Leukaemia Section

Short Communication

t(7;14)(p13;q11)

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Abstract

T-cell malignancies represent a heterogeneous group of diseases with characteristic clinical and genetic features. Chromosomal aberrations that involve the T-cell receptor (TCR) alpha/delta locus (TRA/TRD) at 14q11.2 are characteristic genomic aberrations of a variety of T-cell malignancies and affect a wide array of T-cell oncogenes.

KEYWORDS
T-cell lymphoblastic leukemia/lymphoma, t(7;14)(p13;q11), TRA/TRD, T-cell receptor genes.

Identity

Cytogenetic appearance may resemble the chromosomal translocation t(7;14)(p15;q11) in suboptimal preparations.

Disease

T-cell malignancies mainly.

7 patients (2 males and 5 females) aged 23 to 78 years (median 31 years) (from the known data).

Epidemiology

T-cell malignancy in 5 out of 7 patients: 2 angioimmunoblastic T-cell lymphoma (AITL) (Cosimi et al., 1990), 1 T-cell acute lymphoblastic leukemia (T-ALL) (Secker-Walker et al., 1992) and 1 T-cell large granular lymphocytic leukemia (T-LGL) that presented initially as cytomegalovirus infection (Wong et al., 2003). Various malignancies in the remaining cases: 1 chronic lymphocytic leukemia (Bird et al., 1989), 1 chronic myeloid leukemia (CML) (Farag et al., 2004) and 1 patient with chronic myeloproliferative disorder (CMD) who developed extramedullary T-lymphoid blast crisis (Yamamoto et al., 2014) (Table 1).

<table>
<thead>
<tr>
<th>Sex/Age</th>
<th>Diagnosis</th>
<th>Karyotype</th>
</tr>
</thead>
<tbody>
<tr>
<td>6. F</td>
<td>CML</td>
<td>46,XX,t(7;14)(p13;q11),t(9;22)(q34;q11)</td>
</tr>
<tr>
<td>7. M/31</td>
<td>CMD</td>
<td>46,XY,t(7;14)(p13;q11),der(9)t(9;12)(q34;p13),del(12)(p13) ETV6/ABL1</td>
</tr>
<tr>
<td>4. F/31</td>
<td>T-ALL</td>
<td>46,XX,t(7;14)(p13;q11),add(18)(q25)</td>
</tr>
<tr>
<td>5. M/23</td>
<td>T-LGL</td>
<td>46,XY,t(7;14)(p13;q11)</td>
</tr>
</tbody>
</table>
Cytogenetics

Cytogenetics morphological

Sole anomaly in the T-LGL case (Wong et al., 2003), associated with t(7;14)(q35;q11) and additional 14q11 anomalies in both AITL patients (Cosimi et al., 1990). Found with t(9;22)(q34;q11) in a CML (Farag et al., 2004), der(9) t(9;12)(p34:p13),del(12)(p13) in an ETV6/ABL1-positive CMD (Yamamoto et al., 2014) and with t(11;14)(q11;q32) and complex karyotype in a CLL case (Bird et al., 1989).

Genes involved and proteins

Note

Therefore, it is probable, that various genes have been implicated in reported cases.

TRA/TRD (T-cell receptor alpha/delta)

Location

14q11.2

Result of the chromosomal anomaly

Fusion protein

Oncogenesis

Translocations involving 14q11, the chromosomal band to which TRA and TRD have been mapped often result in rearrangement of TCR genes in T-cell leukemias/lymphomas. In most instances, these chromosomal aberrations induce the transcription of an oncogene on the partner chromosome as a result of juxtaposition of promoter and enhancer elements of TCR genes to the putative oncogene.

The mechanism is not clear, but deregulated expression of a partner gene may activate a mechanism for the genesis of T-cell leukemia/lymphoma.

References


Wong KF, Yip SF, So CC, Lau GT, Yeung YM. Cytomegalovirus infection associated with clonal proliferation of T-cell large granular lymphocytes: causal or casual? Cancer Genet Cytogenet. 2003 Apr 1;142(1):77-9


This article should be referenced as such: