

Introduction

Description

GLI family zinc finger 2, a transcription regulator that acts in Shh signaling and embryogenesis, aberrantly expressed in skin cancer; mRNA is upregulated in medulloblastoma, gene polymorphisms correlate with tardive dyskinesia and pituitary abnormalities

Gene symbol

GLI2

Synonyms

CJS; (THP); GLI2; THP2; HPE9; THP1; (PHS2); hGli2; GLI2beta; GLI2alpha; hGli2 beta; hGli2 alpha; hGli2 delta; hGli2 gamma; tax helper protein; Tax-Helping Protein; GLI family zinc finger 2; Zinc finger protein GLI2; GLI-Kruppel family member GLI2

Gene Ontology [what is this?](#)

Molecular function

protein binding [E], transcription coactivator activity [E], transcription corepressor activity [E], zinc ion binding... [details](#)

Biological process

activation of cysteine-type endopeptidase activity involved in apoptotic process [E], embryonic cranial skeleton morphogenesis [E]... [details](#)

Cellular component

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

Orthologs & Molecular Hierarchy [what is this?](#)

Hierarchy of orthologous relationships for this locus

[+](#) View orthologous relationships





Locus Report - Human
GLI2 (GLI2)

logout help ▾

Table of Contents ↓

Show 5 ▾ entries

Search:

Disease details-all	Significance	Type of Association				Indication		
		Causal 18 associations	Correlative 29 associations	Preventative	Negative 2 associations	Disease Mechanism 17 associations	Prognosis 7 associations	Therapeutic Target 4 associations
Carcinoma, Hepatocellular	12 associations		12 associations				3 associations	
Uterine Cervical Neoplasms	9 associations	8 associations	1 associations			7 associations		4 associations
Carcinoma, Basal Cell	6 associations	3 associations	2 associations		1 associations	3 associations		
Skin Neoplasms	4 associations	2 associations	1 associations		1 associations	2 associations		
Breast Neoplasms	3 associations	2 associations	1 associations			2 associations		

Showing 1 to 5 of 13 entries

[First](#) [Previous](#) [1](#) [2](#) [3](#) [Next](#) [Last](#)

GENE

Mutations

Inherited GLI2 mutations

The [Human Gene Mutation Database \(HGMD®\) report](#) provides information on the following inherited GLI2 mutations (subscription required):

Mutation Type	Count	Mutation Type	Count
Missense/nonsense	68	Small indels	1
Splicing	3	Gross deletions	8
Regulatory	0	Gross insertions	1
Small deletions	12	Complex rearrangements	2
Small insertions	7	Repeat variations	0

Mouse **Gli2** (73.4% identity to Human GLI2 [0.0])**Anatomical effects** : central nervous system; esophagus; lung; motor neuron; neurons; spinal cord; trachea; tumor [details](#)**Physiological effects** : cell death/apoptosis; cell migration; regulated expression; signal transduction; transport [details](#)C. elegans **tra-1** (58.9% identity to Human GLI2 [9e-57])

Show 5 entries	Search:
Phenotypic effect details	Mutation type
Abnormal vulva	Recessive
Cellular defect	Reduction of function
Gonad development is defective	Recessive
Gonad development is defective	Null
Morphological defect	RNAi
Showing 1 to 5 of 7 entries	First Previous 1 2 Next Last

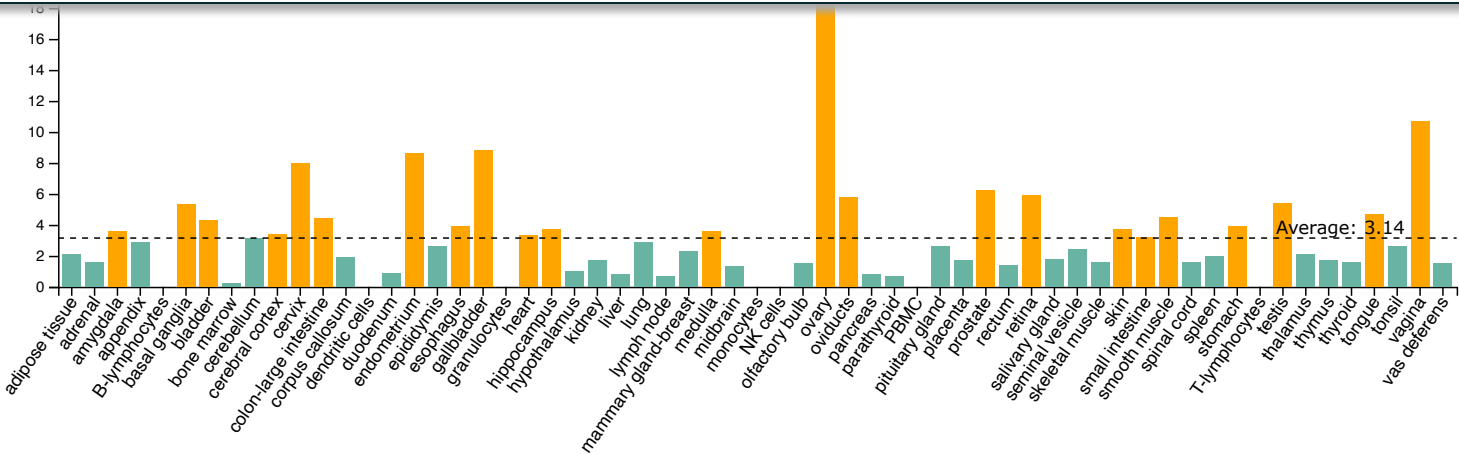
Expression [what is this?](#)**Tissue expression**

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

Relative tissue specificity: 0.11

Sorting: ▾

[Table of Contents](#)



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

Regulation of GLI2 expression

Proteins, complexes, or pathways that influence GLI2 expression (2 entries)

Show 5 entries Search:

Regulator details	Effect
beta-catenin	Upregulated by
SMAD3	Upregulated by

Showing 1 to 2 of 2 entries

First Previous 1 Next Last

Transcriptional Regulation [what is this?](#)

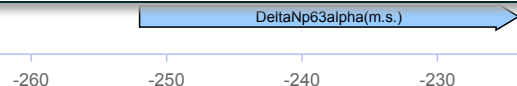
Regulation of GLI2 gene expression



Analyze GLI2 with MATCH Suite

Predicted promoter sequences : Match

Best supported : PM000609702



* Note: Only binding sites whose location is relative to the TSS are graphically displayed. Binding sites with an asterisk (*) are not included in the graphical display.

Transcription factor binding sites within the GLI2 gene (1 entry)

Show entries Search:

Identifier	Relative Location	Genomic Location	Binding Factor(s)	DNA Binding Reaction	Effect
HS\$GLI2_02	-252 to -224		DeltaNp63alpha(m.s.)	DeltaNp63alpha(m.s.) --> GLI2(h)	DNA binding

Showing 1 to 1 of 1 entries First Previous 1 Next Last

In vivo fragments within the promoter(s) of the GLI2 gene that are bound by transcription factors (1000 entries)

Show entries Search:

Promoter	Transcription Factor	Genomic Location	Cell Source	Matrix	Relative Location	CSS	MSS	Sequence	Reference
PM000994151	PRDM14(h)	2:120787024..120787337	NCCIT	V\$PRDM14_02	-10246	0.833	0.789	GAGATAGGAGCCTT	GEO Data 29126285 27281218 23193258
PM000994151	BCL-6-isoform1(h)	2:120787429..120787804	HepG2	V\$BCL6_Q6	-9978	0.857	0.770	CTTCATGGTC	ENCODE Data 22955616
PM000994151	GLIS1(h)	2:120786910..120787365	HEK293	V\$GLIS1_01	-9973	0.198	0.682	CCTTCATGGTCCTTCG	ENCODE Data 22955616
PM000994151	HSF1(h)	2:120787228..120787830	451Lu	V\$HSF1_02	-9942	0.626	0.748	TGCAAGGATTTTC	GEO Data 25720964 29126285 23193258
PM000609702	CTCF(h)	2:120782190..120782373	VCaP + R1881	V\$CTCF_01	-9939	0.825	0.760	AAACCCCTGAGCAGGCCTTC	GEO Data 27641228 29126285 23193258

Showing 1 to 5 of 1,000 entries First Previous 1 2 3 4 5 Next Last

Table of Contents ↓

Accession	Effect	Chromosomal location	(bp)	Identification method	Active in tissue (cell type or line)	Reference
EN000031727	activation	chr2:120541599..120541753	155	chromatin interaction study	eye (retinal pigment epithelial cell), muscle (skeletal muscle), skin (skin fibroblasts)	HACER ↗
EN000031732	activation	chr2:120722633..120723025	393	chromatin interaction study	bone marrow (mesenchymal cell), brain, fat (preadipocyte), muscle (vascular associated smooth muscle cell)	HACER ↗
EN000031734	activation	chr2:120737660..120738060	401	chromatin interaction study		HACER ↗
EN000031735	activation	chr2:120765916..120766325	410	chromatin interaction study, pair-wise expression correlation with RefSeq promoter, pair-wise expression correlation with robust FANTOM5 promoter	bone marrow (mesenchymal cell), fat (preadipocyte), heart (cardiac fibroblasts), muscle (enteric smooth muscle cell), muscle (vascular associated smooth muscle cell)	FANTOM5 ↗ HACER ↗
EN000190049	activation	chr2:120419278..120424766	5489	chromatin interaction study	mammary gland/breast (MCF-7)	HACER ↗

Showing 1 to 5 of 42 entries

[First](#)
[Previous](#)
[1](#)
[2](#)
[3](#)
[4](#)
[5](#)
[Next](#)
[Last](#)

Translational Regulation [what is this?](#)

Regulation of GLI2 mRNA expression

miRNA binding sites within GLI2 mRNA (1entry)

Show entriesSearch:

Identifier	Region	Location	Location Reference Point	Binding Factor(s)
HS\$GLI2_01	3' UTR	521 to 540	stop codon (end of coding sequence (CDS))	hsa-miR-218-5p(h)

Showing 1 to 1 of 1 entries

[First](#)
[Previous](#)
[1](#)
[Next](#)
[Last](#)

RNA Features [what is this?](#)

Overview of RNA sequence

Nucleotide Sequence : GATTGCC...AAAAAAA (1..6780; 6780 nt) [details](#)
Sequence source : REFSEQ#NM_005270

PROTEIN

Drug Interactions [what is this?](#)

Drug(s) targeting GLI2 (3 entries)

Show 5 entries

Search:

Drug(s)	Status	Interaction Data Source	Reference(s)
bms-833923	Small molecule	DrugBank	29328464
Curcumin	small molecule, approved, experimental, investigational	DrugBank	29356693
darinaparsin	small molecule, investigational	DrugBank	25381261

Showing 1 to 3 of 3 entries

FirstPrevious1NextLast

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

Pathways

Pathways from Reactome (12 entries)

Provided by the [Reactome](#) database, release 78 ([ReactomePathways.gmt](#)).

Show 5 entries

Search:

Name	Reactome pathway report link	Reactome pathway browser link
Degradation of GLI2 by the proteasome	R-HSA-5610783	Open in Reactome Browser
Gene expression (Transcription)	R-HSA-74160	Open in Reactome Browser
Generic Transcription Pathway	R-HSA-212436	Open in Reactome Browser
GLI proteins bind promoters of Hh responsive genes to promote transcription	R-HSA-5635851	Open in Reactome Browser
Hedgehog 'off' state	R-HSA-5610787	Open in Reactome Browser

Showing 1 to 5 of 12 entries

FirstPrevious123NextLast

Pathways from WikiPathways (10 entries)

Table of Contents ↓

Ciliopathies

View ↗

WikiPathways ↗

Development of ureteric collection system

View ↗

WikiPathways ↗

Dopaminergic neurogenesis

View ↗

WikiPathways ↗

Endoderm differentiation

View ↗

WikiPathways ↗

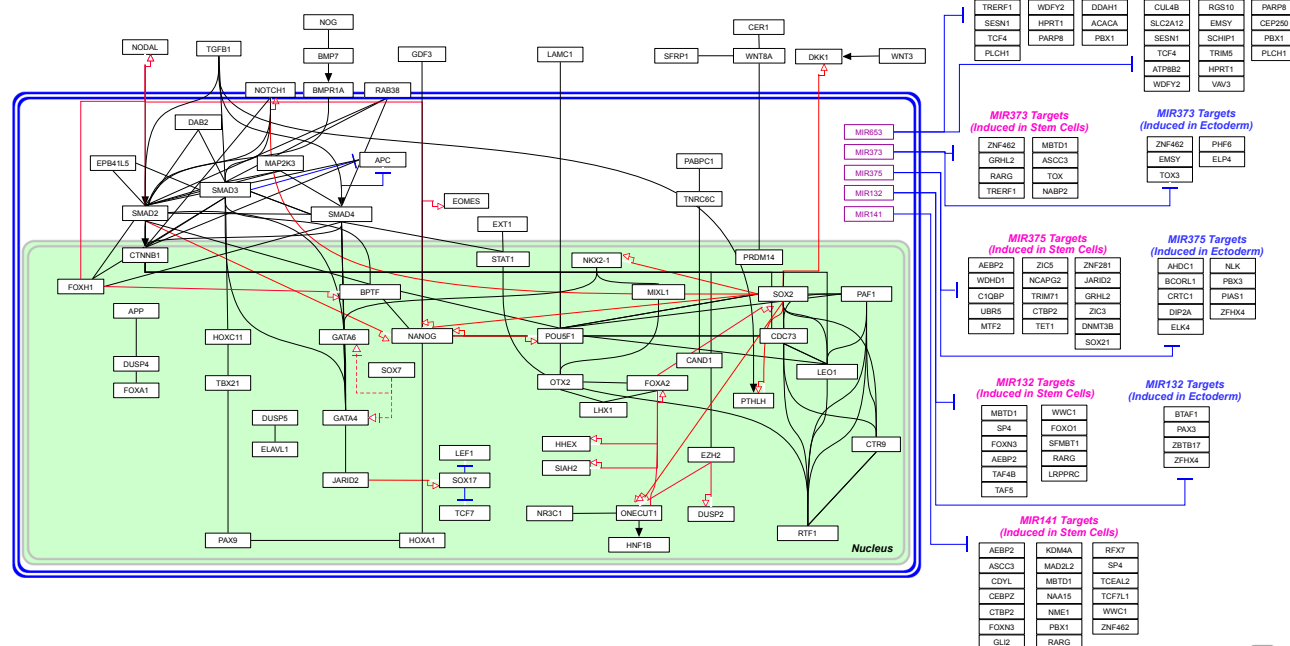
Hair follicle development: cytodifferentiation - part 3 of 3

View ↗

WikiPathways ↗

Showing 1 to 5 of 10 entries

First Previous 1 2 Next Last

+
RESET
-

Protein-protein interactions

+ Proteins or complexes that affect GLI2 in other ways (6 partners)

Events triggered by GLI2

+ Proteins or complexes affected by GLI2 in other ways (48 partners)

Genes regulated (directly or indirectly) by GLI2

Show 5 ▾ entries

Search:

Gene details	Effect
BCL2	Upregulated by
CCND1	Upregulated by
CCNE2	Upregulated by
CDKN1A	Downregulated by
CFLAR	Upregulated by

Showing 1 to 5 of 8 entries

[First](#) [Previous](#) [1](#) [2](#) [Next](#) [Last](#)

Transcription Factor Activity [what is this?](#)

Regulation of gene expression by GLI2

Transcription factor classification :

GLI2; [2.3.3.1.2](#)
C2H2 zinc finger factors; [2.3](#) (Zinc finger motif of TFIIIA/Krueppel type. Each finger comprises 2 cysteine and 2 histidine residues coordinating one zinc ion, in some cases one histidine is replaced by another cysteine. The zinc ion is essential for DNA-binding. The first half of the finger sequence is generally organized in two antiparallel beta-strands, the second half as an alpha-helix and partly as an 310-helix. Hydrophobic contacts between the beta-strands and the alpha-helix are formed by the conserved phenylalanine and leucine residues. The alpha-helix binds to DNA through the major groove. The finger link frequently is TGEKPY.)

Genes bound by GLI2 (19 entries)

Show 5 ▾ entries

Search:

Gene	Location within Gene	Binding Site Identifier	DNA Binding Reaction	Effect	Quality Score
BMI1(h)	-234 to -92	HS\$BMI1_19	GLI2(h) --> BMI1(h)	DNA binding	3
FOXL1(h)		HS\$FOXL1_01	GLI2(h) --> FOXL1(h)	DNA binding	6
FOXL1(h)		HS\$FOXL1_02	GLI2(h) --> FOXL1(h)	DNA binding	6
FOXL1(h)		HS\$FOXL1_03	GLI2(h) --> FOXL1(h)	DNA binding	6

ChIP-seq or similar experiments for GLI2(1 entry)

Show entries Search:

ChIP Experiment Report	Chromosome	Binding Fragments	Cell	Reference
View Report	Human: 1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22	5498	HEK293	ENCODE Data ↗ 22955616 ↗

Showing 1 to 1 of 1 entries [First](#) [Previous](#) [1](#) [Next](#) [Last](#)

Positional weight matrices for GLI2 (10 entries)

Show entries Search:

Sequence logo	PWM ID	Matrix type	Matrix category
	V\$GLI_Q2	family	matrix compiled from individual genomic sites
	V\$GLI2_01	factor-specific	DNA-binding affinity assay
	V\$GLI2_03	factor-specific	HT-SELEX
	V\$GLI2_04	factor-specific	HT-SELEX
	V\$GLI2_05	factor-specific	3D structure-based energy calculations

Showing 1 to 5 of 10 entries [First](#) [Previous](#) [1](#) [2](#) [Next](#) [Last](#)

Protein Features [what is this?](#)

Overview of protein sequence and structure

Chromosome : 2q14**Isoforms** : [GLI2-alpha](#) , [GLI2-beta](#) , [GLI2-delta](#) , [GLI2-gamma](#) , [GLI2-isoform5](#)[+](#) View associated sequences and their domains[+](#) View related proteins

View complexes containing GLI2 protein

Annotations [what is this?](#)

[Display all annotations](#)

Description

- GLI family zinc finger 2, a transcription regulator that acts in Shh signaling and embryogenesis, aberrantly expressed in skin cancer; mRNA is upregulated in medulloblastoma, gene polymorphisms correlate with tardive dyskinesia and pituitary abnormalities [12165851 ↗](#) [15175043 ↗](#) [21695716 ↗](#) [9452474 ↗](#) [15520185 ↗](#) [14581620 ↗](#) [9557682 ↗](#)

Disease related

- Gene polymorphisms correlate with tardive dyskinesia [20939080 ↗](#)
- Increased mRNA correlates with medulloblastoma [15520185 ↗](#)
- May regulate skin tumorigenesis [15175043 ↗](#)
- Mutations of the corresponding gene are associated with pituitary abnormalities and holoprosencephaly [14581620 ↗](#)
- Upregulated in basal cell carcinoma [12165851 ↗](#)

Identifiers [what is this?](#)

Accessions mapped to this record

BIOBASE gene accession : GN000005099, G006129**BIOBASE protein accession** : PR000273439, MO000117573, MO000572588, T11124

Gene

Affymetrix	11743688_at, 11748709_a_at, 11750395_a_at, 11751794_a_at, 11762325_at, 11763578_a_at, 11763579_x_at, 11763611_a_at, 11763612_x_at, 1200_at, 16885153, 207034_s_at, 208057_s_at, 228537_at, 2503375, 2503376, 2503379, 2503380, 2503381, 2503399, 2503405, 2503406, 2503411, 2503412, 2503413, 2503414, 2503416, 2503417, 2503418, 2503421, 2503422, 2503423, 2503424, 2503425, 2503426, 2503427, 2503428, 2503429, 2503430, 2503431, 2503432, 2503433, 2503434, 2503435, 2503436, 2503437, 2503438, 2503439, 2503440, 2503441, 2503469, 34456_s_at, 50974_at, 8044933, D14827_at, g13518230_3p_a_at, g439899_3p_a_at, Hs.293790.0.A1_3p_at, TC02000764.hg, TC02003538.hg,
Agilent	A_14_P107717
Ensembl	ENSG00000074047 ↗ , ENST00000341310 ↗ , ENST00000360874 ↗ , ENST00000361492 ↗ , ENST00000418323 ↗ , ENST00000433812 ↗ , ENST00000437950 ↗ , ENST00000438299 ↗ , ENST00000445186 ↗ , ENST00000452319 ↗ , ENST00000452692 ↗ , ENST00000472722 ↗ , ENST00000482119 ↗
EntrezGene	2736 ↗

	DQ004398 , DQ086814 , M20673 , NM_005270 , NM_030379 , NM_030380 , NM_030381
HGMD	GLI2
HumanProteinAtlas	ENSG00000074047
Illumina	0006620619, 0106350435, ILMN_1727577
OMIM	165230
RefSeq	NM_001371271.1 , NM_001374353.1 , NM_001374354.1 , NM_005270.5 , NP_001358200.1 , NP_001361282.1 , NP_001361283.1 , NP_005261.2 , XM_011510969.2 , XM_011510970.2 , XM_011510971.2 , XM_011510972.2 , XM_011510973.2 , XM_017003818.1 , XP_011509271.2 , XP_011509272.1 , XP_011509273.1 , XP_011509274.2 , XP_011509275.1 , XP_016859307.1
UniGene	Hs&111867
WikiPathways	WP2839 , WP2840 , WP2853 , WP2855 , WP4204 , WP4249 , WP4304 , WP47 , WP4787 , WP4803 , WP5053

Protein

	111494028 , 13518231 , 13518233 , 13518235 , 183245 , 2160414 , 3061314 , 3061316 , 3061318 , 3061320 , 45643627 , 45643629 , 45643631 , 488506 , 4885277 , 62088288 , 66933084 , 66933086 , 66933088 , 68164337 , 86991432 , AAA35898.1 , AAI11411.1 , AAS72889.1 , AAS72890.1 , AAS72891.1 , AAY58315.1 , AAY58316.1 , AAY58317.1 , AAY87165.1 , BAA03568.1 , BAA03569.1 , BAA25665.1 , BAA25666.1 , BAA25667.1 , BAA25668.1 , BAD92591.1 , NP_005261.1 , NP_005261.2 , NP_084655.1 , NP_084656.1 , NP_084657.1
Genbank	
UniProt	P10070

References (66 entries)

Show	5	entries	Search:
Sl.No	PMID	Citation	
1	33961781	Dual Proteome-scale Networks Reveal Cell-specific Remodeling of the Human Interactome Cell 184 3022-3040 (2021)	Show abstract
2	29967343	Zhu, H, Xia, L, Shen, Q, Zhao, M, Gu, X, Bouamar, H, Wang, B, Sun, LZ, Zhu, X, Differential effects of GLI2 and GLI3 in regulating cervical cancer malignancy in vitro and in vivo. Lab Invest 98 (11) 1384-1396 (2018)	Show abstract
3	28818916	A pathology atlas of the human cancer transcriptome. Science 357 (2017)	Show abstract
4	26923702	Holm, K., Staaf, J., Lauss, M., Aine, M., Lindgren, D., Bendahl, P. O., Vallon-Christersson, J., Barkardottir, R. B., Hoglund, M., Borg, A., Jonsson, G., Ringner, M., An integrated genomics analysis of epigenetic subtypes in human breast tumors links DNA methylation patterns to chromatin states in normal mammary cells. Breast Cancer Res 18 (1) 27 (2016)	Show abstract

[Table of Contents](#) ↓treatment-naïve patient melanomas. Clin Epigenetics 7 (1) 59 (2015) [Show abstract](#)

Showing 1 to 5 of 66 entries

[First](#) [Previous](#) [1](#) [2](#) [3](#) [4](#) [5](#) [Next](#) [Last](#)

Copyright QIAGEN
All rights reserved. Not for distribution.