Background
The ZytoLight® SPEC FGFR3 Dual Color Break Apart Probe is designed to detect rearrangements involving the chromosomal region 4p16.3 harboring the FGFR3 (fibroblast growth factor receptor 3, a.k.a. JTK4) gene.

Rearrangements affecting the FGFR3 gene are frequently found in carcinomas of various types including multiple myeloma (MM), bladder cancer, glioblastoma, peripheral T-cell lymphoma, and lung squamous cell carcinoma.

FGFR3 encodes for a transmembrane receptor tyrosine kinase which dimerizes after ligand binding leading to activation of downstream signaling cascades. This gene develops characteristic oncogenic activities after fusion to several gene partners which often leads to ligand-independent activation of the tyrosine kinase of the FGFR3 fusion protein.

Several in vivo and in vitro studies have demonstrated the therapeutic potential of FGFR inhibitors in cell lines and animal models harboring FGFR3 fusion genes. Hence, the detection of FGFR3 translocations by Fluorescence in situ Hybridization may be a useful predictive biomarker in the selection of patients for FGFR-targeted therapy.

Probe Description
The SPEC FGFR3 Dual Color Break Apart Probe is a mixture of two direct labeled probes hybridizing to the 4p16.3 band. The orange fluorochrome direct labeled probe hybridizes proximal, the green fluorochrome direct labeled probe hybridizes distal to the FGFR3 gene at 4p16.3.

Results
In an interphase nucleus of a normal cell lacking a translocation involving the 4p16.3 band, two orange/green fusion signals are expected representing two normal (non-rearranged) 4p16.3 loci. A signal pattern consisting of one orange/green fusion signal, one orange signal, and a separate green signal indicates one normal 4p16.3 locus and one 4p16.3 locus affected by a translocation.

Reference