Atlas of Genetics and Cytogenetics in Oncology and Haematology

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Leukaemia Section

Mini Review

t(11;17)(q23;q12-21) MLL/LASP1

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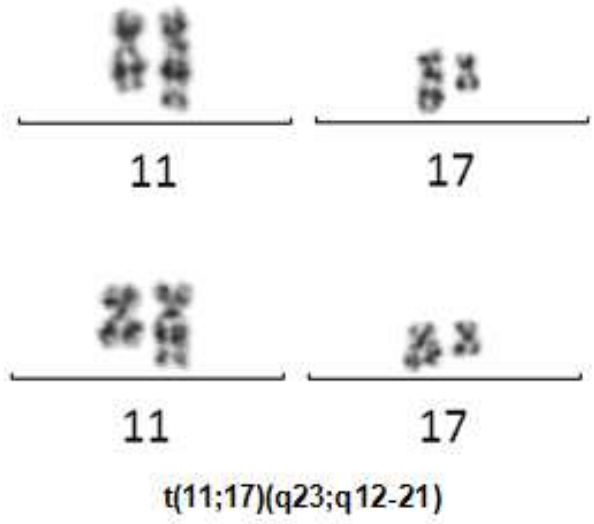
Identity



t(11;17)(q23;q12-21) G- banding - Courtesy Melanie Zenger and Claudia Haferlach.

Clinics and pathology

Disease

Infant acute myeloid leukemia AML-M4

Epidemiology

Only one case described so far.

Prognosis

Insufficient data; of note: the only patient described, remains in complete remission >8 years.

Cytogenetics

Note: so far three MLL fusion partners, namely LASP1 (in the t(11;17) herein described), MLLT6 (alias AF17) (in another t(11;17)(q23;q12-21), and ACACA (also in another t(11;17)(q23;q12-21) have been identified in 17q12-21; these translocations cannot be distinguished cytogenetically and the accurate detection of the specific fusion gene requires RT-PCR or refined FISH analysis.

Cytogenetics morphological

Sole abnormality.

Genes involved and Proteins

MLL

Location: 11q23

DNA / RNA

37 exons, spanning over 100 kb; transcription in a centromeric to telomeric direction; 13 and 15 kb mRNA; coding sequence: 11.9 kb.

Protein

431 kDa; contains two DNA binding motifs (an AT hook, and Zinc fingers), a DNA methyl transferase motif, and a bromodomain; transcriptional regulatory factor; nuclear localization.

LASP1

Location: 17q12

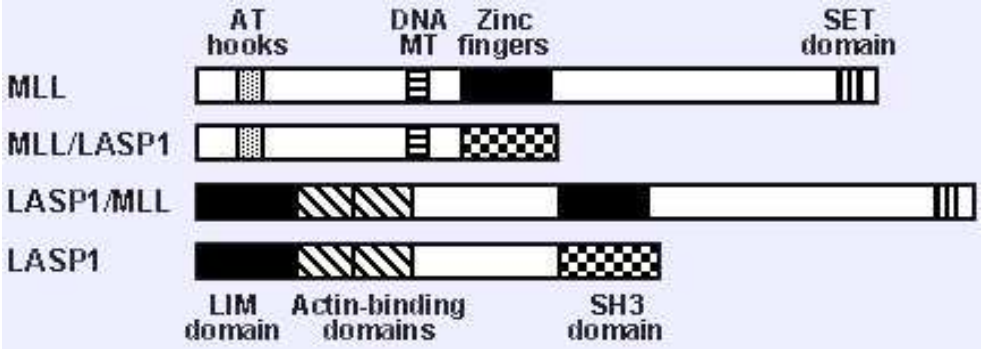
Note: previously LASP1 and MLLT6 (alias AF17) were mapped to 17q21, but according to the most recent genome assembly built and recent FISH data both genes are localized in 17q12 and proximal to RARA.

DNA / RNA

7 exons spanning about 50 kb of genomic DNA; 3845 bp mRNA, 783 bp coding sequence; ubiquitous expression.

Protein

LASP1 encodes a member of a LIM protein subfamily; contains a LIM motif, two actin-binding domains, and an SH3 domain; cytoplasmic localization.



Schematic representation of MLL, LASP1, and the putative MLL-LASP1 and LASP1-MLL fusion proteins.

Results of the chromosomal anomaly

Hybrid gene

Transcript

5' MLL - 3' LASP1; also the reciprocal 5' LASP1 - 3' MLL is present.

Fusion protein

Description

The C-terminal SH3 domain of LASP1 is fused to the N-terminal portion of MLL retaining the AT-hook DNA-binding domain and the DNA methyltransferase motif (MT).

References

Strehl S, Borkhardt A, Slany R, Fuchs UE, König M, Haas OA. The human LASP1 gene is fused to MLL in an acute myeloid leukemia with t(11;17)(q23;q21). Oncogene 2003;22:157-160.

Moore SD, Strehl S, Dal Cin P. Acute myelocytic leukemia with t(11;17)(q23;q12-q21) involves a fusion of MLL and AF17. Cancer Genet Cytogenet 2005;157:87-89.

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