

# ZytoLight® SPEC FGFR3/IGH Dual Color Dual Fusion Probe



## Background

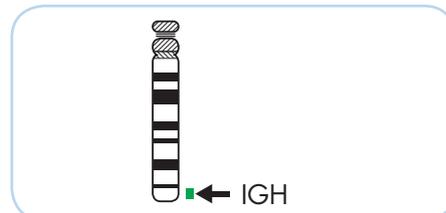
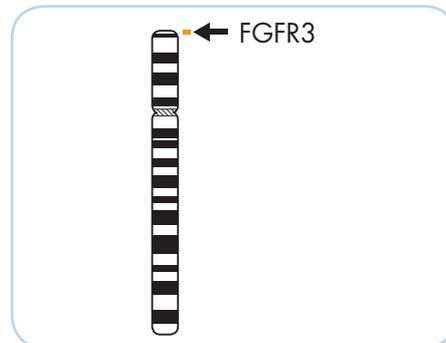
The ZytoLight® SPEC FGFR3/IGH Dual Color Dual Fusion Probe is designed to detect the translocation t(4;14)(p16.3;q32.3) affecting the FGFR3 (fibroblast growth factor receptor 3, a.k.a. JTK4) gene in the chromosomal region 4p16.3 and the IGH (immunoglobulin heavy locus, a.k.a. IGH@) locus in 14q32.33. 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**  
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 Kalf J & Spencer A (2012) *Blood Cancer J* 7: e89.  
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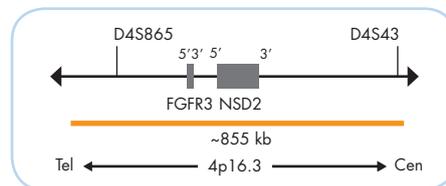
## Probe Description

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



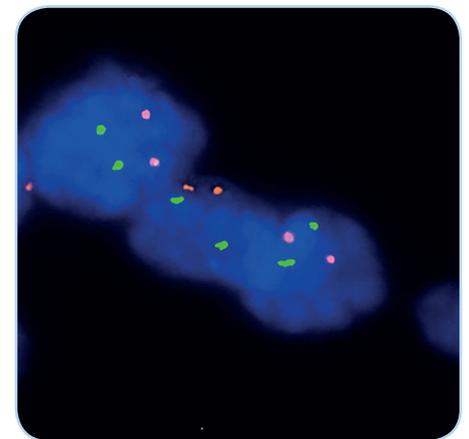
Ideograms of chromosomes 4 (above) and 14 (below) indicating the hybridization locations.



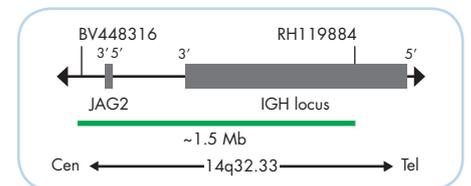
SPEC FGFR3 Probe map (not to scale).

## 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.



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)
<b>Related Products</b>			
Z-2099-20	ZytoLight FISH-Cytology Implementation Kit		20
Incl. Cytology Pepsin Solution, 4 ml; 20x Wash Buffer TBS, 50 ml; 10x MgCl <sub>2</sub> , 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