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Leukaemia Section
Short Communication

t(3;5)(p21;q32)

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Clinics and pathology

Disease

MKPL-1 cell line, established from a 66-year-old male patient with an acute megakaryoblastic leukemia (M7-AML) and a karyotype apparently with -21,+3mar (Takeuchi et al., 1992), re-analysed for tyrosine kinase dysregulation (Gu et al., 2007).

Epidemiology

Only one case to date.

Genes involved and proteins

RBM6

Location
3p21

Protein
From N-term to C-term, contains a BTB/POZ domain (mediates homomeric dimerization) and decamer repeat domains, responsible for multimerization/self-association of the protein, RRM1 and RRM2 (RNA recognition motif) domains, an octamer repeat, a C2H2 zinc finger, a nuclear localisation signal, and a G-patch (made of highly conserved glycines; may have RNA binding functions). RNA-binding protein. Binds poly(G). Splicing factor (Heath et al., 2010).

CSF1R

Location
5q32

Protein
Contains Ig-like domains (extracellular), a transmembrane domain, and a split tyrosine kinase domain (intracellular), from N-term to C-term. Transmembrane glycoprotein, receptor for the ligand colony stimulating factor-1 (CSF1). Upon binding of CSF1, CSF1R tyrosine phosphorylation is induced leading to RAS/RAF/MAPK, PI3K/AKT/mTOR and JAK/STAT (specifically STAT1, STAT3, and STAT5) pathways activation. CSF1R activation by CSF1 results in increased growth, proliferation and differentiation (Fischer et al., 2008).

Result of the chromosomal anomaly

Hybrid gene

Description
Fusion of RBM6 exon 2 to CSF1R exon 12; the reciprocal CSF1R-RBM6 was not detected.

Fusion protein

Description
The RBM6-CSF1R fusion protein consists of the amino terminal 36 amino acids of RBM6, fused to the carboxy terminal 399 amino acids of CSF1R, including a polymerisation domain of RBM6, and the tyrosine kinase domain of CSF1R.

Oncogenesis
Constitutive tyrosine kinase activation.

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