82
KIAA0101	7	170.42
CREBBP	7	391.1
CD19	7	5.33
MARCKSL1	7	110.3
CDK2	7	74.7
CTNNB1	7	94.71
GRB2	7	9.8
TP53	6	33.67
CALM3	6	0
TRAF6	6	0
SUN2	6	16
NOSIP	6	19.06
LY96	6	13
XRCC6	6	31.18
CUL1	6	13.21
COPS5	6	35.06
NFIL3	6	48.75

EGFR	6	0
IER3	6	12.66
PCNP	5	0
PROS1	5	18.6
PHACTR2	5	22
EGR1	5	0
CFTR	5	446.11
C17orf61	5	58.03
VIPR1	5	21
YWHAZ	5	29.58
ITGA4	5	40.52
VCAM1	5	9.34
CD79A	5	7.45
ILF3	5	0
SLC7A5	5	220.93
WHSC1	5	18.48
CRK	5	50.82
GABARAPL2	5	0
PPP1CA	5	108.89
NOV	5	18.45
ITPR3	5	46.71
HSPA4	5	34.54
PLEKHA1	4	0
CREB1	4	17.38
KIAA0430	4	0
XRCC5	4	0
SYK	4	0
IL13RA1	4	0
JUN	4	58.31
GNB2L1	4	179.68
ARRB2	4	110.45
PAN2	4	30.18
SET	4	17.73
MAPK3	4	0
CEBPB	4	0
MSRB2	4	68.11
MAPK1	4	27.57
GSTM3	4	15.84

FAM173A	4	8.8
POLR2F	4	143.49
VCAN	4	40.42
EEF2	4	37.22
GAPDH	4	57.74
HNRNPK	4	454.85
F5	4	2
PXN	4	2.74
SPI1	4	0
RPS20	4	6.1
HSPA8	4	572.6
NFKB1	4	76.07
ACP5	4	0
PITX3	4	0
PPARG	4	85.22
SIRT7	4	29.82
SHC1	4	0
JAZF1	4	15
TYMP	4	14.83
JMJD1C	4	10.49
TRIP6	4	0
CDH2	4	0
PAM	4	10.28
UQCRQ	4	0
DDIT3	4	0
ARHGDIA	3	0
PPM1B	3	17.73
RPL18	3	0
TUFT1	3	0
BAG6	3	0
E2F1	3	0
TOP1	3	0
STAT1	3	26.37
POT1	3	0
MEPCE	3	0
LXN	3	0
RPL4	3	0
CNBP	3	0

RPS16	3	0
TGFBR2	3	211
TERF2	3	59
RPSA	3	48.65
UBE2I	3	41.83
CEBPG	3	8.78
ACTG1	3	0
PFN1	3	0
MAGEB2	3	0
STAT3	3	40.32
G3BP1	3	0
RUNX1	3	37.98
CHD3	3	10.5
RAD21	3	110.06
LGALS1	3	58.06
MAP1LC3A	3	0
SF3A2	3	311.48
HCST	3	0
NEDD8	3	8.27
CALU	3	70.03
CDKN1A	3	71.86
THRAP3	3	10.12
PRDX6	3	303.09
SETBP1	3	4.26
RPS17	3	0
HNRNPU	3	188.48
CBL	3	400.28
S100A9	3	0
CASP8	3	0
MAPK14	3	35
TRAF3	3	137.82
IKBKG	3	2.61
PDIA3	3	0
FAM46C	3	94.5
HNRNPM	3	21.26
NR3C1	3	15.4
PTK2B	3	5.93
PTPRC	3	0

CBR3	3	8.83
DDX42	3	0
HSP90AA1	3	38.15
PDK4	3	3.49
TNFSF10	3	13.5
MAPK6	3	0
TGFBR3	3	0
NDUFB3	3	1.6
ALB	3	0
HNF1A	3	0
RPS27A	3	0
IKBKB	3	0
TSC1	3	0
RPL29	2	0
SRPK1	2	0
EIF4G1	2	0
HLA-DRA	2	0
TGFB1	2	0
SERBP1	2	0
PRKAR2A	2	0
MYC	2	0
VCP	2	0
KRAS	2	0
PPAP2A	2	0
IKZF1	2	0
SEBOX	2	0
CFD	2	0
BRSK1	2	0
APOA1	2	0
TOP2A	2	0
CLTC	2	0
ARPC3	2	0
CUL5	2	0
HIST2H2BE	2	0
CRIP1	2	0
SELL	2	0
MPP3	2	0
B2M	2	0

TGFB1I1	2	0
LGALS8	2	0
HDAC5	2	0
PRKCA	2	0
PTGDS	2	0
CREM	2	1.33
PLCG1	2	0
ERG	2	0
ACTA1	2	0
PRKCB	2	11
LAMTOR3	2	0
RPL27A	2	0
PRKDC	2	0
TMBIM4	2	0
ZYX	2	39
PDPK1	2	0
IGJ	2	0
CFLAR	2	0
SSRP1	2	0
NABP1	2	0
TRAF3IP1	2	25
DYRK1B	2	0
GABARAP	2	0
USP1	2	0
VAMP5	2	0.65
CIRBP	2	66.5
FLOT1	2	23.5
HDAC7	2	5.79
TSPAN9	2	0
UGP2	2	0
SPN	2	0
HSP90B1	2	4
ERCC8	2	0
MPDZ	2	99
A2M	2	0
CALR	2	0
DOCK11	2	1.27
NUAK1	2	0

BARD1	2	0
PARK2	2	2
TUBB2B	2	0
RPS11	2	0
OSGEP	2	0
ZNF579	2	0
TLR2	2	0
SAFB	2	293.33
MZB1	2	0
SLC25A5	2	29
VTN	2	7.33
ITGB1	2	0
CCNE1	2	30.83
TMA7	2	0.95
C1orf198	2	0
ELANE	2	11.72
GNAI3	2	0
LGALS9	2	24.97
BTRC	2	0
TAF1	2	0
GYPC	2	0
CD82	2	0
VKORC1	2	15
SGK1	2	42
NEDD4	2	0
CD4	2	0
ITGAV	2	2.75
ALPL	2	0
NEDD4L	2	0
RFX2	2	0
TOE1	2	0
PRKAA1	2	5
JAK3	2	130.07
TUBA4A	2	0
GPI	2	0
RXRA	2	4
TYK2	2	0
CASP9	2	0

DCUN1D1	2	0
UBE2D2	2	3.56
NOTCH1	2	10.36
AKT1	2	4.46
SFTPD	2	7.5
SIPA1L2	2	2.08
NOS2	2	0
TRAF2	2	0
FAF2	2	0
CRKL	2	0
SLC3A2	2	0
ZBTB16	2	2
PTK2	2	0
UBE2D1	2	1.5
ATXN1	2	0
HAP1	2	0
TK1	2	2.23
SMN1	2	0
MAPK9	2	0
NR2C2	2	75
SYT11	2	6
KAT5	2	0
PTGES3	2	0
PTPN6	2	0
LTF	2	0
CLU	2	0
CD2AP	2	0
BCAR1	2	0
BAG1	2	0
THBS1	2	0
PRMT1	2	0
SPRY2	2	0
PLBD1	2	0.95
CSNK2B	2	0
GNAQ	2	0
NFYA	2	0
CD163	1	0
PMP22	1	0

LPAR1	1	0
ITM2A	1	0
CYBRD1	1	0
PDGFD	1	0
TPPP3	1	0
FGFBP2	1	0
CHI3L2	1	0
MT1E	1	0
FPR1	1	0
CHSY1	1	0
LHFPL2	1	0

Supplementary Table 9. Enriched functional pathways identified from overlapped DEGs between whole blood and synovium of SpA/AS patients

Pathway	Total	Expected	Hits	P Value	FDR
Pathways in cancer	310	12.8	54	2.59E-21	5.62E-19
Prostate cancer	87	3.59	25	2.43E-15	2.63E-13
Chronic myeloid leukemia	73	3.01	23	3.64E-15	2.64E-13
Epstein-Barr virus infection	91	3.75	24	7.66E-14	4.16E-12
Chagas disease (American trypanosomiasis)	89	3.67	22	3.79E-12	1.64E-10
Toxoplasmosis	93	3.84	21	7.80E-11	2.82E-09
ErbB signaling pathway	87	3.59	20	1.60E-10	4.98E-09
Small cell lung cancer	80	3.3	19	2.59E-10	7.03E-09
Hepatitis C	100	4.12	21	3.34E-10	8.06E-09
Pancreatic cancer	69	2.85	17	1.29E-09	2.80E-08
Focal adhesion	200	8.25	29	1.46E-09	2.80E-08
T cell receptor signaling pathway	98	4.04	20	1.55E-09	2.80E-08
Herpes simplex infection	103	4.25	20	3.90E-09	6.51E-08
Acute myeloid leukemia	57	2.35	15	4.74E-09	7.34E-08
B cell receptor signaling pathway	75	3.09	17	5.17E-09	7.48E-08
Toll-like receptor signaling pathway	97	4	19	8.41E-09	1.14E-07
Osteoclast differentiation	119	4.91	21	9.51E-09	1.21E-07
Non-small cell lung cancer	52	2.14	14	1.14E-08	1.38E-07
Neurotrophin signaling pathway	123	5.07	21	1.76E-08	2.01E-07
Shigellosis	47	1.94	13	2.73E-08	2.96E-07
Glioma	65	2.68	15	3.33E-08	3.44E-07
NOD-like receptor signaling pathway	49	2.02	13	4.74E-08	4.68E-07
Leishmaniasis	51	2.1	13	8.00E-08	7.54E-07
Insulin signaling pathway	137	5.65	21	1.24E-07	1.12E-06
MAPK signaling pathway	265	10.9	30	2.56E-07	2.21E-06
Bacterial invasion of epithelial cells	56	2.31	13	2.64E-07	2.21E-06
Leukocyte transendothelial migration	108	4.45	18	2.87E-07	2.30E-06
Jak-STAT signaling pathway	99	4.08	17	4.01E-07	3.11E-06
Colorectal cancer	49	2.02	12	4.15E-07	3.11E-06
Chemokine signaling pathway	189	7.79	24	5.68E-07	4.11E-06
Endometrial cancer	44	1.81	11	1.03E-06	7.19E-06
Influenza A	107	4.41	17	1.26E-06	8.54E-06
Measles	102	4.21	16	3.12E-06	2.05E-05
RIG-I-like receptor signaling pathway	49	2.02	11	3.25E-06	2.08E-05

Apoptosis	83	3.42	14	5.52E-06	3.43E-05
Pertussis	52	2.14	11	6.05E-06	3.65E-05
Tuberculosis	174	7.18	21	6.97E-06	4.09E-05
Fc gamma R-mediated phagocytosis	97	4	15	7.72E-06	4.41E-05
Gap junction	89	3.67	14	1.28E-05	7.09E-05
Epithelial cell signaling in Helicobacter pylori infection	37	1.53	9	1.31E-05	7.09E-05
HTLV-I infection	199	8.21	22	1.74E-05	9.22E-05
GnRH signaling pathway	94	3.88	14	2.44E-05	0.000126
Renal cell carcinoma	60	2.47	11	2.57E-05	0.00013
Salmonella infection	72	2.97	12	3.00E-05	0.000148
Natural killer cell mediated cytotoxicity	138	5.69	17	4.20E-05	0.000203
Fc epsilon RI signaling pathway	75	3.09	12	4.57E-05	0.000215
Regulation of actin cytoskeleton	182	7.51	20	4.70E-05	0.000217
VEGF signaling pathway	76	3.13	12	5.23E-05	0.000236
Dorso-ventral axis formation	12	0.495	5	7.08E-05	0.000314
Transcriptional misregulation in cancer	19	0.784	6	7.88E-05	0.000342
Thyroid cancer	28	1.15	7	0.000103	0.000438
Long-term potentiation	70	2.89	11	0.000113	0.000471
Bladder cancer	29	1.2	7	0.000131	0.000537
Melanoma	68	2.8	10	0.000406	0.00163
Cholinergic synapse	95	3.92	12	0.000463	0.00183
Cell cycle	124	5.11	14	0.00051	0.00198
Melanogenesis	101	4.17	12	0.000812	0.00307
Vibrio cholerae infection	19	0.784	5	0.000821	0.00307
Prion diseases	21	0.866	5	0.00134	0.00494
Progesterone-mediated oocyte maturation	80	3.3	10	0.00149	0.0054
Dopaminergic synapse	124	5.11	13	0.00162	0.00576
TGF-beta signaling pathway	84	3.46	10	0.00217	0.0075
mTOR signaling pathway	45	1.86	7	0.00218	0.0075
Amoebiasis	46	1.9	7	0.00248	0.00841
Retrograde endocannabinoid signaling	60	2.47	8	0.00293	0.00978
Alzheimer's disease	49	2.02	7	0.00359	0.0118
Adipocytokine signaling pathway	63	2.6	8	0.00399	0.0129
Amphetamine addiction	64	2.64	8	0.0044	0.0141
p53 signaling pathway	68	2.8	8	0.00639	0.0201
Rheumatoid arthritis	19	0.784	4	0.00667	0.0207
Pancreatic secretion	30	1.24	5	0.00696	0.0213

Gastric acid secretion	56	2.31	7	0.0076	0.0223
Adherens junction	70	2.89	8	0.00761	0.0223
Long-term depression	70	2.89	8	0.00761	0.0223
Cytosolic DNA-sensing pathway	20	0.825	4	0.00808	0.0234
Aldosterone-regulated sodium reabsorption	34	1.4	5	0.0119	0.034
Oocyte meiosis	108	4.45	10	0.013	0.0365
African trypanosomiasis	25	1.03	4	0.018	0.05
Viral myocarditis	26	1.07	4	0.0206	0.0565
Legionellosis	40	1.65	5	0.0231	0.0626
Huntington's disease	28	1.15	4	0.0264	0.0707
Cell adhesion molecules (CAMs)	121	4.99	10	0.0267	0.0707
Serotonergic synapse	88	3.63	8	0.0277	0.0724
Cocaine addiction	43	1.77	5	0.0306	0.079
Wnt signaling pathway	144	5.94	11	0.0344	0.0879
Carbohydrate digestion and absorption	18	0.742	3	0.0357	0.09
Protein processing in endoplasmic reticulum	129	5.32	10	0.0392	0.0977
Regulation of autophagy	8	0.33	2	0.0402	0.0992
Type II diabetes mellitus	48	1.98	5	0.0462	0.113
Salivary secretion	49	2.02	5	0.0498	0.12

Supplementary Table 10. The list of these overlapped DEGs between the 81 DEGs of the previous study (Assassi et al.) and 1,798 DEGs identified by our meta-analysis of whole blood samples

Overlapped DEGs in "Meta-analysis" and "Assassi et al. 2011 ":		
	Fold change	
	Assassi et al.	Meta-analysis
SERPING1	1.8700147	1.3632503
MRVI1	1.8024752	1.3500611
CA4	1.9281051	1.3201060
CASP5	1.5685153	1.4008224
GK	1.4698305	1.4323637
TLR4	1.4444905	1.3785300
KCNJ15	1.5452644	1.3861224
ZNF438	1.4217511	1.3655319
DYSF	1.6477118	1.2425178
FCGR2A	1.4768139	1.3003326
SYTL2	0.7458609	0.7831941
ACSL1	1.4382924	1.3290495
ENTPD1	1.2753278	1.3021191
CXCL16	1.4889286	1.2324666
FFAR2	1.5014925	1.2121557
PADI4	1.455429	1.1293971
TLR5	1.3763431	1.2043589
NTNG2	1.3700945	1.2430743
GADD45A	1.454719	1.2365440
NPIP	0.7354124	0.8095942
ARHGAP26	1.7014533	1.2149468
AQP9	1.4132309	1.2415465
RSAD1	0.7048079	0.8397204
TNFSF13B	1.3287675	1.2298690
SIDT1	0.8021154	0.8155709
NPL	1.379119	1.2014651
TMEM42	0.7260504	0.8537808
CKAP4	1.408775	1.1668734
TMEM88	1.7136485	1.1282927

CASP4	1.2498605	1.1896972
SLC2A3	1.4444705	1.1242636
TMEM116	0.668057	0.9087538

Supplementary Table 11. The complete list of nodes in the obtained network from DEGs of the previous study (Assassi et al.)

Gene symbol	Degree	Betweenness
UBC	30	154.5
STAT1	29	505.87
CDC20	15	140.33
GADD45A	13	106.67
TLR4	11	137.42
INSR	11	29.33
IRF7	11	11.12
CKAP4	9	0
ELAVL1	9	106.4
APP	9	87.43
RFC1	8	47.03
CHD1L	7	17.87
SUMO2	6	0
TP53	6	111.33
HNF4A	6	68
CASP4	6	16
PEX19	6	12.35
MLL3	6	17.27
GK	5	60.5
FN3KRP	5	18.93
TLR5	5	10.5
EGFR	5	0
DYSF	5	0
MYC	4	40
MYD88	4	0
CAMK1G	4	6
KIAA1191	4	0
PADI4	4	11.83
HDAC1	4	38.5
SSH1	4	38.5
NR4A1	4	24
TRIM10	4	12
MSI2	4	6
FCGR2A	4	11

WDR36	4	0
SRPK1	3	0
RAB24	3	0
ACSL1	3	0
SRC	3	52.5
SLC2A3	3	13
TRAF6	3	0
RXRA	3	49
SYK	3	19.5
EP300	3	16.33
PAXIP1	3	0
SMAD3	3	18
SMAD2	3	0
CUL3	3	3
ARHGAP26	3	2.5
CBFA2T2	3	5
HOXC10	3	0.87
LACTB	3	2.27
PPP1R12C	3	0
HSP90AB1	3	0
PIK3R1	3	0
ATPIF1	3	0
HIST2H3A	3	0
ATM	2	0
FOS	2	0
TP73	2	0
SNTA1	2	0
HDAC3	2	0
BAG6	2	0
EEF1G	2	0
SERPING1	2	3
CXCL16	2	0
MSH6	2	0
AQP9	2	0
PTPRK	2	0
XRCC6	2	0
PTPN11	2	0
PSMC3	2	0

GSK3B	2	1
ECT2	2	0
SIRT2	2	0
POT1	2	1
SIRT1	2	0
THOC7	2	0.5
ESR1	2	0
KRT31	2	7
UBE2D2	2	0
CDK2	2	0
JUN	2	9.5
ADPRH	2	0
EML4	2	1.35
KARS	2	3.5
CD40	2	9.5
IRF3	2	0
CUL4B	2	0
IL16	2	0
DCTN1	2	0
TRIM21	2	0
ASCC2	2	4.5
COPS5	2	5.5
YWHAQ	2	17.5
UBD	2	0
PTK2	2	0
YWHAB	2	0
UBE2D1	2	27.5
HSP90AA1	2	2.5
H2AFX	2	0
TRIM33	2	0
KCNJ15	2	0
EGR1	2	0
SYTL2	2	1.5
APCS	2	15
CACNA1A	2	1
PIK3CA	2	10
CHD3	2	10
MAD2L1	2	0

AHSG	2	0
LSS	2	3
HNF1A	2	0
GRB2	2	0
HDAC6	2	5.5
CBX1	2	19.5
NSF	2	0
TNFSF13B	2	0
IL18	2	0
B3GALT6	1	0
TMEM106C	1	0
CRYGS	1	0
MX2	1	0
NPIP	1	0
CASP5	1	0
NPL	1	0
ZNF419	1	0
FCGR3B	1	0

Supplementary Table 12. Enriched functional pathways identified from DEGs of the previous study (Assassi et al.)

Pathway	Total	Expected	Hits	P Value	FDR
Cell cycle	124	1.96	14	4.78E-09	1.04E-06
Toll-like receptor signaling pathway	97	1.53	12	2.40E-08	2.31E-06
Pathways in cancer	310	4.9	20	3.19E-08	2.31E-06
Epstein-Barr virus infection	91	1.44	11	1.25E-07	6.76E-06
Colorectal cancer	49	0.775	8	7.13E-07	2.87E-05
Prostate cancer	87	1.38	10	7.93E-07	2.87E-05
Neurotrophin signaling pathway	123	1.94	11	2.71E-06	7.90E-05
Hepatitis C	100	1.58	10	2.91E-06	7.90E-05
Measles	102	1.61	10	3.49E-06	8.29E-05
Herpes simplex infection	103	1.63	10	3.82E-06	8.29E-05
Influenza A	107	1.69	10	5.41E-06	0.000107
ErbB signaling pathway	87	1.38	9	7.19E-06	0.00013
Chagas disease (American trypanosomiasis)	89	1.41	9	8.68E-06	0.000145
Leishmaniasis	51	0.806	7	1.23E-05	0.000191
Pertussis	52	0.822	7	1.40E-05	0.000191
Osteoclast differentiation	119	1.88	10	1.41E-05	0.000191
Chronic myeloid leukemia	73	1.15	8	1.57E-05	2.00E-04
HTLV-I infection	199	3.15	12	5.38E-05	0.000638
Endometrial cancer	44	0.696	6	5.58E-05	0.000638
B cell receptor signaling pathway	75	1.19	7	0.000156	0.00169
Renal cell carcinoma	60	0.949	6	0.000324	0.00335
Malaria	11	0.174	3	0.000572	0.0056
Toxoplasmosis	93	1.47	7	0.000593	0.0056
Pancreatic cancer	69	1.09	6	0.000694	0.00628
Jak-STAT signaling pathway	99	1.57	7	0.000865	0.00727
Salmonella infection	72	1.14	6	0.000871	0.00727
Non-small cell lung cancer	52	0.822	5	0.00126	0.0101

Progesterone-mediated oocyte maturation	80	1.26	6	0.00152	0.011
Small cell lung cancer	80	1.26	6	0.00152	0.011
Tuberculosis	174	2.75	9	0.00152	0.011
Rheumatoid arthritis	19	0.3	3	0.00307	0.0215
Glioma	65	1.03	5	0.00341	0.0225
Legionellosis	40	0.632	4	0.00342	0.0225
p53 signaling pathway	68	1.08	5	0.00414	0.0263
T cell receptor signaling pathway	98	1.55	6	0.00425	0.0263
Systemic lupus erythematosus	22	0.348	3	0.00471	0.0284
Type II diabetes mellitus	48	0.759	4	0.00663	0.0389
NOD-like receptor signaling pathway	49	0.775	4	0.00713	0.0407
MAPK signaling pathway	265	4.19	10	0.00823	0.0458
Chemokine signaling pathway	189	2.99	8	0.00937	0.0508
Apoptosis	83	1.31	5	0.00961	0.0509
Bacterial invasion of epithelial cells	56	0.885	4	0.0114	0.0588
Acute myeloid leukemia	57	0.901	4	0.0121	0.061
Focal adhesion	200	3.16	8	0.0129	0.0638
Dorso-ventral axis formation	12	0.19	2	0.0147	0.0709
Aldosterone-regulated sodium reabsorption	34	0.538	3	0.016	0.0754
PPAR signaling pathway	64	1.01	4	0.0179	0.081
Amphetamine addiction	64	1.01	4	0.0179	0.081
Epithelial cell signaling in Helicobacter pylori infection	37	0.585	3	0.0201	0.0889
Natural killer cell mediated cytotoxicity	138	2.18	6	0.0211	0.0918
Melanoma	68	1.08	4	0.0219	0.0932
Adherens junction	70	1.11	4	0.0241	0.101
Oocyte meiosis	108	1.71	5	0.0273	0.112
Fc epsilon RI signaling pathway	75	1.19	4	0.0301	0.121
VEGF signaling pathway	76	1.2	4	0.0314	0.124
Carbohydrate digestion and absorption	18	0.285	2	0.032	0.124
Amoebiasis	46	0.727	3	0.0355	0.135
Cytosolic DNA-sensing pathway	20	0.316	2	0.039	0.146
RIG-I-like receptor signaling pathway	49	0.775	3	0.0416	0.153
TGF-beta signaling pathway	84	1.33	4	0.043	0.156