Atlas of Genetics and Cytogenetics in Oncology and Haematology

OPEN ACCESS JOURNAL AT INIST-CNRS

Leukaemia Section

Short Communication

t(10;14)(q24;q32) NFKB2/IGH

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Published in Atlas Database: September 2017

Online updated version : http://AtlasGeneticsOncology.org/Anomalies/t1014q24q32NFKB2IGHID2019.html

Printable original version : http://documents.irevues.inist.fr/bitstream/handle/2042/68969/09-2017-t1014q24q32NFKB2IGHID2019.pdf

DOI: 10.4267/2042/68969

Abstract

Review on t(10;14)(q24;q32) NFKB2/IGH, with data on clinics, and the genes involved.

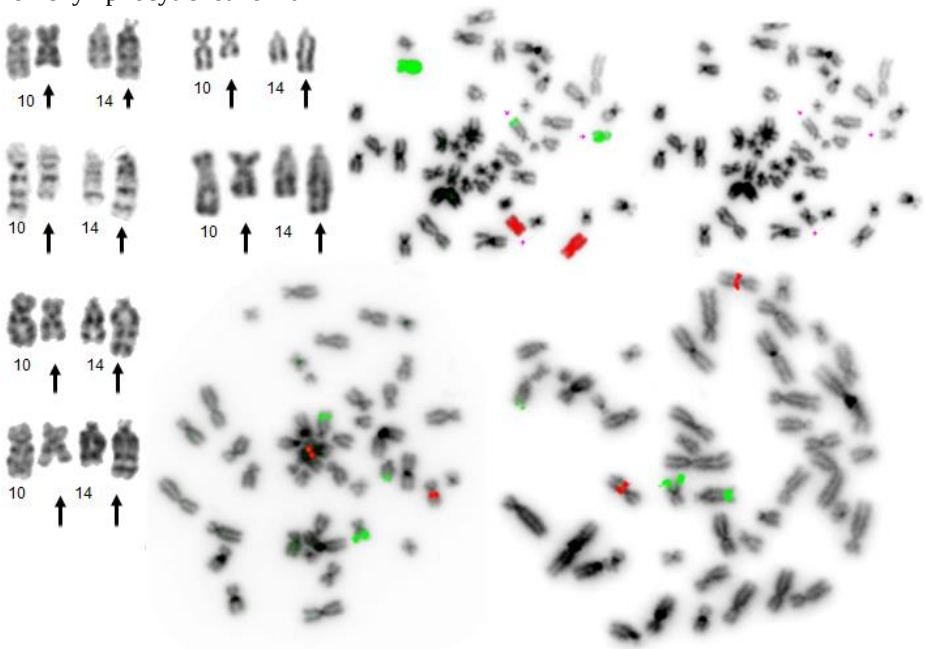
KEYWORDS

Chromosome 10; chromosome 14; NFKB2; IGH; Splenic marginal zone B-cell lymphoma; Multiple myeloma; Chronic lymphocytic leukemia

Identity

Note

The t(10;14)(q24.31;q11) in T-ALL involves the gene TLX1 at the band 10q24.31 and not NFKB2 at band 10q24.32 (Neri et al., 1991).



Conventional karyotype: Partial G and R banded karyotype. The derivative chromosomes are denoted with arrows. G-Banding, Courtesy Nathalie Nadal. R-banding, Courtesy Christine Lefebvre (upper row), N Nadal (lower row); FISH: top: WCP7R/WCP10G (aquarius); XL t(11;14)(IGH/CCND1) (metasystems) 11q13R/14q32G - Courtesy Christine Lefebvre

Clinics and pathology

Disease

B-cell lymphomas: The band 10q24 is involved in 7% of low-grade B-cell lymphomas, splenic marginal zone B-cell lymphomas in particular (Solé et al., 2001; Lefebvre et al., 2007, Nadal, unpublished observation) and also, but less frequently, in intermediate and high risk lymphomas (Neri et al., 1991).

Other chronic lympho proliferative diseases: Multiple myeloma (Migliazza et al., 1994; Mohamed et al.), chronic lymphocytic leukemia (CLL) (Migliazza, 1994)

Prognosis

Unknown.

Cytogenetics

Cytogenetics morphological

The t(10;14)(q24;q32) is a rare but recurrent abnormality in lymphoid malignancies.

Additional anomalies

The following known recurrent abnormalities were found in one case each: +3, +7, and +12.

Genes involved and proteins

NFKB2 (nuclear factor of kappa light polypeptide gene enhancer in B-cells 2 (p49/p100))

Location

10q24.32

Note

Alias: LYT-10, NF-kB2, p105, p49/p100, p52

DNA/RNA

NFKB2 gene is a member of NFKB gene family. NFKB2 gene encodes for the precursor p100/p52 from which the active p52 subunit is formed.

Protein

P52 is a member of the NFKB family transcription factors that are formed by the homo/dimerization of the subunits of the NFKB family. After dimerization with the subunit RELB, P52 migrates to the nucleus where they activate the transcription of target genes.

Localization: cytosol for p100 product and nucleus for the final product p52 after activation

P52 is a component of the non-canonical NF-KB pathway which plays a role in the control of the last stages of B-Cells development (maintenance of the Germinal Center (GC) reaction and Plasma cell development) (Shaffer et al., 2012; De Silva et al., 2017).

IGH (Immunoglobulin Heavy chain)

Location

14q32

Result of the chromosomal anomaly

Hybrid gene

Description

t(10;14)(q24;q32) translocation juxtaposes IGH constant region gene with NFKB2 gene (Neri et al., 1991). The fusion gene NFKB2/IGH results in the constitutional activation of the non-canonical NFKB pathway. The reciprocal fusion gene IGH/NFKB2 is not transcribed.

Fusion protein

Note

NFKB2 gene encodes for the protein P52 which contains a DNA binding domain and an Ankyrin domain. The Ankyrin domain is thought to retain p100/P52 in the cytoplasm and thus prevent the DNA binding.

The band in 10q24 can be involved in different types of rearrangement such as cryptic deletion or translocation t(10;14). The common consequence is a truncated protein which retains the DNA binding domain but lack the Ankyrin domain (Migliazza et al., 1994). These rearrangements result in a constitutive activation of P52 which lead to the activation of the non-canonical NFKB pathway and thus promote B-cell malignancies (de silva, 2017; Guo, 2017).

Expression / Localisation

Nucleus.

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This article should be referenced as such:

Nadal N. t(10;14)(q24;q32) NFKB2/IGH. Atlas Genet Cytogenet Oncol Haematol. 2018; 22(11) :448-450.