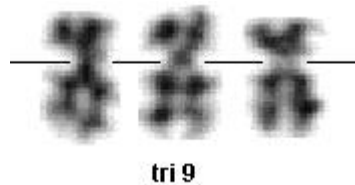


+9 or trisomy 9

Identity

Note Occurs in a large spectrum of myeloid and lymphatic malignancies - chronic myeloproliferative disorders (CMPD), [acute myeloid leukemias](#) (AML), [myelodysplastic syndromes](#) (MDS), acute lymphoblastic leukemias (ALL) of B-lineage and of T-lineage. Strong association to the CMPD and especially to [polycythemia vera](#) (PV).



+9 (G-banding)

Clinics and Pathology

| | |
|-------------------------------------|--|
| Disease | Chronic myeloproliferative disorders |
| Epidemiology | All CMPD: approx. 2% of all cases, approx. 10% of all chromosomal aberrant cases. PV: around 7% of all cases, around 16% of all chromosomal aberrant cases. |
| Cytogenetics | One of the most frequent anomalies (with del(20q) , +8 , and del(13q)) in BCR- ABL negative CMPD, especially in PV and in chronic idiopathic myelofibrosis (CIMF). Additional anomalies: PV: in 50% as sole abnormality, in 50% of all cases most frequently in combination with numerical gain of chromosome 8. |
| Genes | +9 is assumed to represent a gain-of-function mechanism with respect to the JAK2 gene on 9p24 coding for the JAK2 kinase. Additionally, a cooperation of +9 with the V617F mutation of the JAK2 gene is hypothesized. |
| Prognosis | No prognostic impact according to follow-up studies of limited sample sizes. |
| Disease | Acute myeloid leukemia |
| Phenotype / cell stem origin | FAB subtypes M2, M4, M5. |
| Epidemiology | Frequent in combination with other chromosomal changes. Extremely rare as sole abnormality (around 0.1% of all cases). |
| Cytogenetics | Additional anomalies: In combination with other numerical gains (mainly +8) in simple karyotypes or in complex aberrant karyotypes (at least 3 chromosomal abnormalities). |
| Genes | Not known. |
| Prognosis | Intermediate prognosis as sole aberration or as +8,+9 in simple karyotypes. Complex aberrant karyotypes have an inferior prognosis. |
| Disease | Myelodysplastic syndrome |

Epidemiology Rare.
 Cytogenetics Additional anomalies: Occurrence as sole abnormality or within complex aberrant karyotype.
 Genes Not known
 Prognosis Intermediate prognosis as sole aberration. Complex aberrant karyotypes have an inferior prognosis.

Disease B-lineage acute lymphoblastic leukemia

Epidemiology Rare in Philadelphia-positive and in Philadelphia-negative B-lineage.

Cytogenetics Additional anomalies: Philadelphia-negative ALL: Occurrence in hyperdiploid karyotypes (equal or more than 47 chromosomes) mostly in combination with other numerical gains. Philadelphia-positive ALL: Rare additional change.

Genes Not known.

Prognosis Philadelphia-negative ALL with [high hyperdiploid](#) karyotype (equal or more than 51 chromosomes) shows a good prognosis, gain of chromosome 9 is not typical and prognostic impact of trisomy 9 in this setting unknown. In [Philadelphia-positive ALL](#) additional chromosomal anomalies probably enhance the inferior prognosis.

Disease T-lineage acute lymphoblastic leukemia.

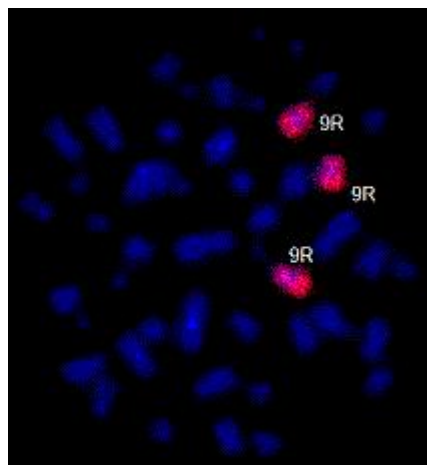
Epidemiology Rare, up to 4% in childhood T-ALL.

Cytogenetics Additional anomalies: Occurs as sole or as combined anomaly.

Genes Not known.

Prognosis So far a prognostic impact could not be defined, which also might be due to the low analyzed case numbers.

Cytogenetics



+9 (chromosome painting, WCP#9 (red))

External links

Other database [+9 or trisomy 9](#) [Mitelman database \(CGAP - NCBI\)](#)

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