ZytoMation® RET Dual Color Break Apart FISH Probe

CE IVD

Background

The ZytoMation® RET Dual Color Break Apart FISH Probe is designed to detect translocations involving the chromosomal region 10q11.21 harboring the RET (ret proto-oncogene) gene. RET encodes a tyrosine kinase (TK) receptor.

Translocations involving RET were first described in papillary thyroid carcinoma (PTC) where somatic rearrangements result in the fusion of its TK catalytic domain with an N-terminal dimerization domain encoded by various fusion partner genes.

In addition, recurrent inversions [inv(10)(p11.2q11.2)] fusing the coiled-coil domains of the kinesin family member 5B (KIF5B) gene to the RET kinase domain have been detected in lung adenocarcinoma.

The resulting KIF5B-RET fusion protein can form homodimers through the coiled-coil domains of KIF5B, causing an aberrant activation of the TK of RET, a mechanism known from KIF5B-ALK fusions which is also found in lung adenocarcinoma.

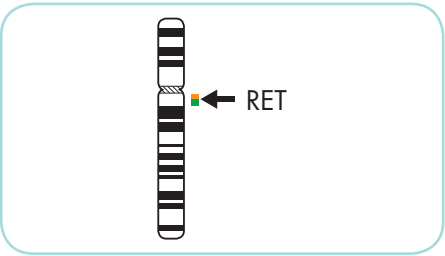
RET translocations are responsible for 1-2% of non-squamous NSCLCs. Similarly to ALK and ROS1, they are more characteristic for young non-smokers and females. This category of cancers is known to be responsive to treatment with RET tyrosine kinase inhibitors.

References
Gautschi O, et al. (2013) J Thorac Oncol 8: e43-4.
Imyanitov EN, et al. (2021) Crit Rev Oncol Hematol 157: 103194.
Ju YS, et al. (2012) Genome Res 22: 436-45.
Kohno T, et al. (2012) Nat Med 18: 375-7.
Lee SE, et al. (2015) Mod Pathol 28: 468-79.
Nikiforov YE (2002) Endocr Pathol 13: 3-16.
Takahashi M, et al. (1985) Cell 42: 581-8.
Takeuchi K, et al. (2012) Nat Med 18: 378-81.

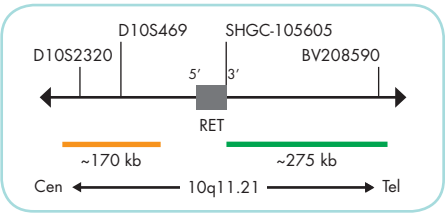
Probe Description

The ZytoMation® RET Dual Color Break Apart FISH Probe is composed of:

- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~6.0 ng/µl), which target sequences mapping in 10q11.21** (chr10:43,626,274-43,902,346) distal to the RET breakpoint region.
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~4.0 ng/µl), which target sequences mapping in 10q11.21** (chr10:43,340,888-43,510,171) proximal to the RET breakpoint region.
- Formamide based hybridization buffer



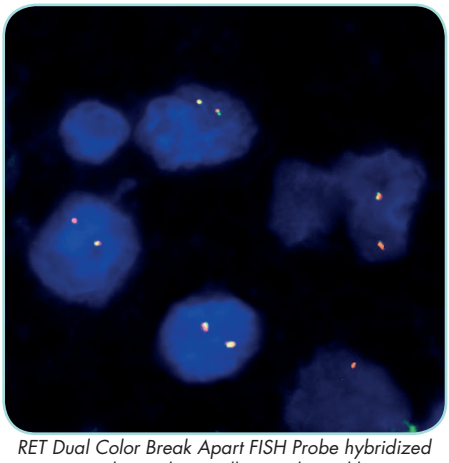
Ideogram of chromosome 10 indicating the hybridization locations.



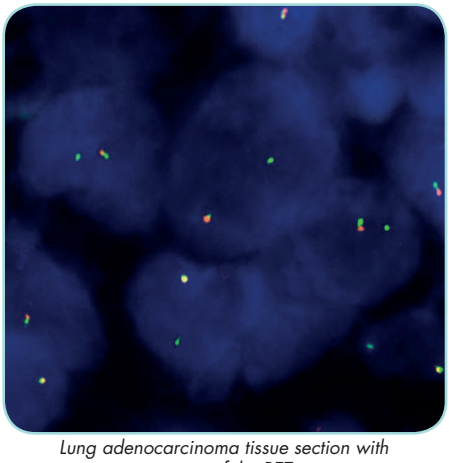
RET Probe map (not to scale).

Results

In an interphase nucleus lacking a translocation involving the 10q11.21 band, two orange/green fusion signals are expected representing two normal (non-rearranged) 10q11.21 loci. A signal pattern consisting of one orange/green fusion signal, one orange signal, and a separate green signal indicates one normal 10q11.21 locus and one 10q11.21 locus affected by a translocation or inversion. Isolated green signals are the result of deletions proximal to the RET breakpoint region.



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



Lung adenocarcinoma tissue section with rearrangement of the RET gene as indicated by isolated green signals.

Prod. No.	Product	Label	Tests* (Volume)
Z-2316-5.1ML	ZytoMation RET Dual Color Break Apart FISH Probe CE IVD	●/●	up to 20 (5.1 ml)

** Using 240 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*