Gene Section
Mini Review

MLLT7 (myeloid/lymphoid or mixed-lineage leukemia (trithorax homolog, Drosophila); translocated to, 7)

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Identity

Other names: AFX1 (ALL1 fused gene from chromosome X, 1); MLLT7 (myeloid/lymphoid leukemia translocated to, 7); AFX; FOXO4
HGNC (Hugo): FOXO4
Location: Xq13

DNA/RNA

Transcription

7,5kb consisting of 3 exons. RNA App. 3.5 kb mRNA; coding sequence. Placental secondary transcript: App. 2.8kb Expression pattern: Heavily expressed in skeletal muscle, placenta and ovary.

Protein

Description

504 amino acids; NH2 -- similarity region with AF6q21 and FHKR -- forkhead motif – COOH.

Expression

Wide.

Localisation

Nuclear.

Function

Transcription factor binding to the motive TTGTTTAC. Target genes: Akt, AFX is able to induce Rb-independent, p27kip1-mediated G1-arrest. Phosphorylation of AFX by protein kinase B inhibits its transcriptional activity.

Homology

daf-16 (C.elegans) and other forkhead-transcription factors (i.e. FKHR, FKHR1, FKHRP1, FKHR1P1) and AF6q21, involved in the t(6;11)(q21;q23). In the fusion protein AFX/MLL, AFX fuses to MLL in the same aminoacid as FHKR fuses to PAX3 in the PAX3/FKHR-fusion protein of alveolar rhabdomyosarcoma.

Implicated in

t(X;11)(q13q23)/acute leukaemias --> MLL - AFX

Disease

ANLL, T-ALL.

Prognosis

Very poor.
Hybrid/Mutated gene
5' MLL-3' AFX as well as the reciprocal 5' AFX-3' MLL on DNA and mRNA level.

Abnormal protein
Comprises about 1400 amino acids from N-term MLL and 354 amino acids from AFX C-term; the reciprocal may be expressed.

References
Parry P, Wei Y, Evans G. Cloning and characterization of the t(X;11) breakpoint from a leukemic cell line identify a new member of the forkhead gene family. Genes Chromosomes Cancer. 1994 Oct;11(2):79-84


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