Background
The ZytoLight® SPEC ALK/EML4 TriCheck™ Probe is designed to detect inversions involving the chromosomal region 2p23 harboring the ALK gene and the chromosomal region 2p21 harboring the EML4 gene. Moreover, using this probe it is possible to discriminate between EML4-ALK inversions and translocations affecting ALK, but not EML4, such as ALK-TGF or ALK-KIF5B translocations.

Inversions in the short arm of chromosome 2 [inv(2)(p21p23)] have been frequently detected in non-small cell lung cancer (NSCLC) and lead to the formation of EML4-ALK fusion transcripts. A few reports also identified EML4-ALK fusion transcripts in breast, gastric, and colorectal cancers. Many different breakpoints affecting ALK and EML4 were indentified in these respective inversions.

Thus, multiple EML4-ALK transcript variants have been identified, all of which involve the intracellular kinase domain of ALK. ALK kinase targeted therapies may represent a very effective therapeutic strategy in NSCLC patients carrying EML4-ALK rearrangements. For the detection of this subset of NSCLC patients, the specific detection of EML4-ALK rearrangements using Fluorescence in situ Hybridization is a helpful tool for diagnosis and for selecting treatment.

Probe Description
The SPEC ALK/EML4 TriCheck™ Probe is a mixture of three direct labeled probes hybridizing to the short arm of chromosome 2. The orange fluorochrome direct labeled probe hybridizes distal to the ALK gene breakpoint region at 2p23, the green fluorochrome direct labeled probe hybridizes proximal to the ALK gene breakpoint region at 2p23, and the blue fluorochrome direct labeled probe hybridizes to the EML4 gene region at 2p21.

References
Results
In an interphase nucleus of a normal cell lacking an inversion involving the 2p21-23 band, two orange/green fusion signals and two blue signals are expected representing two normal (non-rearranged) 2p21-23 loci. One 2p21-23 locus affected by an EML4-ALK inversion is indicated by one separate green signal, one separate orange signal, and an additional blue signal. The separate green and orange signals each co-localize with a blue signal. A signal pattern consisting of one orange/green fusion signal, one orange signal, and a separate green signal as well as two blue signals indicate an AKL translocation without involvement of EML4, or, if the separate green and orange signals are located in close proximity, a non-rearranged 2p21-23 locus. One 2p21-23 locus affected by an EML4-ALK inversion with deletion of 5'-ALK sequences is indicated by loss of one green signal in the presence of an additional blue signal. The orange signal co-localizes with a blue signal.

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