

Introduction

Description

Interferon regulatory factor 1, a transcription factor that acts in toll-like receptor signaling, JAK-STAT cascade, antiapoptosis, and inflammatory response, aberrantly expressed in psoriasis and sclerosis; mRNA is downregulated in leukemia

Gene symbol

IRF1

Synonyms

MAR; IRF1; IRF-1; ISGF2; interferon regulatory factor 1

Gene Ontology [what is this?](#)

Molecular function

glucocorticoid receptor binding [E], transcription factor activity, sequence-specific DNA binding [E] [details](#)

Biological process

cell growth [E, P], cellular process [E], immune response [P], inflammatory response [P], JAK-STAT cascade [E], nitric oxide biosynthetic process [P]... [details](#)

Cellular component

cytosol [Y], nucleoplasm [Y], nucleus [E] [details](#)





View orthologous relationships

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Biomarker Associations

what is this?

Diseases associated with IRF1 (22 entries)

Show 5 entries

Search:

Disease details-all	Significance	Type of Association				Indication		
		Causal 8 associations	Correlative 44 associations	Preventative	Negative 1 associations	Disease Mechanism 8 associations	Prognosis 8 associations	Therapeutic Target
Stomach Neoplasms	9 associations	5 associations	4 associations			5 associations		
Asthma	7 associations	2 associations	5 associations			2 associations		
COVID-19	5 associations		5 associations				5 associations	
Psoriasis	4 associations		3 associations		1 associations			
Ovarian Neoplasms	3 associations		3 associations					

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GENE

Mutations



Mutation Type	Count	Mutation Type	Count
Missense/nonsense	0	Small indels	0
Splicing	0	Gross deletions	0
Regulatory	2	Gross insertions	0
Small deletions	0	Complex rearrangements	0
Small insertions	0	Repeat variations	0

Mutant Phenotype [what is this?](#)

Mutant phenotype of closely related homolog(s)

Mouse **Irf1** (79.3% identity to Human IRF1 [1e-154])

Viability effects : decreased viability; increased viability; inviable [details](#)

Anatomical effects : B-lymphocytes; blood; bone marrow; brain; central nervous system; chondrocytes; colon/large intestine; fibroblasts; glial cells; heart; hepatocytes ... [details](#)

Physiological effects : anti-bacterial response; anti-pathogen response; anti-viral response; cell adhesion; cell cycle control; cell death/apoptosis; cell migration; DNA repair; drug response; immunity and inflammation; infertile ... [details](#)

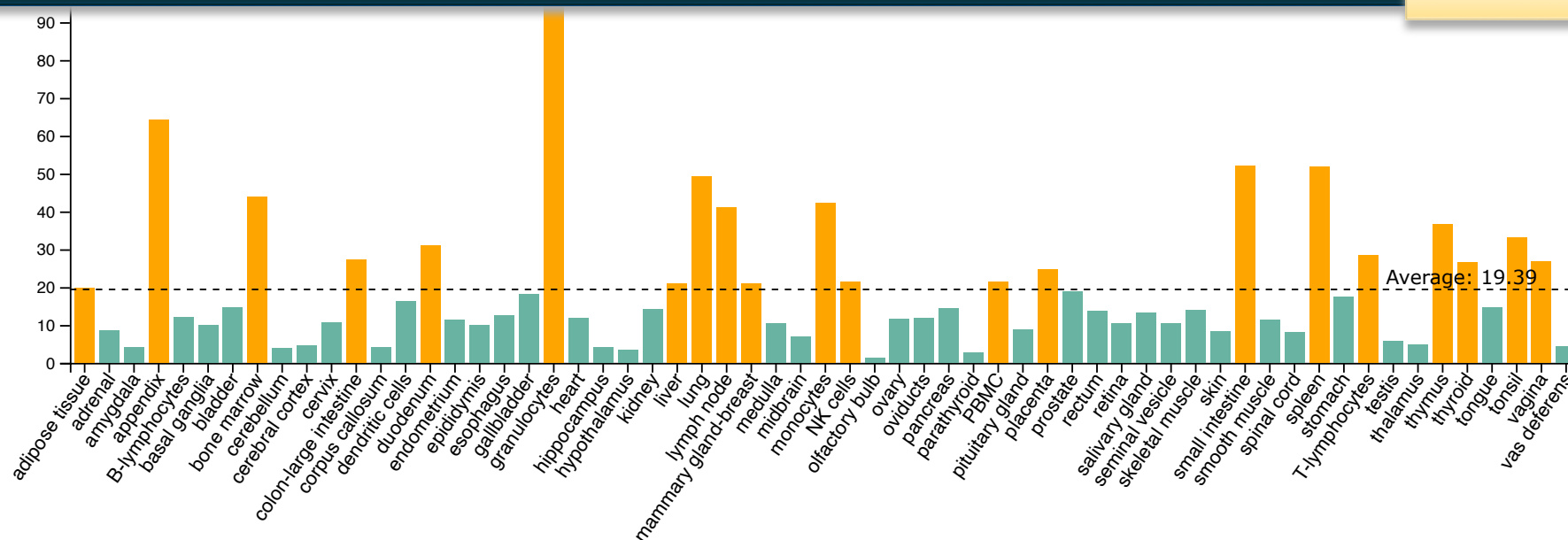
Expression [what is this?](#)

Tissue expression

Consensus normalized transcript expression levels provided by Human Protein Atlas (v20)

Relative tissue specificity: 0.08





+ View organ or tissue, cell type, and tumor type entries in detail

Regulation of IRF1 expression

Proteins, complexes, or pathways that influence IRF1 expression (14 entries)

Show 5 entries	Search:
Regulator details	Effect
C/EBPdelta	Upregulated by
cd40	Upregulated by
IFNgamma	Upregulated by
IFNGR	Upregulated by
IL-10	Upregulated by

Add a subscription to TRANSFAC® and this report will display detailed information about:

38 transcription factor(s) which bind and regulate the IRF1 gene

1033 transcription factor(s) which have been shown by ChIP-Chip or ChIP-Seq experiments to bind within or near the IRF1 gene

71 gene(s) which are bound by the IRF1 factor

10 positional weight matrices for the IRF1 factor

A subscription also provides access to the Match tool for prediction of additional transcription factor binding sites.

[Learn more...](#)

Transcriptional Regulation [what is this?](#)

Regulation of IRF1 gene expression

Transcription factor binding sites within the IRF1 gene (63 entries)

Show 5 entries	Search:
DNA Binding Reaction	Effect
STAT6(m.s.) --/ IRF1(h)	transrepression
MUC-16(h) --/ IRF1(h)	transrepression
BAL1(h) --/ IRF1(h)	transrepression
BCL-3(h) --/ IRF1(h)	transrepression
IPCS-BF(h) --> IRF1(h)	transregulation
Showing 1 to 5 of 63 entries	
First Previous 1 2 3 4 5 Next Last	

Nucleotide Sequence : CGAGCCC...AATTGTT (1..2035; 2035 nt) [details](#)**Sequence source** : RefSeq:NM_002198

FASTA ↓

PROTEIN

Drug Interactions [what is this?](#)

Drug(s) targeting IRF1 (1 entry)

Show 5 ▾ entries		Search:	
Drug(s) ▴	Status ▴	Interaction Data Source ▴	Reference(s) ▴
Fadraciclib	small molecule, investigational	DrugBank ↗	29137393 ↗
Showing 1 to 1 of 1 entries			
First Previous 1 Next Last			

Pathways & Interactions [what is this?](#)

Pathways

Canonical pathways assembled from experiments involving orthologous proteins (2 entries)

Show 5 ▾ entries Search:



geneXplain

Locus Report - Human

IRF1 (IRF-1)

logout

help

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TLR9 pathway	View Supporting Reactions	View Graphic Representation	Load in PathFinder →
--------------	---	---	--

Showing 1 to 2 of 2 entries

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Subcomponents assembled from experiments involving orthologous proteins (2 entries)

Show 5 entries

Search:

Name	View Supporting Reactions	View Graphic Representation	Load in PathFinder
STAT1 ---IRF-1---> IRF2	View Supporting Reactions		Load in PathFinder →
TLR9 ---IRF-1---> NOS2, IFNB1, IL12A	View Supporting Reactions		Load in PathFinder →

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Pathways from Reactome (10 entries)

Provided by the [Reactome](#) database, release 83 ([ReactomePathways.gmt](#)).

Show 5 entries

Search:

Name	Reactome pathway report link	Reactome pathway browser link
Cytokine Signaling in Immune system	R-HSA-1280215	Open in Reactome Browser
Factors involved in megakaryocyte development and platelet production	R-HSA-983231	Open in Reactome Browser
Hemostasis	R-HSA-109582	Open in Reactome Browser
Immune System	R-HSA-168256	Open in Reactome Browser
Interferon alpha/beta signaling	R-HSA-909733	Open in Reactome Browser

Showing 1 to 5 of 10 entries

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Show 5 entries

Search:

Name	Display below	WikiPathways external link
Apoptosis	View	WikiPathways
IL-18 signaling pathway	View	WikiPathways
IL6 signaling pathway	View	WikiPathways
Immune response to tuberculosis	View	WikiPathways
miRNA role in immune response in sepsis	View	WikiPathways

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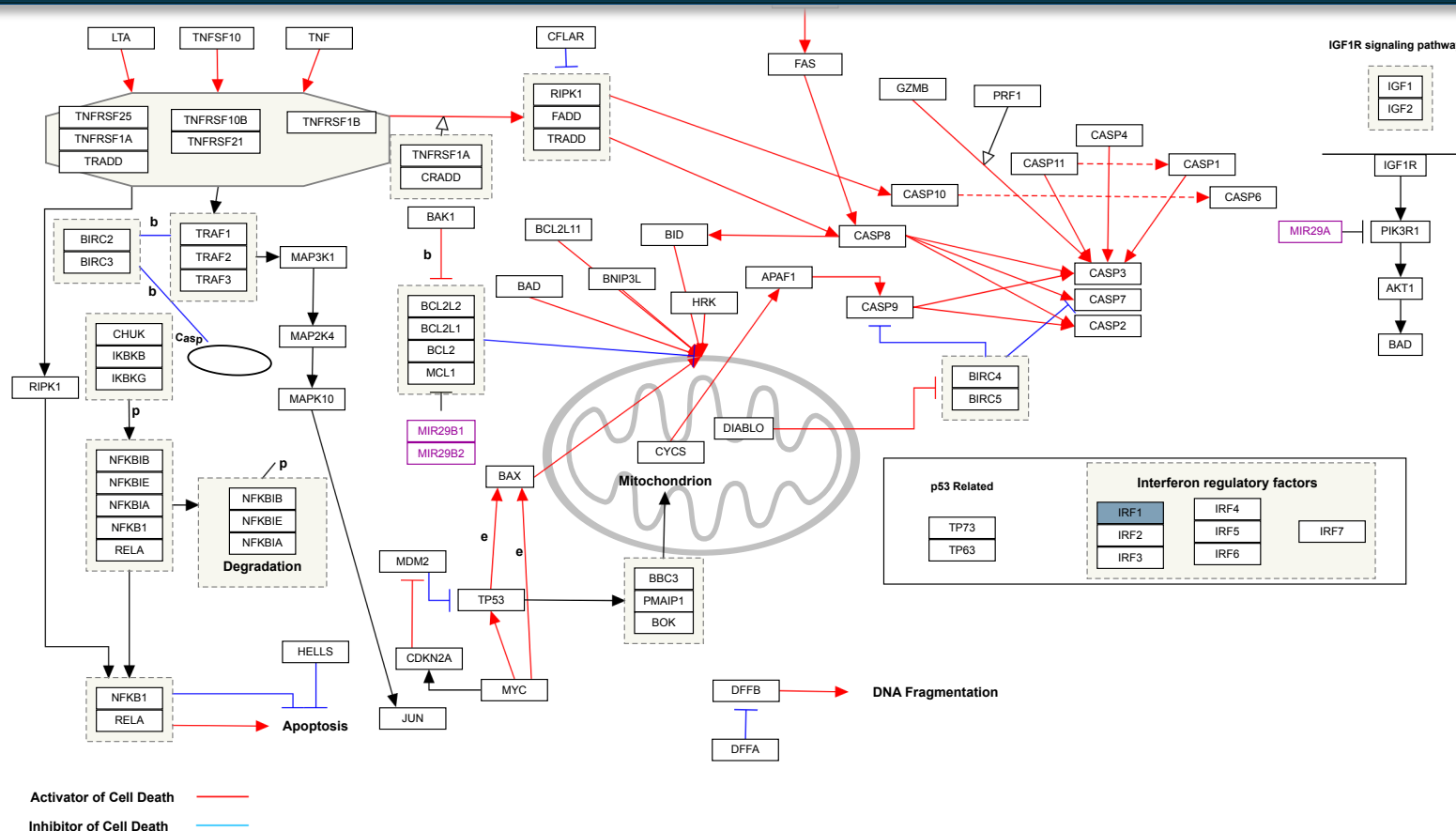
1

2

Next

Last





Protein-protein interactions

- + Proteins bound by IRF1 (37 partners)
- + Protein-protein associations (8 partners)

+ Proteins or complexes that affect IRF1 in other ways (76 partners)

Events triggered by IRF1

+ Proteins or complexes affected by IRF1 in other ways (227 partners)

Genes regulated (directly or indirectly) by IRF1

Show 5 entries	Search:
Gene details	Effect
ANXA2	Downregulated by
BAX	Downregulated by
BIRC5	Downregulated by
BRIP1	Upregulated by
CD38	Upregulated by
Showing 1 to 5 of 20 entries	
First Previous 1 2 3 4 Next Last	

Transcription Factor Activity [what is this?](#)**Regulation of gene expression by IRF1****Transcription factor classification :**

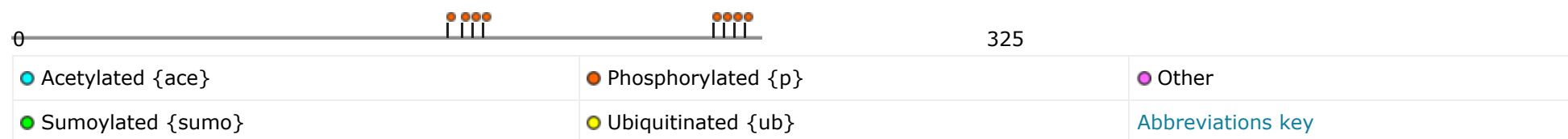
IRF-1; 3.5.3.0.1

Tryptophan cluster factors; 3.5 (The tryptophan clusters comprise several tryptophan residues with a spacing of 12-21 amino acid residues; the subclass of myb-type DNA-binding domains typically exhibit a spacing of 19-21 amino acid residues. All IRF family members, except IRF-1 and IRF-2, contain conserved IAD, IRF association domain that is responsible for protein-protein interactions with other IRF family members or with Ets factor PU.1 and/or bHLH factor E47. IRF-1 and IRF-2 contain IAD2 that is conserved between them and, like IAD, involved in protein-protein interactions.)

Protein Features [what is this?](#)

Isoforms : [IRF-1](#)

+ View associated sequences and their domains

Related proteinsH. sapiens : [IRF2](#) [3e-54;44.1%]; [IRF5](#) [2e-24;43.0%] [details](#)M. musculus : [Irf1](#) [1e-154;79.3%]; [Irf8](#) [2e-25;40.9%]; [Irf5](#) [6e-23;42.7%] [details](#)R. norvegicus : [Irf1](#) [1e-140;73.5%]; [Irf2](#) [2e-53;44.9%] [details](#)**Post-translational modifications of IRF1 protein**

+ Phosphorylated forms (2 entries)

Known types of modification : ubiquitination [details](#)**View complexes containing IRF1 protein**

+ View complexes (44 entry)

Annotations [what is this?](#)

Display all annotations



11278357 ↗ 8438156 ↗ 18216101 ↗

Editor's Notes

- **IFNgamma** induced **IRF-1** protein expression was suppressed in **TGFbeta1** treated HEp-2 cells but not in THP-1 cells 17371985 ↗
- Inducible by alpha and gamma interferons and virus infection, ubiquitously expressed factor.

Function

- Activated by **ISGF3** and thus being a target gene of **STAT1** 7507207 ↗ 8306959 ↗
- Cooperates with STAT-1alpha for IFN-gamma-dependent gene induction in myeloid cells 11781315 ↗
- Deleted in some leukemias and myelodysplasias showing cytogenetic abnormalities of chromosome 5 8438156 ↗
- Inducible by **IFN-gamma** (and weakly by **IFN-alpha**) through an inverted GAAANN repeat, no autoregulation observed 7678055 ↗
- Inducible by **IL-6** 8168491 ↗

more

Disease related

- De novo synthesis and nuclear translocation is induced by infection with respiratory syncytial virus (RSV) and this translocation is inhibited by the antioxidant butylated hydroxyanisole 11259439 ↗
- Decreased mRNA expression correlates with risk of recurrence of breast cancer 19697121 ↗
- Gene deletion is associated with leukemia and myelodysplasia 8438156 ↗
- Increased expression correlates with acute coronary syndrome 20177960 ↗
- Increased mRNA expression correlates with chronic hepatitis C 19858727 ↗

more

Identifiers [what is this?](#)

Accessions mapped to this record

Gene

Affymetrix	11716733_at, 11716734_at, 11754035_a_at, 11761782_at, 16999773, 16999776, 202531_at, 238725_at, 2875331, 2875332, 2875337, 2875338, 2875339, 2875340, 2875342, 2875347, 2875349, 2875350, 2875351, 2875352, 2875353, 2875354, 2875355, 2875356, 2875357, 2875358, 2875359, 2875360, 2875361, 2875362, 2875363, 2875364, 2875365, 2875366, 2875367, 2875368, 2875369, 2875370, 2875371, 2875372, 2875373, 2875374, 2875375, 46648_g_at, 59777_at, 669_s_at, 8114010, g4504720_3p_at, Hs.180559.0.A1_3p_at, L05072_s_at, TC05001767.hg, TC05001768.hg,
Agilent	A_19_P00318006
Ensembl	ENSG00000125347 , ENST00000245414 , ENST00000405885 , ENST00000437654 , ENST00000439555 , ENST00000443093 , ENST00000458069 , ENST00000459982 , ENST00000463784 , ENST00000472045 , ENST00000476613 , ENST00000493208 , ENST00000613424 , ENST00000679440 , ENST00000679499 , ENST00000679500 , ENST00000679522 , ENST00000679620 , ENST00000679633 , ENST00000679700 , ENST00000679743 , ENST00000679762 , ENST00000679786 , ENST00000679820 , ENST00000679860 , ENST00000679921 , ENST00000679945 , ENST00000679964 , ENST00000680139 , ENST00000680237 , ENST00000680352 , ENST00000680380 , ENST00000680562 , ENST00000680594 , ENST00000680796 , ENST00000680848 , ENST00000680903 , ENST00000681049 , ENST00000681197 , ENST00000681240 , ENST00000681336 , ENST00000681458 , ENST00000681462 , ENST00000681573 , ENST00000681584 , ENST00000681595 , ENST00000681603 , ENST00000681634 , ENST00000681694 , ENST00000681715 , ENST00000681749
EntrezGene	3659
Genbank	111117523 , 14550468 , 184648 , 2731598 , 4504720 , 49456386 , 54696375 , 54696377 , 580208 , 58737030 , 62088827 , AB103081 , AB209624 , AC003959 , BC009483 , BT019755 , BT019756 , CR541713 , DQ789232 , L05072 , NM_002198 , X14454
HGMD	IRF1
HumanProteinAtlas	ENSG00000125347
Illumina	0007100435, ILMN_1708375

RefSeq	NR_149068.1 , NR_149069.2 , XM_011543379.2 , XP_011541681.1
UniGene	Hs&436061
WikiPathways	WP2037 , WP254 , WP364 , WP4197 , WP4329 , WP4754 , WP619

mRNA

Pfam	PF09380
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Protein

Genbank	111117524 , 14550469 , 184649 , 2731599 , 4504721 , 49456387 , 54696376 , 54696378 , 580209 , 58737031 , 62088828 , AAA36043.1 , AAB93488.1 , AAH09483.1 , AAV38560.1 , AAV38561.1 , ABH05670.1 , BAD89424.1 , BAD92861.1 , CAA32624.1 , CAG46514.1 , NP_002189.1
PFAM	PF00605
PROSITE	PS00601
Pfam	PF09242
UniProt	P10914

References (324 entries)

Show 5 entries

Search:

Sl.No	PMID	Citation
1	35140242	Human transcription factor protein interaction networks. 13 766 (2022) Show abstract
2	33531712	Flament, H, Rouland, M, Beaudoin, L, Toubal, A, Bertrand, L, Lebourgeois, S, Rousseau, C, Soulard, P, Gouda, Z, Cagninacci, L, Monteiro, AC, Hurtado-Nedelec, M, Luce, S, Bailly, K, Andrieu, M, Saintpierre, B, Letourneur, F, Jouan, Y, Si-Tahar, M, Baranek, T, Paget, C, Boitard, C, Vallet-Pichard, A, Gautier, JF, Ajzenberg, N, Terrier, B, Pene, F, Ghosn, J, Lescure, X, Yazdanpanah, Y,

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3	33278357	Karki, R, Sharma, BR, Tuladhar, S, Williams, EP, Zalduondo, L, Samir, P, Zheng, M, Sundaram, B, Banoth, B, Malleddi, KRS, Schreiner, P, Neale, G, Vogel, P, Webby, R, Jonsson, CB, Kanneganti, TD, Synergism of TNF-? and IFN-? Triggers Inflammatory Cell Death, Tissue Damage, and Mortality in SARS-CoV-2 Infection and Cytokine Shock Syndromes. Cell 184 (1) 149-168 (2021) Show abstract
4	33248817	Vadillo, E, Taniguchi-Ponciano, K, Lopez-Macias, C, Carvente-Garcia, R, Mayani, H, Ferat-Osorio, E, Flores-Padilla, G, Torres, J, Gonzalez-Bonilla, CR, Majluf, A, Albarran-Sanchez, A, Galan, JC, Pe?a-Martinez, E, Silva-Roman, G, Vela-Pati?o, S, Ferreira-Hermosillo, A, Ramirez-Renteria, C, Espinoza-Sanchez, NA, Pelayo-Camacho, R, Bonifaz, L, Arriaga-Pizano, L, Mata-Lozano, C, Andonegui-Elguera, S, Wachter, N, Blanco-Favela, F, De-Lira-Barraza, R, Villanueva-Compean, H, Esquivel-Pineda, A, Ramirez-Montes-de-Oca, R, Anda-Garay, C, Noyola-Garcia, M, Guizar-Garcia, L, Cerbulo-Vazquez, A, Zamudio-Meza, H, Marrero-Rodriguez, D, Mercado, M, A Shift Towards an Immature Myeloid Profile in Peripheral Blood of Critically Ill COVID-19 Patients. Arch Med Res - (2020) Show abstract
5	32911434	A functionally defined high-density NRF2 interactome reveals new conditional regulators of ARE transactivation. 37 101686 (2020) Show abstract

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