Chromosome 14q+ in a Japanese patient with Burkitt’s lymphoma.

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Abstract

Cytogenetic studies were performed on a biopsy specimen of a jaw tumor and on a bone marrow aspirate from a Japanese patient with Epstein-Barr virus-negative Burkitt’s lymphoma. A 14q+ chromosome was found in cells from either source, although each contained a different clone. Other karyotypic abnormalities present in common included 2dir dup (1q) (q21 leads to q32), 3q+, 6p−, +12, +mar.

KEYWORDS: non-African Burkitt’s lymphoma, chromosome 14q+.
CHROMOSOME 14q+ IN A JAPANESE PATIENT WITH BURKITT'S LYMPHOMA

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Chromosome 14q+ has been associated with Burkitt's and non-Burkitt's
lymphomas (1–4) and with other lymphoid malignancies (5, 6). The marker
chromosome, usually consisting of a t(8q−; 14q+) translocation, has been ob-
served not only in African but in American and European Burkitt's lymphomas
(3, 7, 8). It is unrelated to the presence or absence of Epstein-Barr virus (EBV).
Previously, we reported a t(2q−, 8q+) translocation in an EBV-carrying
Japanese Burkitt's lymphoma (9). This paper briefly reports another case of
Japanese Burkitt's lymphoma in which the 14q+ marker was found.

The patient was a 52-year-old man who presented with a rapidly enlarging
tumor of a hen's egg size in the right mandible; x-ray films showed an osteolytic
lesion. A biopsy of the jaw tumor revealed undifferentiated lymphoma with a
starry sky pattern (Fig. 1). The tumor cells from the biopsy specimen were
negative for EBV nuclear antigen (EBNA). Antibodies to the EBV capsid anti-
gen, early antigen or EBNA were not detectable at the serum dilution of 1:10.
Partial response was obtained by chemotherapy but relapse was complicated by
hypercalcemia and azotemia. Finally, numerous tumor cells appeared in the
bone marrow and the patient died of leukemia after three months from the onset of the disease.

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Karyotypes were analyzed on cells from the jaw tumor before chemotherapy, and on bone marrow cells at the terminal stage 50 days apart. The cells from both sources were incubated for seven h in RPMI 1640 medium with 20% bovine serum at 37°C in a humidified 5% CO₂ atmosphere. Mitotic cells were accumulated with Colcemid (0.5 μg/ml), treated in a hypotonic solution of 75 mM KCl for 13 min, and fixed in a methanol-acetic acid (3:1) mixture. Chromosome preparations were air-dried and banded with quinacrine mustard (10) and trypsin-Giemsa (11).

The number of chromosomes for the jaw tumor ranged from 46 to 49 with a bimodal number of 46 and 47, while the bone marrow cells had a modal number of 48 (Table 1). Of 18 banded cells from the jaw tumor, two were normal, 11 hyperdiploid and five pseudodiploid. Banding analysis of 19 bone marrow cells revealed two normal and 17 hyperdiploid cells. All the abnormal cells were found to have a 14q + chromosome. The extra chromosome material, comprising about 20% of the long arms, was attached to band 14q32, but it was not possible to determine its origin. Both chromosomes No. 8 from the jaw tumor appeared normal, whereas the marrow tumor cells lacked a chromosome No. 8.
Table 1. Chromosome Number Distribution in a Japanese Burkitt's Lymphoma

<table>
<thead>
<tr>
<th>Material</th>
<th>Date performed</th>
<th>Chromosome number</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jaw tumor</td>
<td>8/1/79</td>
<td>46, 47, 48, 49, 49</td>
<td>50(18)</td>
</tr>
<tr>
<td>Bone marrow</td>
<td>9/20/79</td>
<td>46, 47, 48, 49, 49</td>
<td>50(19)</td>
</tr>
</tbody>
</table>

Numbers in parentheses: number of banded cells examined.

Another consistent abnormality was a duplication of segment 1q21→1q32, producing a pair of large submetacentric chromosomes (1q+). The bimodal karyotypes for the jaw tumor were 46, XY, 2dir dup (1q) (q21→q32), −2, 3q+, 6p−, −9, +12, −14, 14q+, +18, +mar, and 47, XY, 2dir dup (1q) (q21→q32), −2, 3q+, 6p−, −9, +12, +13, −14, 14q+, +18, +mar (Fig. 2). On

Fig. 2. Karyotype from the jaw tumor: 47, XY, 2dir dup (1q) (q21→q32), −2, 3q+, 6p−, −9, +12, +13, −14, 14q+, +18, +mar.
Fig. 3. Karyotype from the bone marrow: 48, XY, +Y, 2dir dup (1q11→q32), t(2;3) (q13;q29), +5, 6p−, −8, 9q−, +12, 14q+, −21, +mar.
the other hand, the modal karyotype for the bone marrow was 48, XY, + Y, 2dir dup (1q) [q21→q32], t (2; 3) [q13 ; q29], +5, 6p−, −8, 9q−, +12, 14q+, −21, + mar (Fig. 3). The marker chromosome found in the jaw tumor was morphologically distinct from that found in the bone marrow.

In the present study, we demonstrated a 14q+ chromosome in a Japanese adult with Burkitt’s lymphoma, although the origin of the translocated segment could not be identified. In addition, there were multiple chromosome abnormalities, including a partial duplication of the long arms of chromosomes No. 1. Slater et al. (8) described a similar duplication of the long arms of chromosome No. 1 as well as the 14q+ marker in a boy of B-cell acute lymphocytic leukemia of the Burkitt’s type, and considered the 1q+ rearrangement to have played an important role in the evolution of leukemic cell population. Recently, we have seen a Japanese patient with Burkitt’s lymphoma that was shown to have the typical t(8q−; 14q+) translocation (to be reported). It has become evident that there are both EBV-positive and -negative Burkitt’s lymphomas in Japan as in the United States and Europe, and that some of Japanese cases are associated with a 14q+ marker chromosome.

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REFERENCES


