Leukaemia Section
Short Communication

t(2;8)(q12;p11) RANBP2/FGFR1

Carine Gervais
Laboratoire de Cytogenetique Hematologique, CHU Strasbourg, France

Published in Atlas Database: November 2014
Online updated version : http://AtlasGeneticsOncology.org/Anomalies/t0208q12p11ID1661.html
Printable original version : http://documents.irevues.inist.fr/bitstream/handle/2042/62672/11-2014-t0208q12p11ID1661.pdf
DOI: 10.4267/2042/62672

This work is licensed under a Creative Commons Attribution-Noncommercial-No Derivative Works 2.0 France Licence.
© 2016 Atlas of Genetics and Cytogenetics in Oncology and Haematology

Clinics and pathology

Disease
Myeloid and lymphoid neoplasms with FGFR1 abnormalities (previously: 8p11 myeloproliferative syndrome)

Note
Different disease phenotypes according to the FGFR1 partner gene.

Phenotype/cell stem origin
Pluripotent haematopoietic stem cell.

Epidemiology
Only one case to date, a 63 years old female with myeloproliferative/myelodysplastic neoplasm (Gervais et al., 2013).

Clinics
Splenomegaly, dyspnea, impaired general condition at diagnosis. Rapid disease progression despite chemotherapy.

Evolution
Disease progressed rapidly and the patient died 6 months after the diagnosis.

Prognosis
Undetermined (myeloid and lymphoid neoplasms with FGFR1 abnormalities prognosis is currently poor).

Bone marrow (MGG): hypercellularity with granular hyperplasia, dysgranulopoiesis and few eosinophils.
R and G-banding showing t(2;8)(q12;p11).

Cohybridization of FGFR1 BAC RP11-350N15 (8p11, green) and RANBP2 RP11-84C2 (2q12, red) showing a dual fusion signal.

Schematic representation of RANBP2-FGFR1 fusion transcript.

Schematic representation of RANBP2, FGFR1 and RANBP2-FGFR1 predicted fusion protein.
Cytogenetics

**Cytogenetics morphological**
t(2;8)(q12;p11) without additional abnormality.

Genes involved and proteins

**FGFR1**

**Location** 8p11.23

**Note** Receptor tyrosine kinase.

**DNA/RNA** 18 exons.

**Protein** Extracellular ligand-binding domain (with the N-terminus). Unique transmembrane domain. Catalytic (tyrosine kinase) cytosolic domain.

**RANBP2**

**Location** 2q12.3

**Note** Implicated in various cancers, inflammatory myofibroblastic tumors (with ALK 2p23), JMML and AML with RANBP2-ALK fusion (Rottgers et al., 2010; Maesako et al., 2014; Lim et al., 2014).

**DNA/RNA** 31 exons.

**Protein** Component of the nuclear pore complex, localised at its cytoplasmic side.

Result of the chromosomal anomaly

**Hybrid gene**

**Description** 5’ RANBP2 - 3’ FGFR1; fusion of RANPB2 exon 20 to FGFR1 exon 9.

**Transcript** Detection of both RANBP2-FGFR1 transcript and FGFR1-RANBP2 reciprocal transcript.

**Fusion protein**

**Description** RANBP2 N-terminal (leucine-rich region) - FGFR1 C-terminal (TK domain).

**Oncogenesis** Constitutive activation of FGFR1 kinase activity.

References

- Fioretos T, Panagopoulos I, Lassen C, Swedin A, Bilstöm R, Isaksson M, Strömbeck B, Olofsson T, Mitelman F, Johansson B. Fusion of the BCR and the fibroblast growth factor receptor-1 (FGFR1) genes as a result of t(8;22)(p11;q11) in a myeloproliferative disorder: the first fusion gene involving BCR but not ABL. Genes Chromosomes Cancer. 2001 Dec;32(4):302-10
- Hidalgo-Curtis C, Chase A, Drachenberg M, Roberts MW, Finkelstein JZ, Mould S, Oscier D, Cross NC, Grand FH. The t(1;9)(p34;q34) and t(8;12)(p11;q15) fuse pre-mRNA processing proteins SFPQ (PSF) and CPSF6 to ABL and FGFR1. Genes Chromosomes Cancer. 2008 May;47(5):379-85
- Li J, Yin WH, Takeuchi K, Guan H, Huang YH, Chan JK. Inflammatory myofibroblastic tumor with RANBP2 and ALK gene rearrangement: a report of two cases and literature review. Diagn Pathol. 2013 Sep 13;8:147


Wasag B, Lierman E, Meeus J, Vandenboghe P. The kinase inhibitor TKI258 is active against the novel CUX1-FGFR1 fusion detected in a patient with T-lymphoblastic leukemia/lymphoma and t(7;11)(q22;q11). Haematologica. 2011 Jun;96(6):922-6


This article should be referenced as such: