

ZytoLight® SPEC FGFR3/IGH Dual Color Dual Fusion Probe



Background

The ZytoLight® SPEC FGFR3/IGH Dual Color Dual Fusion Probe is designed to detect the translocation t(4;14)(p16.3;q32.3) affecting the FGFR3 (fibroblast growth factor receptor 3, a.k.a. JTK4) gene in the chromosomal region 4p16.3 and the IGH (immunoglobulin heavy locus, a.k.a. IGH@) locus in 14q32.33.

FGFR3 encodes for a receptor tyrosine kinase, which regulates downstream signaling cascades after ligand binding. Fusion to several partner genes (including the IGH locus) can lead to a ligand-independent activation of the tyrosine kinase of the resulting FGFR3 fusion protein, frequently found in multiple myeloma (MM).

FGFR3/IGH translocations are observed in approximately 15–20% of patients with MM. The breaking points for the 4p16.3 locus are found between the FGFR3 gene and the 5' end of the NSD2 gene. The t(4;14)(p16.3;q32.3) translocation is associated with upregulation of the FGFR3 and the myeloma NSD2 (a.k.a. MMSET) domain protein. Patients with FGFR3/IGH translocation demonstrate an overall poor prognosis that is only partially mitigated by the use of the novel agents bortezomib and lenalidomide.

With conventional cytogenetics, the t(4;14)(p16.3;q32.3) translocation is difficult to identify. Thus, the detection of FGFR3/IGH translocations by fluorescence *in situ* hybridization may be of diagnostic and prognostic relevance.

References

- Bergsagel PL & Kuehl WM (2001) *Oncogene* 20: 5611-22.
- Chesi M, et al. (1998) *Blood* 92: 3025-34.
- Fabris S, et al. (2005) *Genes Chromosomes Cancer* 42: 117-27.
- Fenton JA, et al. (2003) *Oncogene* 22: 1103-13.
- Kalff A & Spencer A (2012) *Blood Cancer J* 7: e89.
- Sonneveld P, et al. (2016) *Blood* 127: 2955-62.
- Walker BA, et al. (2013) *Blood* 121: 3413-19.

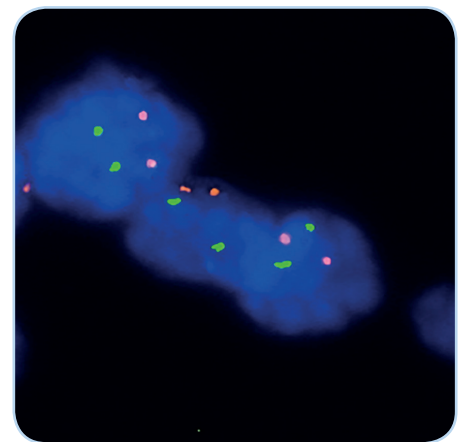
Probe Description

The ZytoLight® SPEC FGFR3/IGH Dual Color Dual Fusion Probe is composed of:

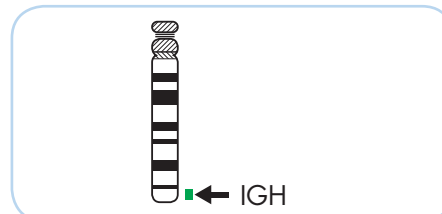
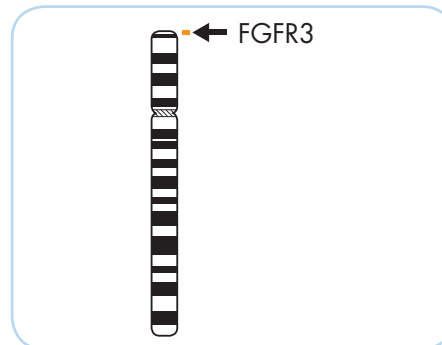
- ZyOrange (excitation 547 nm/emission 572 nm) labeled polynucleotides (~6.0 ng/µl), which target sequences mapping in 4p16.3** (chr4:1,496,938-2,351,657) harboring the FGFR3 gene region.
- ZyGreen (excitation 503 nm/emission 528 nm) labeled polynucleotides (~12.0 ng/µl), which target sequences mapping in 14q32.33** (chr14:105,462,169-106,995,000) harboring the IGH locus.
- Formamide based hybridization buffer

Results

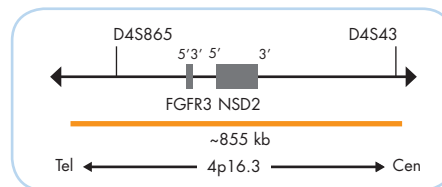
In a normal interphase nucleus, two orange and two green signals are expected. A reciprocal translocation involving two breakpoints splits the two signals and generates a fusion signal on each of the chromosomes involved. The chromosomal regions which are not translocated are indicated by the single orange and green signal, respectively.



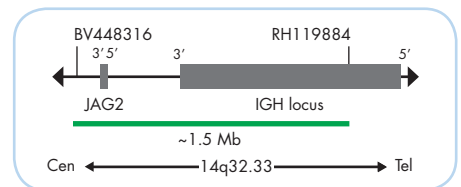
SPEC FGFR3/IGH Dual Color Dual Fusion Probe hybridized to normal interphase cells as indicated by two orange and two green signals in each nucleus.



Ideograms of chromosomes 4 (above) and 14 (below) indicating the hybridization locations.



SPEC FGFR3 Probe map (not to scale).



SPEC IGH Probe map (not to scale).

Prod. No.	Product	Label	Tests* (Volume)
Z-2282-50	ZytoLight SPEC FGFR3/IGH Dual Color Dual Fusion Probe	●/●	5 (50 µl)
Related Products			
Z-2099-20	ZytoLight FISH-Cytology Implementation Kit		20
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			

* Using 10 µl probe solution per test. 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