ZytoLight® SPEC NTRK1 Dual Color Break Apart Probe

CE IVD

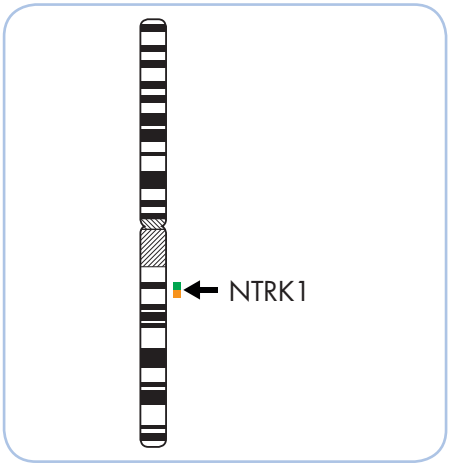
Background

The ZytoLight® SPEC NTRK1 Dual Color Break Apart Probe is designed to detect translocations involving the chromosomal region 1q23.1 harboring the NTRK1 (neurotrophic tyrosine kinase receptor type 1, a.k.a. TRKA or TRK) gene. NTRK1 encodes a tyrosine kinase (TK) receptor for the nerve growth factor (NGF). The NTRK1 gene was found to be rearranged in about 12% of papillary thyroid carcinoma (PTC) cases. PTC accounts for about 80% of all thyroid cancers. NTRK1 rearrangements result in the fusion of the 3' end of the NTRK1 gene with the 5' end of different activating genes (TPM3, TPR, or TFG). All these fusion genes encode hybrid proteins comprising the TK domain of NTRK1 and the N-terminus of the partner proteins carrying coiled-coil domains. NTRK1 rearrangements were shown to be involved in thyroid carcinogenesis. Several studies showed that NTRK1 rearrangements may be associated with a worse clinical course when compared with NRTK1 rearrangement-negative PTCs. Recently, NTRK1 rearrangements were also found in lung adenocarcinomas. Various inhibitors targeting the NTRK1-derived fusion proteins were shown *in vitro* to inhibit proliferation of cells expressing the fusion genes. This indicates that these fusion genes are potential therapeutic targets. Hence, detection of NTRK1 rearrangements by Fluorescence *in situ* Hybridization represents a useful tool for studying thyroid carcinogenesis and may be of prognostic and therapeutic significance.

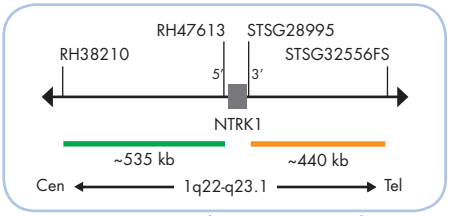
References
Alberti L, et al. (2003) J Cell Physiol 195: 168-86.
Bongarzone I, et al. (1998) Clin Cancer Res 4: 223-8.
Doebele RC, et al. (2013) J Clin Oncol 31 Suppl: Abstr. 8023.
Greco A, et al. (2010) Mol Cell Endocrinol 321: 44-9.
Musholt TJ (2000) Surgery 128: 984-93.
Russell JP, et al. (2000) Oncogene 19: 5729-35.

Probe Description

The SPEC NTRK1 Dual Color Break Apart Probe is a mixture of two direct labeled probes hybridizing to the 1q22-q23.1 band. The green fluorochrome direct labeled probe hybridizes proximal and the orange fluorochrome direct labeled probe hybridizes distal to the NTRK1 gene.



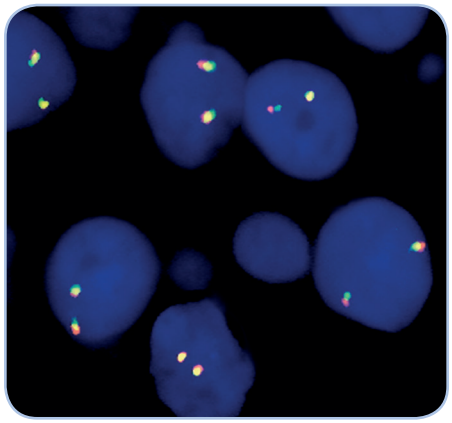
Ideogram of chromosome 1 indicating the hybridization locations.



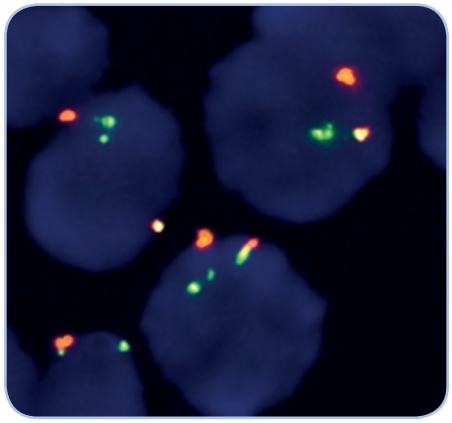
SPEC NTRK1 Probe map (not to scale).

Results

In an interphase nucleus lacking a translocation involving the 1q22-q23.1 band, two orange/green fusion signals are expected representing two normal (non-rearranged) 1q22-q23.1 loci. A signal pattern consisting of one orange/green fusion signal, one orange signal, and a separate green signal indicates one normal 1q22-q23.1 locus and one 1q22-q23.1 locus affected by a translocation.



SPEC NTRK1 Dual Color Break Apart Probe hybridized to normal interphase cells as indicated by two orange/green fusion signals per nucleus.



Lung cancer tissue section with translocation of the NTRK1 gene as indicated by one non-rearranged orange/green fusion signal, one orange and one separate green signal indicating the translocation.

Image kindly provided by Prof. Büttner, Cologne, Germany

Prod. No.	Product	Label	Tests* (Volume)
Z-2167-200	ZytoLight SPEC NTRK1 Dual Color Break Apart Probe CE IVD	●/●	20 (200 µl)
Related Products			
Z-2028-20	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 500 ml; 25x Wash Buffer A, 100 ml; DAPI/DuraTect-Solution, 0.8 ml		20

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

ZytoLight® FISH probes are direct labeled using the unique ZytoLight® *Direct Label System II* providing improved signal intensity. Advanced specificity of the single copy SPEC probes is obtained by the unique ZytoVision® *Repeat Subtraction Technique.*

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