

## inv(2)(p23q35)

### Clinics and Pathology

<b>Disease</b>	Translocations involving 2p23 are found in more than half cases of <a href="#">anaplastic large cell lymphoma</a> (ALCL), a high grade non Hodgkin lymphoma (NHL). They involve ALK, and are therefore called ALK+ ALCL. The most frequent ALK+ ALCL being the the <a href="#">t(2;5)(p23;q35)</a> with <a href="#">NPM1</a> -ALK fusion protein, which localises both in the cytoplasm and in the nucleus. The inv(2)(p23q35) is very rare., and, like other t(2;Var) involving various partners and ALK, the fusion protein has a cytoplasmic localization; they are therefore called "cytoplasm only" ALK+ ALCL.
Phenotype / cell stem origin	CD30+; ALK+
Epidemiology	at least 7 known cases, aged 12 yrs to 52 yrs (med 23 yrs); no sex unbalance so far, in contrast with the general feature found in ALK+ ALCL
Clinics	ALK+ ALCL without the t(2;5) (so called cytoplasmic only ALK cases) show clinical features similar to those of classical ALK+ ALCL: young age, male predominance, presentation with advanced disease, systemic symptoms, frequent involvement of extranodal sites, and a good prognosis. Nothing in particular is known concerning inv(2) cases, as cases are not fully documented
Prognosis	not well documented

### Cytogenetics

Cytogenetics	difficult to identify, as breakpoints lie in telomeric regions; an apparent
Morphological	i(2q) -when present- in ALCL should ring the bell; in some other cases, with numerous anomalies, there is no apparent breakpoint on chromosomes 2.
Cytogenetics Molecular	FISH analyses are thereof essential
Additional anomalies	ider(2)(q10)inv(2) has been found in some cases, carrying 2 additional copies of the ATIC-ALK hybrid gene, as detected with FISH; frequent complex karyotypes

### Genes involved and Proteins

<b>Gene Name</b>	<a href="#">ALK</a>
Location	2p23
Protein	1620 amino acids; 177 kDa; glycoprotein (200 kDa mature protein) ; membrane associated tyrosine kinase receptor
<b>Gene Name</b>	<a href="#">ATIC</a>
Location	2q35
Protein	591 amino acids, 64 kDa; bifunctional purine biosynthesis:9th and 10th

step of the de novo purine synthesis

## Result of the chromosomal anomaly

### Hybrid

gene 5' ATIC- 3' ALK

Description

**Fusion Protein** Description 791 amino acids, 87 kDa. 229 N-term amino acid from ATIC containing the IMPCH domain and the dimerization domain fused to the 562 C-term amino acids from ALK (i.e. the entire cytoplasmic portion of ALK with the tyrosine kinase domain).

Oncogenesis ATIC seems to provoke the dimerization of ATIC-ALK, which should lead to constitutive autophosphorylation and activation of the ALK tyrosine kinase, as for NPM1-ALK (see [t\(2;5\)\(p23;q35\)](#) )

## External links

Other

database

[inv\(2\)\(p23q35\)](#)

[Mitelman database \(CGAP - NCBI\)](#)

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**Written** 08-2001 Jean-Loup Huret

**Citation**

*This paper should be referenced as such :*

**Huret JL** . inv(2)(p23q35). *Atlas Genet Cytogenet Oncol Haematol*. August 2001 .

URL :

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