t(4;11)(p12;q23)

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Disease
Treatment related diseases.

Clinics
Four cases to date:
A 67 year old female patient with acute lymphoblastic leukemia (ALL) following breast adenocarcinoma treatment; latency was 5 years.
A 49 year old female patient with acute myeloid leukemia. The patient have had a non Hogkin lymphoma and a breast adenocarcinoma, 5 years and more before onset of the leukemia.
The third case was that of a 3 year old boy with juvenile myelomonocytic leukemia 17 months after treatment of a pre-B ALL with the typical t(12;21)(p13;q22) (ETV6/RUNX1).
The fourth case was a 4 year old boy; the t(4;11) was found from bone marrow surveillance, 18 months after diagnosis of a metastatic neuroblastoma; there was no other evidence of leukemia and the patient carried the t(4;11) and remained healthy for 37 months, before progression to myelodysplasia.

Prognosis
One patient died at 1 month, the 3 others reached complete remission and were alive at 13 months+, 19 months+, and 51 months+.

Genes involved and proteins

FRYL
Location 4p12
Protein FRYL, also called AF4p12, is the homolog of the Drosophila melanogaster furry (Fry). Fry maintains the integrity of polarized cell extensions during morphogenesis (Cong et al., 2001; He and Adler, 2001). The morphogenesis of these cell extensions involves the activation of the actin and microtubule cytoskeletons (Tilney et al., 2000). Fry controls various aspects of dendritic outgrowth and branching via the Tricornered (Trc) kinase and Furry (Fry) Trc/Fry signaling pathway; in particular, it may regulate dendritic tiling (non-redundant coverage via dendritic repulsion) and dendritic self-avoidance (Emoto et al., 2004; Gao, 2007).

MLL
Location 11q23
Protein Transcription regulator (yin/yang?), regulates, among others, HOX genes expression. --> hematopoiesis and embryogenesis regulation.

Result of the chromosomal anomaly

Hybrid gene
Description In frame fusion between MLL exon 6 and FRYL exon 49 in one case, between MLL exon 8 and FRYL exon 51 in another case.
**Fusion protein**

**Description**
The 2074 or 2156 predicted amino acids of the fusion protein comprise the N-term AT hooks, speckled nuclear localisation signals and repression domains (methyl transferase domain) of MLL, and the leucine zipper domain from FRYL C-term.

**References**


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