

ZytoLight® SPEC TCF3/PBX1 Dual Color Dual Fusion Probe



Background

The ZytoLight® SPEC TCF3/PBX1 Dual Color Dual Fusion Probe is designed to detect rearrangements affecting the chromosomal region 19p13.3 harboring the TCF3 (transcription factor 3, a.k.a E2A) gene and the chromosomal region 1q23.3 harboring the PBX1 (PBX homeobox 1) gene.

TCF3 is the target of several known recurrent rearrangements in ALL that create TCF3 fusion proteins. The balanced t(1;19)(q23.3;p13.3) and the more common unbalanced der(19)t(1;19)(q23.3;p13.3), which occur in approximately 6% of pediatric B-ALL cases and in 20-25% of all pre-B-ALL cases, fuse the TCF3 gene to the PBX1 gene. The t(17;19)(q22;p13.3) fuses TCF3 to the HLF gene in <1% of cases. TCF3-PBX1 and TCF3-HLF are chimeric transcription factors that contain the same portion of TCF3, including two transcriptional activation domains, fused to regions of PBX1 or HLF that contain unique DNA binding domains. As a sole abnormality, t(1;19)/der(19)t(1;19) is associated with an intermediate prognosis. In the context of hyperdiploid B-ALL, this translocation is associated with a poor prognosis. TCF3-HLF fusion has an extremely poor prognosis.

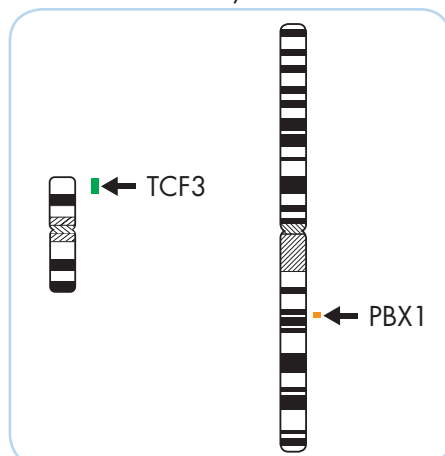
In the revised 2016 WHO classification of myeloid neoplasms and acute leukemia, "B-lymphoblastic leukemia/lymphoma with t(1;19)(q23.3;p13.3);TCF3-PBX1" is classified as its own cytogenetic subgroup of ALL. Because more intensive therapy improves the outcome of patients with TCF3-PBX1 gene fusions, it is critical to identify this subset of patients so that appropriate therapy can be administered.

References

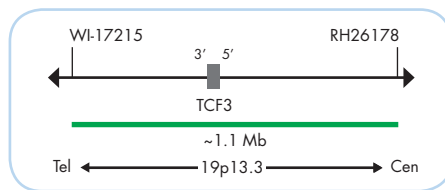
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Probe Description

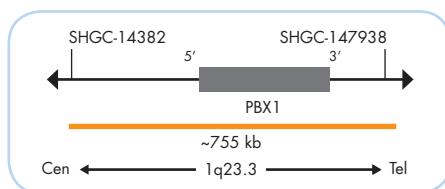
- The ZytoLight® SPEC TCF3/PBX1 Dual Color Dual Fusion Probe is composed of:
- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~12.0 ng/µl), which target sequences mapping in 19p13.3** (chr19:1,152,432-2,233,487) harboring the TCF3 gene region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~6.0 ng/µl), which target sequences mapping in 1q23.3** (chr1:164,223,543-164,979,228) harboring the PBX1 gene region.
- Formamide based hybridization buffer



Ideograms of chromosomes 19 (left) and 1 (right) indicating the hybridization locations.



SPEC TCF3 Probe map (not to scale).

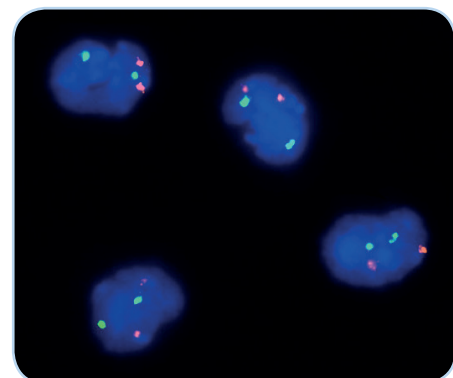


SPEC PBX1 Probe map (not to scale).

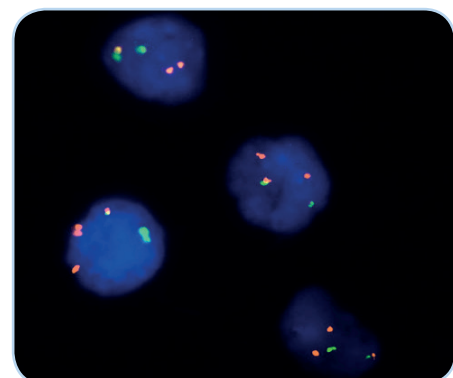
Results

In a normal interphase nucleus, two green and two orange signals are expected. A balanced translocation involving the chromosomal regions of TCF3 and PBX1 is indicated by one separate green signal, one separate orange signal, and two green/orange fusion signals. A signal pattern showing one fusion signal, one separate green and two separate orange signals can occur due to an unbalanced translocation.

Other relevant signal patterns may also be observed as a result of TCF3 rearrangements without the involvement of the PBX1 locus.



SPEC TCF3/PBX1 Dual Color Dual Fusion Probe hybridized to normal interphase cells as indicated by two orange and two green signals in each nucleus.



Bone marrow smear with rearrangement affecting the TCF3/PBX1 loci as indicated by two separate orange signals, one separate green signal, and one orange/green fusion signals.

Prod. No.	Product	Label	Tests* (Volume)
Z-2308-50	ZytoLight SPEC TCF3/PBX1 Dual Color Dual Fusion Probe CE IVD	●/●	5 (50 µl)
Related Products			
Z-2099-20	ZytoLight FISH-Cytology Implementation Kit CE IVD Incl. Cytology Pepsin Solution, 4 ml; 20x Wash Buffer TBS, 50 ml; 10x MgCl ₂ , 50 ml; 10x PBS, 50 ml; Cytology Stringency Wash Buffer SSC, 500 ml; Cytology Wash Buffer SSC, 500 ml; DAPI/DuraTect-Solution, 0.8 ml		20

* Using 10 µl probe solution per test. IVD labeled products are only available in certain countries. All other countries research use only! Please contact your local dealer for more information.

**According to Human Genome Assembly GRCh37/hg19