

# ZytoLight® SPEC NTRK1 Dual Color Break Apart Probe



## 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 receptor tyrosine kinase 1, a.k.a. TRKA or TRK) gene.

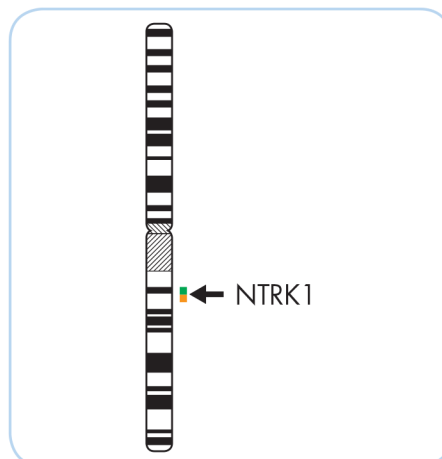
The neurotrophic tyrosine receptor kinase genes (NTRK1, NTRK2, and NTRK3) encode a family of receptor tyrosine kinases that serve important roles in cell survival, proliferation, and cellular differentiation in healthy human cells.

NTRK gene rearrangements were found to occur in many different tumor types. They result in the fusion of the 3' end of the NTRK gene, encoding the NTRK kinase domain, with the 5' end of various activating genes. The product of the fusion is a chimeric oncoprotein characterized by ligand-independent constitutive activation of the NTRK kinase. More than 40 different 5' gene partners of NTRK1 have been described in a diverse range of human tumor types including, e.g., papillary thyroid carcinoma (PTC), lung cancer, sarcomas, and spitzoid neoplasms.

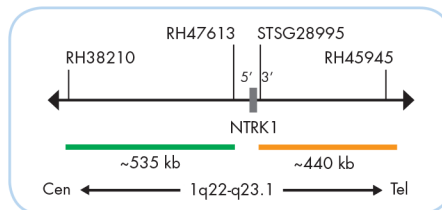
NTRK1 rearrangements were shown to be involved in thyroid carcinogenesis. Several studies showed that NTRK1 rearrangements may be associated with a worse clinical course when compared with NTRK1 rearrangement-negative PTCs. The treatment of patients with NTRK fusion-positive cancers with a NTRK inhibitor, such as the FDA-approved drugs larotrectinib or entrectinib, is associated with high response rates, regardless of NTRK gene, fusion partner, and tumor type. Hence, detection of NTRK1 rearrangements by *in situ* Hybridization may be of prognostic and therapeutic significance.

## 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.



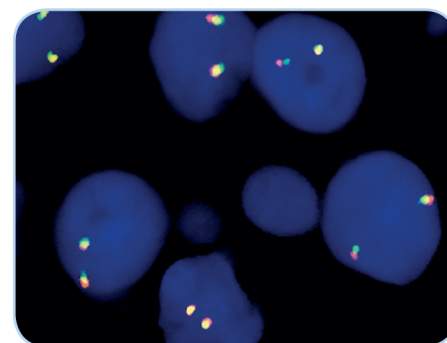
SPEC NTRK1 Probe map (not to scale).

## References

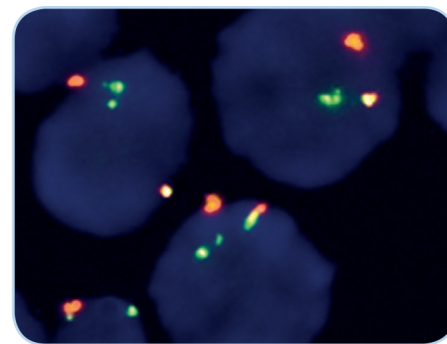
Cocco E, et al. (2018) Nat Rev Clin Oncol 15: 731-47.  
 Farago AF, et al. (2015) J Thorac Oncol 10: 1670-4.  
 Greco A, et al. (2010) Mol Cell Endocrinol 321: 44-9.  
 Haller F, et al. (2016) J Pathol 238: 700-10.  
 Hsiao SJ, et al. (2019) J Mol Diagn 21: 553-71.  
 Marchiò C, et al. (2019) Ann Oncol 30: 1417-27.  
 Martin-Zanca D, et al. (1986) Nature 319: 743-8.  
 Mushoff TJ (2000) Surgery 128: 984-93.  
 Russell JP, et al. (2000) Oncogene 19: 5729-35.  
 Solomon JP & Hechtman JF (2019) Cancer Res 79: 3163-8.  
 Vaishnavi A, et al. (2013) Nat Med 19: 1469-72.

## 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. Isolated orange signals are the result of deletions proximal to the NTRK1 breakpoint region or are due to unbalanced translocations affecting this chromosomal region.



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.

Image kindly provided by Prof. Büttner, Cologne, Germany.

Prod. No.	Product	Label	Tests* (Volume)
Z-2167-50	ZytoLight SPEC NTRK1 Dual Color Break Apart Probe CE IVD	●/●	5 (50 µl)
Z-2167-200	ZytoLight SPEC NTRK1 Dual Color Break Apart Probe CE IVD	●/●	20 (200 µl)
Related Products			
Z-2028-5	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 150 ml; Pepsin Solution, 1 ml; Wash Buffer SSC, 210 ml; 25x Wash Buffer A, 50 ml; DAPI/DuraTect-Solution, 0.2 ml		5
Z-2028-20	ZytoLight FISH-Tissue Implementation Kit CE IVD Incl. Heat Pretreatment Solution Citric, 500 ml; Pepsin Solution, 4 ml; Wash Buffer SSC, 560 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.