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Leukaemia Section

Short Communication

t(2;8)(p23;p11) KAT6A/ASXL2

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Abstract

Short communication on t(2;8)(p23;p11) KAT6A/ASXL2, with data on clinics, and the genes implicated.

Clinics and pathology

Disease

Treatment-related myelodysplastic syndrome (t-MDS)

Epidemiology

Only one case to date, a 6-year old girl who have had a M2 acute myeloid leukemia (M2-AML) with a t(8;21)(q22;q22), treated with epipodophyllotoxin, 17 months before onset of a therapy related myelodysplasia.
She died 14 months after diagnosis of the t-MDS (Imamura et al., 2003).

Genes involved and proteins

ASXL2

Location
2p23

Protein
Polycomb-group (PcG) and trithorax-group (trxG) proteins regulate histone methylation to establish repressive and active chromatin configurations in Drosophila.
Mutations in Asx (the homolog of ASXL2) enhance both Polycomb-group (PcG) and trithorax-group (trxG) mutant phenotypes (Baskind et al., 2009). ASXL2 is an enhancer of PcG activity.
ASXL2 and the histone methyltansferase EZH2 (7q36) directly represses MYH7 (14q11) (Beta-Myosin Heavy Chain) (Lai et al., 2012).
ASXL2 is implicated in prostate, breast, pancreatic cancers (review in Katoh, 2013).
EPC1-ASXL2 fusion gene has been found in adult T-cell leukaemia/lymphoma with a t(2;10)(p23;p11) (Nakahata et al., 2009).
EPC1 (10p11) is also a component of the histone acetyltransferase complex.

KAT6A

Location
8p11.2

Note
KAT6A is also known as MYST3, or MOZ.

Protein
KAT6A is a histone acetyltransferase (HAT). KAT6A has intrinsic HAT activity; KAT6A also forms complexes with MEAF6 (1p34), ING5 (2q37), and BRPF1 (3p25) to acetylate histones H3.
KAT6A is a transcriptional co-activator; it interacts with RUNX1 (21q22) and SPI1/PU.1 (11p11) to regulate the expression of haematopoietic-related genes; KAT6A and MLL (11q23), an histone methyltransferase, cooperate to regulate HOX genes, which are key genes in human cord blood CD34+ cells progenitors, and are critical for leukemogenesis.
KAT6A is also an epigenetic regulator of haematopoiesis (reviews in Perez-Campo et al., 2013; Yang and Ullah, 2007).

Result of the chromosomal anomaly

Hybrid gene

Description

Exons 2-13 of ASXL2 are fused to exons 1-14 of the KAT6A (Katoh and Katoh, 2004).

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