Leukaemia Section
Mini Review

**t(2;12)(p12;p13), t(12;14)(p13;q32), t(12;22)(p13;q11)**

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**Identity**

Note
Mantle cell lymphoma are usually associated with a t(11;14)(q13;q32), a CCND1/IgH rearrangement, and cyclin D1 overexpression.

**Clinics and pathology**

**Disease**
Mantle cell lymphoma (MCL)

**Note**
This review does not include a case of t(2;12)(p12;p13) found in myeloid malignancy (Lai et al., 1995), a case of acute lymphoblastic leukemia with a t(12;14)(p13;q32) and IgH/ETV6 involvement (Lu et al., 2002); five cases of t(12;22)(p13;q11), not herein included either, have also been described in lymphoid malignancies, but with an unknown CCND2 status (see Mitelman database). Finally, there are a number of chronic myeloid leukemia aberrant translocations with t(12;22), which again represent other diseases.

**Phenotype/cell stem origin**
The cases of mantle cell lymphomas with the above translocations were typical mantle cell cases, with CD5+, CD20+, CD10-, CD23- expression, except for the lack of CCND1 expression.

**Epidemiology**
Five cases are available: 4 cases of MCL (Gesk et al., 2006; Herens et al., 2008; Wlodarska et al., 2008), and a case of chronic lymphocytic leukemia (CLL) transforming into a Richter disease (Qian et al., 1999).

**Clinics**
The patients are in stage IV of the disease, with a nodular, or nodular/diffuse pattern. There were 3 male and 2 female patients, aged 33, 52, 65, 70, and 7 years.

**Prognosis**
Data is missing in most cases; the two patients with data on prognosis died: the patient with Richter disease, and a MCL case, who died 64 months after diagnosis.

**Cytogenetics**

**Cytogenetics morphological**
There were two cases of t(2;12), one case of cryptic t(12;14), one case of t(12;22), and one case with no metaphase.

**Additional anomalies**
+3 was found in two cases, +21 in one case, a complex karyotype in one case, and +12 and a t(14;19)(q32;q13) in the CLL/Richter case.

**Genes involved and proteins**

**Note**
IgH, IgK, or IgL can be alternative partners of CCND2.

**CCND2 (cyclin D2)**

**Location**
12p13

**Protein**
CCND2 promotes cell cycle progression at the G1/S start transition. Interacts with CDK4 and CDK6. CCND2 is activated through B-cell antigen receptor-induced, and CD19-induced signal transduction.
pathways, including the RAS/RAF/MAPK pathway, the PLC gamma pathway, and the IKK/NF-KB pathway. CCND2 is critical in B-cell development (review in Chiles, 2004).

Result of the chromosomal anomaly

Fusion protein

Oncogenesis

Overexpression of cyclin D2.

References


Herens C, Lambert F, Quintanilla-Martinez L, Bisig B, Deusings C, de Leval L. Cyclin D1-negative mantle cell lymphoma with cryptic t(12;14)(p13;q32) and cyclin D2 overexpression. Blood. 2008 Feb 1;111(3):1145-6


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