Leukaemia Section
Mini Review

t(11;17)(q13;q21)
Franck Viguié
Laboratoire de Cytogénétique - Service d'Hématologie Biologique, Hôpital Hôtel-Dieu, 75181 Paris Cedex 04, France

Published in Atlas Database: May 1998
Online updated version: http://AtlasGeneticsOncology.org/Anomalies/t1117ID1126.html
DOI: 10.4267/2042/37458
This work is licensed under a Creative Commons Attribution-Non-commercial-No Derivative Works 2.0 France Licence.
© 1998 Atlas of Genetics and Cytogenetics in Oncology and Haematology

Clinics and pathology

Disease
Atypical M3 ANLL (in most cases, M3 ANLL is characterized by a t(15;17)(q25;q21)).

Epidemiology
Exceptional (only 1 case fully described), a 6 mth old male patient.

Clinics
Multiple cutaneous localizations; blue-green macules on the scalp and the trunk; coagulation parameters and platelets count were normal.

Prognosis
Complet remission obtained with ATRA treatment and autologous bone marrow transplantation (38 mths disease-free follow up after BMT).

Cytogenetics

Additional anomalies
No.

Variants
3 related translocations observed in M3 ANLL; the first is the common translocation (15;17) and the two others are extremely rare; all these translocations involve a breakpoint at 17q21, in RARα, which fuses with different partners: 1- t(15;17)(q22;q21), fusion with PML in 15q22; 2- t(5;17)(q32;q12), fusion with NPM1 in 5q32, encoding for a RNA processing protein; 3- t(11;17)(q23;q21), fusion with PLZF in 11q23, a transcription factor.

Genes involved and Proteins

NuMA
Location: 11q13
Protein
NuMA protein is an essential component for the formation and maintenance of mitotic spindle poles during mitosis; dimerization domain and nuclear localisation signal.

RARα
Location: 17q12-21
Protein
Wide expression; nuclear receptor; binds specific DNA sequences: HRE (hormone response elements); ligand and dimerization domain; role in growth and differentiation.

Results of the chromosomal anomaly

Hybrid gene
Description
Fusion gene on der(11) encompassed by a lambda phage clone B350g; breakpoint in RARα gene in the usual breakpoint cluster region within intron 2.

Transcript
5’ NuMA - 3’ RARα transcript; no reciprocal 5’ RARα - 3’ NuMA transcript can be detected.

Fusion protein
Description
2284 amino acids, 260 kDa; includes the NH2-terminal
globular domain and the alpha helical dimerization domain of NuMA (amino acids 1 to 1883) linked to the ligand-binding, dimerization and DNA-binding domains of RARa (amino acids 61 to 462).

Expression localisation
Nuclear localisation, under the form of sheet-like nuclear aggregates which partially co-localizes with normal NuMA protein.

Oncogenesis
As for the three other translocations associated with APL, the main consequence of NuMA-RARa fusion seems to be an alteration in the retinoid signalling pathway; as for PML, PLZF or NPM, NuMA, the forth fusion partner of RARa would “share the capacity to participate in protein-protein interactions, which may result in the formation of abnormal heterodimers or aggregates in which co-activators of retinoid signalling are sequestered”.

References


This article should be referenced as such: