Atlas of Genetics and Cytogenetics in Oncology and Haematology

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Gene Section
Mini Review

CBP (CREB-binding protein)

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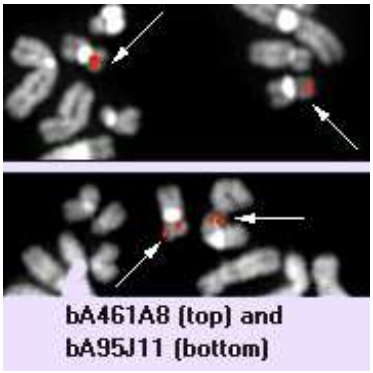
Identity

Other names: CREBBP (CREB binding protein (Rubinstein-Taybi syndrome)); RTS (Rubinstein-Taybi syndrome); RSTS
HGNC (Hugo): CREBBP
Location: 16p13.3



CBP (16p22) - Courtesy Mariano Rocchi, Resources for Molecular Cytogenetics.

DNA/RNA

Description

The gene spans about 190 kb; transcription from centromere to telomere.

Transcription

8.7 kb mRNA, with a 7.3 kb coding sequence.

Protein

Description

2442 amino acids; 265 kDa; from NH2-term, is made of a CREB-Binding domain, a bromodomain. Cystidine/Histidine-rich domains, and Glutamine-rich domains in COOH-term.

Expression

Wide expression; expression in the whole embryo as well.

Localisation

Nucleus.

Function

Binds specifically to the DNA-binding protein CREB and connects it to the basal transcriptional machinery: transcription coactivator, with P300; has histone acetyltransferase activity; essential role in embryogenesis, cell differentiation, apoptosis, and proliferation; involved in the regulation of cell cycle during G1/S transition.

Homology

P300.

Implicated in

t(8;16)(p11;p13)/M4 ANLL --> MOZ/CBP

Disease
Acute non lymphocytic leukemia (ANLL) and treatment related ANLL (t-ANLL).
Prognosis
Poor: remission is obtained in half cases; survival is often less than 1 year.
Cytogenetics
+8 as an additional anomalies in half cases.
Hybrid/Mutated gene
5' MOZ - 3' CBP.

Abnormal protein
N-term finger motifs and acetyl transferase from MOZ fused to most of CBP, with a breakpoint in 5' of the CREB binding domain of CBP.

t(11;16)(q23;p13)/t-ANLL --> MLL/CBP

Disease
Treatment related ANLL (t-ANLL); should be very close to the t(11;22)(q23;q13).
Prognosis
Likely to be poor.
Hybrid/Mutated gene
5' MLL - 3' CBP.
Abnormal protein
N-term AT hook and DNA methyltransferase from MLL fused to most of CBP; variable breakpoint in CBP: either in 5' of the CREB binding domain (like in the t(8;16)), or just upstream of the bromodomain.

Rubinstein-taybi syndrome

Note
Due to CBP haploinsufficiency.
Disease
Autosomal dominant disorder with mental retardation, facial dysmorphia, broad thumbs/halluces, cardiac anomalies, and an increased risk of medulloblastoma, meningioma, and neuroblastoma.

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