Atlas of Genetics and Cytogenetics in Oncology and Haematology

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Leukaemia Section

Mini Review

t(3;14)(q27;q32)
t(2;3)(p12;q27)
t(3;22)(q27;q11)

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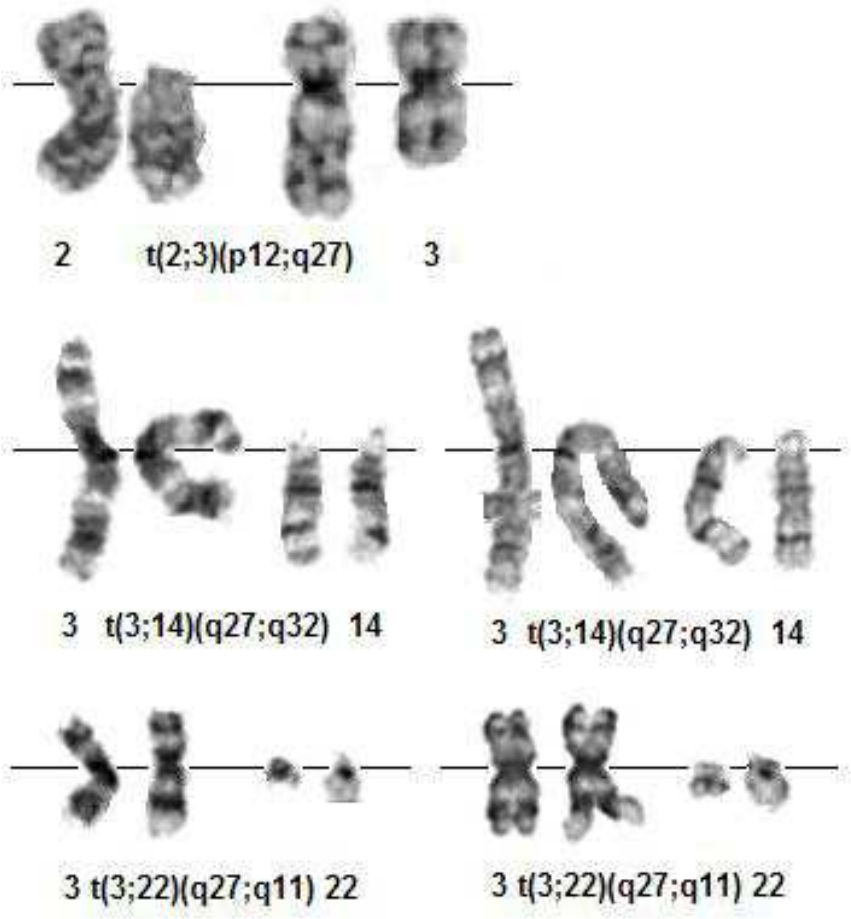
Identity

Note: the three translocations are variant of each other, share identical features, and represent translocations of the same proto-oncogene into various immunoglobulin loci.



t(2;3)(p12;q27) G-banding (above) - Courtesy Jean-Luc Lai and Alain Vanderhaegen; t(3;14)(q27;q32) G-banding (middle) and t(3;22)(q27;q11) G-banding (below) - Courtesy Diane H. Norback, Eric B. Johnson, and Sara Morrison-Delap, UW Cytogenetic Services.

Clinics and pathology

Disease

NHL; mainly diffuse large cell lymphoma (DLCL); high grade lymphoma; rare cases with low grade/follicular lymphoma; in those cases, 3q rearrangements can be isolated or associated with a t(14;18) translocation.

Phenotype / cell stem origin

B-cell.

Epidemiology

3q27 rearrangements present in 25 to 30% of DLCL; about 10% of follicular lymphoma.

Clinics

Mainly adult aggressive lymphoma.

Treatment

Intensive chemotherapy.

Prognosis

Controversial.

Cytogenetics

Cytogenetics, morphological

t(2;3) and t(3;22) are easily identified; t(3;14) is telomeric and difficult to see, especially when using G-banding.

Cytogenetics, molecular

Some cosmid and YAC probes have been developed.

Additional anomalies

Very frequent, as usual in NHL, involving chromosome 1, del(6q), 10q, 11q, 12q, 13q, 17p arms.

Variants

Large number of recurring defects involving the 3q27 region:
t(3;4)(q27;p13), t(3;6)(q27;p22), t(3;7)(q27;p13), t(3;8)(q27;q24), t(3;11)(q27;q23), t(3;13)(q27;q14), t(3;15)(q27;q22), t(3;17)(q27;q11).

Genes involved and Proteins

Note: BCL6 (see below) with various partners: immunoglobulin genes IgH (mainly Sμ region) in 14q32, IgK in 2p12, and IgL in 22q11; (for variant translocations, partners are: RHOH in the t(3;4), histone H1F1 in the t(3;6), OBF1 in the t(3;11), LCP1 in the t(3;13); in these cases, the first non-coding exon of the partner gene fuses with the second exon of BCL6, resulting in the deregulated expression of a chimerical transcript and the production of a normal BCL6 protein).

BCL6

Location: 3q27

DNA / RNA

10 exons; alternative splicing of exons 1 (1a and 1b), without modification of the open reading frame.

Protein

Transcription factor; belongs to the Krüppel family, with a N-term BTB/POZ domain and 6 zinc fingers; transcription repressor.

Results of the chromosomal anomaly

Fusion protein

Description

No fusion protein, but promoter exchange; the immunoglobulin gene promoter controls the expression of the BCL6 gene.

Oncogenesis

Deregulated protein expression; alternative deregulation mechanisms: deletion of regulating sequences, mutations.

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