t(14;19)(q32;q13)

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Cytogenetics

Identity

Note
The t(14;19)(q32.3;q13.2) is a rare but recurrent translocation found in patients with B-cell malignancies, mainly in chronic B-cell lymphoproliferative disorders. When occurring in chronic lymphocytic leukemia (CLL), atypical lymphocyte morphology and immunophenotype have been reported.

Clinics and pathology

Disease
Chronic lymphocytic leukemia (most are the atypical form). Other diseases (maybe less well defined): low grade B-NHL, mantle cell lymphoma, small noncleaved cell lymphoma, one case of biphenotypic (B/M) acute leukemia.

Phenotype/cell stem origin
Chronic B-cell lymphoproliferation.

Epidemiology
Annual incidence 30/10^6; median age: 60-80 years; A high proportion of patients with CLL and t(14;19) are aged less than 40 years.

Clinics
Often a slow evolutive disease.

Prognosis
Highly variable according to the staging: from staging A: where the survival is not reduced compared to age matched population, to staging C: with a median survival of 2 years. t(14;19) is often associated with rapidly progressive disease, and overall prognosis is poor compared to the expected survival in chronic lymphocytic leukemia and low-grade B-cell lymphoma.

Cytogenetics morphological
The t(14;19)(q32.3;q13.2) is reciprocal and results in 14q+ and a 19q- derivative chromosomes.

Cytogenetics molecular
FISH is useful for identifying variant translocations.

Additional anomalies
t(14;19) is rarely the sole cytogenetic aberration. Trisomy 12 is the most frequent associated abnormality, and is observed in 50% of cases; this may even be underestimated as with FISH more cases with +12 are detected. Other chromosomes involved in structural aberrations are 6, 2 and 10.

Variants
Three way variants are relatively frequent, compared to variants in other recurrent translocations. t(14;17;19) and t(7;19;14) were described.

Genes involved and proteins

IgH
Location
14q32

BCL3
Location
19q13

DNA/RNA
9 exons, spanning 11.5 kb. BCL3 mRNA is expressed in a variety of tissues, particularly in spleen, liver and lung.

Protein
- Encodes the a protein which contains seven ankyrin repeats. Similar repeats are described in the structural
protein ankyrin, as well as in proteins involved in cell cycle control and lineage determination (SW14, SW16, lin2).

- BCL3 is a member of the IkappaB family, whose proteins regulate the NFkappaB family of transcription factors. NFkappaB plays a major role in B-cell development.

**Result of the chromosomal anomaly**

**Hybrid gene**

**Description**
The breakpoint is located in the 5’ untranslated region of the BCL3 gene. BCL3 is juxtaposed to the immunoglobulin heavy chain gene locus on chromosome 14 (often in the switch alpha region) in a "head-to-head" configuration.

**Fusion protein**

**Oncogenesis**

- No fusion protein. The translocation does not interrupt the transcriptional integrity of BCL3, but is associated with increased production of a BCL3 RNA of normal size. The immunoglobulin enhancer is not present on the same derivative chromosome as BCL3, suggesting other mechanisms for overexpression. The genes affected by overexpression of BCL3 remain to be identified.

**References**


*This article should be referenced as such:*