

ZytoLight® SPEC DiGeorge Triple Color Probe



Background

The ZytoLight® SPEC DiGeorge Triple Color Probe is designed to detect deletions affecting the chromosomal regions 22q11.21 harboring the genes HIRA (a.k.a. TUPLE1) and CRKL as well as 22q11.21-q11.22 harboring the MAPK1 (a.k.a. PRKM2, ERK) gene.

The 22q11.2 deletion syndrome (22q11.2DS), also known as velocardio-facial syndrome (VCFS) and DiGeorge syndrome, is a genetic disorder caused by hemizygous microdeletions on chromosome 22q11.2, with population prevalence of about 1 in 4,000 births. The characteristic phenotype of 22q11.2DS includes cardiac defects, immune deficiency, growth restriction, and deficits in cognitive abilities.

The 22q11.2 deletion usually occurs by meiotic non-allelic homologous recombination events between low copy repeats on chromosome 22q11.2 termed LCR22. There are eight LCR22s that span the 22q11.2 region termed LCR22A through LCR22H. The majority (90%) of 22q11.2DS patients show a recurrent 3 Mb deletion between LCR22A and LCR22D while 8% harbor a nested 1.5 Mb deletion (LCR22A-B). Some rare atypical deletions of shorter size and in variable locations have also been reported (e.g., LCR22B-D and LCR22C-D). Classic FISH probes for the detection of 22q11.2DS target the HIRA gene mapping to the LCR22A-B region, and thus, miss deletions that occur outside this region. The DiGeorge Triple Color Probe additionally targets CRKL that maps to the LCR22C-D region allowing the detection of rare deletions.

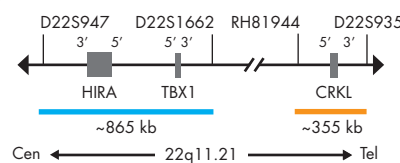
Various deletions of more distal regions (between LCR22D-H) have also been reported and result in phenotypic features similar to 22q11.2DS. FISH probes targeting MAPK1, which maps to the LCR22D-E region, can be used for the detection of this 22q11.2 distal deletion syndrome.

Probe Description

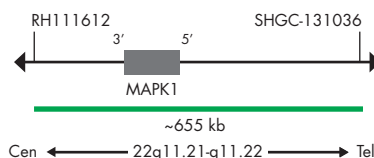
The SPEC DiGeorge Triple Color Probe is a mixture of a blue fluorochrome direct labeled probe spanning the HIRA gene region at 22q11.21, an orange fluorochrome direct labeled probe spanning the CRKL gene region at 22q11.21, and a green fluorochrome direct labeled probe spanning the MAPK1 gene region at 22q11.21-q11.22. The MAPK1 targeting probe additionally serves as a reference in case of a deletion of the HIRA and CRKL gene loci (LCR22A-D).



Ideogram of chromosome 22 indicating the hybridization locations.



SPEC HIRA/SPEC CRKL Probe map (not to scale).



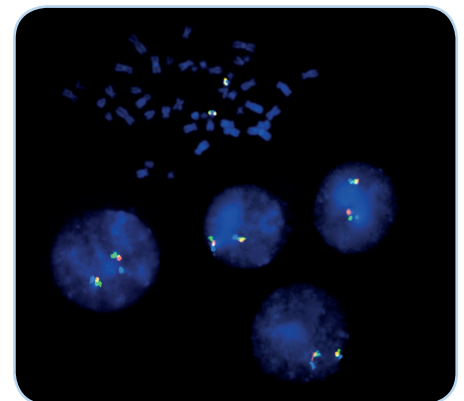
SPEC MAPK1 Probe map (not to scale).

References

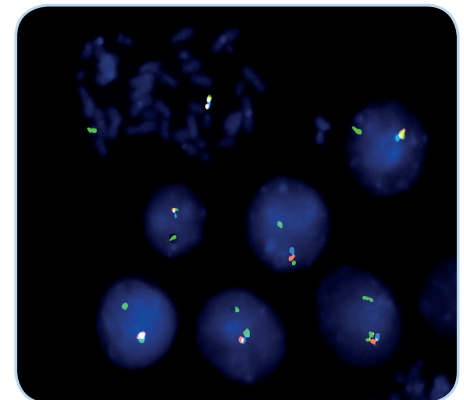
- Ben-Shachar S, et al. (2008) Am J Hum Genet 82: 214-21.
- Burnside RD (2015) Cytogenet Genome Res 146: 89-99.
- Michaelovsky E, et al. (2012) BMC Med Genet 13: 122.
- Morrow BE, et al. (2018) Am J Med Genet A 176: 2070-81.
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Results

In a normal interphase nucleus, two blue, two orange, and two green signals are expected. In a cell with deletion of the HIRA and/or the CRKL gene locus, a reduced number of blue and/or orange signals will be observed, respectively. In a cell with deletion of the MAPK1 gene locus, a reduced number of green signals will be observed.



SPEC DiGeorge Triple Color Probe hybridized to normal interphase cells as indicated by two orange, two green, and two blue signals and to metaphase chromosomes of a normal cell.



Lymphocytes and metaphase chromosomes from a DiGeorge syndrome case showing a HIRA/CRKL deletion as indicated by the loss of one blue and one orange signal.

Kindly provided by Dr. Liehr, Jena, Germany.

Prod. No.	Product	Label	Tests* (Volume)
Z-2289-50	ZytoLight SPEC DiGeorge Triple Color Probe	●/●/●	5 (50 µl)
Related Products			
Z-2028-5	ZytoLight FISH-Tissue Implementation Kit		5
Incl. Heat Pretreatment Solution Citric, 150 ml; Pepsin Solution, 1 ml; Wash Buffer SSC, 210 ml; 25x Wash Buffer A, 50 ml; DAPI/DuraTect-Solution, 0.2 ml			
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. only available in certain countries. All other countries research use only! Please contact your local dealer for more information.