

TAL2 (T-cell acute lymphoblastic leukemia 2)

Identity

Hugo [TAL2](#)

Location 9q31

from centromere to telomere: CSDUFD1, MGC45564, FCMD, TAL2, C9orf87, ZNF462

DNA/RNA

Description exons 1a, 2, 3, and 1b located 5-8 kb upstream of exon 4; coding region in exon 4 (326 bp)

Transcription various mRNA isoforms were found in SUP-T3 and in the mouse, which also encompass upstream exons; gene products, however, always corresponded to the TAL2 protein encoded by exon 4

Protein

Description 108 amino acids; basic Helix Loop Helix motif for protein dimerization and DNA-binding

Expression in adult testes; in developing midbrain, dorsal diencephalon, rostroventral diencaphalic/telencephalic boundary, and anterior pons; pivotal role in the development of the mature central nervous system; not expressed during normal hematopoietic development

Function transcription factor; TAL2 dimerizes with members of the class A subgroup of bHLH proteins (ie E47, E12, E2-2, HEB), as well as LIM-only proteins LMO1 and [LMO2](#); heterodimers are formed intracellularly through stable interaction between bHLH domains of TAL2 and E47; TAL2/E47 heterodimers bind DNA in a sequence-specific manner that is dependent on the E-box element; TAL2/E12 heterodimers also have DNA-binding activity; TAL2 does not bind DNA in absence of [E2A](#) proteins; a significant fraction (60%) of TAL2 polypeptides from SUP-T3 exist in phosphorylated form, the rest is unphosphorylated; serine residue 100 of TAL2 is the potential site of phosphorylation by MAP kinases.

Homology [TAL1](#) at 1p31, LYL1 at 19p13; TAL2, TAL1, and LYL1 share more than 85% amino acid identity in the bHLH domain and are thus more related to one other than to other bHLH proteins, for instance c-myc

Implicated in

Entity [t\(7;9\)\(q34;q32\)](#) -->TAL2-[TCRB](#)

Disease T cell acute lymphoblastic leukemia found in < 1% of ALL, in 1-2% of T-ALL, rare but recurrent

Hybrid/Mutated Gene	Translocation of part of TCRB locus to a breakpoint 33 kb downstream of TAL2 mediated by the V(D)J recombinase via a fortuitous recombination signal sequence (YRSS) on chromosome 9; the translocation results in a signal joint fusion of TAL2 YRSS with the Db1 23-RSS; this gene product was detected in 6 of 10 thymus samples of healthy children with an estimated frequency of 1 in 10 million thymic cells; only upon secondary rearrangement of the TAL2/Db signal joint to the Jb2.6 segment, and deletion of the intervening sequence, the typical TAL2/Jb2.6 T-ALL junctions could be observed which presumably lead to overexpression of TAL2 and development of leukemia.
Abnormal Protein	TAL2 placed under control of TCRB enhancer leading to overexpression of TAL2 in T-cells and development of leukemia

External links

Nomenclature

Hugo	TAL2
GDB	TAL2
Entrez Gene	TAL2 6887 T-cell acute lymphocytic leukemia 2

Cards

GeneCards	TAL2
Ensembl	TAL2
CancerGene	TAL2
Genatlas	TAL2
GeneLynx	TAL2
eGenome	TAL2
euGene	6887

Genomic and cartography

GoldenPath	TAL2 - 9q31 chr9:105504333-105504659 + 9q31.2 (hg17-May_2004)
Ensembl	TAL2 - 9q31.2 [CytoView]
NCBI	Genes Cyto Gene Seq [Map View - NCBI]
OMIM	Disease map [OMIM]
HomoloGene	TAL2

Gene and transcription

Genbank	M81078 [SRS] M81078 [ENTREZ]
Genbank	S69377 [SRS] S69377 [ENTREZ]
Genbank	BC069422 [SRS] BC069422 [ENTREZ]
RefSeq	NM_005421 [SRS] NM_005421 [ENTREZ]
RefSeq	NT_086754 [SRS] NT_086754 [ENTREZ]

[AceView](#) [TAL2](#) AceView - NCBI
[TRASER](#) [TAL2](#) Traser - Stanford
[Unigene](#) [Hs.247978](#) [SRS] [Hs.247978](#) [NCBI] [HS247978](#) [spliceNest]

Protein : pattern, domain, 3D structure

[SwissProt](#) [Q16559](#) [SRS] [Q16559](#) [EXPASY] [Q16559](#) [INTERPRO]
[Prosite](#) [PS50888 HLH](#) [SRS] [PS50888 HLH](#) [Expasy]
[Interpro](#) [IPR001092 HLH_basic](#) [SRS] [IPR001092 HLH_basic](#) [EBI]
[CluSTr](#) [Q16559](#)
[Pfam](#) [PF00010 HLH](#) [SRS] [PF00010 HLH](#) [Sanger] [pfam00010](#) [NCBI-CDD]
[Blocks](#) [Q16559](#)

Polymorphism : SNP, mutations, diseases

[OMIM](#) [186855](#) [map]
[GENECLINICS](#) [186855](#)
[SNP](#) [TAL2](#) [dbSNP-NCBI]
[SNP](#) [NM_005421](#) [SNP-NCI]
[SNP](#) [TAL2](#) [GeneSNPs - Utah] [TAL2](#) [SNP - CSHL] [TAL2](#) [HGBASE - SRS]

General knowledge

[Family Browser](#) [TAL2](#) [UCSC Family Browser]
[SOURCE](#) [NM_005421](#)
[SMD](#) [Hs.247978](#)
[SAGE](#) [Hs.247978](#)
[Amigo](#) [function|DNA binding](#)
[Amigo](#) [function|protein binding](#)
[Amigo](#) [process|regulation of transcription, DNA-dependent](#)
[PubGene](#) [TAL2](#)

Other databases

Probes

[Probe](#) [TAL2 Related clones \(RZPD - Berlin\)](#)

PubMed

[PubMed](#) [4 Pubmed reference\(s\) in LocusLink](#)

Bibliography

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 Medline [2536065](#)

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Xia Y, Brown L, Yang CYC, Tsan JT, Siciliano MJ, Espinosa R, Le Beau MM, Baer RJ.

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Medline [8142619](#)

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Medline [9931488](#)

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Marculescu R, Le T, Simon P, Jaeger U, Nadel B.

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Medline [11781368](#)

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Marculescu R, Vanura K, Le T, Simon P, Jaeger U, Nadel B.

Nat Gen 2003; 33: 342-344.

Medline [12567187](#)

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Contributor(s)

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