




## ZytoDot SPEC 21q22 Probe

**REF** C-3026-400  40 (0.4 ml)

For the qualitative detection of human chromosome 21 specific sequences by chromogenic *in situ* hybridization (CISH)

For research use only.  
Not for use in diagnostic procedures.

### 1. Intended use

The ZytoDot SPEC 21q22 Probe (PD16) is intended to be used for the qualitative detection of human chromosome 21 specific sequences in formalin-fixed, paraffin-embedded specimens by chromogenic *in situ* hybridization (CISH). The probe is intended to be used in combination with the ZytoDot CISH Implementation Kit (Prod. No. C-3018-40).

### 2. Test principle

The chromogenic *in situ* hybridization (CISH) technique allows the detection and visualization of specific nucleic acid sequences in cell preparations. Hapten-labeled nucleotide fragments, so called CISH probes, and their complementary target sequences in the preparations are co-denatured and subsequently allowed to anneal during hybridization. Afterwards, unspecific and unbound probe fragments are removed by stringency washing steps. Duplex formation of the labeled probe can be visualized using primary (unmarked) antibodies, which are detected by secondary polymerized enzyme-conjugated antibodies. The enzymatic reaction with chromogenic substrates leads to the formation of colored precipitates. After counterstaining the nucleus with a nuclear dye, hybridized probe fragments are visualized by light microscopy.

### 3. Reagents provided

The ZytoDot SPEC 21q22 Probe is composed of:

- Digoxigenin-labeled polynucleotides (~1.8 ng/ $\mu$ l), which target sequences mapping in 21q22.13-q22.2\* (chr21:39,583,050-39,784,793) (see Fig. 1).
- Formamide based hybridization buffer

\*according to Human Genome Assembly GRCh37/hg19

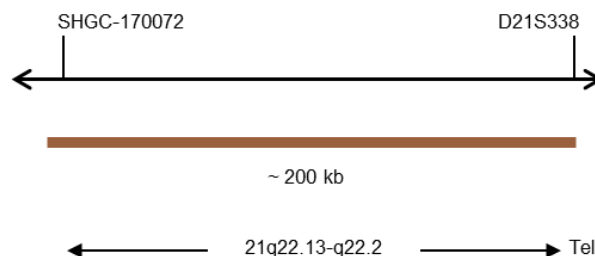


Fig. 1: SPEC 21q22 Probe map (not to scale)

The ZytoDot SPEC 21q22 Probe is available in one size:

- C-3026-400: 0.4 ml (40 reactions of 10  $\mu$ l each)

### 4. Materials required but not provided

- ZytoDot CISH Implementation Kit (Prod. No. C-3018-40)
- Positive and negative control specimens
- Microscope slides, positively charged
- Water bath (80°C, 98°C)
- Hybridizer or hot plate
- Hybridizer or humidity chamber in hybridization oven
- Adjustable pipettes (10  $\mu$ l, 1000  $\mu$ l)
- Staining jars or baths
- Timer
- Calibrated thermometer
- Ethanol or reagent alcohol
- Xylene
- Methanol 100%
- Hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>) 30%
- Deionized or distilled water
- Coverslips (22 mm x 22 mm, 24 mm x 32 mm)
- Rubber cement, e.g., Fixogum Rubber Cement (Prod. No. E-4005-50/-125) or similar
- Adequately maintained light microscope (400-630x)

### 5. Storage and handling

Store at 2-8°C in an upright position. Return to storage conditions immediately after use. Do not use reagents beyond expiry date indicated on the label. The product is stable until expiry date indicated on the label when handled accordingly.

### 6. Warnings and precautions

- Read the instructions for use prior to use!
- Do not use the reagents after the expiry date has been reached!
- This product contains substances (in low concentrations and volumes) that are harmful to health and potentially infectious. Avoid any direct contact with the reagents. Take appropriate protective measures (use disposable gloves, protective glasses, and lab garments)!
- If reagents come into contact with skin, rinse skin immediately with copious amounts of water!
- A material safety data sheet is available on our homepage ([www.zytovision.com](http://www.zytovision.com)).
- Do not reuse reagents, unless reuse is explicitly permitted!
- Avoid any cross-contamination and micro-bacterial contamination of the reagents!
- The specimens must not be allowed to dry during the hybridization and washing steps!

**Hazard and precautionary statements:**

The hazard-determining component is Formamide.



**Danger**

- H351 Suspected of causing cancer.
- H360FD May damage fertility. May damage the unborn child.
- H373 May cause damage to organs through prolonged or repeated exposure.
- P201 Obtain special instructions before use.
- P202 Do not handle until all safety precautions have been read and understood.
- P260 Do not breathe dust/fume/gas/mist/vapours/spray.
- P280 Wear protective gloves/protective clothing/eye protection/face protection.
- P308+P313 IF exposed or concerned: Get medical advice/attention.
- P405 Store locked up.

**7. Limitations**

- For research use only.
- For professional use only.
- Specimen staining, especially signal intensity and background staining, is dependent on the handling and processing of the specimen prior to staining. Improper fixation, freezing, thawing, washing, drying, heating, sectioning, or contamination with other specimens or fluids may produce artefacts or false results. Inconsistent results may result from variations in fixation and embedding methods, as well as from inherent irregularities within the specimen.
- The probe should be used only for detecting loci described in 4. "Reagents provided".
- The performance was validated using the procedures described in these instructions for use. Modifications to these procedures might alter the performance and have to be validated by the user.

**8. Interfering substances**

The following fixatives are incompatible with ISH:

- Bouin's fixative
- B5 fixative
- Acidic fixatives (e.g., picric acid)
- Zenker's fixative
- Alcohols (when used alone)
- Mercuric chloride
- Formaldehyde/zinc fixative
- Hollande's fixative
- Non-buffered formalin

**9. Preparation of specimens**

Recommendations:

- Avoid cross-contamination of samples in any step of preparation as this may lead to erroneous results.
- Fixation in 10% neutrally buffered formalin for 24 h at room temperature (18-25°C).
- Sample size ≤ 0.5 cm<sup>3</sup>.
- Use premium quality paraffin.
- Embedding should be carried out at temperatures lower than 65°C.
- Prepare 3-5 μm microtome sections.
- Use positively charged microscope slides.
- Fix tissue sections for 2-16 h at 50-60°C.

**10. Preparatory treatment of the device**

The product is ready-to-use. No reconstitution, mixing, or dilution is required. Bring probe to room temperature (18-25°C) and mix briefly before use.

**11. Assay procedure**

**Specimen pretreatment**

Perform specimen pretreatment (e.g., dewaxing, proteolysis) according to the instructions for use of the [ZytoDot CISH Implementation Kit](#).

**Denaturation and hybridization**

1. Pipette 10 μl of the probe onto each pretreated specimen.
2. Cover specimens with a 22 mm x 22 mm coverslip (avoid trapped bubbles) and seal the coverslip.

*We recommend using rubber cement (e.g., Fixogum) for sealing.*

3. Place slides on a hot plate or hybridizer and denature specimens for 5 min at 94-95°C.
4. Transfer slides to a humidity chamber and hybridize overnight at 37°C (e.g., in a hybridization oven).

*It is essential that specimens do not dry out during the hybridization step.*

**Post-hybridization**

Perform post-hybridization processing (washing, detection, counter-staining, mounting, microscopy) according to the instructions for use of the [ZytoDot CISH Implementation Kit](#).

**12. Recommended quality control procedures**

In order to monitor correct performance of processed specimens and test reagents, each assay should be accompanied by internal and external controls. If internal and/or external controls fail to demonstrate appropriate staining, results with patient specimens must be considered invalid.

**Internal control:** Non-neoplastic cells within the specimen that exhibit normal signal pattern, e.g., fibroblasts.

**External control:** Validated positive and negative control specimens.

**13. Performance characteristics**

The performance of the probe was determined by comparison against the corresponding IVD approved FISH probe. The concordance was 100%.

**Accuracy:** The accuracy was calculated as 100%.

**Analytical sensitivity:** The analytical sensitivity was calculated as 100%.

**Analytical specificity:** The analytical specificity was calculated as 100%.

**14. Disposal**

The disposal of reagents must be carried out in accordance with local regulations.

**15. Troubleshooting**

Any deviation from the operating instructions can lead to inferior staining results or to no staining at all.

**Weak signals or no signals at all**

Possible cause	Action
Cell or tissue sample has not been properly fixed	Optimize fixing time and fixative
Heat pretreatment, proteolysis, hybridization, denaturation, stringency wash or antibody-incubation temperature not correct	Check temperature of all technical devices used, using a calibrated thermometer. Use always the same number of slides in solutions with critical temperature
Proteolytic pretreatment not carried out properly	Depending on multiple factors, e.g., nature and duration of fixing, thickness of sections, and nature of tissue/cells, different incubation times may be required. Ascertain the optimum time for pepsin incubation in pre-tests
Hybridization time too short	Hybridize for at least 12 h; extend hybridization time if necessary
Old dehydration solutions	Prepare fresh dehydration solutions

Probe evaporation	When using a hybridizer, the use of the wet stripes/water filled tanks is mandatory. When using a hybridization oven, the use of a humidity chamber is required. In addition, the coverslip should be sealed completely, e.g., with Fixogum, to prevent drying-out of the sample during hybridization
Insufficient preparation of chromogenic substrate	Instead of using one drop of DAB Solution A use 30 $\mu$ l
Counterstaining time too long	The counterstaining time depends on the nature of the specimen and should be optimized accordingly. Avoid dark counterstaining, because it may obscure positive staining signals
Bluing of counterstain not carried out properly	Use cold running tap water for bluing; do not use warm or hot water, or bluing reagents

**Signals too strong**

Possible cause	Action
Proteolytic pretreatment carried out too long	Depending on multiple factors, e.g., nature and duration of fixing, thickness of sections, and nature of tissue/cells, different incubation times may be required. Ascertain the optimum time for pepsin incubation in pre-tests
Substrate reaction is too intense	Shorten substrate incubation time; do not heat substrate solution over 25°C; incubate at room temperature only

**Signals fade or merge**

Possible cause	Action
An unsuitable mounting solution has been used	Use only the mounting solution provided with the kit or xylene-based mounting solutions free of any impurities; do not use coverslip tape

**Uneven or in some parts only very light staining**

Possible cause	Action
Incomplete dewaxing	Use fresh solutions; check duration of dewaxing times
Reagent volume too small	Ensure that the reagent volume is large enough to cover the tissue area
Air bubbles caught before hybridization or during mounting	Avoid air bubbles

**Inconsistent results**

Possible cause	Action
Insufficient drying before probe application	Extend air-drying
Too much water/wash buffer on tissue prior to application of pepsin, antibodies and/or color substrates	Ensure that excess liquid is removed from tissue section by blotting or shaking it off the slide. Small amounts of residual water/wash buffer do not interfere with the test
Variations in tissue fixation and embedding methods	Optimize fixation and embedding methods
Variations in tissue section thickness	Optimize sectioning

**Tissue morphology degraded**

Possible cause	Action
Cell or tissue sample has not been properly fixed	Optimize fixing time and fixative
Proteolytic pretreatment not carried out properly	Optimize pepsin incubation time; increase or decrease if necessary

**Cross hybridization signals; noisy background**

Possible cause	Action
Stringency wash temperature not correct	Check temperature of the technical devices used, using a calibrated thermometer. Use always the same number of slides in the jar. We recommend not to use more than eight slides per jar for heat incubation steps
Slides not thoroughly rinsed	Use fresh and sufficient wash buffer and deionized or distilled water where indicated
Sections dried out any time during or after hybridization	Avoid sections being dried out; use humidity chamber; seal coverslip properly
Prolonged substrate incubation time	Shorten substrate incubation time
Incomplete dewaxing	Use fresh solutions; check duration of dewaxing
Proteolytic pretreatment too strong	Optimize pepsin incubation time
Slides cooled to room temperature before hybridization	Transfer the slides quickly to hybridization temperature

**Overlapping signals**

Possible cause	Action
Inappropriate thickness of tissue sections	Prepare 3-5 $\mu$ m microtome sections

**Specimen floats off the slide**

Possible cause	Action
Unsuitable slide coating	Use appropriate (positively charged) slides
Proteolytic pretreatment too strong	Shorten pepsin incubation time

**16. Literature**

- Isola J, Tanner M (2004) *Methods Mol Med* 97: 133-44.
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- Tsukamoto T, et al. (1991) *Int J Dev Biol* 35: 25-32.
- Wilkinson DG: *In Situ Hybridization, A Practical Approach*, Oxford University Press (1992) ISBN 0 19 963327 4.

Our experts are available to answer your questions.  
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